Center for Anti-Counterfeiting
and Product Protection
MICHIGAN STATE UNIVERSITY

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A-CAPP Center Global Anti-Counterfeiting Consumer Survey

ONLINE MEDICATION PURCHASE

An 8-Country Study

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intro

director's message

Kari Kammel

Director

As the reach of online marketplaces grows, the rise of counterfeit pharmaceuticals and medications represents one of the most urgent and complex threats to brands and consumer health today. From the proliferation of illegal online pharmacies to the staggering number of falsified products circulating through online marketplaces, the risks facing patients and medical systems are expanding faster than most systems can respond. In moments like this, academic research becomes not just valuable, but essential. At the A-CAPP Center, we believe that understanding consumer behavior, market dynamics, and communication gaps is part of the foundation for meaningful intervention. This eight-country study offers evidence-based insight into why consumers turn to illicit sources, how they perceive risk, and where education and policy must evolve. By grounding our work in data, we aim to equip industry, government, and public health partners with the knowledge needed to protect consumers in an increasingly vulnerable pharmaceutical landscape.

foreword

Jennifer Frink

In the fall of 2022, my son, Tasman William Frink, was a 20-year-old college sophomore in Boulder, Colorado. He was a strapping 6' tall, with a physique honed from countless hours in the gym. He had a mop of blonde hair and big, beautiful green eyes that attracted attention from girls. His smile lit up the room, and he gave strong, genuine hugs. He'd developed close friends and a serious girlfriend. He was a good student with grades that got him admitted to the competitive business school. My husband, Jason, and I were relieved.

Raising our son was not easy. He was crazy smart, liked to push boundaries, question authority, and pull pranks. He was a "digital native," meaning he grew up in the digital age, comfortable with computers and the internet from toddlerhood. Getting a smartphone was a rite of passage at age 13; it was not uncommon for our son to lose his cell phone privileges. Misuse of technology was a problem—the distracting, addictive nature of cell phones in particular. Tasman's generation reaped the benefits of instant access to information, connection, and creative tools, alongside the disruption, dependence, and social pressure that technology has brought.

After the challenges of parenting a smart kid with a penchant for getting into trouble, it seemed as though he was maturing and thriving. However, our relief was short-lived: his second year at Boulder was a year of rough transitions—a bad breakup, a less-than-ideal housing situation, and a skateboarding accident that led to a broken arm (and an oxycodone prescription). We saw him twice during the fall of 2022: once in October for Parents' Weekend and again in November when he came home for Thanksgiving. He was not himself. We thought he was depressed and planned to dig into how we could help when he came home for Winter Break. We were oblivious as to what was really going on.

On December 12, 2022, a friend of my son's called me with news that would change my life: "Tasman's drug use is out of control." We had caught Tasman with weed in high school and knew he'd experimented with alcohol. Neither was acceptable and unfortunately, neither was unusual for a high-school-aged male. We didn't see any harmful or excessive drinking or any hard drug use, so what his friend told me on that call came as a complete shock. We learned that, during the fall semester of his sophomore year, he had developed dependencies on cocaine, benzodiazepines, and opioids— "the gas and the brakes," one drug counselor later told me. His source, we would learn much later, was the dark web.

The next ten months were a blur of trying to get our son help that he initially didn't think he needed. We got him to leave college and come home. He ultimately spent thirty days in a rehab program that he would later describe as one of the "greatest, most memorable experiences of his life." Once out of rehab, we worried about him relapsing if he lived anywhere but under our roof. He reassured Jason that it didn't matter where he lived; he said, "Dad, I can buy drugs online anywhere."
But he told us that he had no desire to touch drugs or alcohol ever again. We were in close touch, and he had strong family support as he enrolled in an EMT program, with the goal of a career as an EMT and firefighter. We loved hearing about his ambulance and hospital shifts and seeing pictures of him in uniform. Toward the end of April 2024, the extended family was looking forward to celebrating his graduation in May, profoundly grateful that a dark chapter was behind us.

Instead, on April 24, 2024, sixteen months after we first learned he was struggling, and ten months after he completed rehab, my son died from an accidental overdose. He did not want to die. He had so much life left to live, so much still ahead of him. Every single day, the reality of his absence hits me all over again.

From what we can gather, Tasman thought he could take a break from sobriety and got hold of what turned out to be fake pain medication. He died from a lethal combination of four substances. One was oxycodone, the same thing he had been prescribed for his broken arm twenty-one months prior. The coroner described the other three substances as counterfeits. In his words, "dark web stuff that you're not going to find in any pharmacy."

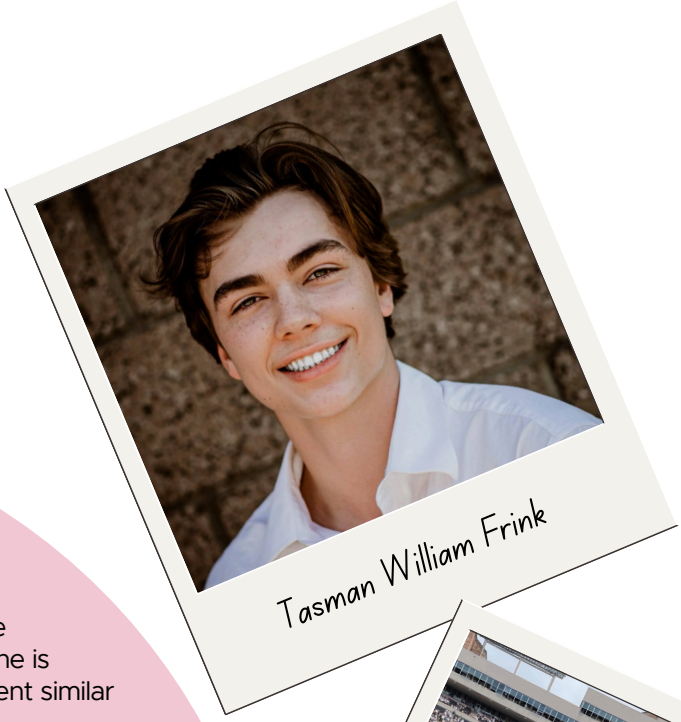
Reflecting on the sixteen months between the phone call from his friend to my son's death, two themes stand out: the rapid progression from experimentation to addiction, and the extraordinary ease of access to illicit drugs. Once Tasman learned how to access the dark web—converting money to cryptocurrency, using encrypted messaging, and purchasing from marketplaces like Archetyp—acquiring drugs became dangerously easy, as seamless as calling an Uber or ordering DoorDash for delivery. Packages were delivered through the U.S. Postal Service. For someone struggling to remain sober, temptation is only a few keystrokes away, and this accessibility can be deadly. In today's illicit online ecosystem, one pill can end a life.

My son was an adult, making his own—albeit terrible—decisions. He was also moving on with his life, about to graduate from a program he loved, doing noble work he was passionate about. But once he knew how to tap into the dark web, he had the keys to the pharmacy, an overpowering temptation.

Conclusion
I shared our story publicly for the first time at an Online Controlled Substances Summit, where I met Dr. Alhabash and became acquainted with A-CAPP. It is painful to speak about something so deeply personal, but if our experience can prevent even one family from enduring a similar loss, I will continue to do so.

foreword

Our children and young adults now have unprecedented access to electronic devices, along with direct exposure to illegal online drug markets. As the subsequent study conveys, my son—an educated Gen Z male who was a frequent online shopper—fit the profile of someone more likely to buy counterfeit medications online. It is all too easy to believe "not my kid," and I will never fully understand what led Tasman, who grew up with every opportunity for a healthy life, to turn to substances. I am not an expert in addiction or the dark web. But I know that drugs eased his mind in ways he didn't know how to manage, and that the convenience and anonymity of online drug markets magnified his risk. We can't erase the dangers our children face online, but we can refuse to ignore them. Advocate for better protections, push for accountability, and stay engaged with the digital spaces your kids navigate.



Tasman William Frink

Jason, Tasman, & Jennifer Frink!

Jennifer Frink became connected with A-CAPP through her advocacy work following the loss of her 21-year-old son, Tasman, to an accidental overdose from drugs purchased on the dark web in 2024. By sharing her family's story, she is committed to raising awareness and helping prevent similar tragedies for other families.

Professionally, Jennifer serves in Retail Supply Chain Finance at Nike, Inc., bringing more than 20 years of experience across both Fortune 100 companies and start-up environments. She has a longstanding passion for supporting youth and previously served on the Board of the Children's Healing Art Project.

More about Tasman's legacy can be found through the memorial scholarship created in his honor:

https://www.frontrange.edu/about/frcc-foundation/giving/memorial-scholarships/tasman-frink-scholarship.html

exec summary

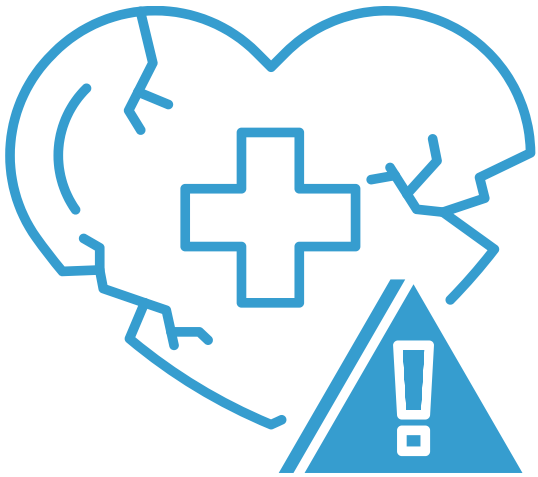
executive summary

What We Did!

This study presents findings from a multinational survey of 4,758 participants across Australia, Brazil, China, India, Italy, Nigeria, the United Arab Emirates, and the United States. Administered in five languages (English, Arabic, Simplified Chinese, Italian, and Brazilian Portuguese), the research examined consumer behaviors and perceptions surrounding the online purchase of legitimate and counterfeit medications—including motivations, risk factors, advertising influences, and sociodemographic predictors.

1 SIZE OF THE PROBLEM

- While more than 80% of participants continue to buy medications from **physical pharmacies**, nearly half have **purchased medications online** in the past year.
- Among online buyers, over **75%** used online pharmacies.
- An estimated **20–30%** of participants have purchased counterfeit medications online, knowingly or unknowingly.
- More than **1 in 10** reported health or financial harm after a deceptive counterfeit medication purchase.

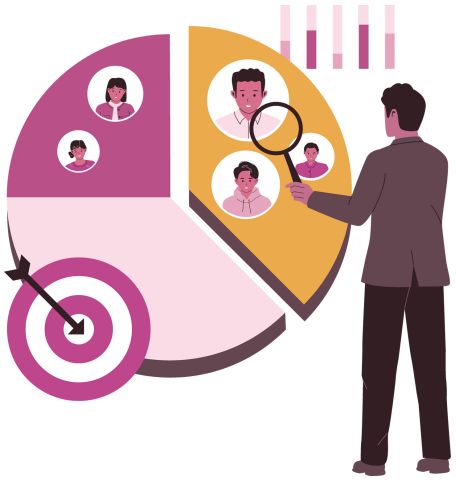


Actionable Insights

Counterfeit medications represent a substantial and urgent global online threat requiring multi-stakeholder interventions.

executive summary

2 SOCIODEMOGRAPHICS



Individuals who reported purchasing counterfeit medications were more likely to be:

- **Male**
- **Younger (Gen Z and Gen Y)**
- **Married**
- **Highly educated**
- **High-income earners**
- **Frequent online shoppers**
- **Lower in health literacy**

Actionable Insights

Prevention and awareness interventions must be segmented and tailored to demographic and psychographic profiles.

3 MOTIVATIONS

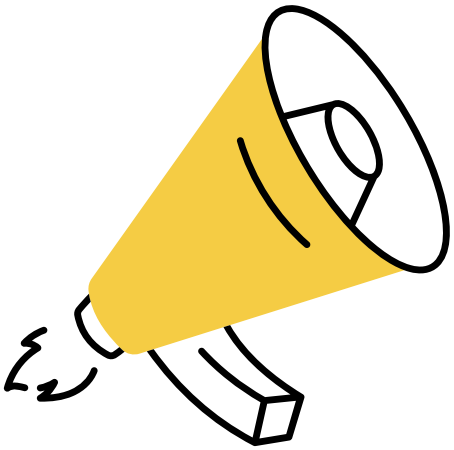
Convenience and accessibility motivate many consumers to shop for medications online. However, **necessity**—driven by factors such as lack of prescription access, high prices, or limited availability of legitimate medications—is the strongest predictor of counterfeit purchasing. A one-unit increase in necessity-based motivation increases counterfeit purchase likelihood by **50%**.

Actionable Insights

Strategies should address structural barriers to legitimate medication access, which are the primary drivers of risky online behaviors.

executive summary

4 AD EXPOSURE



- Nearly **60%** of participants were exposed to medication-related advertising and promotion in the previous year.
- Exposure to **television ads** reduced the likelihood of counterfeit medication purchasing.
- Exposure to **radio ads** or messages posted by **illicit sellers** on social media increased the likelihood of buying counterfeit medications by more than 12%.

Actionable Insights

Coordinated actions are needed to limit illicit sellers' presence on social platforms and strengthen counter-messaging.

5 BEHAVIORAL PLANNING

- Although participants expressed strong negative views of counterfeit medications, such attitudes did not reliably predict behavior. Instead, positive associations and perceptions of social acceptance were significant predictors.
- Participants believed that about one-third of people in their social networks purchase counterfeit medications.

Actionable Insights

Behavior-change initiatives must reduce positive beliefs about counterfeits and reshape perceptions of social norms.

executive summary

6 RISK PERCEPTIONS

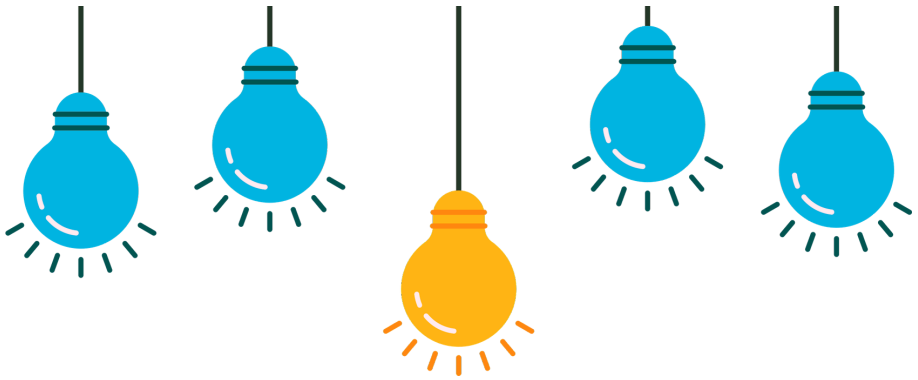
- Participants reported **high awareness** of counterfeit medication risks and **strong confidence** in their ability to detect them—yet this confidence paradoxically increased purchasing likelihood.
- Higher perceived **threat severity** and **response efficacy** reduced counterfeit medication purchases (by 32% and 18%).
- Higher **threat susceptibility**, **self-efficacy**, and **response cost** increased the likelihood (by 32%, 17%, and 26%).

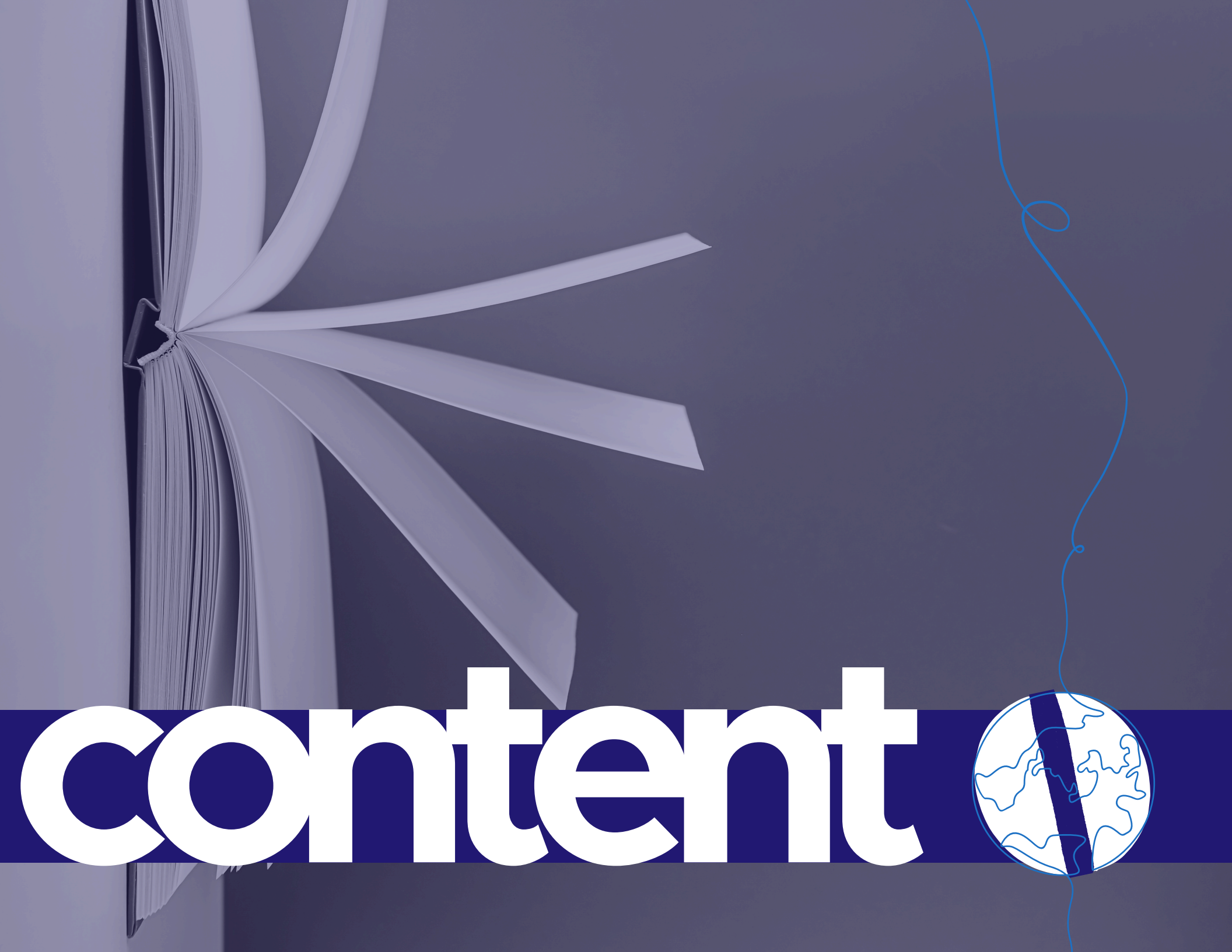
Actionable Insights

Coordinated actions are needed to limit illicit sellers' presence on social platforms and strengthen counter-messaging.

Overall Conclusion

The online counterfeit medication market is pervasive and poses significant consumer health risks. Motivations rooted in necessity, social acceptance of buying medications online, heightened sense of confidence in distinguishing legitimate and counterfeit medications while shopping online, and targeted digital advertising are key behavioral drivers for buying fake medications. Effective solutions will require targeted, culturally and demographically nuanced strategies that improve legitimate medication access, limit exposure to illicit sellers, and reshape consumers' beliefs and perceived norms.

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Counterfeiting: A Global Phenomenon with Growing Risks!

Counterfeiting refers to the intentional, unauthorized making, importing, distribution, or sale of goods and related packaging that employ identical or essentially indistinguishable protected trademarks, thereby infringing intellectual property and misleading market actors (including consumers) regarding authenticity, source, or approval (OECD/EUIPO, 2019; WTO, 1994, WIPO, 2015).

As this common and broad definition of counterfeiting situates the phenomenon within a global context, countries — by virtue of their domestic laws and regulations — vary in how counterfeiting is defined, both conceptually and operationally. Counterfeiting, as a form of criminal activity, influences global, regional, and local communities by harming the economy, destabilizing society, and directly impacting the health and well-being of consumers.

The most recent report from the Organisation for Economic Co-operation and Development (OECD) estimates that global trade in counterfeit goods represents $467 billion, or 2.3% of global trade. This report identified clothing, footwear, and electronics as major counterfeit goods categories. In 2021, clothing accounted for 21.6% of total seizures, footwear for 21.4%, and electronics for approximately 10% (OECD/European Union Intellectual Property Office (EUIPO), 2025). Counterfeit pharmaceuticals accounted for approximately 1-2% of total global trade. As in previous years, China was the predominant source of counterfeit products, accounting for 45% of all counterfeit seizures, followed by Hong Kong (27%), and Turkey (15%) (OECD/EUIPO, 2025). The counterfeit risks are evolving with diversified strategies employed by counterfeiters that make it harder to seize such illicit products. For example, small parcel shipments, which typically receive less scrutiny by customs and border protection entities, increased from 61% of all seizures in 2019 to 79% in 2021 (OECD-EUIPO, 2025).

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In 2023, the Center for Anti-Counterfeiting and Product Protection (A-CAPP Center) at Michigan State University published a global study of consumers from 17 countries on counterfeit purchasing behavior. This report yielded the following findings (Alhabash et al, 2023).

Counterfeit Purchasing is Prevalent

Over 50% of respondents reported knowingly buying at least one counterfeit product. Separately, more than 60% were deceived into purchasing at least one other counterfeit product. When considering these knowing and deceptive counterfeit purchases together, about 75% of all respondents had purchased counterfeit products knowingly and/or unknowingly.

Clothes & Shoes

Similar to global trends, the most frequently purchased counterfeit products were clothing and shoes, with the majority being purchased through online platforms or social media.

Consumer Persona

Demographically, counterfeit buyers were more likely to be male, younger, highly religious, and from lower-income households.

It's *Not* All About the Money!

The most frequent motivation for purchasing counterfeits was economic (wanting a deal or bargain), but deeper analysis showed that enjoyment from previous counterfeit shopping was the best predictor of future buying behavior.

Attitudes Matter

Consumers were more likely to purchase counterfeits if they had positive attitudes toward this behavior or they believed people in their social networks (family, close friends or fellow citizens) accepted this behavior.

Knowing the Risks = Protection

Consumers with the ability to recognize counterfeits on e-retail platforms who also strongly believed that buying counterfeit goods was risky were less likely to purchase counterfeit goods. On the other hand, consumers who felt more vulnerable to the risks associated with counterfeits or had confidence in their ability to protect themselves from these risks were more likely to purchase counterfeit products.

Counterfeit Medication Purchase is A Thing

Relevant to the A-CAPP Center's new counterfeit pharmaceuticals report, 6.5% of respondents in the global survey reported purchasing counterfeit medications, and 3.7% reported purchasing counterfeit medical devices. India had the highest incidence of purchasing both types of products (16.5% and 15.5%, respectively). Argentina and the UK had the lowest incidence of purchases of counterfeit medication and medical devices (1.9% and 1%, respectively).

Heightened Health Risks around the World!

Fake medications are everywhere! How much? That's easier said than estimated. Quantifying the dollar value of the counterfeit medication markets is a challenge (Ofori-Parku & Park, 2022), with annual estimates ranging from $4.4 billion (OECD/EUIPO, 2019) to $200-432 billion (Ofori-Parku & Park, 2022) or even $470 billion (Von Schilcher, 2024). Regardless of the estimate, the prevalence of counterfeit medications, even at the most conservative estimates, presents a global public health challenge that has exacerbated as a function of technological advances. For example, of an estimated 35,000 online pharmacies, 96% are believed to operate outside the law (Office of the United States Trade Representative, 2024). According to the 2024 seizure data from the U.S. Customs and Border Protection (CBP, 2025), seized pharmaceutical products were the sixth most seized in terms of Manufacturer Suggested Retail Price (MSRP), valued at over $129 million. However, when looking at the volume of seized goods, pharmaceutical products ranked second with over 3.7 million units (handbags and wallets ranked top in terms of volume with over 5.1 million units). This presents a significant and direct risk to the health and well-being of consumers.

Counterfeit pharmaceutical products have a direct impact on consumer health and well-being. About 50% of medications sold online and 10% of all medications are counterfeit, and the health toll presents a long list of short- and long-term effects, including over one million deaths – 250,000 children – attributed to taking counterfeit medications (Sample, 2019; Statista, 2022; World Health Organization, 2017; World Health Organization, 2024a; Yadav & Rawal, 2015).

A key driver of counterfeit medication purchases is consumers' lack of awareness about the risks associated with substandard and falsified medical products and how to identify them (World Health Organization, 2024a). The risks posed to consumers from substandard, falsified, or counterfeit medications include a lack of active ingredients, rendering the product useless; the wrong active ingredients, which might cause an adverse reaction with the individual's physiology (e.g., allergic reaction) or other medications the individual is taking; harmful substances (e.g., fentanyl) in the counterfeit medication that can be fatal; and unsanitary or otherwise substandard manufacturing conditions (Office of the United States Trade Representative, 2024).

In addition, there are inherent dangers associated with purchasing medications online, whether they're counterfeit or authentic. These dangers include insufficient or incorrect information about the medication, self-diagnosing a condition, and lack of counseling about potential drug interactions (Desai et al., 2015). Consumers can also be easily deceived by online pharmacies. In a recent survey, over half of respondents believed all online pharmacies are approved by the Food and Drug Administration (FDA; Office of the United States Trade Representative, 2024). In the same survey, 24% of respondents indicated direct experience with substandard, falsified, or counterfeit medications (Office of the United States Trade Representative, 2024).

How We Talk to Consumers Matters!

The mushrooming prevalence of counterfeit medications in physical and online marketplaces reveals an insurmountable problem that is hard to contain. Unlike contained physical spaces that sell counterfeit medications and are easily accessible by enforcement personnel, online and digital marketplaces have limitless shelves, thus, are harder to contain in terms of counterfeit medication prevalence. This is especially important as consumers are increasingly gravitating to online and

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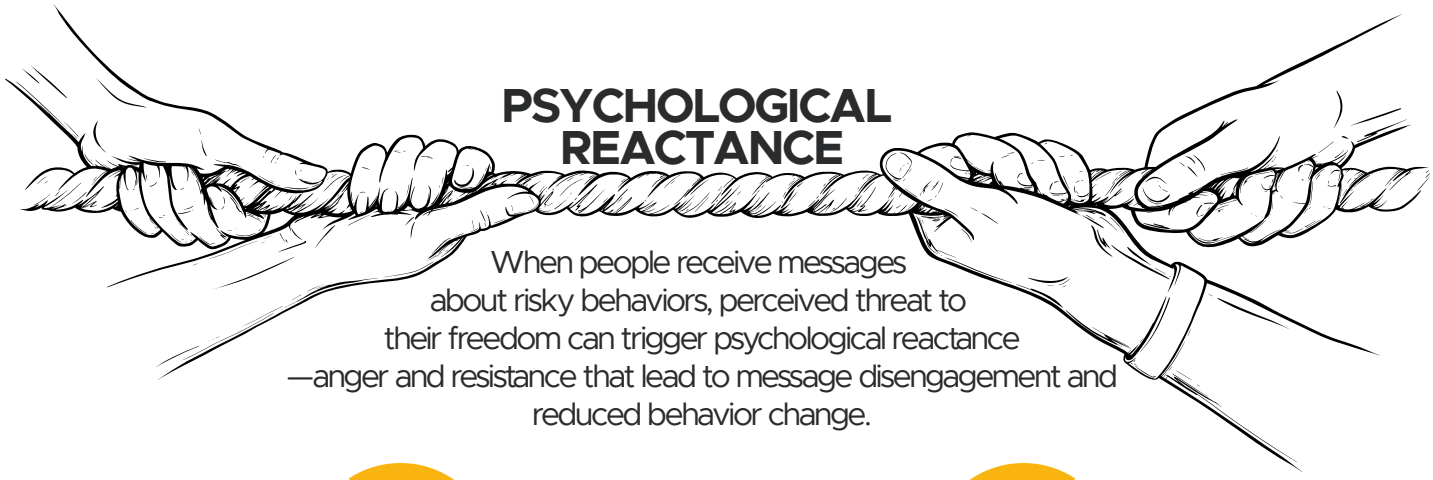
digital spaces for their pharmaceutical needs. That said, it is critical to understand the importance of educating consumers about the dangers of buying and consuming counterfeit medications.

Researchers and members of the pharmaceutical industry acknowledge that provider and patient education on how to differentiate between genuine and counterfeit medications is essential, as well as cautioning them to purchase only from trusted sources (Desai et al., 2015; Von Schilcher, 2024). At the same time, anti-counterfeiting campaigns are rarely based on professional communication and marketing expertise, thus lacking effective strategies to inform consumers about the risks of buying illicit medications and provide advice about the best ways to protect against such risks.

A recent analysis of existing anti-counterfeiting campaigns launched between 2005 and 2024 (Kononova et al., 2026) demonstrated that campaign messages frequently include features that increase audience resistance to message persuasion, a phenomenon called psychological reactance. Such messages often use direct, controlling, and domineering language (e.g., "Stop buying drugs on social media!"). Majority of messages used negative emotional appeals (55%) and/or imagery (12%). Within this same message pool, 69% focused on loss, and 10% included threats to identity (e.g., "You are bad if you buy fake meds!").



PSYCHOLOGICAL REACTANCE

When people receive messages about risky behaviors, perceived threat to their freedom can trigger psychological reactance —anger and resistance that lead to message disengagement and reduced behavior change.

REACTANCE INDUCING

REACTANCE REDUCING

	Reactance Inducing		Reactance Reducing	
Language	63%	High Controlling Language	47%	Low Controlling Language
Framing	69%	Loss Frame	36%	Gain Frame
Emotional Appeal	55%	Negative Appeal	28%	Positive Appeal

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Despite their obvious intention to persuade audience members, these reactance-inducing communication features often have the opposite effect. Specifically, when exposed to messages with such features, consumers often feel that their freedom to choose which vendor to buy from is threatened, and they behave in a way to restore that perceived loss of freedom. In other words, when a company or organization directly orders a message recipient to stop buying counterfeit pharmaceuticals, the message recipient might do the opposite and continue buying illicit drugs.

Additional findings from the campaign analysis study (Kononova et al., 2026) showed that nearly a third of the analyzed campaign messages (29.4%) did not specify the product type, thus lacking specific details about risks and protection strategies associated with individual product types. Another third of the messages (33.9%) targeted fake medicines (e.g., "One Pill Can Kill" by the Drug Enforcement Administration), indicating the severity of the counterfeit pharmaceuticals problem. Other messages were about electronics and tools (19.6%), apparel (10.1%), and other products.

Selected messages from the Kononova et al. (2026) report were tested in an online experiment. Messages that included predominantly high reactance features (controlling language, negative emotional appeals and imagery, loss frame, and threats to identity) made study participants experience anger, an emotional response correlated with high psychological reactance, than messages that did not include such elements.

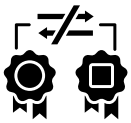
Great efforts have been exerted by government agencies, non-profit organizations, industry associations, and companies to combat the problem of counterfeit medications (Kononova et al., 2026). Yet, anti-counterfeiting communication campaigns appealing to consumers are scarce, and do not typically use theory- and data-informed approaches for effective communication and consumer education. In addition, proper audience segmentation strategies must be used to develop personalized messages tailored to each group of consumers using demographic and psychographic characteristics.

"The 2026 A-CAPP Center Global Consumer Survey: Online Medication Purchase, An 8-Country Study" focused specifically on studying differences across consumer groups to better understand what motivates them to buy or stay away from counterfeit medications, what attitudes and perceptions they have about counterfeit medication-buying behavior, how consumers engaged in buying fake drugs in the past, and whether they plan to do it in the future.

Overview of Terminology

In the current study, we surveyed consumers in eight countries (Australia, Brazil, China, India, Italy, Nigeria, the United Arab Emirates, and the United States). In the survey, we used the following definitions to distinguish between legitimate and counterfeit medications, as well as prescription and over-the-counter pharmaceuticals, vitamins, and dietary supplements.

Legitimate (Authentic or Genuine) Medications: Medications that contain the appropriate ingredients and are produced, properly labeled, and packaged by legally authorized manufacturers. Legitimate medicines are advertised and sold by authorized sellers.



Counterfeit Medications: Medications that are fake. They may be contaminated and contain the wrong or no active ingredients, which can be harmful to one's health. Counterfeit medicines are made, sold, and advertised illegally by unauthorized sellers who may unlawfully use registered trademarks to mislead, confuse, and deceive buyers. Though these medications are often described as substandard, falsified, and/or counterfeit, we use the term *counterfeit* throughout this report for ease of interpretation.

Prescription (Rx) Medications: Medications that are issued for a legitimate medical purpose by a licensed healthcare professional (e.g., physician, dentist, podiatrist). Acquisition of these medications requires an official prescription.

Over-the-Counter (OTC) Medications: Medications that are deemed safe and effective for use by the general public without seeking treatment or prescription by a healthcare professional. They include: Analgesics, cold and cough remedies, digestives and intestinal remedies, hand sanitizer, incontinence remedies, skin treatment, vitamins and minerals, among others.

Vitamins and Supplements (V&S): A category of products that includes amino acid products, enzyme supplements, herbals, and vitamins and minerals. These medications are available for purchase without a provider prescription and are sold over the counter.

Past Research on Fake Medications

A 2023 survey by the Alliance of Safe Online Pharmacies (ASOP) found that 52% of consumers 18 years old and older had purchased prescription medications online, an increase of 17% since 2020 (ASOP, 2023). This increase was driven by drug shortages, changes in access, convenience, and cost considerations (ASOP, 2023). Overall sales of prescription drugs were projected to reach $1.3 trillion by 2025, with an annual growth rate of 4.02%. Globally, the U.S. generates the highest revenue (Statista, 2025a). Online pharmacy sales are projected to be $97.2 billion by 2025 (Statista, 2024b).

The global OTC products market is projected to reach a revenue of $386.96 billion in 2025, with an annual growth rate of 4.4% (Statista, 2025b). OTC ecommerce revenue reached $82.5 billion in 2024, representing 41% of total OTC sales, and is expected to grow 9.6% per year through 2029 (Statista, 2024c).

Vitamins and minerals (supplements) comprise the smallest category of medical products, with the overall revenue generated worldwide in 2025 amounting to $34.24 billion. The growth rate for this category is 6.61% (Statista, 2025c). Online sales of vitamins and minerals in 2024 were projected to reach $11.3 billion, or about 36% of total revenue, with an annual expected growth rate of 15.8% through 2029 (Statista, 2024a).

As noted above, the use of online platforms to buy and sell medications is growing rapidly, especially after the COVID-19 pandemic, opening new opportunities for the pharmaceutical industry. However, this growth also brings serious public health risks. Many of the medications sold online — especially through illegal or unauthorized sources — are substandard, falsified, or counterfeit (SFC). According to the World Health Organization, about half of all medications sold online fall into this category (World Health Organization, 2017). The online market for SFC medications is estimated to be worth between $65 and $200 billion annually (Ziavrou et al., 2022). The Centers for Disease Control and Prevention (CDC) reported a significant increase in deaths linked to the use of these fake medications (O'Donnell et al., 2023). Alarmingly, 60% of nearly 58,000 drug overdose deaths were caused by counterfeit drugs (O'Donnell et al., 2023).

With such heightened public health risks indicated by market-level data, it is important to examine how scholarly research has tackled this issue. The following section provides a review of academic literature on counterfeit pharmaceuticals.

Review of Academic Research

In an early study of online health activities, Atkinson et al. (2009) analyzed the National Cancer Institute survey data and discovered that the most prevalent health-related online activities were looking for information for oneself, using an online support group for people with a similar health or medical issue, and buying medications online. Over the past two decades, the proportion of people buying medications online tripled; it grew from 1% of the sample in a 2002-2010 data set (Brown & Li, 2014) and 14% in 2007 (Desai et al., 2015) to 52% in 2023 (ASOP, 2023).

The COVID-19 pandemic, with lock-down and movement restrictions has largely ushered a new era of e-retail and e-commerce. Though e-commerce has been steadily growing prior to the

pandemic, the necessity of protecting one's self from health risks through in-person exposure paved the way for an exponential growth in e-retail and reliance on e-commerce, including buying medications through online and digital platforms. The frequency of buying medications online massively increased during the COVID-19 pandemic, along with a moderate improvement in consumers' attitudes toward online medication purchasing/online pharmacies, with nearly one in five planning to buy drugs through online pharmaceutical platforms (Fittler et al., 2022). Limbu and Huhmann's (2024) systematic literature review indicated 11 drivers for such behavior, including: convenience, easy access, price, evaluative processing (e.g., attitude toward online pharmacies, trust, perceived usefulness), product quality considerations, sources of information (e.g., friends/family, website information), privacy and risk perceptions, experience with digital technology use and online shopping, and access to health insurance.

Despite an increase in online pharmacy use, many consumers exhibit low awareness of the quality of medications they buy on the internet (Fittler et al., 2013; Pal et al., 2015). The low level of awareness is incredibly problematic, as various studies across the world continuously show that a large percentage of medicines ordered on the internet does not meet the established quality standards (Orizio et al., 2011).

Limbu and Huhmann (2024) indicated that the majority of the 48 publications they systematically reviewed did not distinguish between prescription and OTC medications available online. They suggested, however, that significant differences exist between these two categories of drugs.

> "...the majority of the 48 publications systematically reviewed **did not distinguish between prescription and OTC medications available online.**"

Buying Medications Online: Three Medication Classes

In the current study, we examined consumer perceptions and behaviors regarding the purchase of counterfeit medications across three classes: prescription medications, OTC medications, and vitamins and supplements. In this section, we review past research for each of these medication classes. Though the literature addressing counterfeiting across the three categories is scarce, in this section, we prioritize reviewing scholarly research on online purchase of prescription and OTC medications, vitamins, and supplements in general, referencing studies on counterfeit pharmaceuticals where available.

Prescription Medications

Consumers buy, or intend to buy, prescription medications online predominantly for convenience, especially when they have health insurance coverage, consult or follow the suggestions of close social circles about the purchase, and have lower risk perceptions of this behavior (Limbu & Huhmann, 2024). In a systematic literature review, Almomani and colleagues (2023) indicated that consumers buy prescription medicines online for several main reasons: convenience, anonymity,

irritation with the lack of access to pharmaceuticals offline, developed internet and social media infrastructure, prior experience with buying online, trust in renowned pharmaceutical brands, and social influence of friends and relatives. Among other common reasons are low prices, ease of buying without a prescription, and misuse (Long et al., 2022).

In line with the theory of planned behavior, intention to purchase prescription medications online led to a high likelihood of actual behavior. In addition, this behavior was associated with the absence of negative attitudes toward it and the use of risk reduction strategies, such as checking reviews, asking friends, using renowned brands and platforms, and others (Naughton, 2025). As for risk perceptions, Moureaud and colleagues (2021) found that their survey respondents perceived drug buying on the internet as mostly safe. They also ranked e-retail and select social media platforms (e.g., Amazon, YouTube) as credible retailers of prescription medications.

Mackey and Liang (2013) created fictitious no-prescription-needed social media ads and found few barriers to entry for creating an ad promoting illicit drugs. For example, website registration was available at no cost and ad creation and website maintenance were available at a nominal fee. Illicit e-direct-to-consumer advertisements (eDCTA) were accessed by users in diverse countries. User traffic was highly concentrated in countries known to have illicit online drug sales and counterfeit drug trafficking activity, such as China, Russia, the U.S., and the UK. Mackey and colleagues (2013) suggested requiring social media platforms to monitor for content associated with illicit online drug selling activity during the registration and in content generated by users.

Moreover, Mackey et al. (2017) analyzed over 600,000 tweets to identify online pharmacies illegally selling prescription opioids. While only a very small percentage of tweets promoted DTC sales of controlled substances, this study verified that Twitter (now X) was a viable platform to see illegal drugs. These illegal online pharmacies reached consumers by using several digital marketing strategies including blogs, social media, user forums and affiliate marketing, and fabricated quality seals.

Over-the-counter (OTC) Medications

Limbu and Huhmann (2024) pointed out that convenience, social recommendations (information sources), and availability were the only common motivations that drove consumers to buy both prescription and OTC medications. Other drivers of OTC online drug purchase behavior were different from those of prescription drugs. Specifically, consumers were motivated to purchase OTC pharmaceuticals online by their experience with internet use and frequency of online shopping, as well as their evaluation of the purchase environment (e.g., attitudes, trust, usability). In general, regardless of the distribution channel, positive attitude and perceived behavioral control toward OTC drug purchases have been found to positively predict this behavior (Sehgal & Mittal, 2019), along with brand experience and packaging, expert advice, medicine availability, and the opinions of family and friends (Habash & Al-Dmour, 2020). At the same time, as more pharmacies have transitioned from brick-and-mortar to digital storefronts, risk perceptions of buying these same OTC drugs have increased (Erzöz, 2023). While not much literature is available regarding purchasing OTC pharmaceuticals online, Alarsali & Aghaei's (2022) investigation of Cypriate consumers and the influence of digital marketing, reference groups, and brand experience on online OTC purchases found that reference groups and brand experience predicted this purchase behavior. Brand experience had the most significant influence on OTC purchases. Furthermore,

Temechewu & Gebremedhin (2020) found that for Ethiopian consumers, pharmacist recommendations, country of origin, and price influenced OTC medication purchase decision making, but reference group and past experience did not.

Vitamins and Supplements

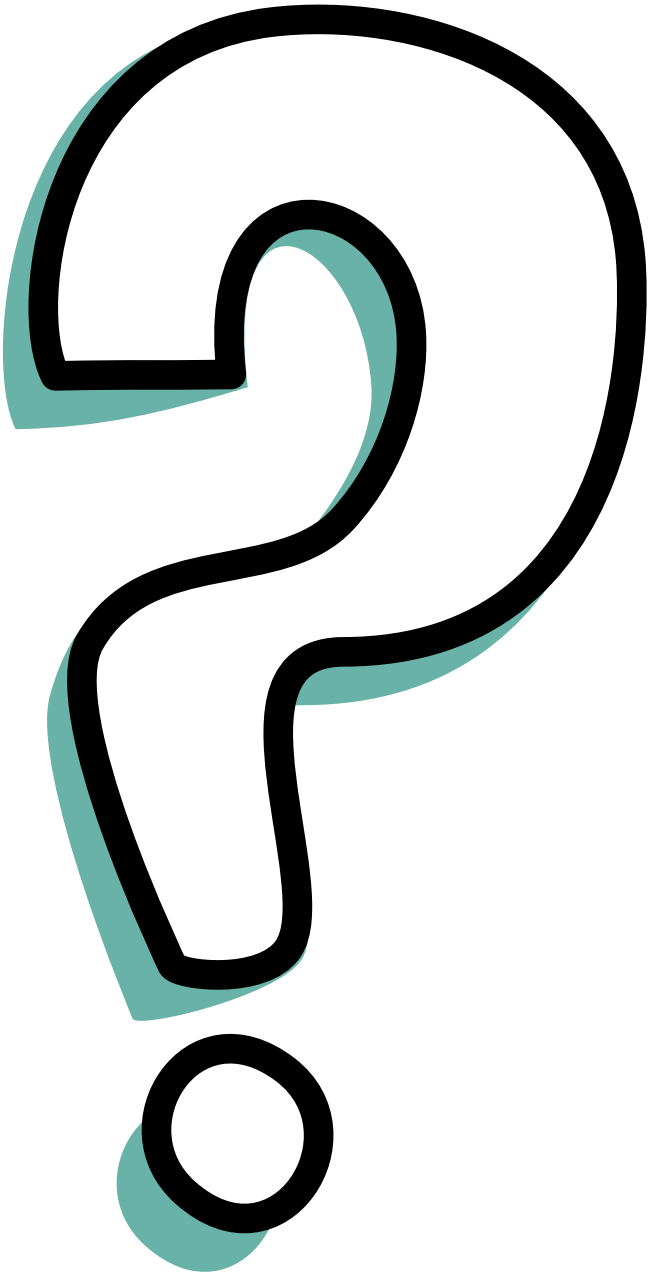
Aziz et al. (2020) investigated consumer perceptions of counterfeit dietary supplements. Using a sample of Malaysian consumers, they found that the overwhelming majority were aware of fraudulent dietary supplements, and most purchased these from social and digital media. Demographics (age, race, religion, and education) accounted for a considerable portion of explaining consumers' behavior of buying fake dietary supplements. Using the theory of planned behavior, subjective norms, attitudes, perceived behavioral control, and awareness all had a positive relationship with behavior toward fraudulent dietary supplements, with awareness being the strongest predictor.

Sfodera et al. (2020) conducted a qualitative study of the role of social networks in Italian millennials' decision-making process when purchasing illegal food supplements. Social networks act as key information sources in purchasing illegal supplements. These findings highlighted a dichotomy of awareness: some consumers were aware of illegal, counterfeit supplements and others were not. Further, social commerce facilitated collaboration and provided support for purchase decisions related to illegal supplements, and allowed misinformation to be shared. While social networks reduced perceived risk, they did not reduce actual risk.

Similar to OTC medicines, vitamins and supplements do not typically require prescriptions; thus, consumers prefer brick-and-mortar, physical pharmacies to buy these products. They acknowledge that buying vitamins, supplements, and related natural products online means taking some risks. The decision to purchase online is made through an assessment of the benefits and risks of that behavior. Product-related factors — such as perceived effectiveness and safety of supplements — and shopping-related factors — such as convenience, autonomy in purchase decisions, and online security — facilitate online buying behaviors (Ang et al., 2023).

Research Questions

The act of buying anything is the result of a complex interaction between the individual consumer and the retail environment, whether physical or online. A series of psychological mechanisms are at play at any given time. At times, purchase decisions are impulsive, while in other times, they require a lot of thinking and cognitive elaboration.



Exploring the complex nature of buying medications online, including the purchase of counterfeit medications, is essential to understand the dynamics necessary for effective communication with consumers that promote protective behaviors related to health and well-being.

In the current study, we attempted not only to describe the problem of buying medications online but also look at why consumers engage in such behaviors – both intentionally and unintentionally. Knowing the raw numbers of how many consumers buy counterfeit medications certainly helps shape market and policy interventions from rights holders, law enforcement, and policy makers. That alone does not curb the demand for counterfeit medications. Removing a node of counterfeit in the medication value chain might offer a temporary solution but not an eradication of the problem. Because once one counterfeit product – including medications – is taken down, the counterfeiters will start a multiplicity of other listings. Additionally, simply talking to consumers with a generic tone of "DON'T BUY COUNTERFEIT MEDICATIONS" might be ineffective and lead to communication waste. Why? Because consumers are human; and humans are complex. This is why it is critical to understand a multitude of factors that predict and help explain consumers' behavior of buying counterfeit medications knowingly and/or unknowingly.

> …simply talking to consumers with a generic tone of "DON'T BUY COUNTERFEIT MEDICATIONS" is misguided and leads to communication waste. **Why? Because consumers are human; and humans are complex.**

RESEARCH QUESTIONS

1

SIZE OF THE PROBLEM

What is the prevalence of buying legitimate and counterfeit medications (prescription, OTC, and vitamins and supplements) online?

2

SOCIODEMOGRAPHICS

What are the sociodemographic predictors of buying counterfeit medications online?

3

MOTIVATIONS

How do motivations to buy medications online predict purchase of counterfeit medications online?

4

AD EXPOSURE

How does the exposure to advertising in different media predict purchase of counterfeit medications online?

5

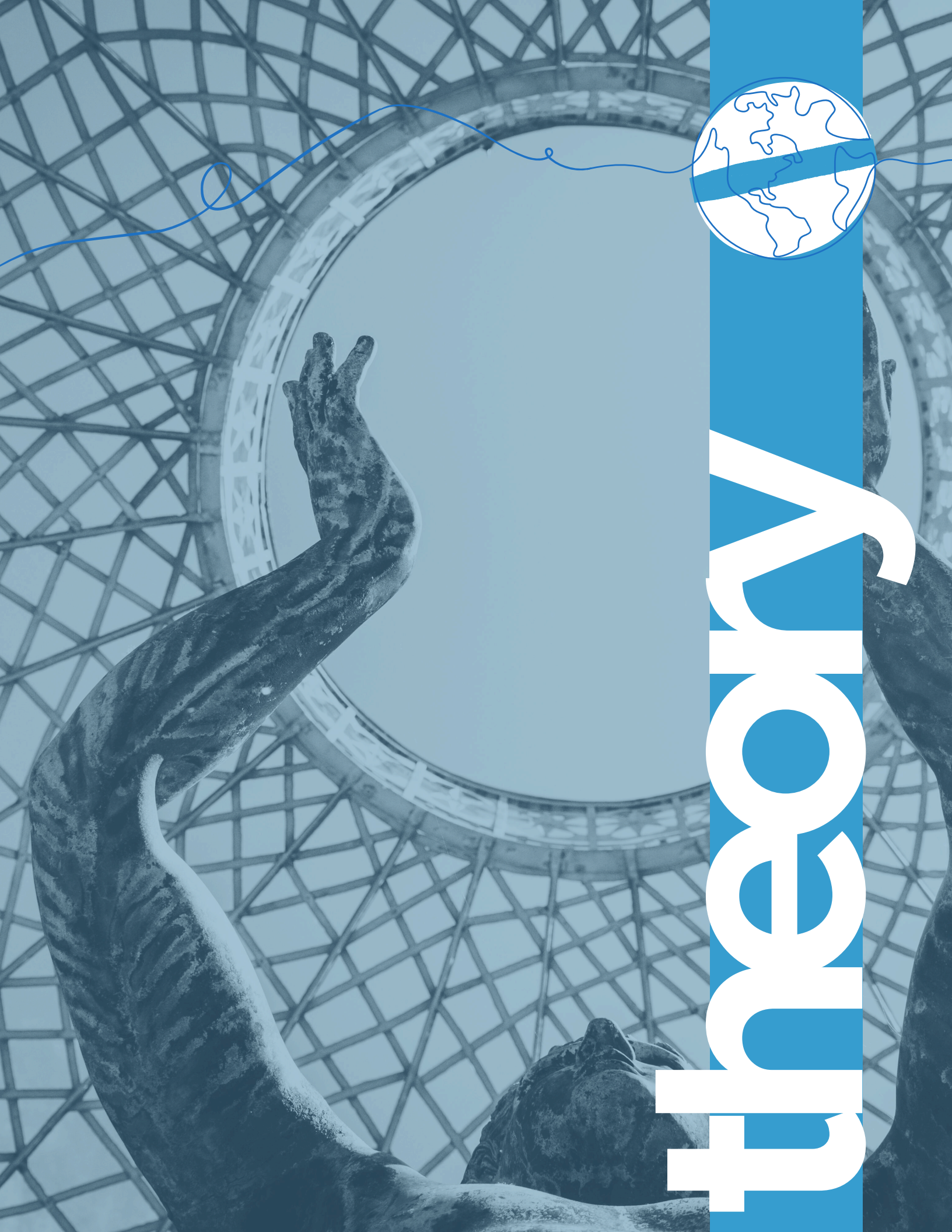
BEHAVIORAL PLANNING

How do cognitive and affective factors related to behavioral planning predict purchase of counterfeit medications online?

6

RISK PERCEPTIONS

How do risk perceptions predict purchase of counterfeit medications online?


theory

theory

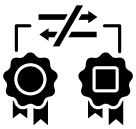
1 SIZE OF THE PROBLEM

In the current study, similar to the 2023 A-CAPP Global Anti-Counterfeiting Consumer Survey, we examined four broad purchase behaviors and intentions that are briefly defined below:

Non-Deceptive Purchase refers to past purchase of counterfeit medications from online sources where the consumer is aware that they are counterfeit. These products do not attempt to mislead the consumer into thinking the product is legitimate, with cues such as points of sale, unusually low prices, and inferior quality making their counterfeit status apparent to consumers (Spink, 2019).

Deceptive Purchase refers to buying counterfeit medications where the consumer is made to believe the product was legitimate (authentic or genuine) and later discovered it was was counterfeit (Bian & Veloutsou, 2007; Spink, 2019).

Legitimate Medication Online Purchase Intentions deal with future intentions to buy legitimate medications from online sources.



Counterfeit Medication Online Purchase Intentions deal with future intentions to buy counterfeit medications from online sources.

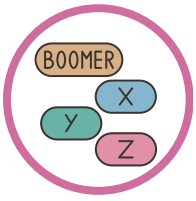
2 SOCIODEMOGRAPHICS

Past research (Desai et al., 2015; Limbu & Huhmann, 2024; Pal et al., 2015) has identified that much like general consumer behavior, buying medications online varies by sociodemographic attributes of consumers. In strategic communication campaigns, defining the audience based on demographic and psychographic indicators is a necessary step for enhancing efficiency of communicating with consumers, as it aligns communication strategies and tactics with segment and target audience characteristics.

Past research has identified a number of demographic factors predicting the adoption and use of online pharmacies (Brown & Li, 2014; Desai et al., 2015; Limbu & Huhmann, 2024; Pal et al., 2015) that we also expect to be reflected in access and behaviors related to counterfeit medications. In the following section, we provide conceptual definitions of the major demographic attributes we have included in this study and explore relationships between these attributes, on one hand, and adoption and use of online pharmacies, on the other hand (Brown & Li, 2014; Desai et al., 2015; Fitter et al., 2018; Limbu & Huhmann, 2024; Pal et al., 2015).

GENDER

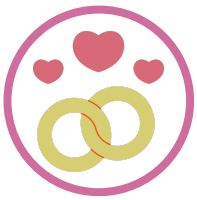
Gender is defined as a socially constructed system of identities and norms that organizes expectations, roles, and meanings associated with perceived sex within a given cultural context (American Psychological Association, 2015; West & Zimmerman, 1987). Within the context of online pharmacy adoption and use, males were more likely to use these platforms than females.



AGE

Age refers to an individual's chronological position in the life course, while generational cohorts, which we use in some analyses in this report, represent groups of individuals born during the same historical period who share formative social, economic, and technological experiences (Mannheim, 1952; Ryder, 1965). Per research cited above, older individuals were more likely to use online pharmacies than younger counterparts.

theory



MARITAL STATUS

Marital status denotes an individual's legally or socially recognized relationship status, reflecting institutionalized family arrangements that influence social roles, resources, and well-being (Cherlin, 2004; Waite & Gallagher, 2000).

EDUCATION

Education level refers to the highest formal credential or degree attained by an individual, representing accumulated human capital that shapes cognitive skills, social status, and economic opportunities (Becker, 1964; Mirowsky & Ross, 2003). As it relates to online pharmacy use, higher education was associated with greater use.

INCOME

Income represents the monetary resources received by an individual or household over a specified period, typically from wages, salaries, or other earning, and serves as a core indicator of socioeconomic status and material access (Duncan et al., 2002; OECD, 2013). Access to income has been found to be associated with access to technology and thus higher adoption of online pharmacies.

ONLINE SHOPPING

Online shopping frequency refers to the regularity with which consumers purchase goods or services via internet-based platforms, reflecting habitual engagement with digital commerce channels (Limayem et al., 2007; Verplanken & Orbell, 2003). Past research identified that online shopping habits significantly shaped favorable attitudes toward buying medications online, thus influencing willingness to buy medications via digital platforms.

These six demographic predictors have been shown to significantly predict counterfeit purchase behavior, mirroring general consumer behavior. For example, in the 2023 A-CAPP Global Anti-Counterfeiting Consumer Survey, we found that counterfeit buyers tend to be male, younger in

age, married, highly educated, with more disposable income, and who frequently shop online (Alhabash et al., 2023). As a measure of caution, it is important to not consider the association between each of these demographic indicators in isolation of other indicators. Humans are made of multiple attributes and it is the combination of these attributes and the ways in which they form socioeconomic indicators explain how individuals buy certain products, including counterfeit medications.

Finally, due to the close relationship between medication purchase and health status, we elected to include the psychographic concept of health literacy, on which we elaborate below.

HEALTH LITERACY

Health literacy, first introduced in the 1970s (Simonds, 1974), has evolved into a foundational component of healthcare and public health. It is now defined as the ability to find, understand, and use information and services to make informed health decisions (Centers for Disease Control and Prevention, 2024; National Institutes of Health, 2024). Strong health literacy enables individuals to interpret risk information accurately, engage in preventive behaviors, and participate in addressing broader social and environmental determinants of health (Nutbeam & Muscat, 2021; World Health Organization, 2024b). Research shows that those with higher health literacy use and trust information sources such as newspapers and the internet and adopt proactive health strategies, whereas individuals with lower health literacy often struggle to navigate online health information, comprehend medical instructions, or follow safety warnings (Brown et al., 2011; von Wagner et al., 2009; Ishikawa et al., 2016; Davis et al., 1993; Brewer et al., 2009). These limitations have been linked to suboptimal health practices, including reduced disease prevention and poorer treatment outcomes, as observed during the COVID-19 pandemic (Gök et al., 2024; Ishikawa & Kato, 2023; Mosher et al., 2012). Evidence also suggests that beliefs about health behaviors may mediate how health literacy shapes risk assessments and protective actions (McAnally & Hagger, 2023).

Although less studied, health literacy also influences decisions related to purchasing counterfeit medications online. Research shows that individuals with lower health literacy may misjudge the credibility of online pharmacies, with 30–50% of university students giving favorable ratings to fictitious, illicit pharmacy websites (Ivanitskaya et al., 2010). Additional findings indicate a positive relationship between favorable attitudes toward and intentions to purchase substandard and falsified medicines (SFMs) and self-reported knowledge, along with a negative relationship between SFM knowledge and perceived risk (Ofori-Parku & Park, 2022). More broadly, risk perception, medication adherence, and preventive health behaviors are shaped by health literacy levels, with better knowledge associated with stronger self-efficacy and confidence in recommended actions (Mohammadnabizadeh et al., 2023; Nabizadeh et al., 2018; Davis et al., 1996; Torres & Marks, 2009). However, knowledge alone does not always translate directly into behavioral intention—highlighting a complex interplay among understanding, perceived severity and vulnerability, and health-related decision-making (Nabizadeh et al., 2018).

3 MOTIVATIONS

The reasons people buy things — called purchase motivations — help explain how consumers think and behave. These motivations stem from either personal needs (such as saving money or enjoying the experience) or social needs (like expressing personal values or fitting in with others) (Shavitt, 1990). Economic motives involve getting a good deal or saving money, while hedonic motives are about enjoying the shopping experience or the product itself. Value-expressive motives involve conveying an individual's beliefs, while social-adjustive motives focus on fitting into a group or demonstrating status.

Understanding why people buy counterfeit products is important for predicting consumer behavior (Khan et al., 2021). While some people are tricked into buying fakes, research indicates that many knowingly purchase counterfeit goods, despite being aware of the associated ethical concerns (OECD/EUIPO, 2019; Shan et al., 2022; Wilcox et al., 2009). Studies have shown that saving money is the primary reason people purchase counterfeits (Singh et al., 2021; Wilcox et al., 2009). Enjoyment and excitement — such as the thrill of purchasing something "luxurious" — also drive people to buy counterfeit luxury items (Moon et al., 2018). Social- and value-based motivations explain why people in certain groups feel pressure to purchase counterfeit products in order to fit in or express their identity (Iyer et al., 2022; Ngo et al., 2020; Perez et al., 2010; Wilcox et al., 2009). These motivations can vary across different cultures and countries (Khan et al., 2021; Singh et al., 2021).

4 AD EXPOSURE

Seeing an ad once or many times can significantly influence consumer behavior, especially when it comes to purchasing medications, which directly impact people's health. The mere exposure effect (MEE) helps explain how repeated or even a single exposure to advertisements for medications can shape people's perceptions of the product and lead them to make a purchase, even if the medication is fake or low-quality (Zajonc, 1968).

According to MEE, people tend to like something more just because they've seen it before (Zajonc, 1968). From an evolutionary perspective, people are cautious when they first encounter something new because it may be dangerous (Zajonc, 1968). However, if they encounter the same thing repeatedly, it begins to feel familiar, and familiar things are often perceived as safer and more predictable, even if the ads are promoting illicit products. This makes people more likely to feel comfortable with and like what they see repeatedly (Harrison, 1968; Zajonc, 1968).

5 BEHAVIORAL PLANNING

The Theory of Planned Behavior (TPB) suggests that an individual's actions are guided by their intentions, which are shaped by both their rational (cognitive) and emotional (affective) attitudes toward the behavior, their perception of how much control they have over performing the behavior — known as Perceived Behavioral Control (PBC) — and by social norms (Ajzen, 1991). Cognitive attitudes are based on beliefs, values, and evaluations of the behavior, and can be either positive or negative (Ostrom, 1969). Affective attitudes, on the other hand, involve emotional responses to the behavior, such as whether it is seen as enjoyable or unpleasant (Ostrom, 1969). PBC refers to a person's sense of capability in carrying out the behavior in question (Ajzen, 1991). Social norms can be further divided into two types: injunctive norms, which reflect what individuals believe others think they should do, and descriptive norms, which reflect what individuals think others actually do (Rivis & Sheeran, 2003).

Within the context of consumer behavior, the act of purchasing — including the purchase of counterfeit goods — is typically considered a deliberate and planned activity (Bian & Veloutsou, 2007). This planning becomes even more important when the purchase is non-deceptive, meaning that consumers are aware they are buying counterfeit products. Previous studies have shown that favorable attitudes (both cognitive and affective), low perceived control, and strong social influences all contribute to greater intention to buy counterfeit products, which is closely linked to actual purchasing behavior (Bian & Veloutsou, 2007; Cheng et al., 2011; Chiu & Leng, 2016; Gentry et al., 2006; Patiro & Sihombing, 2016; Garas et al., 2022; Kim & Karpova, 2010).

In particular, when individuals view counterfeit purchasing positively, feel limited in their ability to avoid it, and believe that people around them commonly buy and approve of counterfeits, they are more likely to engage in deliberate decision making that supports these purchases, especially when they knowingly buy counterfeits. Differences in the prevalence and social acceptance of counterfeit purchases across countries can often be explained by variations in cultural norms, economic conditions, legal frameworks, and the enforcement of anti-counterfeiting laws (Chiu & Leng, 2016; Gentry et al., 2006).

6 RISK PERCEPTIONS

One theoretical framework employed in this study is Protection Motivation Theory (PMT), which here investigates how individuals' thoughts and feelings about risk influence their intentions and

behavior regarding the purchase of counterfeit products. PMT explains how people respond to threats that evoke fear, particularly in areas such as health and safety (Prentice-Dunn & Rogers, 1986; Rogers, 1975).

According to PMT, people are motivated to protect themselves through two thought processes: threat appraisal and coping appraisal. Threat appraisal involves assessing the seriousness (severity) of the threat and its likelihood of affecting them (susceptibility) (Norman et al., 2015). Threat severity refers to the perceived danger or harm associated with a risk, while threat susceptibility indicates the likelihood that someone feels they will be affected (Alhabash et al., 2023). If people see the threat as serious and feel vulnerable to it, their fear grows, which can lead to protective action. Coping appraisal examines how capable people feel in dealing with a threat. This includes their belief in their ability to take action (self-efficacy), their belief that the action will be effective (response efficacy), and the amount of time, effort, or resources they estimate it will require (response cost) (Maddux & Rogers, 1983; Rogers & Prentice-Dunn, 1997).


results

results

This section is organized into six different sections corresponding with the study's overarching research questions. Each section is organized in the following fashion:

tl;dr

Each section opens with a ***tl;dr*** **(i.e., "too long; didn't read")** highlight of the section's key findings. These brief data snapshots highlight the most salient results at the global sample level but do not capture the full scope of the analyses. Readers are therefore encouraged to consult the complete results.

In each section, findings are presented comprehensively, beginning with results for the global sample and then highlighting selected results for each of the eight countries included in the study.

Each results section, aligned with one of the six research questions, concludes with **actionable insights**. While not exhaustive, these insights provide a practical framework for applying the findings to strengthen anti-counterfeiting consumer awareness and education efforts.

1

SIZE OF THE PROBLEM

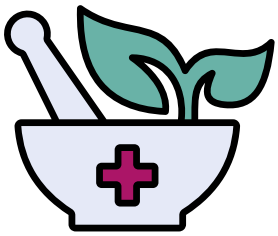
tl;dr

>84%

bought medications from **physical pharmacies**

~50%

bought medications **online**



Top 6

meds bought online:

1. Vitamins
2. Cold/flu medications
3. Cough suppressants
4. Analgesics
5. Antibiotics
6. Supplements

>75%

of online medication buyers used **online pharmacies** more than **e-commerce** and **social media** platforms

---

1 in 4

bought counterfeit meds **knowingly**

- Rx = 26%
- OTC = 23%
- V&S = 29%

1 in 5

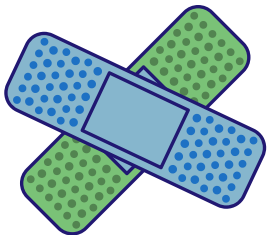
deceived into buying counterfeit meds

- RX = 23%
- OTC = 20%
- V&S = 21%

...and they most frequently bought them from **online pharmacies**

Unclear

Consumers don't know what to do after unknowingly purchasing counterfeit meds. They mostly **dispose it**, followed by **keeping and using it**, or **keeping it without using it**



>10%

reported experiencing **personal injury, negative health consequences,** and/or **money loss** after using counterfeit prescription and OTC medications

1.1 Medication Purchase Channels

In the current study, we asked participants about their medication purchase habits, both from physical pharmacies and online sources, with ample focus on the various venues and forms of buying medications online, including those that are substandard, falsified, and counterfeit. Generally, our findings confirmed that participants rely heavily on physical pharmacies to acquire prescription medications, over-the-counter (OTC) medications, and vitamins and supplements.

Buying Medications from Physical Pharmacies

Majority of participants (90%) indicated that they have purchased a prescription medication from a physical pharmacy in the past year; 88% bought OTC medications, and 84% frequented physical pharmacies to buy vitamins and supplements. Italian participants were the top purchasers of prescription medications from physical pharmacies (94%) and U.S. participants indicated the lowest frequency of such purchases (83%). As for OTC medications, Italian participants were the most prevalent purchasers (94%), and Emirati participants reported the lowest frequency (84%). Finally, the highest frequency of buying vitamins and supplements from physical pharmacies was reported by Nigerian participants (90%) compared to the lowest frequency among Australian participants (73%).

Buying Medications Online

Roughly half of the sample reported they have bought prescription medications (46%), OTC medications (45%), and vitamins and supplements (55%) from online sources. Indian participants reported the highest frequency of buying prescription medications online (63%), while Australian participants reported the lowest frequency (36%). Chinese participants reported the highest frequency of buying OTC medications online (65%) compared to the lowest frequency reported by Nigerian participants (28%). Finally, Chinese participants reported the highest frequency of buying vitamins and supplements online (77%), while Australian participants reported the lowest frequency of such purchases (41%).

1 SIZE OF THE PROBLEM

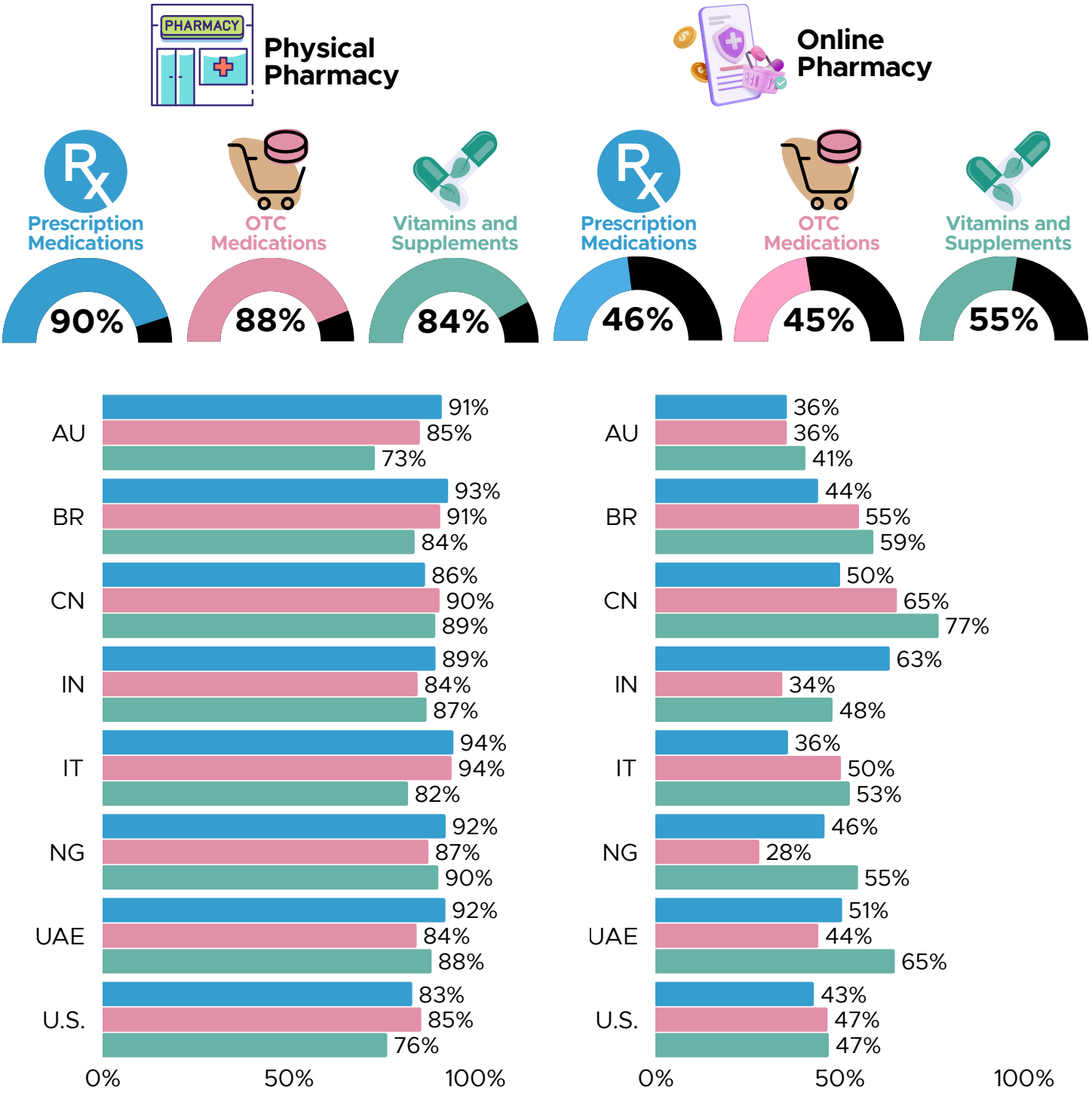


Figure 1.1.1 Percentage of participants in the global sample who have purchased pharmaceutical products from a physical and online pharmacy in the past 12 months, by medication class and country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America.

Types of Medications Bought Online

Participants indicated whether or not they have purchased 42 medication types from online sources. For the global sample, the Top 10 medications bought online included: vitamins, cold cures, cough suppressants, analgesics, antibiotics, nutritional supplements, antacids, antibacterials, anti-inflamatories, and decongestants. Figure 1.1.3 provides a breakdown by country of the Top 10 medication types bought online. Vitamins were the most frequently purchased medication online among the Australian, Indian, Italian, Nigerian, Emirati, and U.S. American samples. By contrast, analgesics were the most frequently bought medication online among the Brazilian participants, and cold cures were the most frequently purchased among the Chinese participants. Figure 1.1.5 provides the complete list of the 42 medications bought online and the frequency breakdown for the global sample and by country.

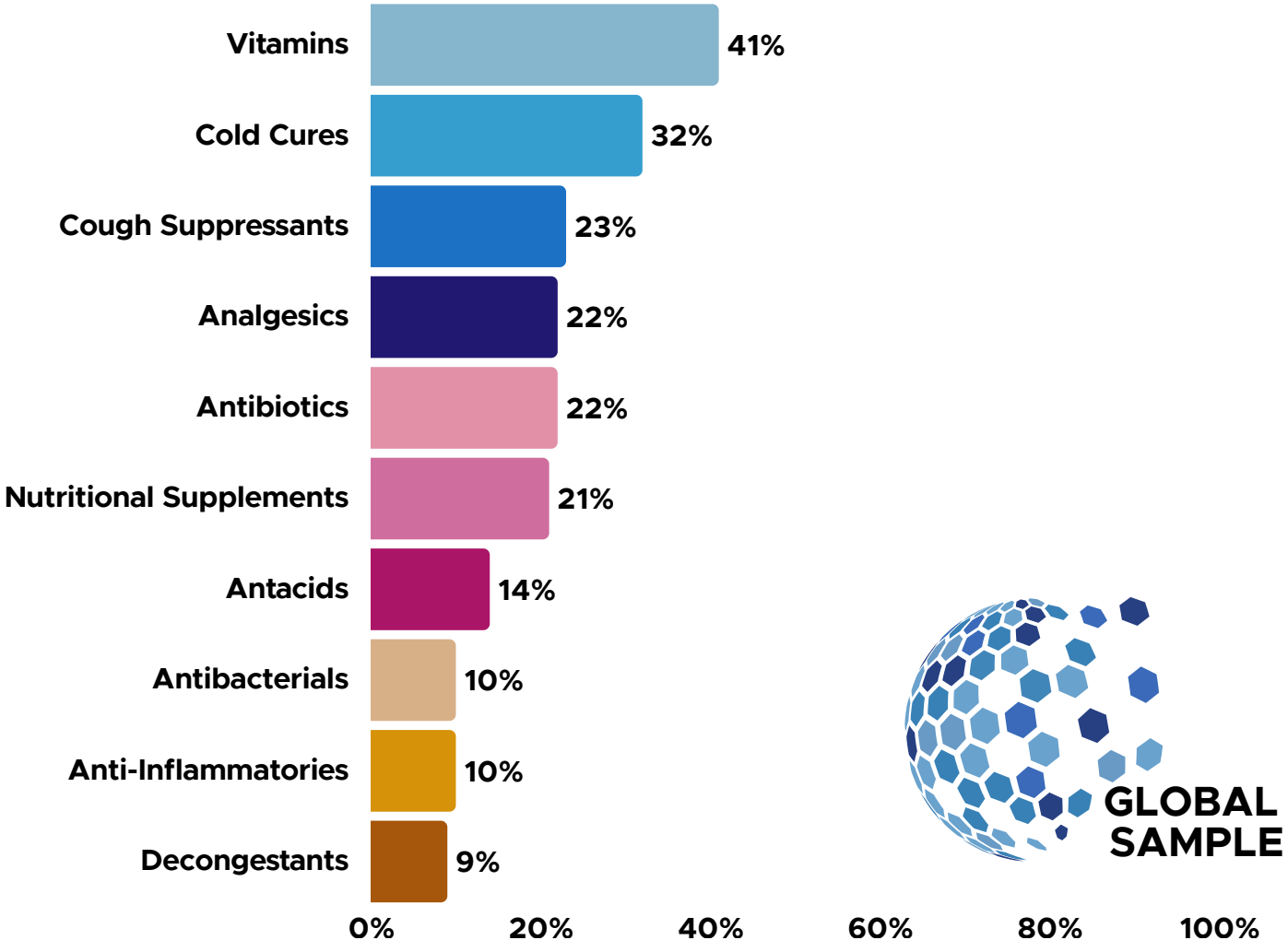


Figure 1.1.2 Frequency of the Top 10 medication types purchased online, global sample.

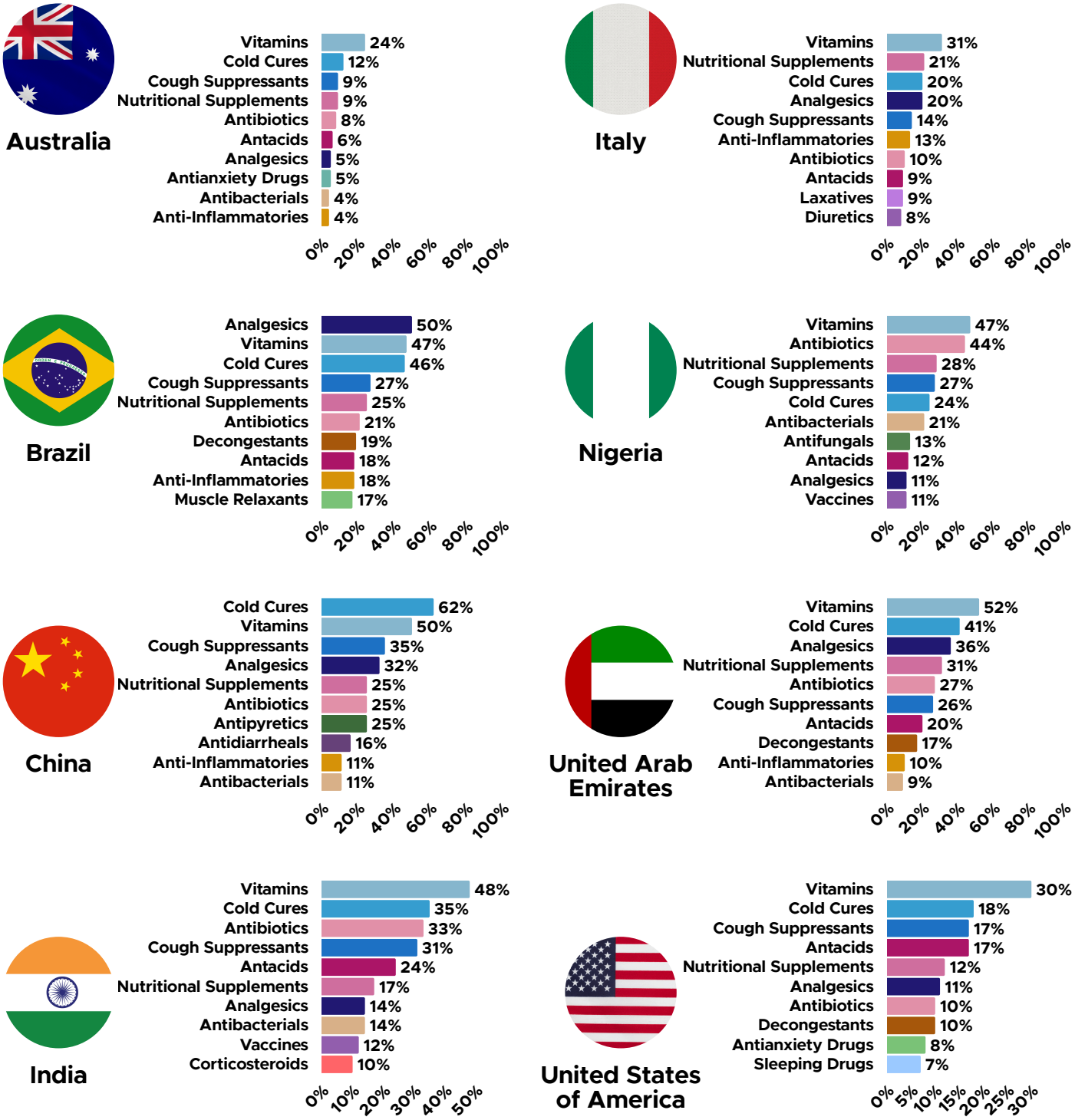


Figure 1.1.3 Top 10 medication types purchased online, by country.

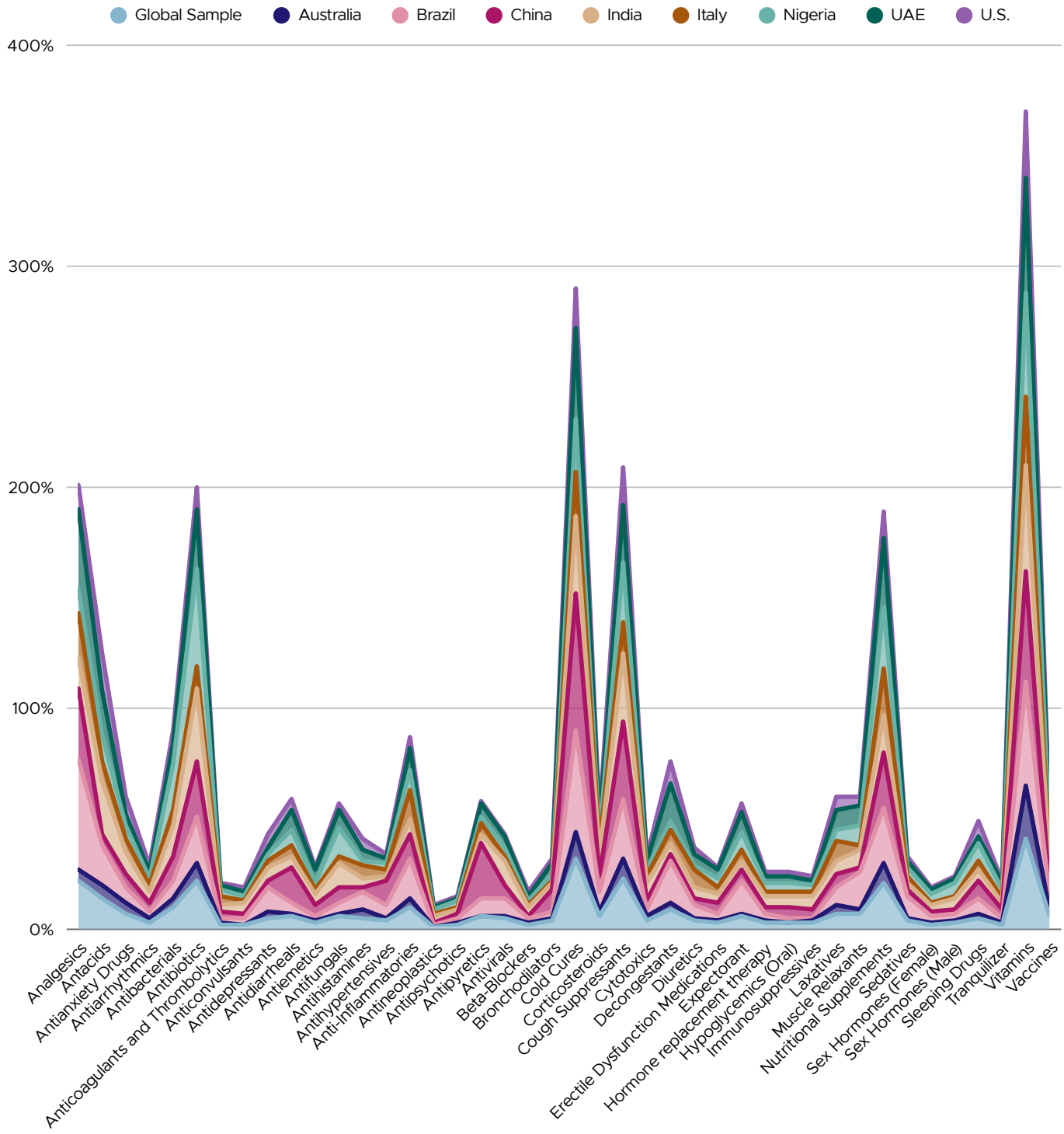


Figure 1.1.4 Cumulative frequency of buying different types of medications online, by global sample and country.

Online Medication Purchase Channels

Prescription Medications. Among participants who bought medications online, 67% purchased prescription medications through e-commerce platforms, 58% through social media marketplaces, and 78% via online pharmacies. Chinese participants who bought medications online reported the highest frequency of buying prescription medications across the different retail platforms (78%-94%), while Australian participants reported the lowest frequency (30%-53%).

OTC Medications. Two-thirds of participants who bought medications online (67%) bought OTC medications from e-commerce platforms, 52% from social media marketplaces, and 77% from online pharmacies. As with prescription medications, Chinese participants reported the highest frequency across purchase channels (70%-93%), while Australian participants reported the lowest purchase frequency from e-commerce (46%) and social media platforms (32%). U.S. participants reported the lowest frequency of buying OTC medications from online pharmacies (38%).

Vitamins and Supplements. Three-quarters of participants who bought medications online (73%) reported buying vitamins and supplements from e-commerce platforms, 50% from social media marketplaces, and 75% from online pharmacies. Chinese participants were the most frequent buyers of vitamins and supplements from e-commerce platforms (91%), while Australian participants were the lowest (46%). Indian participants were the most frequent buyers of vitamins and supplements via social media (69%) and online pharmacies (90%), while Australian participants were the lowest buyers from social media (24%) and U.S. American reported the frequency online pharmacies (41%).

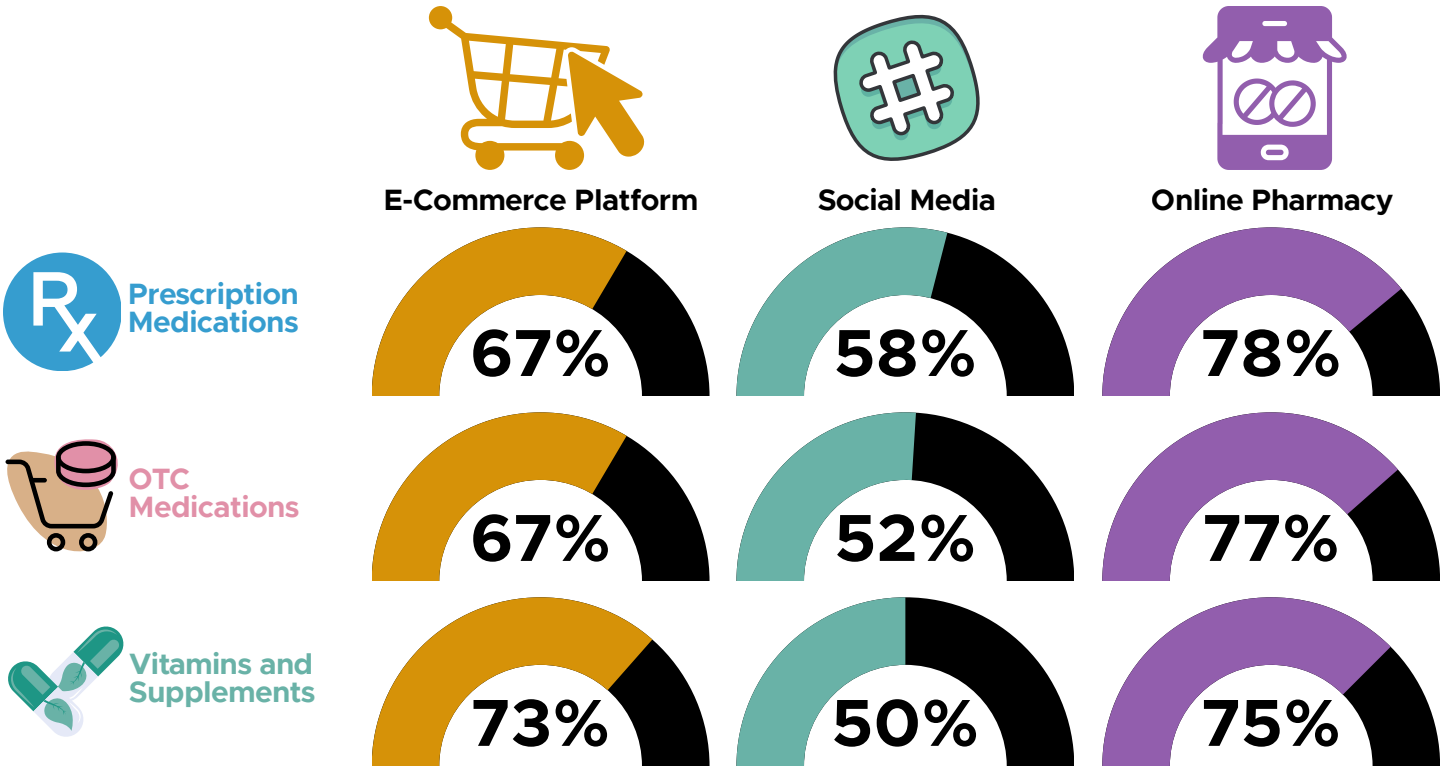


Figure 1.1.5 Proportion of online medication shoppers who purchased three medication classes in the past 12 months, by online purchase channel, global sample.

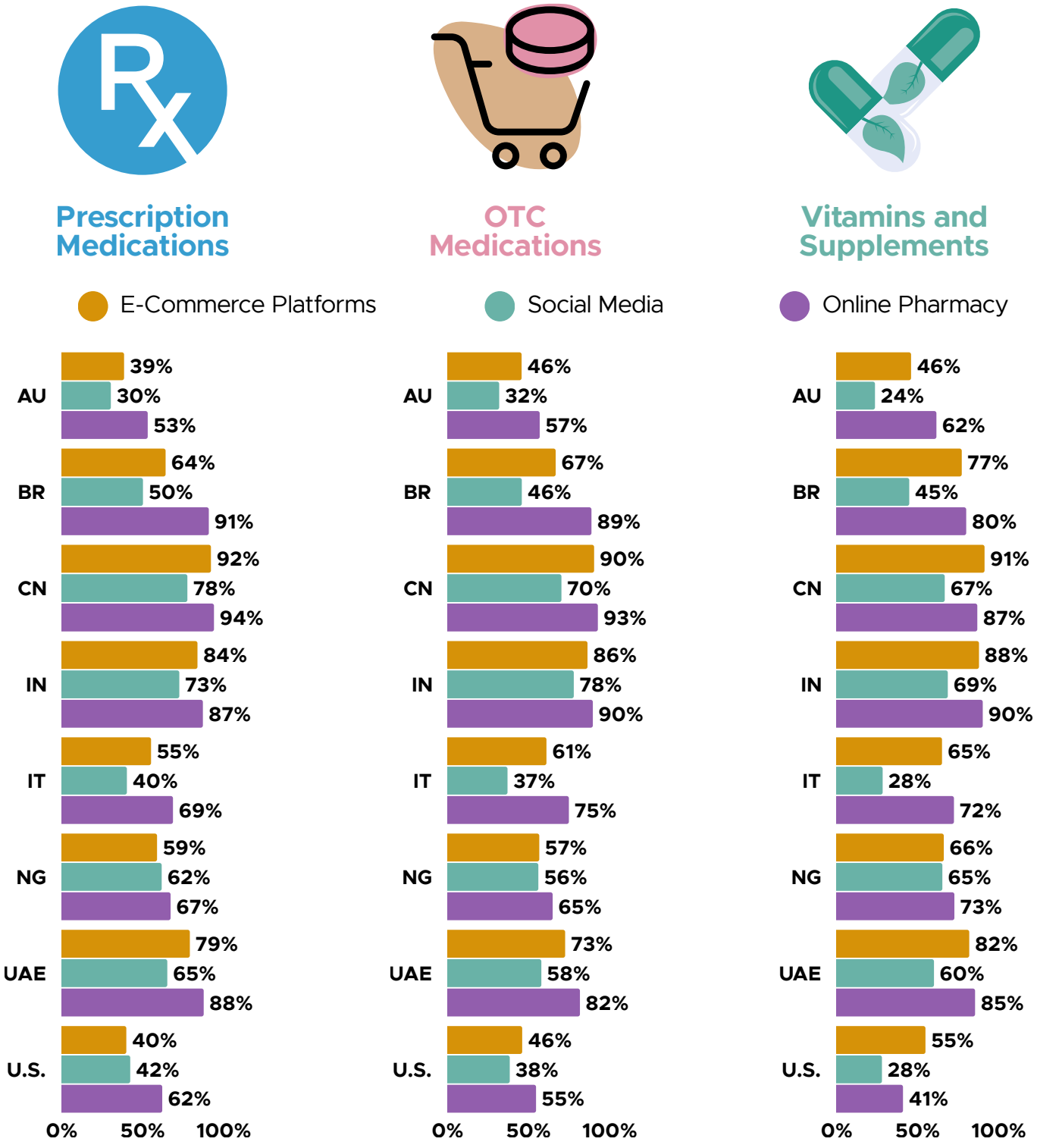


Figure 1.1.6 Proportion of online medication shoppers who purchased three medication classes in the past 12 months, by online purchase channel and country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

1.2 Counterfeit Medication Purchase

In the current study, we focused our inquiry on exploring online purchase patterns of counterfeit medications in two distinct ways. First, we asked participants to indicate whether or not they had frequented online marketplaces with the intent to buy counterfeit medications — what we term as a non-deceptive purchase. Second, we asked them to indicate instances when they had purchased medications online and later found out they were counterfeit — what we term as a deceptive purchase. For the frequency calculations, we set the denominator as the entire sample — as opposed to the sub-group of the sample who had indicated they bought medications online.

Buying Counterfeit Medications Online

For counterfeit prescription medications, 26% of the global sample indicated they knowingly bought these products (Indian participants were highest at 53%; Australians were lowest at 13%). 23% bought counterfeit OTC medications (Chinese participants were highest at 33%; Australians were lowest at 13%). 29% knowingly bought counterfeit vitamins and supplements (Emirati participants were highest at 44%; Australians were lowest at 13%).

A similar number of participants, albeit slightly lower than non-deceptive purchasers, indicated they were deceived into buying counterfeit medications. Specifically, 23% reported being deceived into buying prescription medications (Indian participants were highest at 50%; Australians were lowest at 10%). 20% bought OTC medications (Indians were highest at 27%; Australians were lowest at 12%). 21% bought vitamins and supplements (Indian and Emirati participants were highest at 35%; Australians were lowest at 8%).

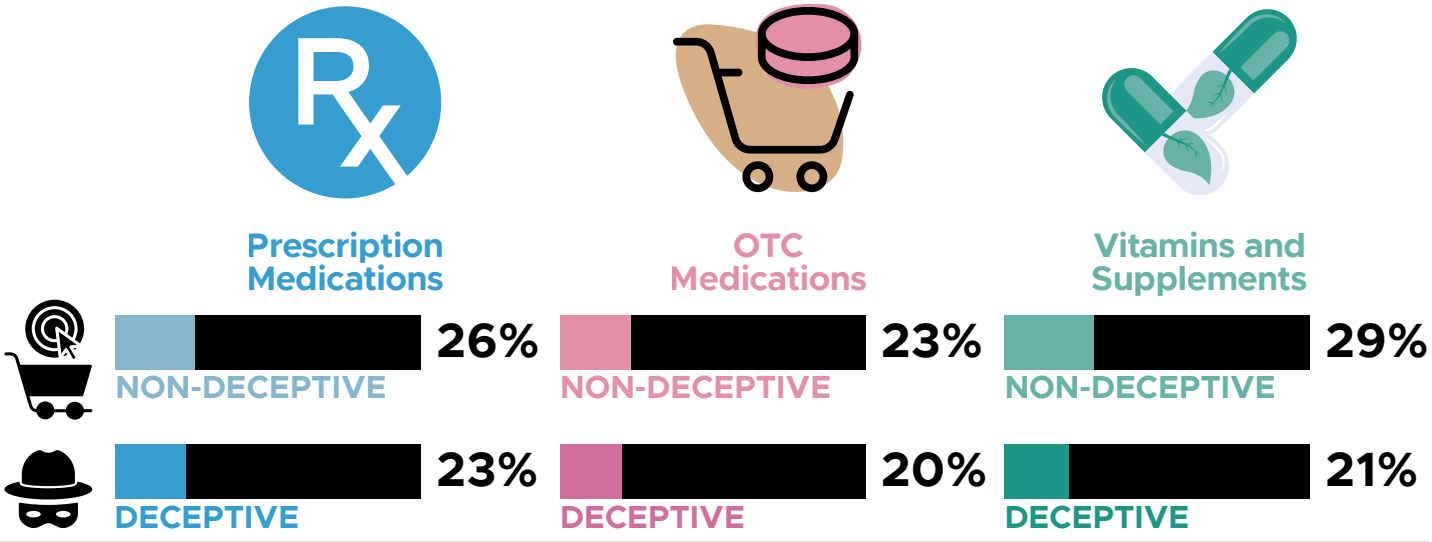


Figure 1.2.1 Percentage of all participants who have purchased any counterfeit medications non-deceptively and deceptively in the past 12 months, by medication class, global sample.

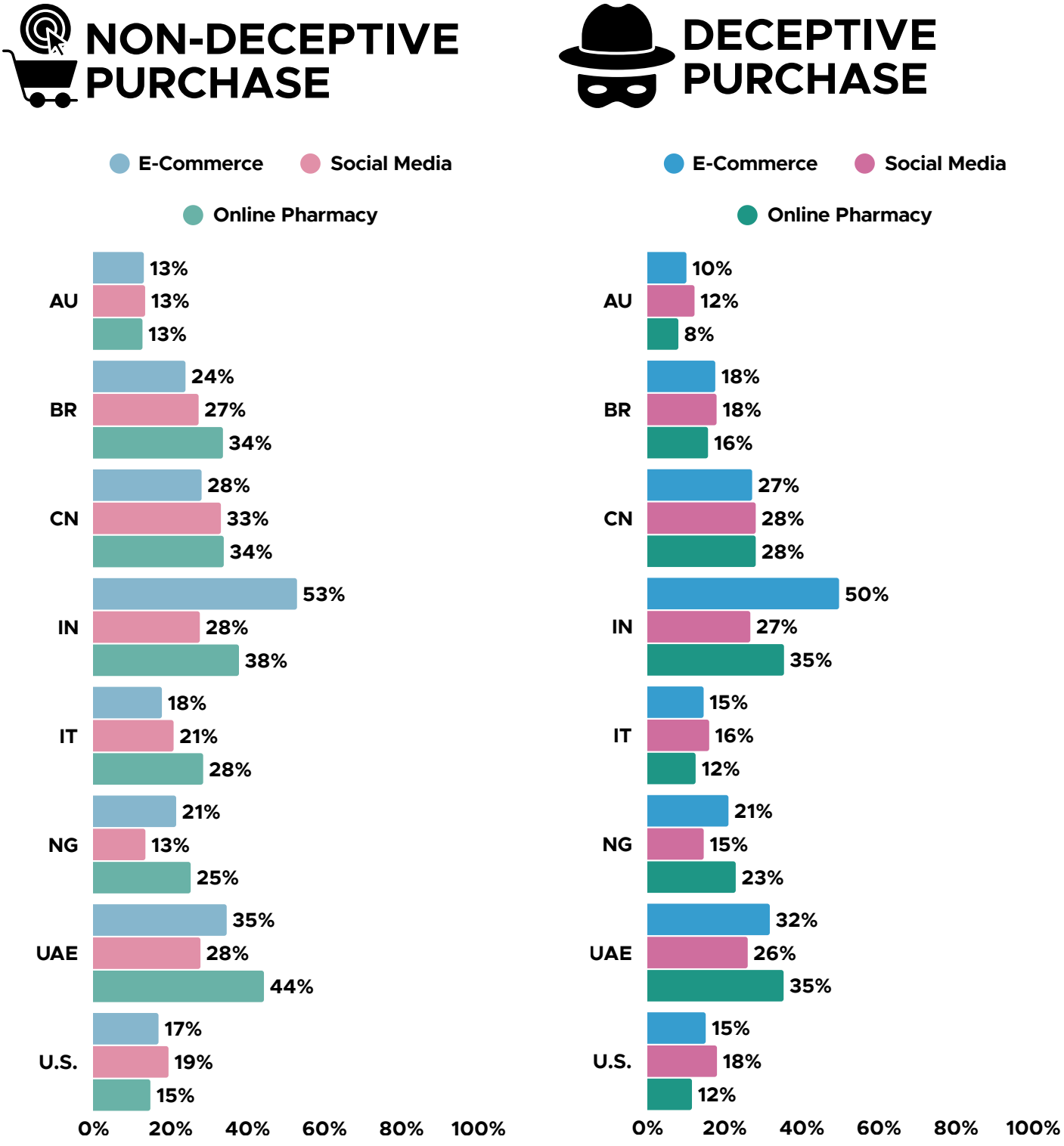


Figure 1.2.2 Percentage of participants who purchased counterfeit medications non-deceptively and deceptively, by medication class and country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Platform-Based Differences in Purchase of Counterfeit Medications

Prescription Medications. Across the entire sample, 22% knowingly bought fake prescription medications from e-commerce platforms, 21% did so from social media marketplaces, and 24% bought them intentionally from online pharmacies. Indian participants reported the highest frequency of these purchases from e-commerce (49%), social media (45%), and online pharmacies (51%) compared to Australian participants who reported the lowest frequency of buying fake medications from e-commerce (9%), social media (11%), and online pharmacies (11%). As for deceptive purchase, 20% of the global sample were deceived into buying counterfeit prescription medications from e-commerce platforms, social media, and online pharmacies. Indian participants reported the highest non-deceptive purchase across three purchase channels (42 - 47%) and Australian participants reported the lowest non-deceptive purchase across three purchase channels (9%).

OTC Medications. About one in five participants from the global sample (19%) indicated they bought counterfeit OTC medications knowingly from e-commerce platforms, compared to 18% who did so from social media marketplaces and 21% from online pharmacies. Chinese participants reported the highest non-deceptive OTC counterfeit medication purchase from e-commerce platforms (30%), social media (26%), and online pharmacies (29%), while Nigerian participants reported the lowest non-deceptive purchase frequency from e-commerce platforms (10%), social media marketplaces (11%) and online pharmacies (12%). As for deceptive purchase, 17% of the global sample were decieved into buying OTC counterfeit medications across the three purchase channels. Indian participants reported the highest frequency of non-deceptive OTC counterfeit medication purchase across the three purchase channels (24%), while Nigerian participants reported the lowest frequency of purchase from e-commerce platforms (10%) and online pharmacies (11%) and Australian participants reported the lowest frequency of purchase from social media marketplaces (10%).

Vitamins and Supplements. Roughly a quarter of the sample (24%) indicated that they knowingly bought counterfeit vitamins and supplements via e-commerce platforms, 20% from social media marketplaces, and 25% from online pharmacies. Emirati participants reported the highest frequency of knowingly buying counterfeit vitamins and supplements from e-commerce (38%), social media (33%), and online pharmacies (40%). Australian participants reported the lowest purchase frequency of deceptive counterfeit vitamins and supplements from e-commerce (9%), social media (7%), and online pharmacies (10%). As for being deceived into buying counterfeit vitamins and supplements, 18% of the global sample did so through e-commerce platforms, 17% via social media marketplaces, and 17% from online pharmacies. Indian participants reported the highest frequency of deceptive purchases from e-commerce platforms (33%), while Emirati participants reported the highest frequency of such purchases from both social media (30%) and online pharmacies (30%). Australian participants reported the lowest frequency of such purchases from e-commerce (7%), social media (6%), and online pharmacies (6%).

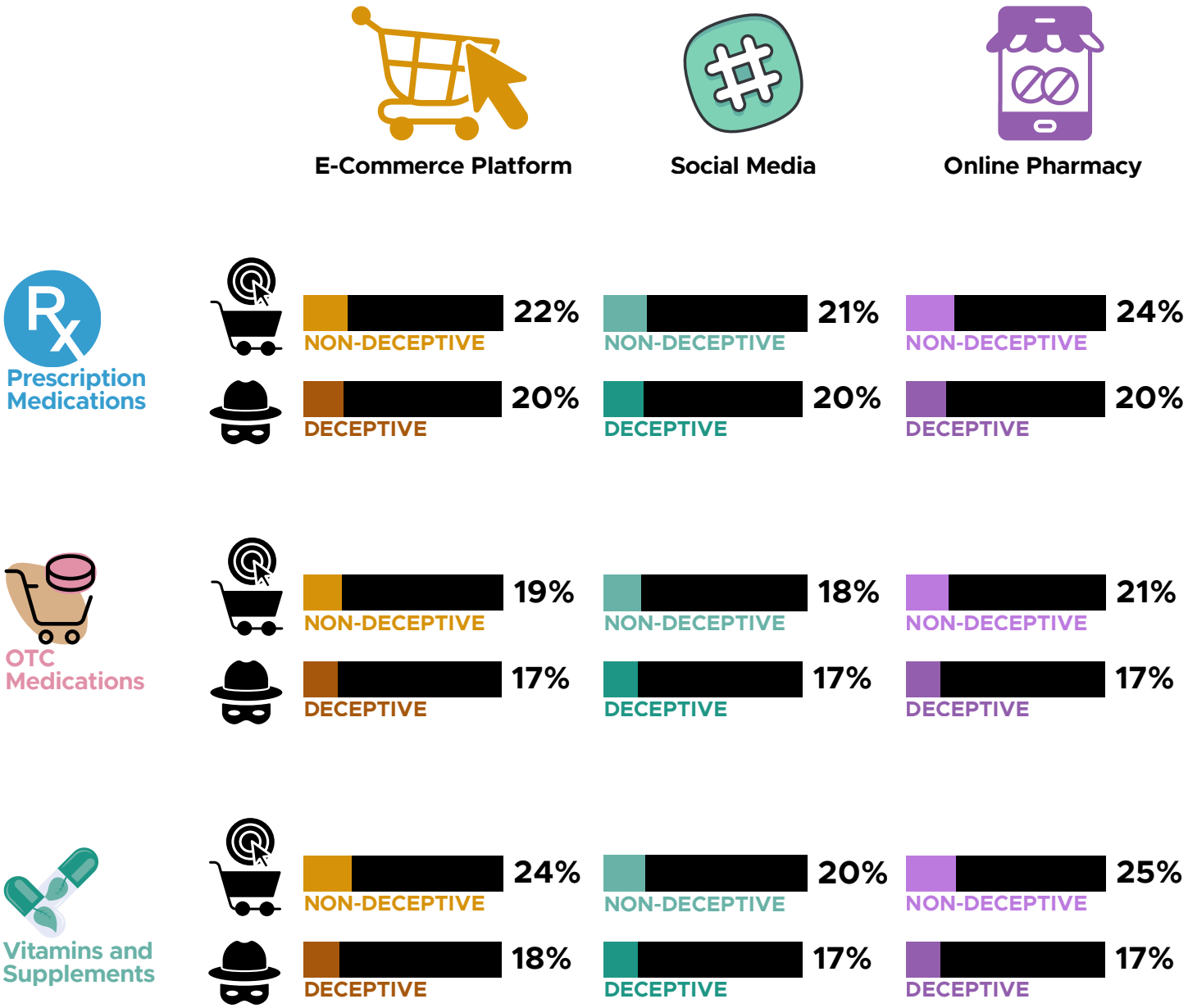


Figure 1.2.3 Percentage of all participants who have purchased counterfeit medications non-deceptively and deceptively in the past 12 months, by medication class and purchase channel, global sample.

NON-DECEPTIVE PURCHASE

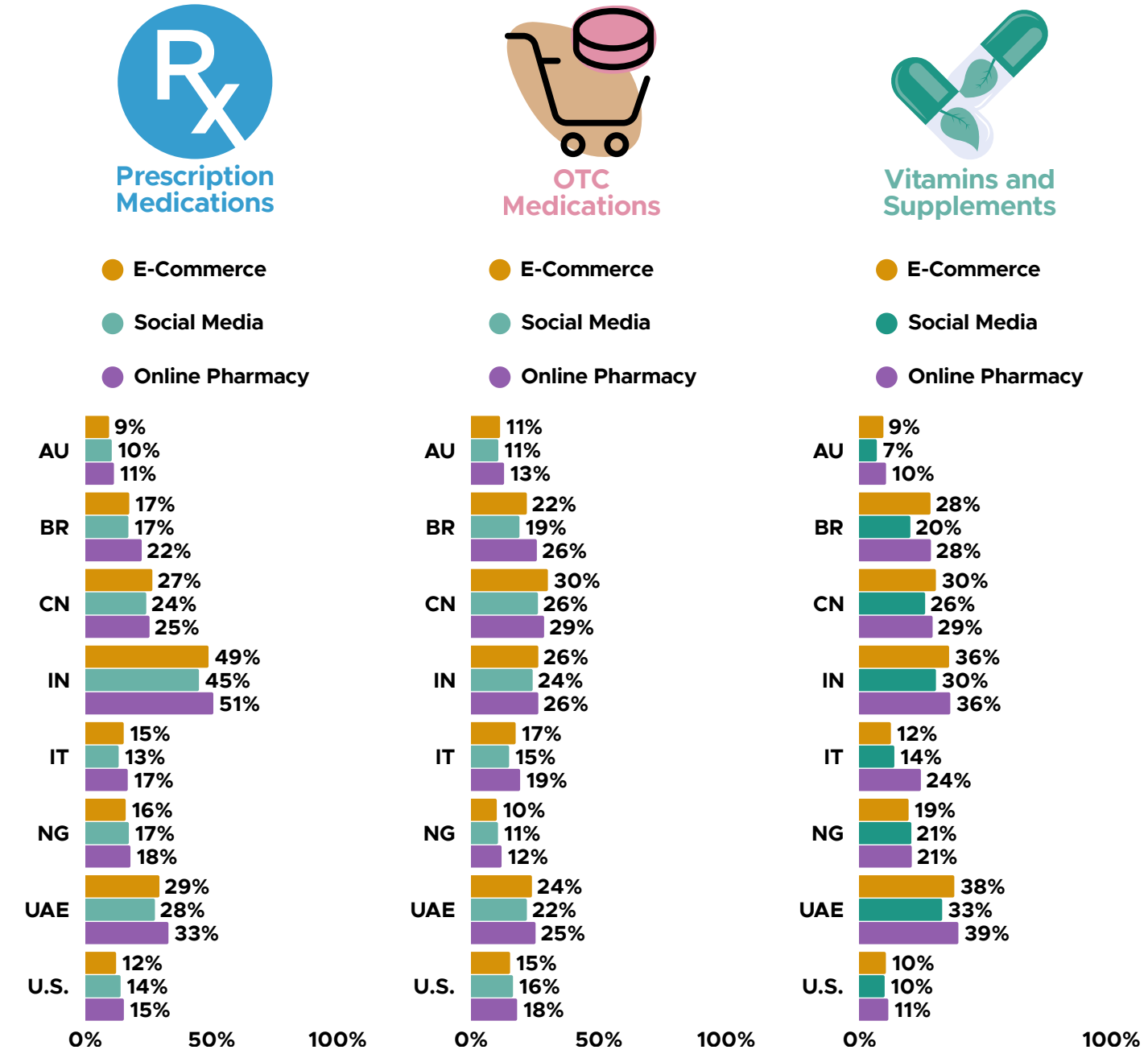


Figure 1.2.4 Percentage of all participants who have purchased counterfeit medications non-deceptively in the past 12 months, by medication class, purchase channel, and country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

DECEPTIVE PURCHASE

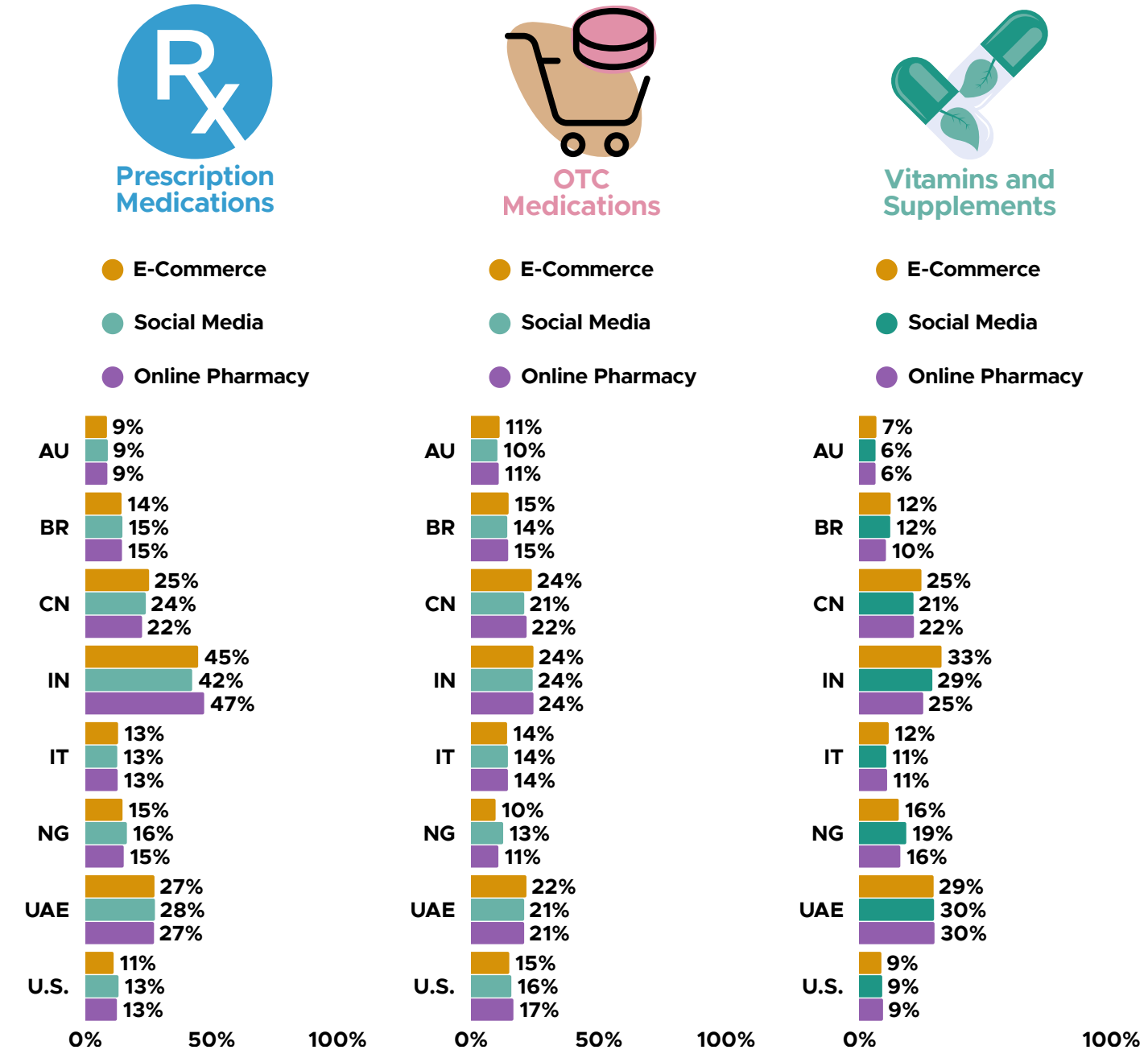


Figure 1.2.5 Percentage of all participants who were decieved into buying counterfeit medications in the past 12 months, by medication class, purchase channel, and country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Future Purchase Intentions

In this study, we asked participants about their future desires and readiness to buy both legitimate and counterfeit medications online using a seven–point scale, where the higher the mean value, the greater the intention.

Legitimate Medication Online Purchase Intentions (PI). When asked about their future purchase intentions of legitimate medications online, the mean for the global sample was 3.68, which is slightly higher than the scale mid-point, thus indicating relative acceptance and readiness to buy medications online. Indian participants expressed the highest purchase intentions (4.93) and Australian participants scored the lowest (2.51).

Counterfeit Medication Online Purchase Intentions (PI). When asked if they intend to buy counterfeit medications online, the global average was 2.51, indicating low acceptance of this behavior, with Indian participants scoring the highest (4.18) and both Australian (2.01) and Italian participants indicating the lowest means compared to the other countries.

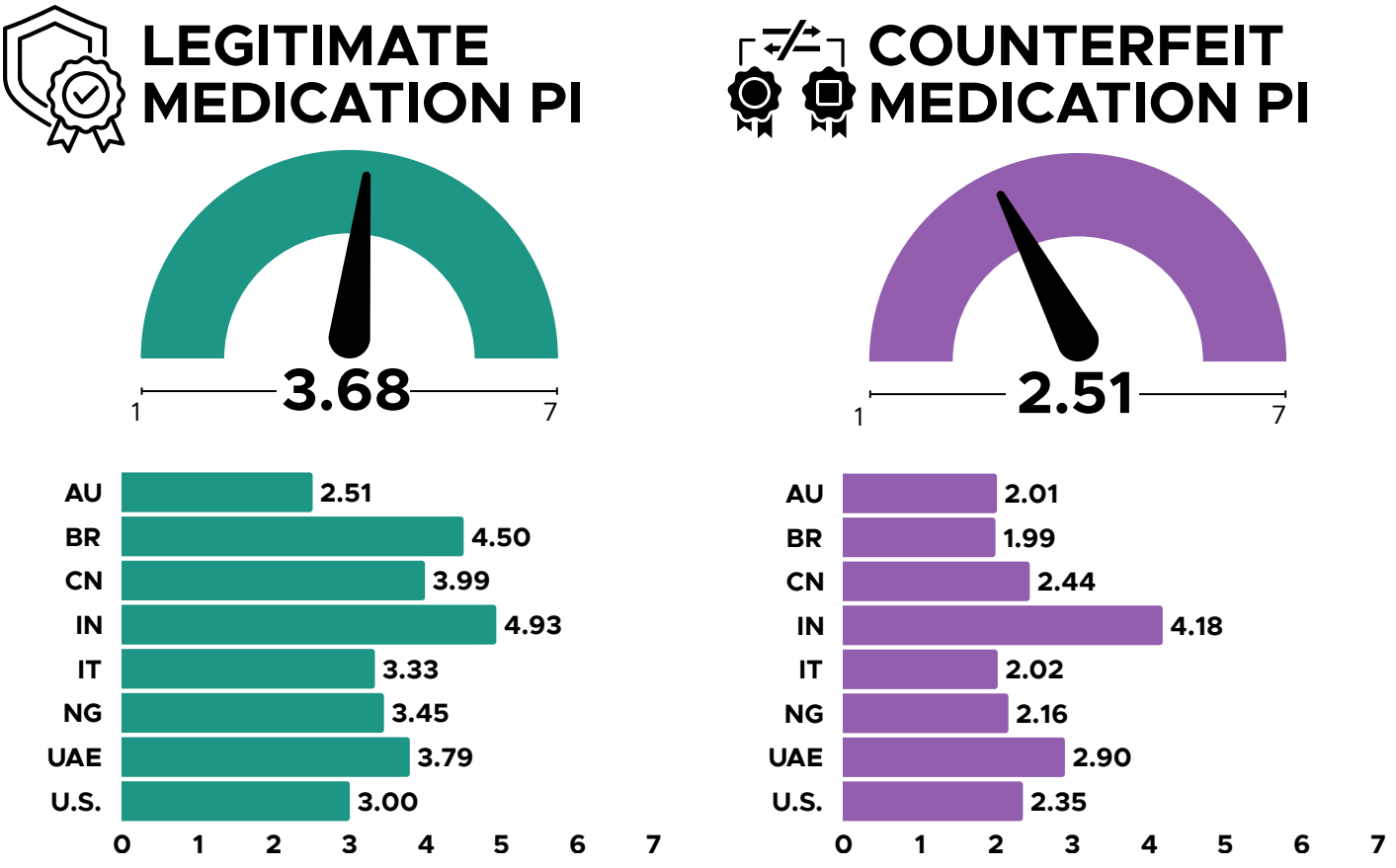


Figure 1.2.6 Means for legitimate and counterfeit medication purchase intentions for the global sample (top) and by country (bottom).

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

1.3 Counterfeit Medication Uses

Uses of Counterfeit Medications

Participants indicated that they primarily bought counterfeit medications for personal use, rather than to pass along to friends and family. Out of all the participants who indicated they had previously purchased any medication online, 36% indicated that they bought counterfeit prescription medications for personal use, while 9% gave them to a friend and 8% gave them to a family member. Similarly, 34% of those participants purchased counterfeit OTC medications for personal use, 8% gave them to friends, and 6% gave them to family. Finally, 18% of online medication buyers bought counterfeit vitamins and supplements for personal use, 4% gave them to friends, and another 4% gave them to family members. The same pattern of findings was observed across countries, as shown in Figure 1.3.2.

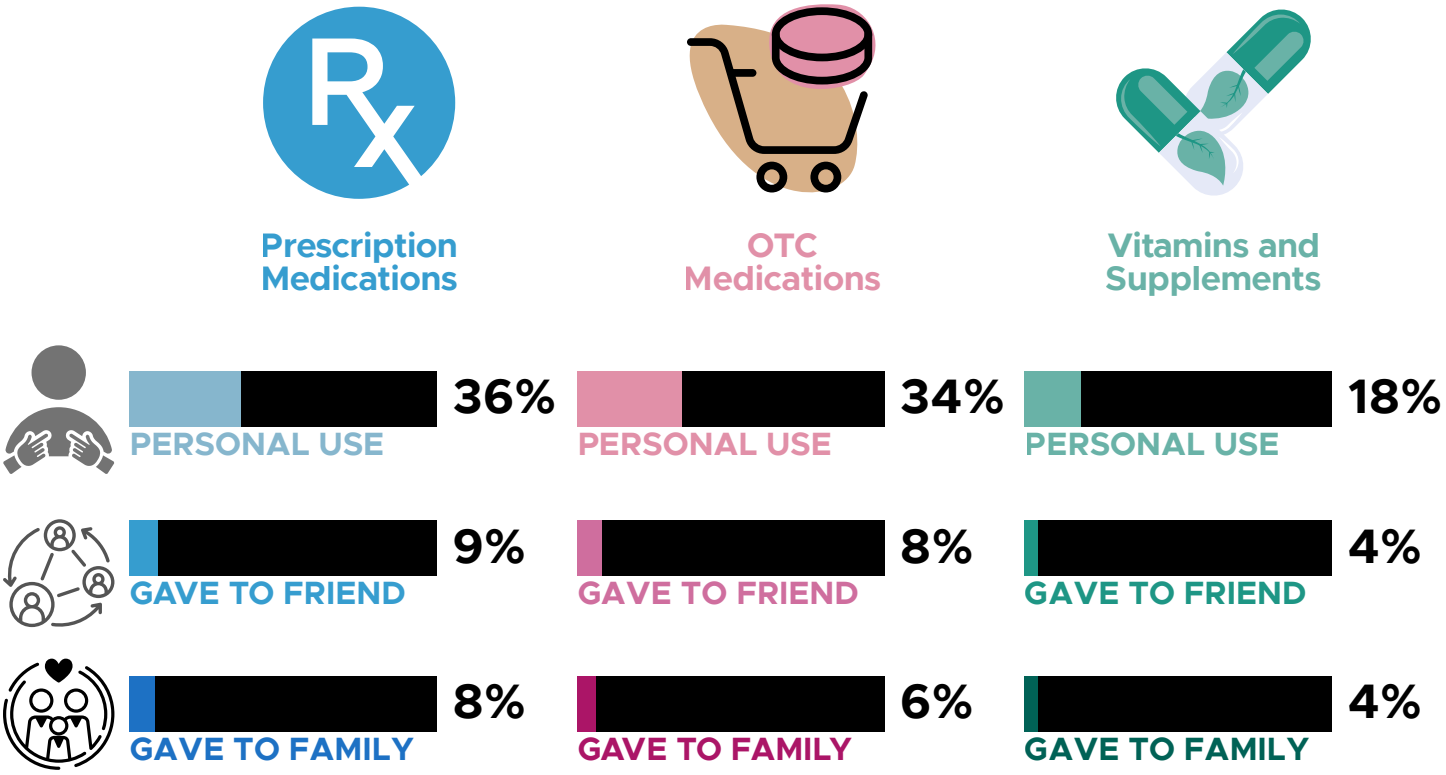


Figure 1.3.1 Uses of counterfeit medications bought online, by medication class, global sample.

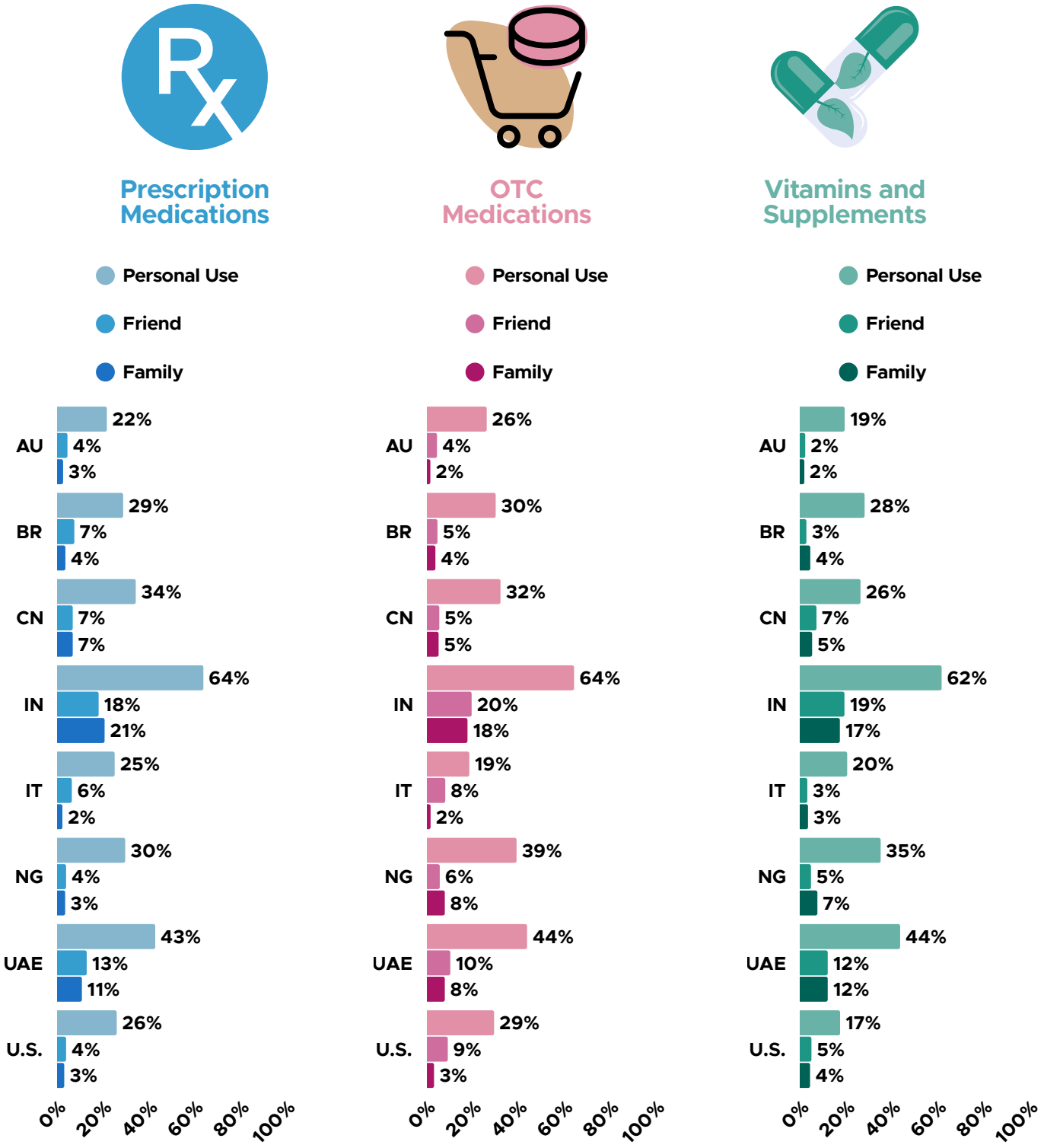


Figure 1.3.2 Uses of counterfeit medications bought online, by medication class and country.
AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Actions Taken by Participants

We asked participants about actions they took after discovering that medications they bought online were counterfeit. Of the participants who indicated they purchased any medications online, the most frequent action taken was to dispose of counterfeit medications, including prescription medication (18%), OTC medications (16%), and vitamins and supplements (8%). 16% kept and used counterfeit prescription medications, 14% kept and used counterfeit OTC medications, and 6% kept and used counterfeit vitamins and supplements. At a lower frequency, participants indicated they have kept, but not used, counterfeit medications: prescription medications (14%), OTC medications (11%), and vitamins and supplements (6%). The same pattern was observed across countries (see Figure 1.3.4).

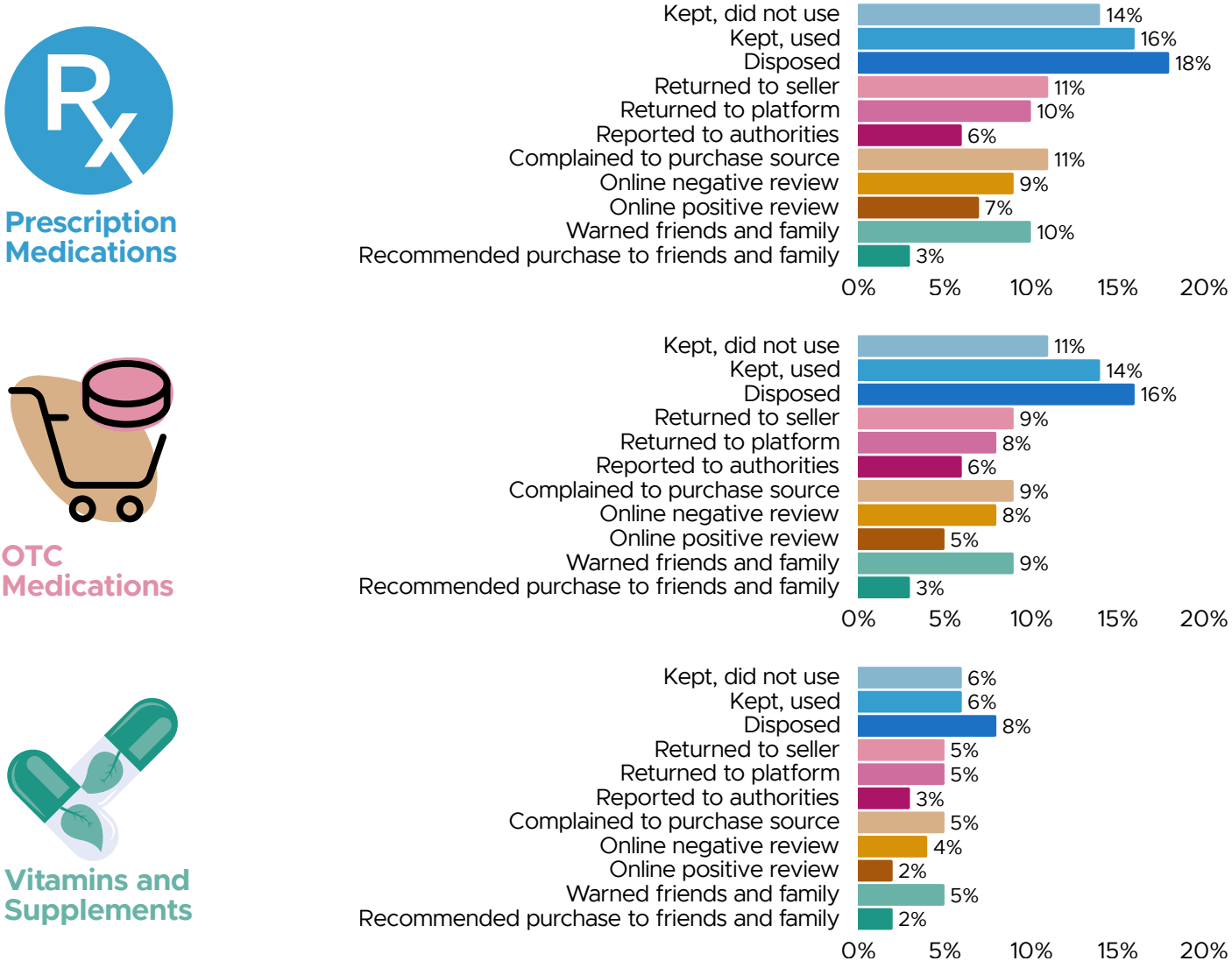


Figure 1.3.3 Frequency of actions taken by participants who were deceived into buying counterfeit medications, by medication class, global sample.

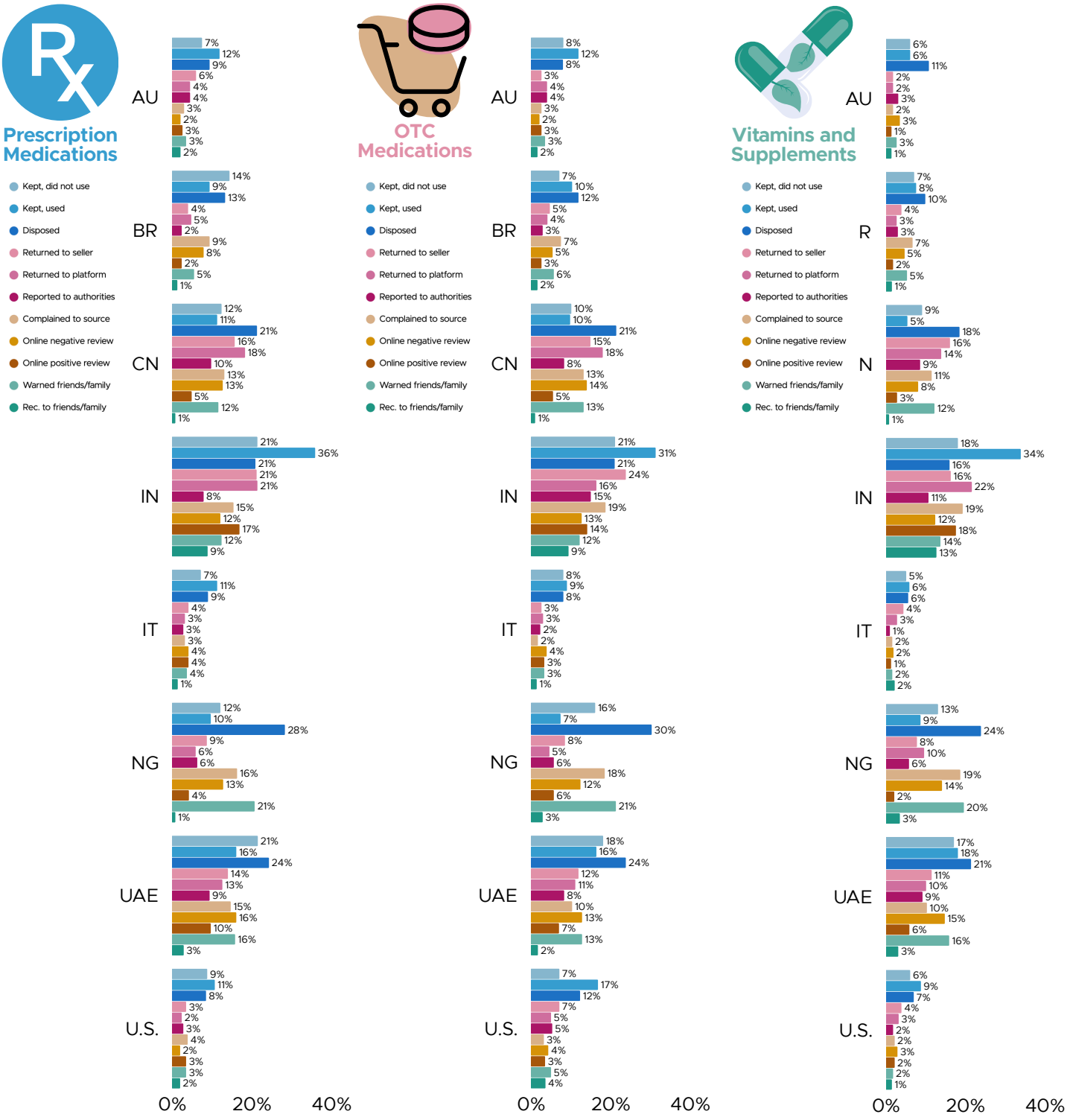


Figure 1.3.4 Frequency of actions taken by participants who were deceived into buying counterfeit medications, by medication class and country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Consequences of Deceptive Counterfeit Medication Purchase

Most participants did not report any consequences from using deceptively purchased counterfeit prescription medications (14%), OTC medications (14%), and vitamins and supplements (8%). However, when analyzing consequence patterns across medication classes, notable divergence emerged. For prescription medication, 14% of participants reported incurring negative health consequences, 13% reported a personal injury, and 14% indicated money loss. Additionally, 11% reported no health improvement, 10% reported injury or negative health consequences to someone close to them, and 9% felt embarrassed. Regarding OTC medications, 13% reported negative consequences to their own health, 13% lost money, 11% reported a personal injury, and 10% reported no health improvement. Overall, less than 10% of the sample of online medication buyers reported injury or negative health consequences to others, felt embarrassment, and compromised their personal information. Finally, as it relates to vitamins and supplements, the most frequent consequence was money loss (7%), followed by no health improvement (6%), negative consequences personal health (5%) and health of others (4%), and personal injury (4%), among other consequences.

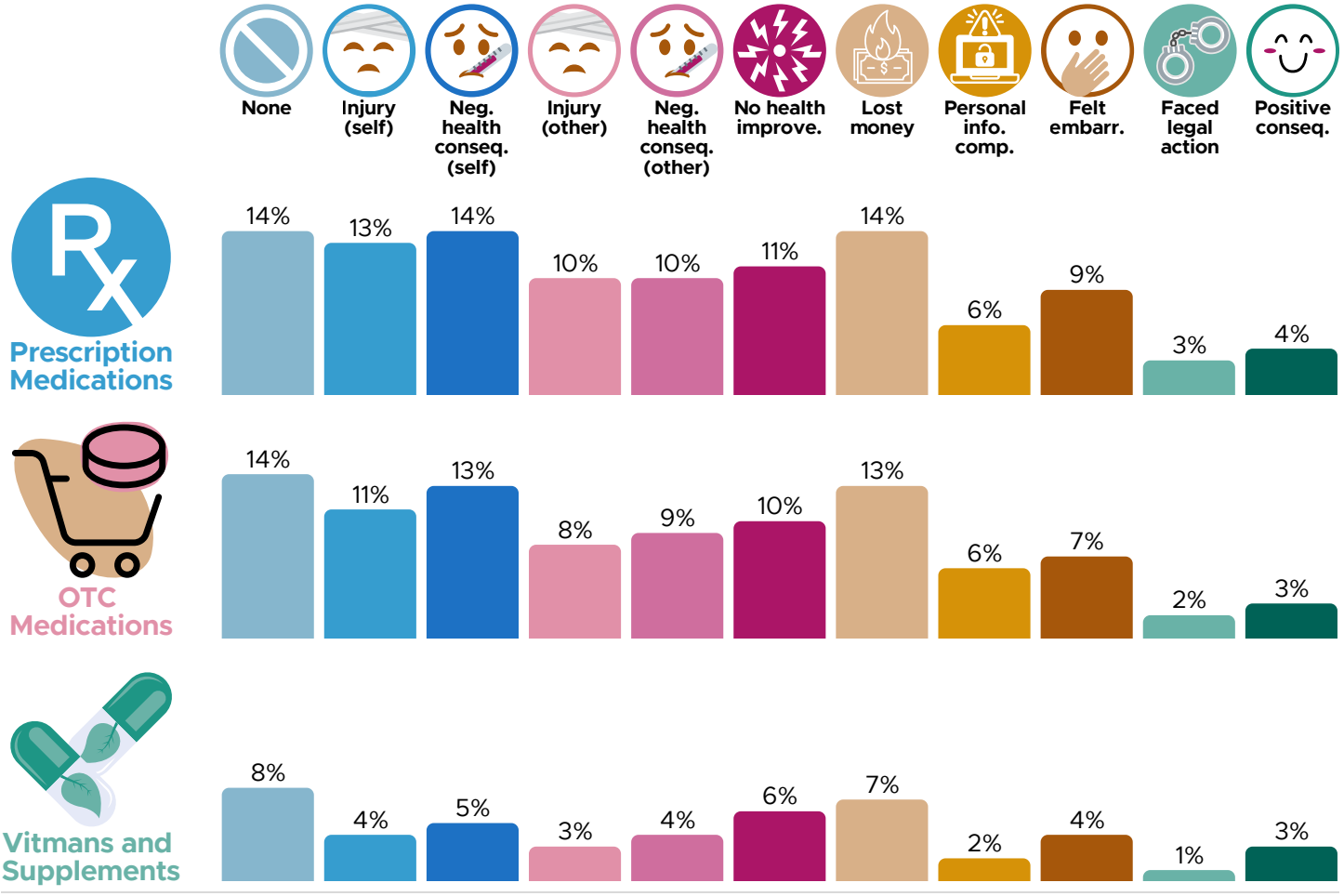


Figure 1.3.5 Consequences of using counterfeit medications, by medication class, global sample.

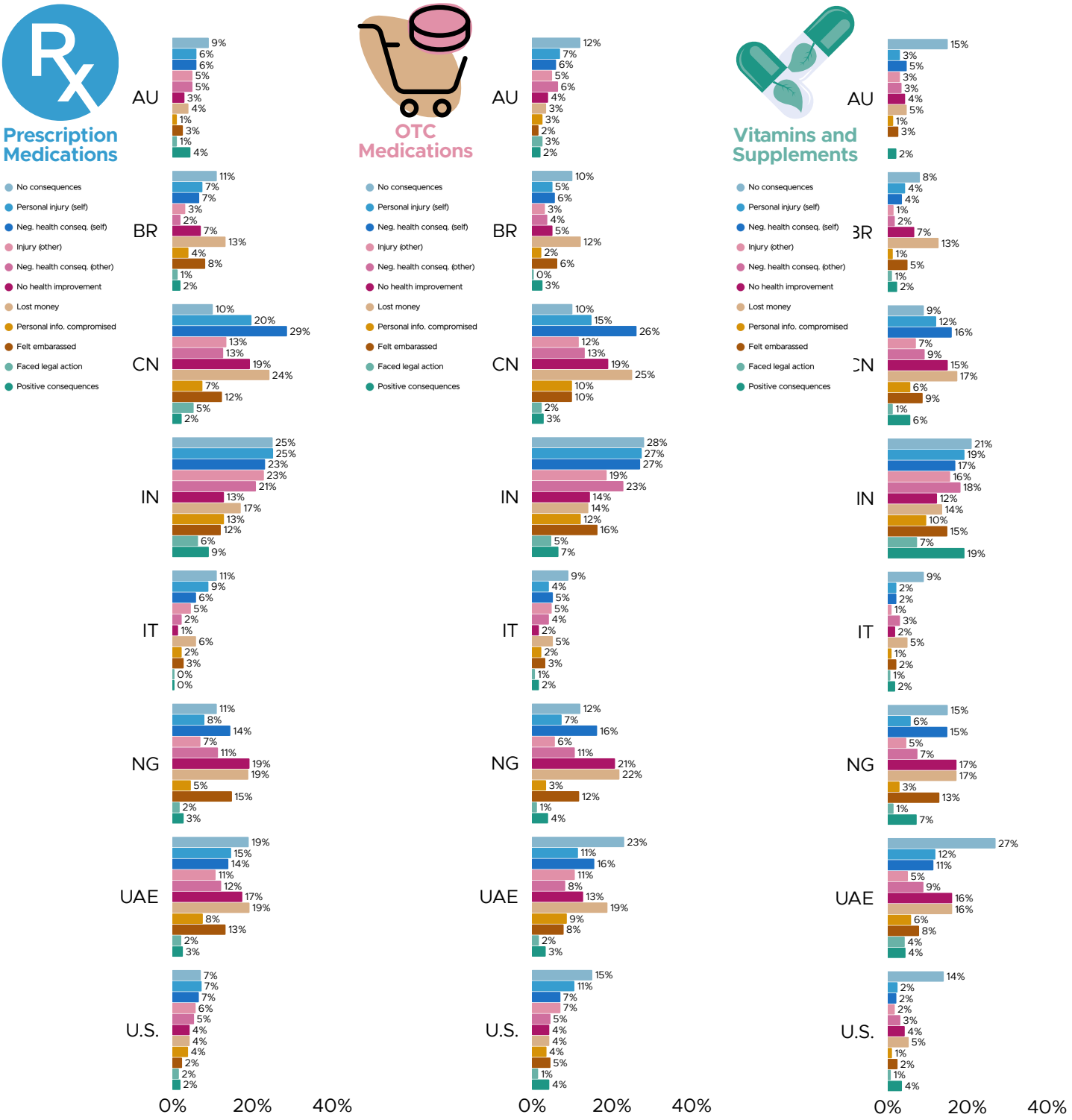
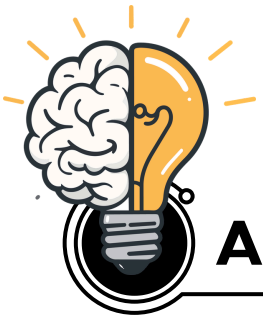


Figure 1.3.6 Consequences of using counterfeit medications, by medication class and country.
AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America



Actionable Insights

We Need to Act Now!

Participants in the global sample indicated relatively moderate intentions to buy medications online, and lower intentions to buy counterfeit medications online. Though behavioral intention measures were around or lower than the midpoint of the 7-point scale, a considerable portion of consumers have bought counterfeit medications across channels and medication types. The move toward online sources for buying medications presents an area of heightened risk due to the exponential growth in availability of counterfeit medications in online marketplaces.

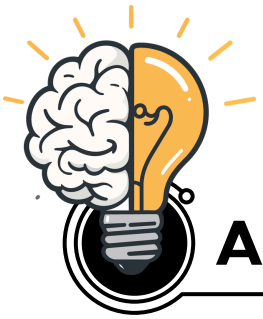
Impact on Individual Health and Healthcare Costs

Though some might see the prevalence of buying counterfeit medications online as low, it is important to situate these numbers within a broader scope of impact on individual health and healthcare costs that result from harms stemming from such risky behaviors.

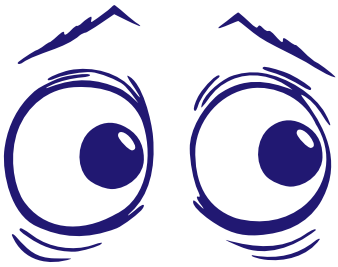
Tailored Approaches

The nature of buying medications online, and especially those that are fake, varies greatly by country. There is a need for geographically tailored approaches to communicating about the dangers of buying counterfeit medications. Such tailoring could also include country-specific information regarding the most counterfeited medications.

Though consumers primarily buy counterfeit medications for personal use, few yet non-negligible percentage of participants gave counterfeit medications to friends and family, which should inform intervention strategies and situating anti-counterfeit communication within a framework of self- and other-protection.

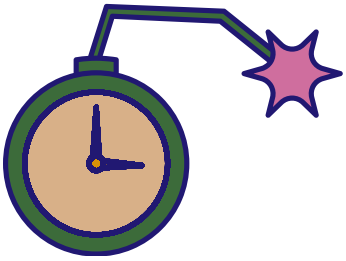


Actionable Insights



Guide Consumers Rather than Scare Them

Consumer do not have a clear mechanism of what to do when they are deceived into buying counterfeit medications. Though the top action taken by participants was to discard counterfeit medications bought deceptively, more participants who kept them reported using them instead of discarding them or refraining to use them. This is alarming and requires a multi-stakeholder approach to enhancing consumers' knowledge about the dangers of using counterfeit medications. More importantly, such efforts should also prioritize raising consumers' awareness and confidence in the types of actions that protect them against health risks and also help with anti-counterfeiting efforts by rights holders and law enforcement. Such interventions should inform consumers about clear and simple actions they can take to evade the dangers of using counterfeit medications and protect their and their loved one's health and well-being.



A Ticking Healthcare Crisis

It is no surprise that one of the top negative consequences of using counterfeit medications was related to personal harm through injury or other negative health consequences, in addition to loss of money. This is alarming and concerning and requires action. More than 1 in 10 participants who bought medications online experienced direct harm from using counterfeit drugs. Not only does this confirm global statistics regarding deaths and injuries resulting from using counterfeit medications, it begs the question about the impact of such health and well-being harms on the global and country-level healthcare system and costs. More than a quarter of participants from China and India reported negative health consequences, thus highlighting the urgent need to act!

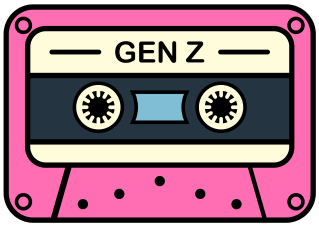
2

SOCIODEMO-GRAPHICS

tl;dr

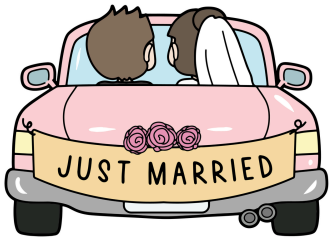
5%

Across medication types, **men** were 5% more likely to buy counterfeit medications



~1/3

About a third of **Gen Y and Gen Z** participants bought counterfeit medications; higher than older folks!



7%

Married participants were, on average, 7% more likely to buy counterfeit medications than those not married

39%

of participants with **advanced degrees** bought counterfeit prescription medications knowingly

---

10%

Participants with **high income** were 10% more likely to have bought counterfeit medications than those with low income

e-shop

Frequent online shoppers bought more counterfeit medications and want to buy medications online in the future

14%

Participants with **high health literacy** were, on average, 14% more likely to have bought counterfeit medications than those with low health literacy

Counterfeit medication buyers tend to be:

- Male
- Young
- Married
- Highly educated
- High income
- Frequenct online shopper
- Low on health literacy

2.1 Gender

Males are More Prone to Buying Fake Medicines

In the current study, we compared self-identifying male and female participants. Though our survey included non-binary and "other" categories, these percentages within the global sample were very small; thus, we limit the statistical comparison to the two majority gender categories.

Prescription Medications

Non-Deceptive Purchase

Within the global sample, 30% of male participants and 23% of female participants knowingly bought counterfeit prescription medications. Looking at by-country differences, for non-deceptive purchase of counterfeit prescription medications, males from Italy (23%), Nigeria (25%), and the U.S. (23%) reported a higher purchase frequency than their female counterparts (Italy = 12%, Nigeria = 18%, U.S. = 15%).

Deceptive Purchase

Within the global sample, 27% of males and 20% of females indicated having been deceived into buying counterfeit prescription medications. Only Italian (18%) and U.S. American (21%) male participants reported a higher deceptive purchase frequency than their female counterparts from Italy (10%) and the U.S. (14%).

OTC Medications

Non-Deceptive Purchase

Within the global sample, male participants (24%) were more likely to buy counterfeit OTC medications non-deceptively (knowingly) than their female counterparts (22%). No significant gender differences were observed for any of the countries regarding non-deceptive purchase of counterfeit OTC medications.

Deceptive Purchase

Within the global sample, gender differences were not significant when it came to deceptive purchase of counterfeit OTC medications. Gender differences were observed for deceptive purchase in China and the United States. Interestingly, Chinese females (33%) reported higher deceptive purchase frequency of counterfeit OTC medications than their male counterparts (25%), whereas male U.S. participants (25%) were more likely to have bought these medications deceptively than females (16%).

Vitamins and Supplements

Non-Deceptive Purchase

Within the global sample, no significant gender differences were observed in buying counterfeit vitamins and supplements non-deceptively (knowingly). Regarding country-level differences, females from China (40%) and Italy (33%) were more likely to have bought counterfeit vitamins and supplements non-deceptively (knowingly) than their male counterparts (China = 30%; Italy = 25%).

Deceptive Purchase
Within the global sample, male participants (23%) were more likely to have been deceived into buying fake vitamins and supplements than their female counterparts (19%). No country-level significant gender differences were observed.

Online Purchase Intentions

Legitimate Medication Online Purchase Intentions
Within the global sample, males (3.85) reported significantly higher intentions to buy legitimate medications online than females (3.54) on a 7-point scale. By-country differences showed that in Nigeria, males (3.74) indicated higher online medication purchase intention of legitimate medications than female (3.14) and among the U.S. sample, males (3.36) reported higher legitimate medications purchase intentions than females (2.91).

Counterfeit Medication Online Purchase Intentions
Within the global sample, males (2.67) expressed significantly higher intentions to buy counterfeit medications online than females (2.35). Significant gender differences in intentions to buy counterfeit medications online were observed in two of the eight countries: China (Male = 2.65, Female = 2.14) and Nigeria (Male = 2.30, Female = 1.99), where males consistently expressed greater counterfeit medication online purchase intentions than females. It is worth mentioning that, even though gender differences were not observed in other countries, Indian participants, both males and females, expressed the highest readiness to buy counterfeit medications online, where the average response was situated higher than the midpoint of the 7-point scale.

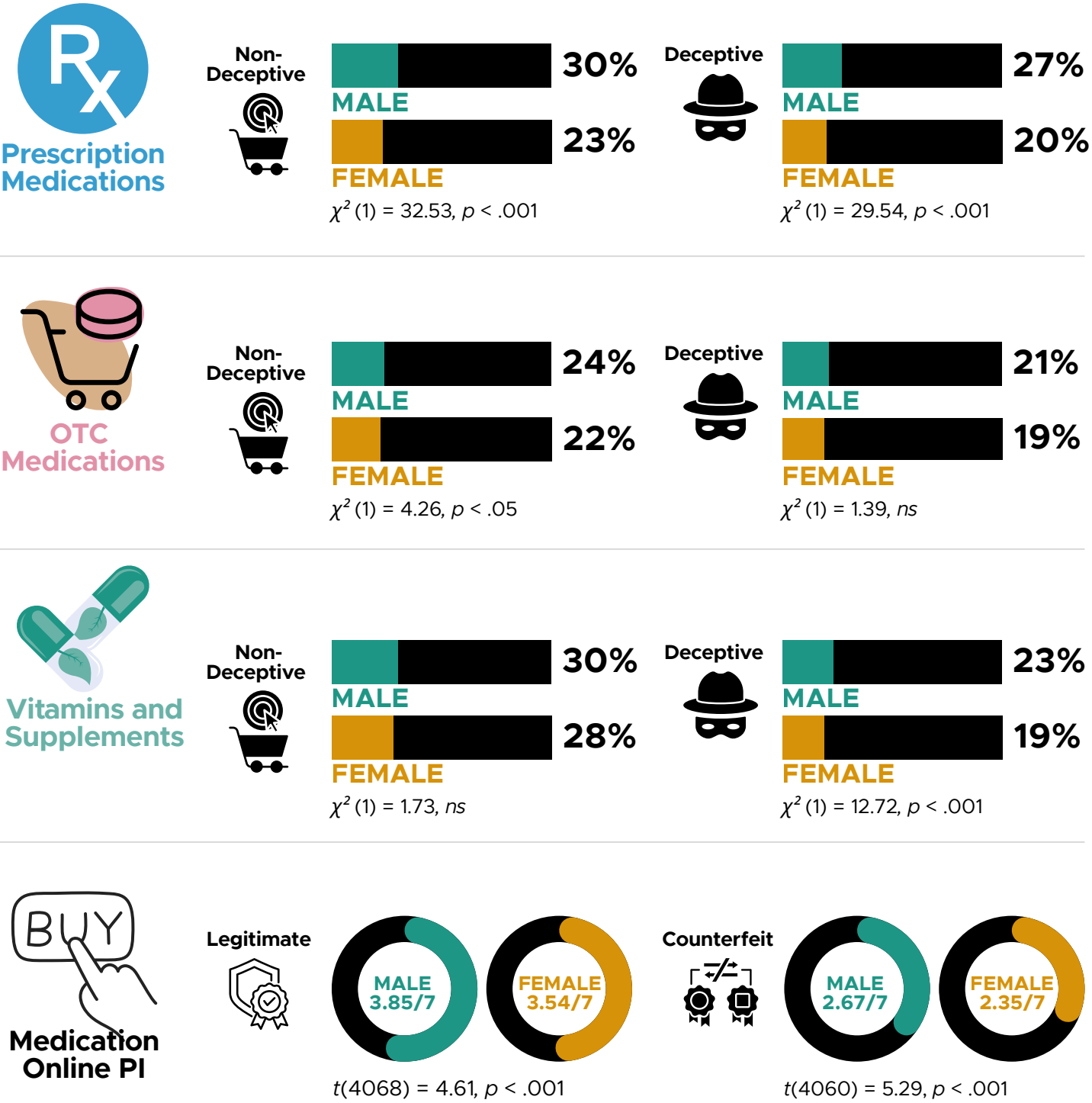


Figure 2.1.1 Gender differences in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, global sample.

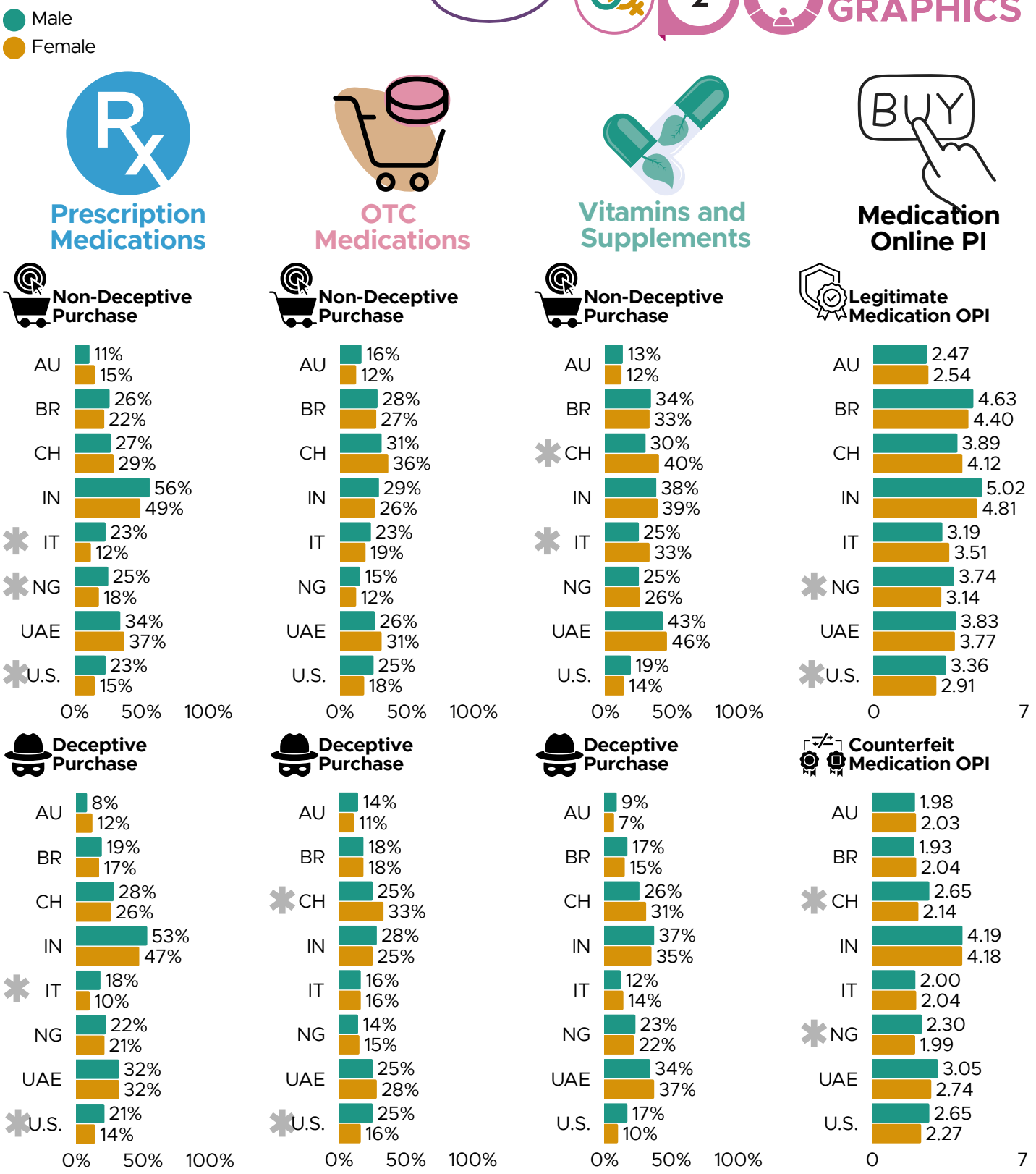


Figure 2.1.2 Gender differences in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, by country.
Significant differences noted with (*); AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

2.2 Age

Is it a Gen Z Problem?

We examined age differences in counterfeit medication purchase among four generational groups based on their self-reported birth year: Baby Boomers and older (Boomers+, born before 1964), Generation X (Gen X, born between 1965 and 1980), Generation Y (Gen Y, born between 1981 and 1996), and Generation Z (Gen Z, born between 1997 and 2012). Across the board, we observed that younger participants were more likely to indicate having bought counterfeit medications, both knowingly and unknowingly. Surprisingly, Gen Y and Gen Z participants were not very different in their counterfeit medication purchase behaviors, and in some cases (as noted below) Gen Y participants were more likely to engage in such risky behaviors, in some cases. Significant generational differences are reported below.

Prescription Medications

Non-Deceptive Purchase

Within the global sample, Boomers+ indicated the lowest frequency (8%) of non-deceptive purchase of counterfeit prescription medications, compared to Gen X (17%), Gen Y (32%), and Gen Z (34%), respectively. Country-level differences were observed in six of the eight countries (Australia, Brazil, China, Italy, UAE, and U.S.), with a mixed pattern of generational differences. Across these six countries, a clear generational divide was observed, where Boomers+ and Gen X reported significantly lower non-deceptive purchase frequency than younger generations of Gen Y and Gen Z. For participants from Australia, Italy, UAE, and U.S.., Boomers+ reported the lowest frequency, while in Brazil and China, it was Gen Xers who reported the lowest frequency. In contrast, Gen Y participants from Australia, China, Italy, and the U.S. reported the highest non-deceptive purchase frequency, compared to Brazil and UAE, where it was Gen Zers who reported the highest frequency.

Deceptive Purchase

Within the global sample, Boomers+ (4%) reported the lowest frequency of being deceived into buying counterfeit prescription medications, followed by Gen X (14%), Gen Y (29%), and Gen Z (31%) participants, respectively. Generational differences were observed among participants from Australia, Brazil, China, Italy, UAE and U.S. Across these six countries, Gen Z participants were the most likely to have been deceived into buying counterfeit prescription medications, except for the U.S. sample where Gen Y participants reported the highest frequency.

OTC Medications

Non-Deceptive Purchase

Within the global sample, Gen Y participants (27%) reported the highest frequency of knowingly buying counterfeit OTC medications, followed by Gen Z (25%), Gen X (20%), and Boomers+ (7%). Within-country differences were observed in Australia, Italy, and the U.S. Specifically, Gen Y reported the highest prevalence of knowingly buying OTC medications in Australia and Italy, while U.S. Gen Z participants reported the highest frequency.

Deceptive Purchase
Within the global sample, Gen Y participants reported the highest frequency (24%), followed by Gen Z (22%), Gen X (17%), and Boomers+ (4%). Similar to non-deceptive purchase, generational differences were observed in Australia, Italy, and the U.S., with Gen Y participants from Australia and Italy indicating the highest purchase frequency, and U.S. Gen Z participants with the highest frequency.

Vitamins and Supplements
Non-Deceptive Purchase
Within the global sample, Gen Y participants reported the highest frequency (34%) of non-deceptive purchase of counterfeit vitamins and supplements, followed by Gen Z (31%), Gen X (25%), and Boomers+ (13%), respectively. Within-country generational differences were observed in four of the eight countries: Australia, Brazil, India, and the U.S., where Gen Z participants in Australia and the U.S. reported the highest frequency, while Gen Y participants in Brazil and India were the highest in terms of knowingly buying counterfeit vitamins and supplements.

Deceptive Purchase
Within the global sample, Gen Y (27%) and Gen Z (26%) reported the highest frequency, followed by Gen X (14%) and Boomers+ (4%), respectively. Generational differences were observed in all countries, except China and Nigeria. Specifically, Gen Z participants from Australia and the U.S. reported the highest frequency of being deceived into buying counterfeit vitamins and supplements, whereas Gen Y participants from Brazil, India, Italy, and the UAE reported the highest frequency.

Online Purchase Intentions
Legitimate Medication Online Purchase Intentions
Within the global sample, Gen Y participants (4.07) expressed significantly higher intentions to buy legitimate medications online, followed by Gen Z (3.95), Gen X (3.37), and Boomers+ (2.30), respectively. Within-country differences in legitimate medication online purchase intentions were observed in all countries, except Nigeria. Gen Y participants from Australia, Brazil, China, India, Italy, and the UAE indicated the highest online purchase intentions of legitimate medications, while Gen Z participants from the U.S. reported the highest intentions. It is worth noting, however, that Gen Y and Gen X participants from India reported the highest intentions compared to other generational groups. In Italy, Gen X, Gen Y, and Gen Z participants reported relatively similar intentions.

Counterfeit Medication Online Purchase Intentions
Within the global sample, Gen Z participants (2.97) reported the highest counterfeit medications online purchase intentions, followed by Gen Y (2.74), Gen X (2.16), and Boomers+ (1.36). Within-country differences were observed for all countries, except China and Nigeria. Gen Y participants from Australia, India, and Italy reported the highest intentions to buy counterfeit medications online, while Gen Z participants from Brazil, the UAE, and the U.S. reported the highest mean for such intentions compared to other generational groups. Consistently, older adults reported significantly lower intentions to buy counterfeit medications online.

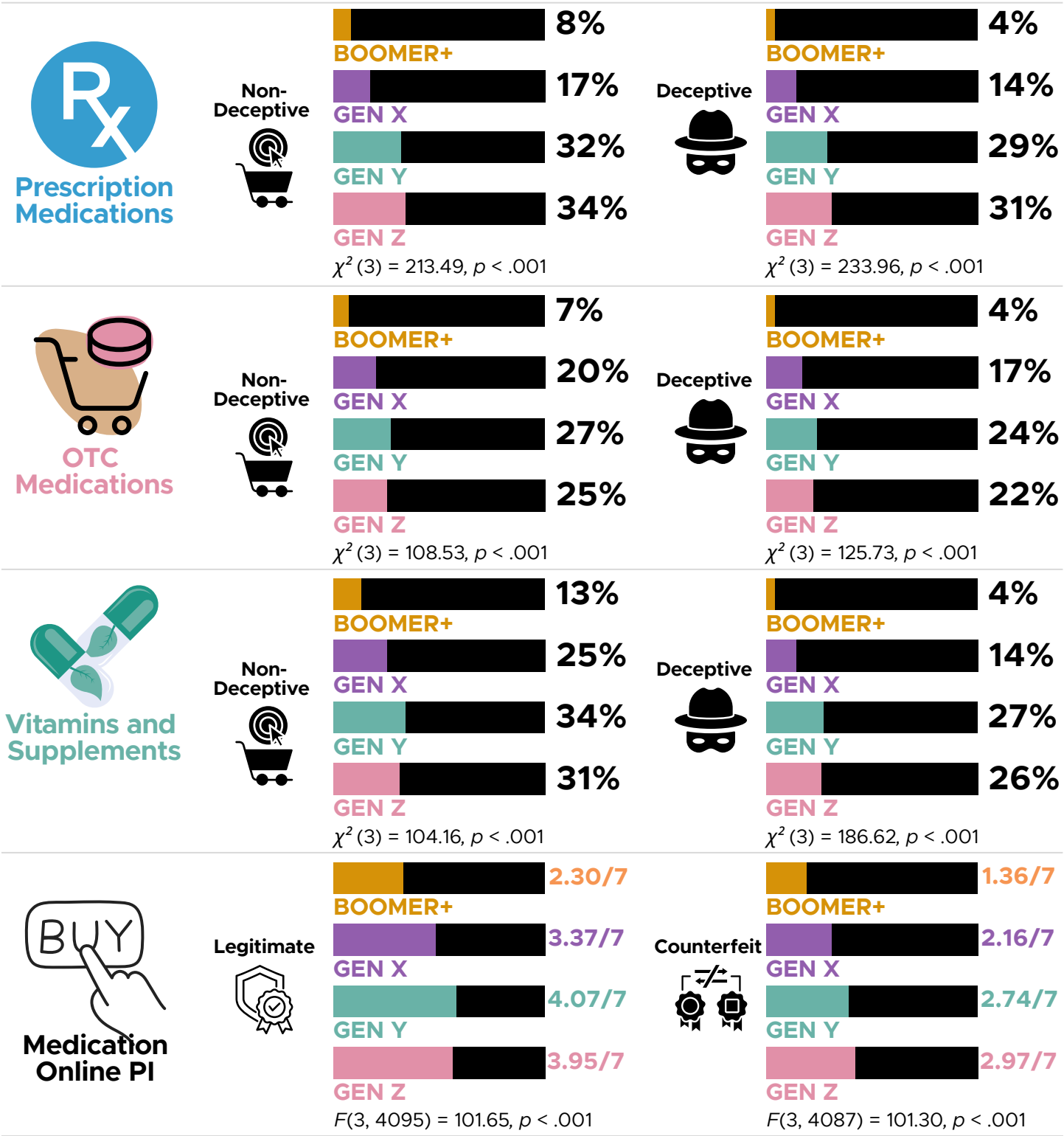


Figure 2.2.1 Generational differences in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, global sample.

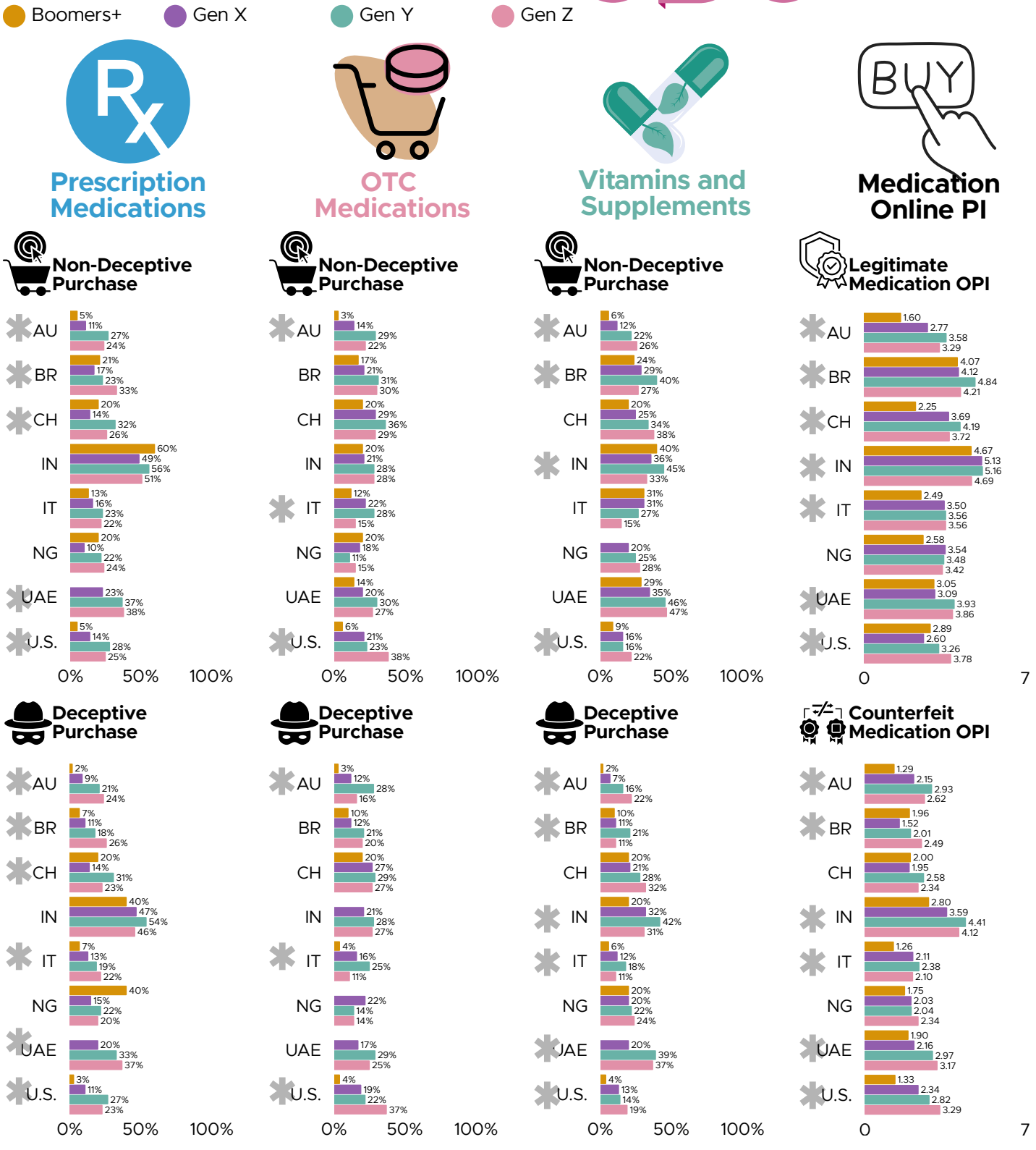


Figure 2.2.2 Generational differences in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, by country.
Significant differences noted with (*); AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

2.3 Marital Status

What's Marriage Got to Do with Buying Counterfeit Medications?

Our survey asked participants to indicate their marital status by choosing from a set of options that included married, widowed, divorced, separated, and never married. Upon examining the data, we found that more than half of the global sample (54%) indicated they are married, compared to the other categories of individuals who were not married. Thus, we categorized the marital status variable into married vs. not married for ease of interpretation. Statistically significant differences are reported below.

Prescription Medications

Non-Deceptive Purchase

Within the global sample, 30% of married participants indicated they knowingly purchased counterfeit prescription medications in the past 12 months, compared to only 22% of those not married. Differences between participants who were married and not married observed in Australia, China, India, and the UAE; all of which indicated higher purchase prevalence of those married compared to their not married counterparts.

Deceptive Purchase

Within the global sample, more than a quarter of married participants (27%) indicated they were deceived into buying counterfeit prescription medications, compared to 19% of those not married. Country-level differences based on marital status were observed in China, India, and the UAE, where married participants indicated higher purchase prevalence than not married participants.

OTC Medications

Non-Deceptive Purchase

Within the global sample, 25% of married participants indicated they knowingly bought counterfeit OTC medications, compared to one in five (20%) of those not married. Married participants from Brazil, China, and the UAE indicated significantly higher non-deceptive purchase of counterfeit OTC medications than their not married counterparts.

Deceptive Purchase

Within the global sample, 22% of married participants indicated they were deceived into buying counterfeit OTC medications, compared to 17% of those not married. Country-level differences were only observed among participants from the UAE, where married participants indicated higher deceptive purchase than their not married counterparts .

Vitamins and Supplements

Non-Deceptive Purchase

Within the global sample, over a third of married participants (34%) indicated they knowingly bought counterfeit vitamins and supplements online, compared to 23% of not married participants.

Country-level differences based on marital status were observed among participants from Brazil, the UAE, and the U.S., all of which showed that married participants reported higher purchase frequency than those not married.

Deceptive Purchase
Within the global sample, 24% of married participants indicated they were deceived into buying counterfeit vitamins and supplements online, compared to 17% not married participants. Country-level differences were observed in Brazil, India, and the U.S., where married participants indicated greater frequency of being deceived into buying counterfeit vitamins and supplements compared to not married participants.

Online Purchase Intentions

Legitimate Medication Online Purchase Intentions
Within the global sample, married participants expressed higher intentions to buy legitimate medications online (3.96) compared to not married participants (3.35). Similarly, married participants from Brazil, China, India, Italy, Nigeria, and the U.S. indicated higher intentions to buy medication online than not married participants.

Counterfeit Medication Online Purchase Intentions
Within the global sample, married participants (2.60) expressed greater intentions to buy counterfeit medication online compared to not married participants (2.39). Country-level differences were only observed in China and India, where married participants expressed higher counterfeit purchase intentions compared to not married participants.

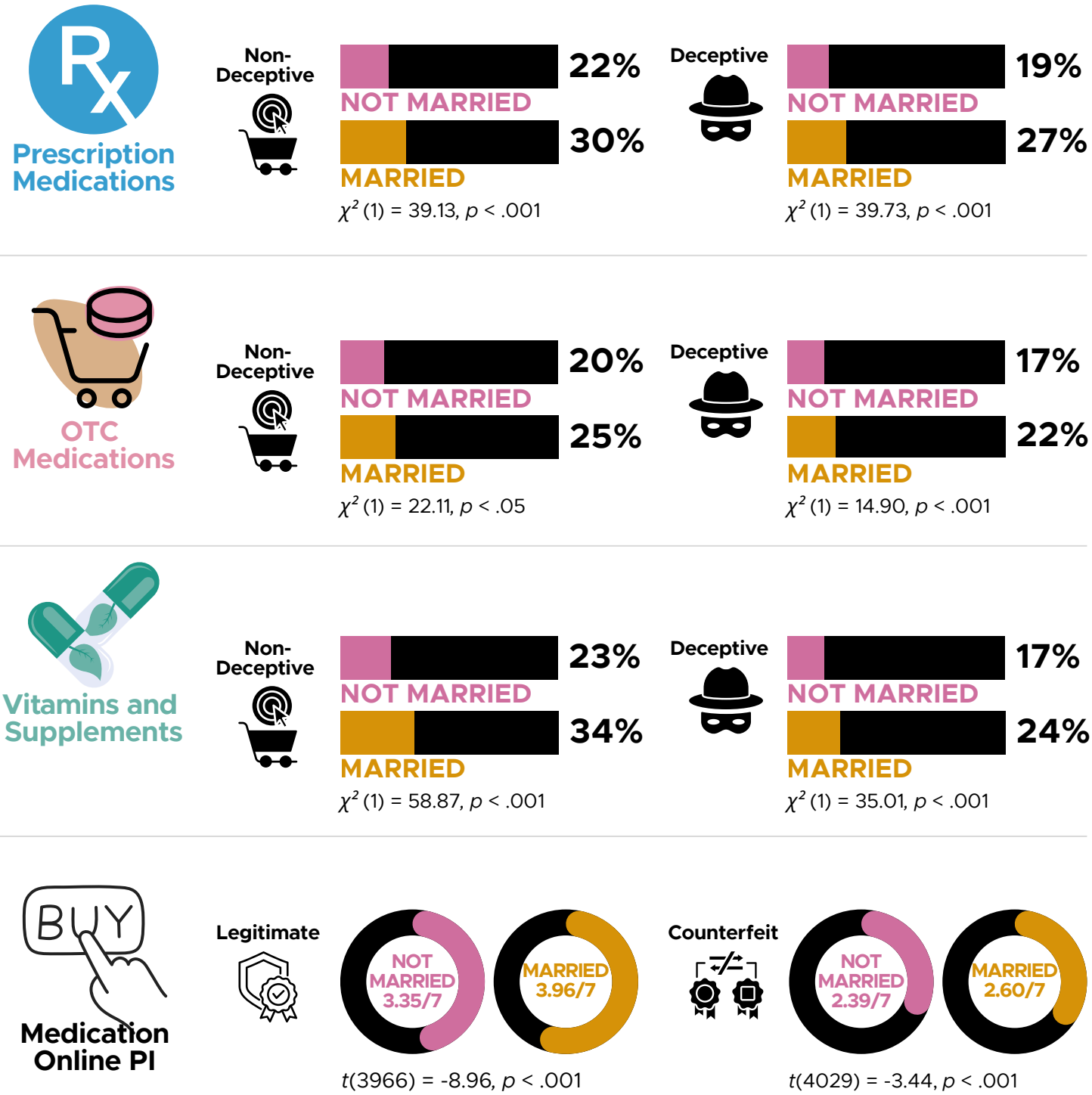


Figure 2.3.1 Differences as a function of marital status in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, global sample.

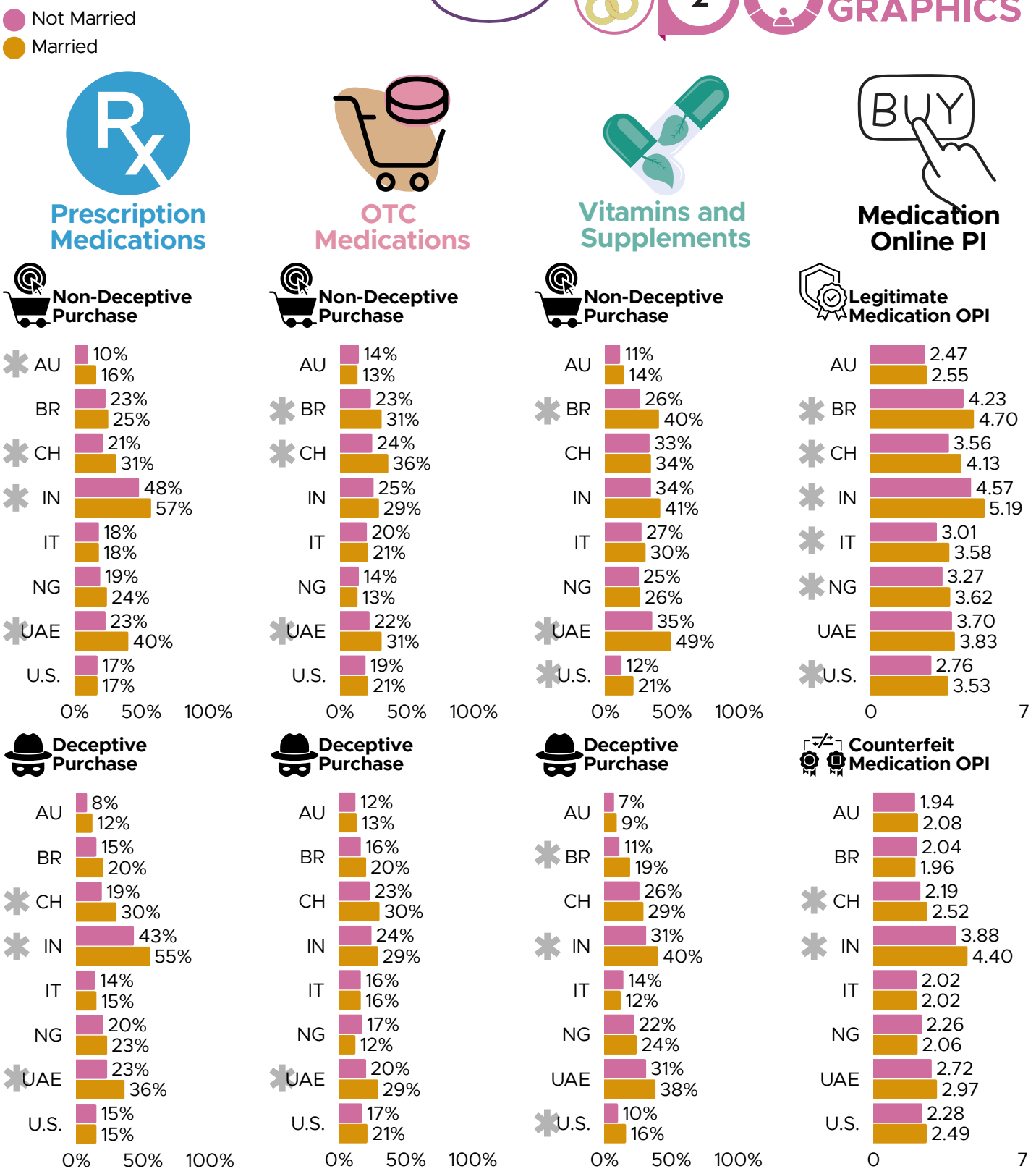


Figure 2.3.2 Differences as a function of marital status in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, by country.

Significant differences noted with (*); AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

2.4 Education

Counterintuitive Findings

Our survey measured different levels of education that were grouped into three categories: high school or less; college education, including both associate's and/or bachelor's degree; and advanced degrees (i.e., MA, Ph.D., J.D., MD, etc.). We report significant differences below.

Prescription Medications

Non-Deceptive Purchase

Within the global sample, 20% of participants with high school or less education indicated they knowingly bought counterfeit prescription medications, followed by college-educated participants (26%), and those with an advanced degree (39%). Country-level differences were only observed in India and Italy, showing a similar pattern of higher purchase frequency among those with advanced degrees, followed by college-educated participants, and those with high school diplomas or less.

Deceptive Purchase

Within the global sample, 18% of those with high school diplomas or less were deceived into purchasing counterfeit prescription medications, followed by college-educated participants (23%), and those with advanced degrees (36%). Country-level differences were observed among participants from India, Italy, and the UAE, showing that those with advanced degrees reported higher frequency of deceptive purchase than their counterparts with lower levels of education.

OTC Medications

Non-Deceptive Purchase

Within the global sample, 18% of those with high school diplomas or less knowingly bought counterfeit OTC medications, followed by college-educated participants (24%) and those with advanced degrees (29%), respectively. Country-level differences showed that participants with advanced degrees from Australia, Italy, and the UAE were more frequent non-deceptive buyers than their less-educated counterparts.

Deceptive Purchase

Within the global sample, 15% of participants with high school diplomas or less were deceived into buying counterfeit OTC medications, followed by college-educated participants (20%) and those with advanced degrees (27%), respectively. Participants with advanced degrees from Australia, Italy, and the UAE were more likely to have been deceived into buying OTC counterfeit medications than their less-educated counterparts.

Vitamins and Supplements

Non-Deceptive Purchase

Within the global sample, 23% of those with high school diplomas or less knowingly bought counterfeit vitamins and supplements, followed by college-educated participants (30%) and those with advanced degrees (36%), respectively. No significant differences were observed for non-

deceptive purchase of counterfeit vitamins and supplements as a function of education in any of the country samples.

Deceptive Purchase
Within the global sample, 14% of those with high school diplomas or less reported having been deceived into buying counterfeit vitamins and supplements online, followed by college-educated participants (22%) and those with advanced degrees (31%). Participants with advanced degrees from Australia and Nigeria were more likely to have been deceived into buying counterfeit vitamins and supplements than their less-educated counterparts.

Online Purchase Intentions

Legitimate Medication Online Purchase Intentions
Within the global sample, more educated participants, specifically those with advanced degrees, reported the highest mean for legitimate medication online purchase intentions (4.50), followed by college-educated participants (3.27) and those with high school diplomas or less (3.14). Significant mean differences were observed in all countries, except China and Nigeria, with a uniform pattern of higher purchase intentions among those with advanced degrees compared to less-educated participants.

Counterfeit Medication Online Purchase Intentions
Within the global sample, participants with advanced degrees expressed the highest intentions to buy counterfeit medications online (3.19), followed by college-educated participants (2.40) and those with high school diplomas or less (2.31). Participants from Australia, China, Italy, and the UAE showed significant differences in counterfeit medication purchase intentions online. In all four countries, those with advanced degrees were the most likely to want to buy counterfeit medications online. However, Australian and Italian participants who were less educated (high school or less and college-educated) reported relatively similar low intentions to buy counterfeit medications online, while participants from China and the UAE with lower educational levels (high school or less) reported higher intentions than college-educated participants.

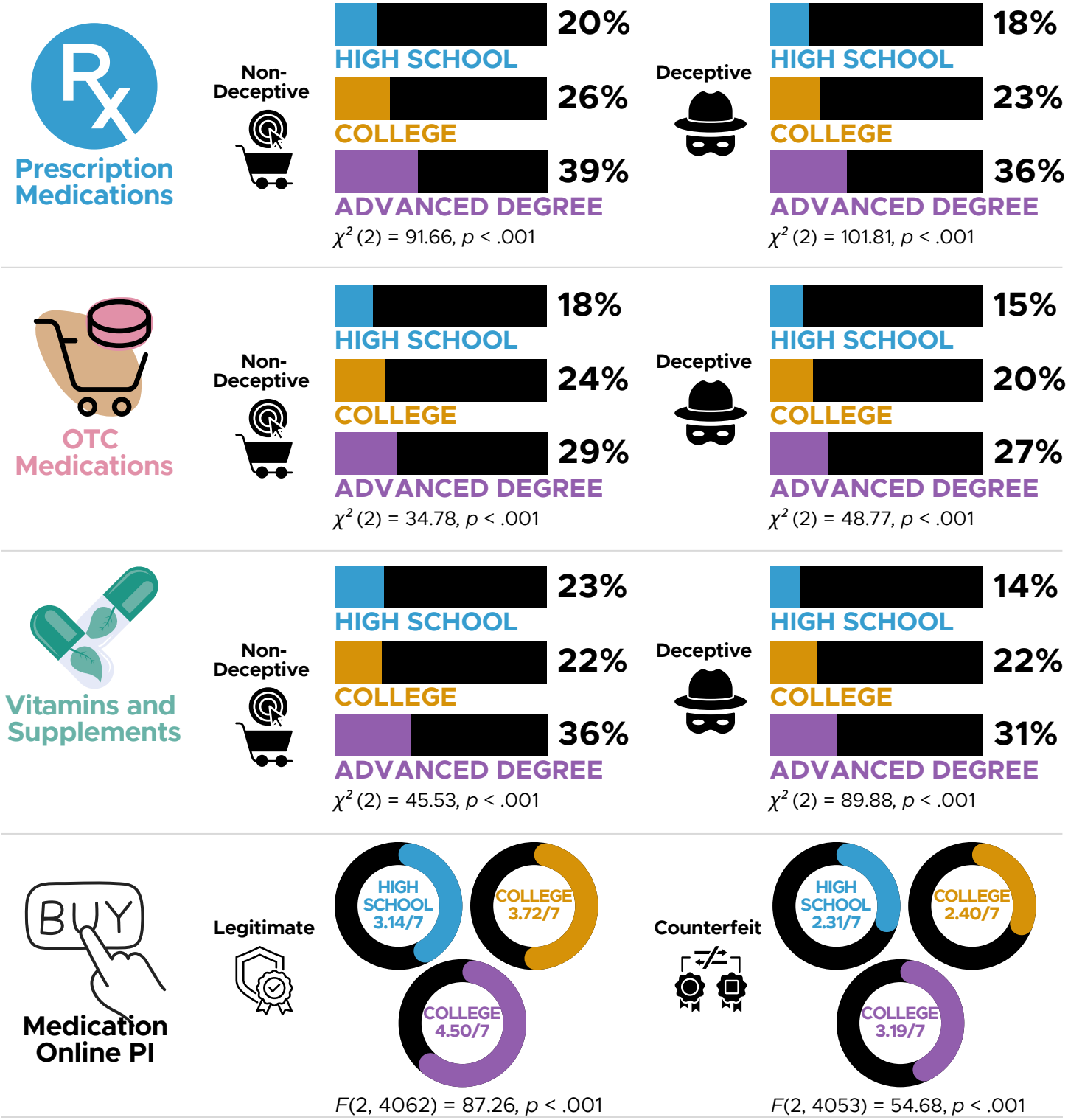


Figure 2.4.1 Differences as a function of education in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, global sample.

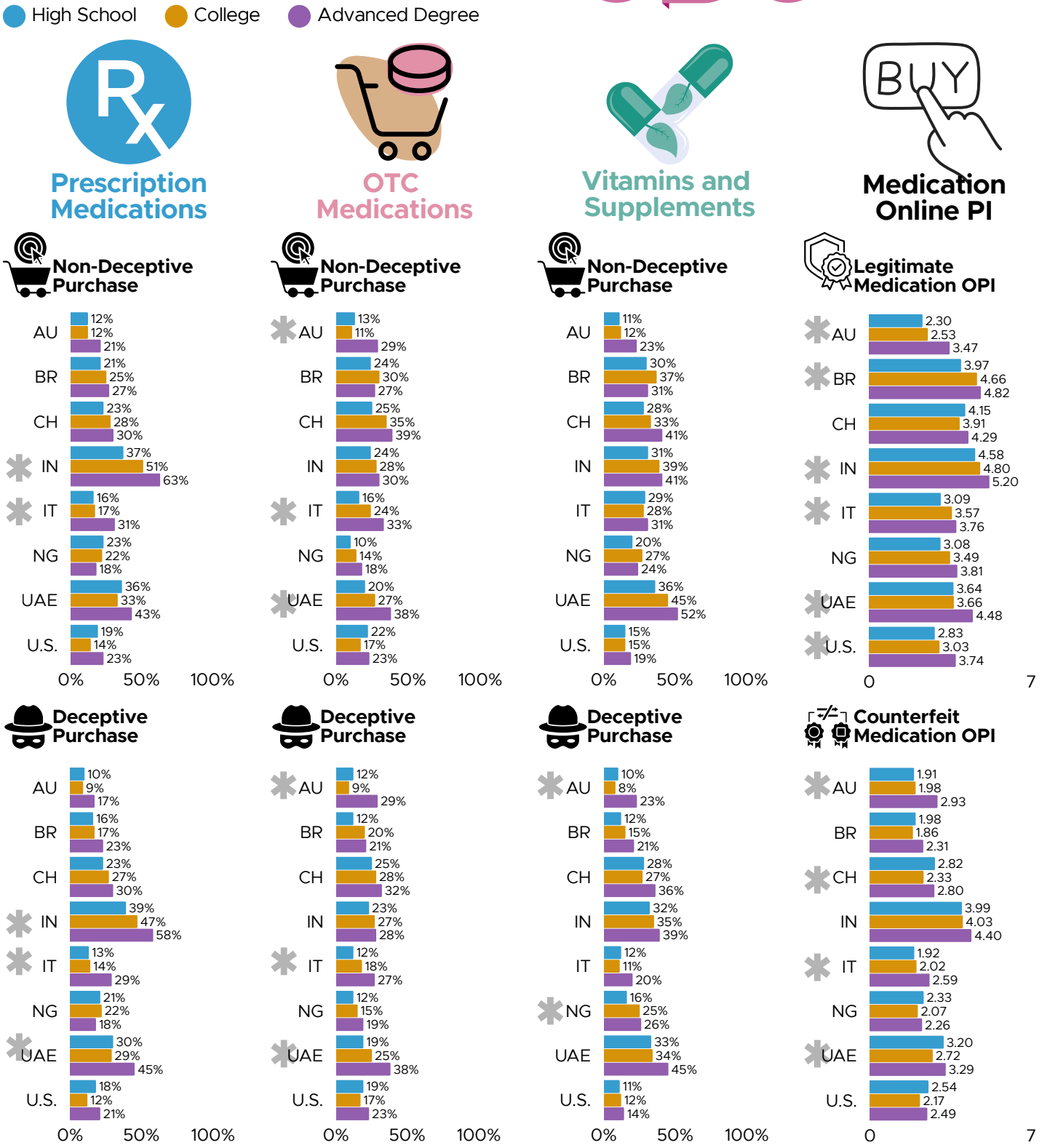


Figure 2.4.2 Differences as a function of education in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, by country.

Significant differences noted with (*); AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

2.5 Income

More Money, More Counterfeit Purchasing

Income level was measured using a multi-category variable that was tailored to each of the participating countries. For each country, income was adjusted in terms of currency and normative mode of income reporting (monthly vs. annually). The mid-category was also adjusted based on median income levels in each country. The multi-categorical measure was then reduced to a three-level variable of low, medium, and high income levels. We report significant differences below.

Prescription Medications

Non-Deceptive Purchase

Within the global sample, 31% of those with high income levels reported knowingly buying counterfeit medications online in the past 12 months, followed by those with medium (27%) and low (22%) income levels, respectively. Income-level differences were observed among the samples from Australia, China, India, and the UAE, each with its own pattern of results. In Australia, the highest non-deceptive purchase prevalence was observed among those with low income, followed by high and medium income. In China, those with medium income exhibited the highest prevalence, followed by low and high income. For India and the UAE, the highest purchase prevalence was observed among high income participants, followed by medium and low income levels, respectively.

Deceptive Purchase

Within the global sample, the highest prevalence of deceptive purchase was observed among high income participants (29%), followed by medium (25%) and low (18%) income participants. Among Australian participants, low-income participants exhibited the highest deceptive purchase, followed by high and medium income levels, respectively. For Chinese participants, those with medium income exhibited the highest deceptive purchase prevalence, followed by low- and high-income participants, respectively. Indian and Emirati participants with high income exhibited the highest deceptive purchase, followed by medium and low income levels, respectively.

OTC Medications

Non-Deceptive Purchase

Within the global sample, 27% of those with high income knowingly bought counterfeit OTC medications, followed by medium (22%) and low (21%) income levels, respectively. Income differences were only observed among participants in Australia and the UAE. For the Australian participants, those with high income levels indicated higher purchase prevalence, followed by low and medium income levels, respectively. Emirati participants with high income levels showed the highest purchase prevalence, followed by medium and low income levels, respectively.

Deceptive Purchase

Within the global sample, 25% of those with high income reported being deceived into buying OTC counterfeit medications, followed by medium (20%) and low (17%) income levels. Australian participants with high income indicated the highest deceptive purchase, followed by low and

medium levels, respectively. For Italian and Emirati participants, those with high income showed the highest prevalence of deceptive OTC counterfeit medication purchase, followed by medium- and low-income participants, respectively.

Vitamins and Supplements

Non-Deceptive Purchase

Within the global sample, 34% of those with high income reported having knowingly bought counterfeit vitamins and supplements online in the past 12 months, followed by medium- (30%) and low- (24%) income participants. Country-level differences were observed among Indian and Emirati participants, where the highest prevalence was observed among high-income participants, followed by medium- and low-income participants, respectively.

Deceptive Purchase

Within the global sample, 29% of high-income participants reported having purchased counterfeit vitamins and supplements, followed by 22% of medium-income and 15% of low-income participants. Among participants from Brazil, India, and the UAE, those with high income reported the highest prevalence of deceptive counterfeit purchase of vitamins and supplements, followed by those with medium and low income levels. On the other hand, Chinese participants with medium income reported the highest deceptive purchase prevalence, followed by low and high income levels, respectively.

Online Purchase Intentions

Legitimate Medication Online Purchase Intentions

Within the global sample, high-income participants (4.11) indicated the highest intentions to buy legitimate medications online, followed by medium- (3.59) and low- (3.49) income participants. Country-level differences were observed among participants from Australia, India, Italy, the UAE and the U.S. Australian high-income participants reported the highest intentions, while low- and medium-income participants reported similar lower intentions. For participants from India, those with medium and high income levels reported similarly higher intentions compared to those with low income levels. Finally, for participants from Italy, the UAE and the U.S., participants with high income reported the highest intentions, followed by medium- and low-income-level participants.

Counterfeit Medication Online Purchase Intentions

Within the global sample, participants with high income expressed the highest intentions to buy counterfeit medications online (2.62), followed by medium (2.55) and low (2.38) income levels. Country-level differences were observed among participants from Australia, Nigeria, and the U.S. Australian high-income participants reported the highest intentions, followed by low- and medium-income participants. In Nigeria, low-income participants reported the highest intentions, followed by medium–and high-level-income participants. Finally, high-income U.S. participants reported the highest intentions, followed by low- and medium-level-income participants.

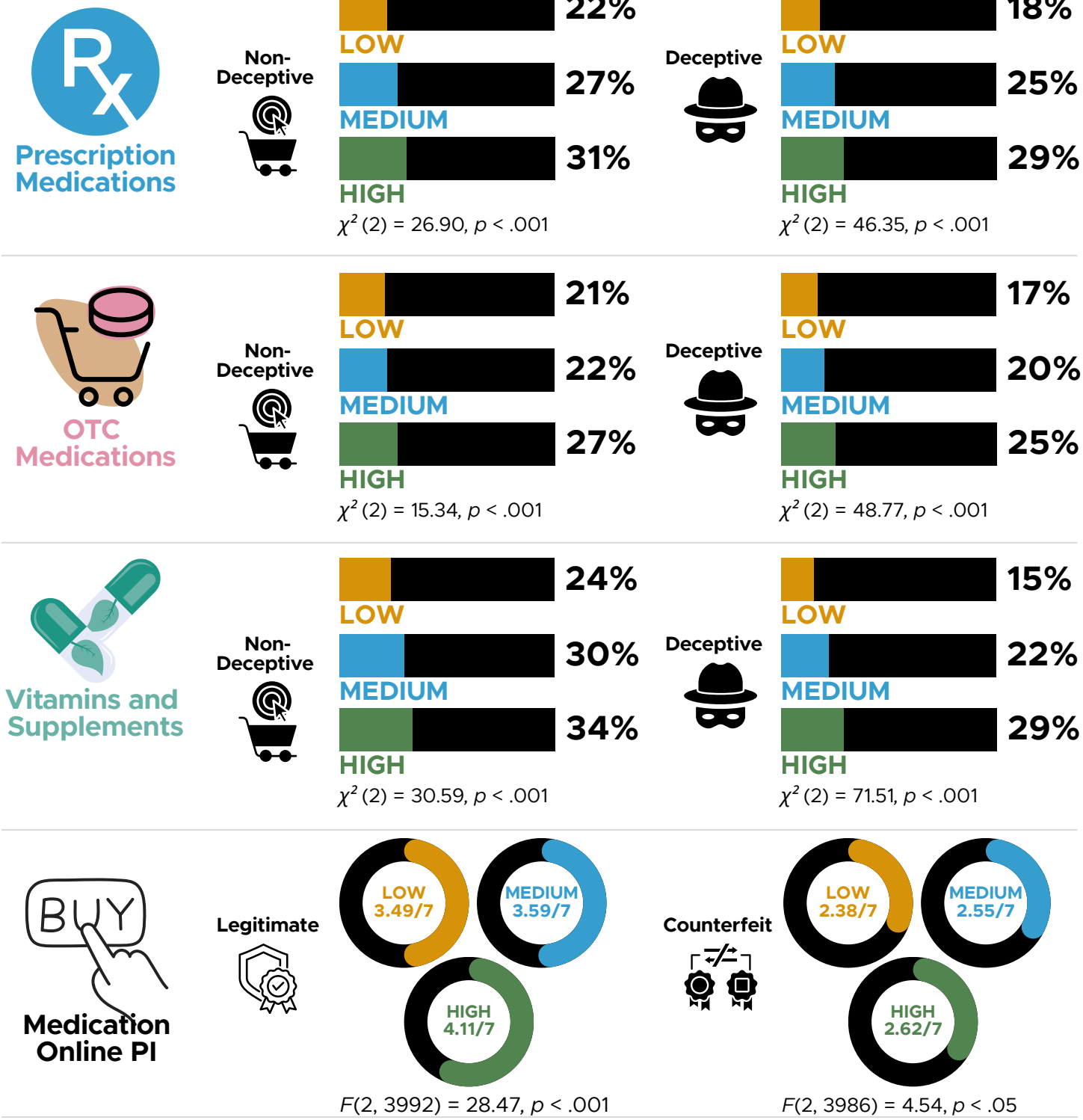


Figure 2.5.1 Income level differences in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, global sample.

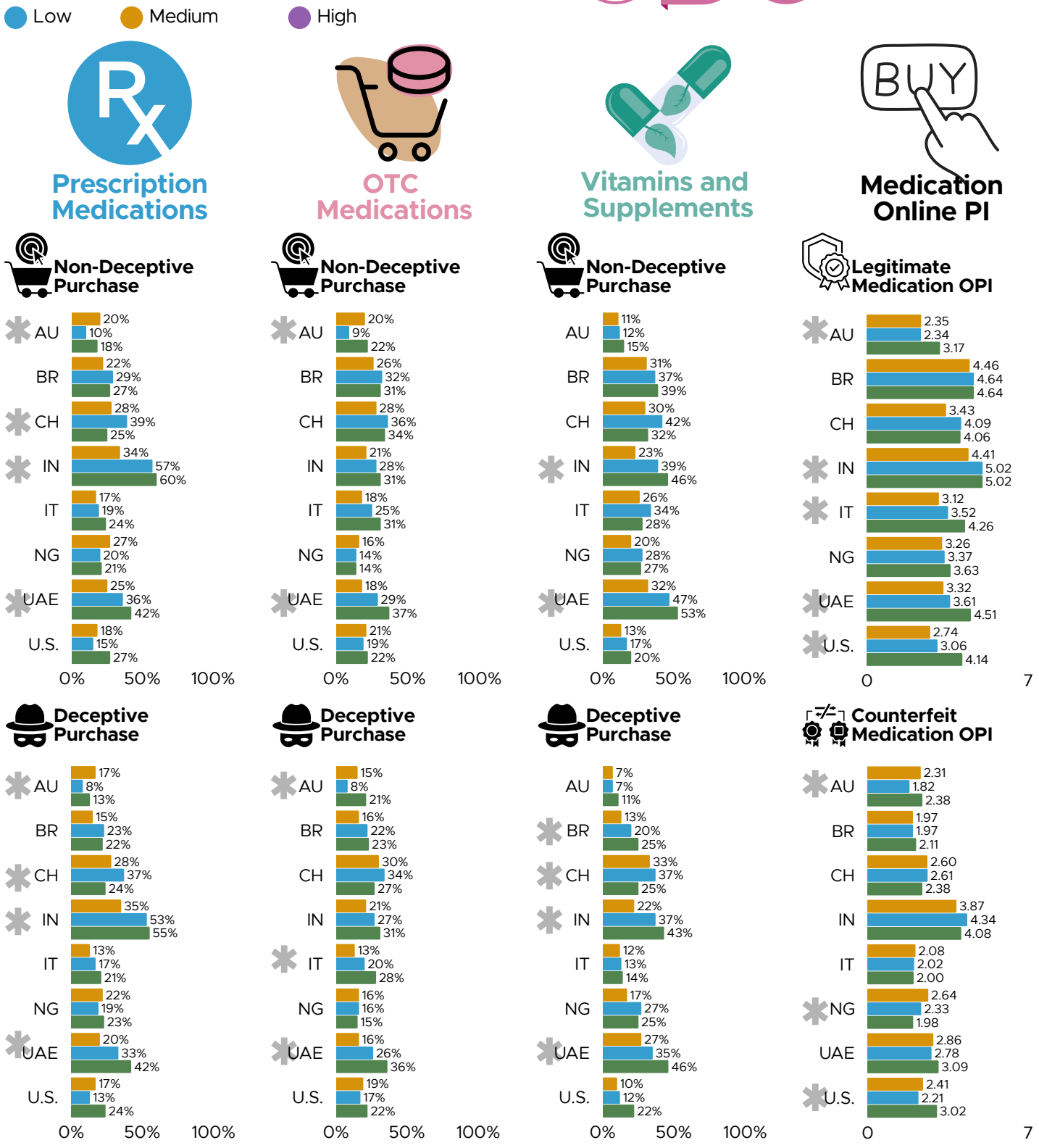


Figure 2.5.2 Income level differences in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, by country.
Significant differences noted with (*); AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

2.6 Online Shopping

Frequent Online Shoppers are More Likely to Buy Counterfeit Meds

Online shopping frequency was measured on a 7-point categorical scale. For ease of interpretation of the findings, we reduced the categories to three levels of low, moderate and high online shopping frequency. We report significant differences below.

Prescription Medications

Non-Deceptive Purchase

Within the global sample, more frequent online shoppers reported the highest frequency of buying counterfeit prescription medications (30%), followed by low (24%) and moderate (21%) online shoppers, respectively. This pattern was observed among participants in Italy and the UAE; however, for Chinese participants, it was low-frequency online shoppers who reported the highest prevalence of knowingly buying counterfeit prescription medications.

Deceptive Purchase

Within the global sample, more frequent online shoppers reported being the most deceived into buying counterfeit prescription medications (26%), followed by low (22%) and moderate (18%) online shoppers. Emirati participants who were low- and high-frequency online shoppers reported similar deceptive purchase frequency, while low-frequency online shoppers from China reported the highest prevalence of deceptive purchase.

OTC Medications

Non-Deceptive Purchase

Within the global sample, high-frequency online shoppers reported the highest prevalence of knowingly buying OTC medications (28%), followed by moderate- (20%) and low- (17%) frequency online shoppers. This pattern of results was observed in Brazil, India, and the UAE. However, among Chinese participants, high- and low-frequency online shoppers bought significantly more counterfeit OTC medications knowingly than those with moderate levels of online shopping. And among the Italian sample, moderate- and high-frequency shoppers reported significantly higher non-deceptive purchase frequency than those with low online shopping frequency.

Deceptive Purchase

Within the global sample, high-frequency shoppers reported the highest level of deceptive counterfeit OTC purchase (24%), followed by those with moderate (17%) and low (15%) levels of online shopping. Significant differences were observed only among Chinese and Indian participants, yet with varying patterns of results. For Indian participants, the highest prevalence of deceptive counterfeit OTC purchase was observed among participants with high levels of online shopping, followed by moderate and low levels, respectively. On the other hand, among Chinese participants, those with low frequency of online shopping were the most likely to have been deceived into buying counterfeit OTC medications, followed by high and moderate online shoppers.

Vitamins and Supplements

Non-Deceptive Purchase

Within the global sample, participants with high online shopping frequency were the most likely to have bought counterfeit vitamins and supplements knowingly (37%), followed by those with moderate (24%) and low (19%) frequency of online shopping. Significant differences were observed among all countries, except the U.S. Among the countries with significant differences, all but China showed a similar relationship between online shopping frequency and non-deceptive purchase of counterfeit vitamins and supplements, where those with high shopping frequency were more likely to have knowingly bought counterfeit vitamins and supplements, followed by moderate and low online shoppers, respectively. For Chinese participants, low-frequency online shoppers reported the highest non-deceptive purchase, closely followed by high-frequency shoppers, but significantly higher than moderate-frequency shoppers.

Deceptive Purchase

Within the global sample, 29% of high-frequency online shoppers reported having been deceived into buying counterfeit vitamins and supplements, followed by those with moderate (15%) and low (13%) online shopping frequency. Significant differences were observed among all the countries, except the U.S., where the higher the frequency of online shopping, the more likely participants were deceived into buying counterfeit vitamins and supplements. However, among Chinese participants, those with low and high levels of online shopping frequency were equally likely to have been deceived into buying counterfeit vitamins and supplements, and both groups reported greater levels of deceptive purchase than those with moderate online shopping frequency.

Online Purchase Intentions

Legitimate Medication Online Purchase Intentions

Within the global sample, the higher participants' online shopping frequency, the higher their intentions. Specifically, among the global sample, participants with high online shopping frequency reported the highest intentions (4.14), followed by those with moderate (3.45) and low (3.04) levels of online shopping frequency. This pattern was observed among all the participating countries.

Counterfeit Medication Online Purchase Intentions

Within the global sample, participants did not differ significantly in their intentions to buy counterfeit medications online as a function of their online shopping frequency, noting that participants reported relatively low intentions to buy counterfeit medications. However, significant differences were observed among participants in both Brazil and China, where an inverse relationship emerged. Specifically, among Brazilian participants, participants with low online shopping frequency reported the highest intentions, followed by high- and moderate-frequency shoppers. In China, participants with moderate and low online shopping frequency reported higher intentions than those with high online shopping frequency.

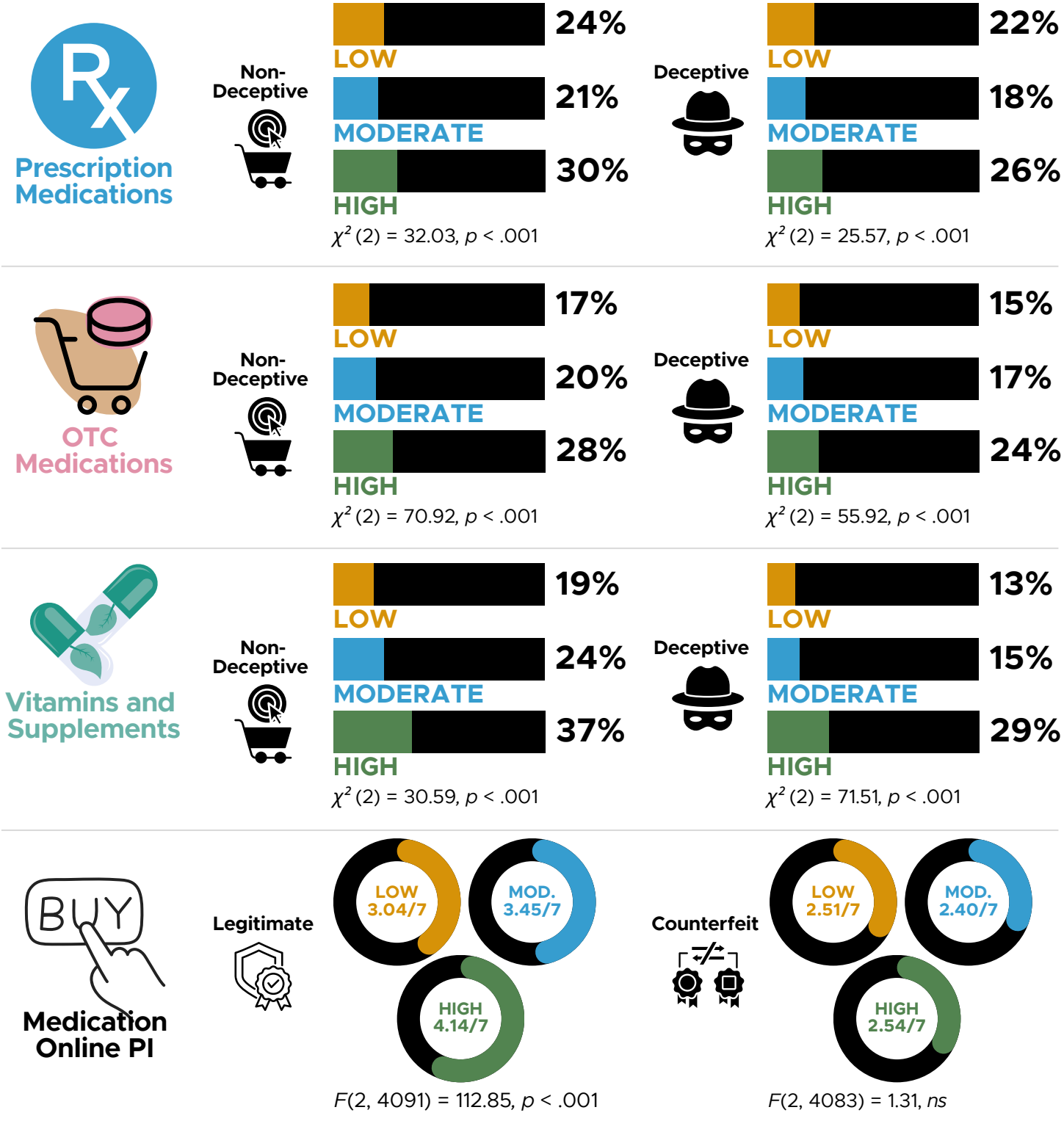


Figure 2.6.1 Differences as a function of online shopping in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, global sample.

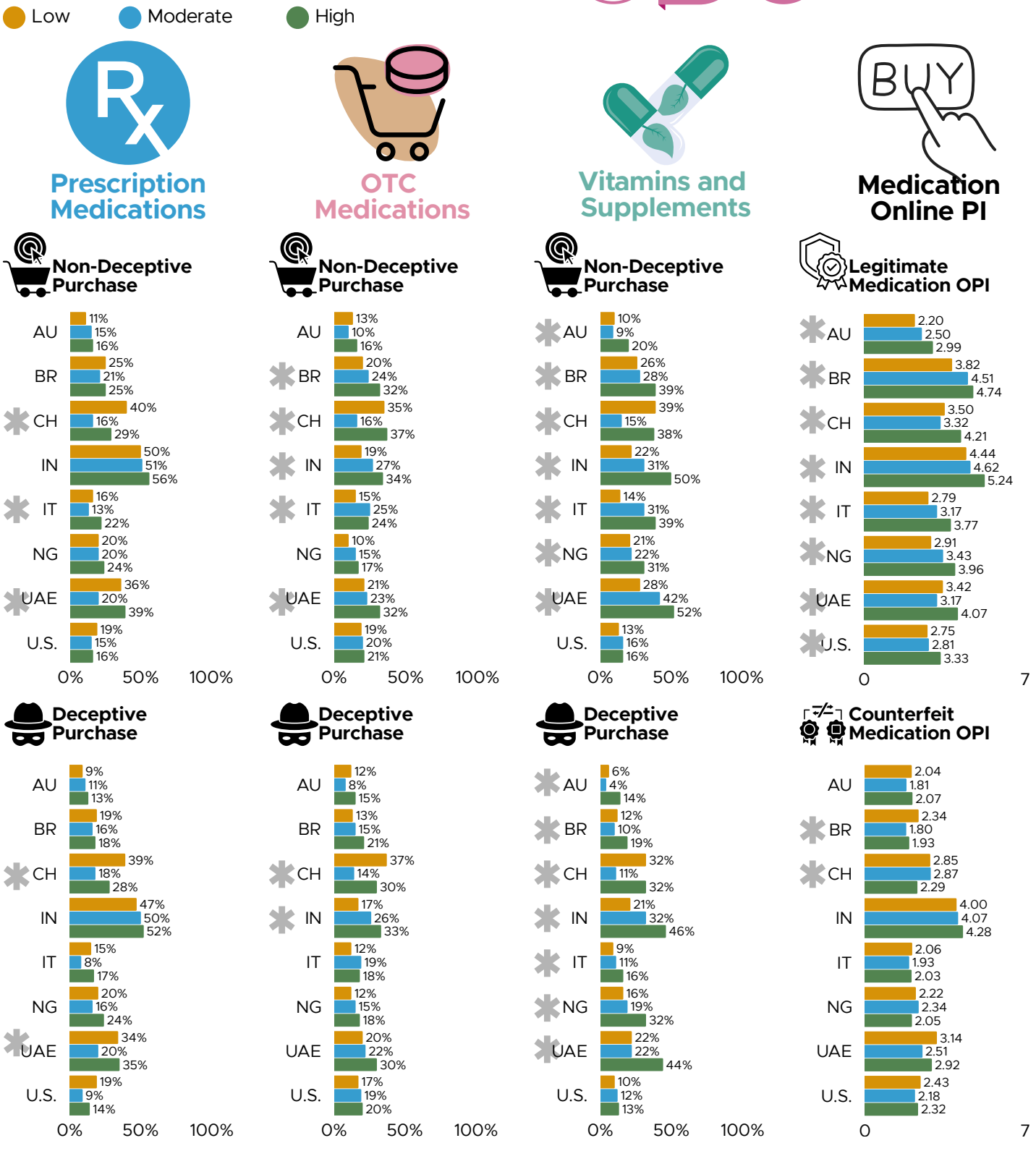


Figure 2.6.2 Differences as a function of online shopping in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, by country.

Significant differences noted with (*); AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

2.7 Health Literacy

When it Comes to Buying Counterfeit Medications, Health Literacy Matters

We examined online (digital) health literacy by asking participants to indicate their proficiency in understanding health information and their health-related decision making. We categorized participants into three groups of low, moderate, and high health literacy. We report significant differences below.

Prescription Medications

Non-Deceptive Purchase

Within the global sample, 37% of participants with low health literacy knowingly bought these medications online, followed by those with moderate (25%) and high (22%) levels of health literacy, respectively. Country-level differences were observed in Australia, Brazil, Italy, the UAE, and the U.S. With the exception of Brazil, participants with low levels of health literacy were the most likely to have bought counterfeit prescription medications knowingly, followed by participants with moderate and high levels of health literacy, respectively. Though Brazilian participants with low health literacy were highest in terms of knowingly buying counterfeit prescription medications, those with high health literacy were more likely to have bought counterfeit medications than their counterparts with moderate health literacy.

Deceptive Purchase

Within the global sample, 35% of participants with low levels of health literacy reported being deceived into buying counterfeit prescription medications, followed by participants with moderate (23%) and high (19%) levels of health literacy, respectively. Participants with low levels of health literacy from Australia, Brazil, Italy, the UAE, and the U.S. reported the highest frequency of deceptive purchase compared to those with moderate and high levels of health literacy, respectively.

OTC Medications

Non-Deceptive Purchase

Within the global sample, 33% of those with low levels of health literacy reported they knowingly bought counterfeit OTC medications, followed by 26% of those with moderate levels and 16% of those with high levels of health literacy, respectively. Participants from Australia, Italy, Nigeria, the UAE, and the U.S. with low levels of health literacy were the most likely to have knowingly bought counterfeit OTC medications, followed by those with moderate and high levels of health literacy, respectively. However, participants from China with moderate levels of health literacy reported higher counterfeit OTC medication purchase, followed by those with low and high levels of health literacy, respectively.

Deceptive Purchase

Within the global sample, 31% of participants with low levels of health literacy were deceived into buying counterfeit OTC medications, followed by participants with moderate (21%) and high (14%)

levels of literacy. A similar pattern was observed for participants from Australia, Brazil, China, Italy, the UAE, and the U.S.

Vitamins and Supplements.

Non-Deceptive Purchase

Within the global sample, 36% of those with low health literacy indicated having knowingly bought counterfeit vitamins and supplements online in the past 12 months, compared to 30% of those with moderate health literacy and 28% of those with high health literacy. Differences across health literacy levels were prevalent in Australia, the UAE, and the U.S., where low health literacy was associated with higher non-deceptive purchase of counterfeit vitamins and supplements.

Deceptive Purchase

Within the global sample, 29% of those with low health literacy indicated they were deceived into buying counterfeit vitamins and supplements, compared to 21% of those with moderate health literacy and 19% of those with high health literacy. Health literacy was associated with counterfeit vitamins and supplement purchase among Australian, Italian, and U.S. participants in a pattern similar to the global sample.

Online Purchase Intentions

Legitimate Medication Online Purchase Intentions

Within the global sample, participants with low health literacy indicated the highest intentions to buy legitimate medications online (4.17), followed by those with moderate (3.49) and high (3.49) health literacy (all were rated on a 7-point scale). Country-level differences were observed in all countries, except China and Nigeria. Participants from Australia, Italy, the UAE, and the U.S. indicated higher online purchase intentions for legitimate medications when their health literacy was low, followed by moderate and high levels of health literacy. However, participants from India with high health literacy indicated the highest intentions, followed by low and moderate health literacy participants. Finally, Brazilian participants with low health literacy indicated the highest intentions, followed by those with high and moderate health literacy, respectively.

Counterfeit Medication Online Purchase Intentions

Within the global sample, participants with low health literacy reported the highest intentions (3.33), followed by those with moderate (2.31) and high (1.93) levels. A similar pattern of results was observed in each of the eight participating countries for counterfeit purchase intentions.

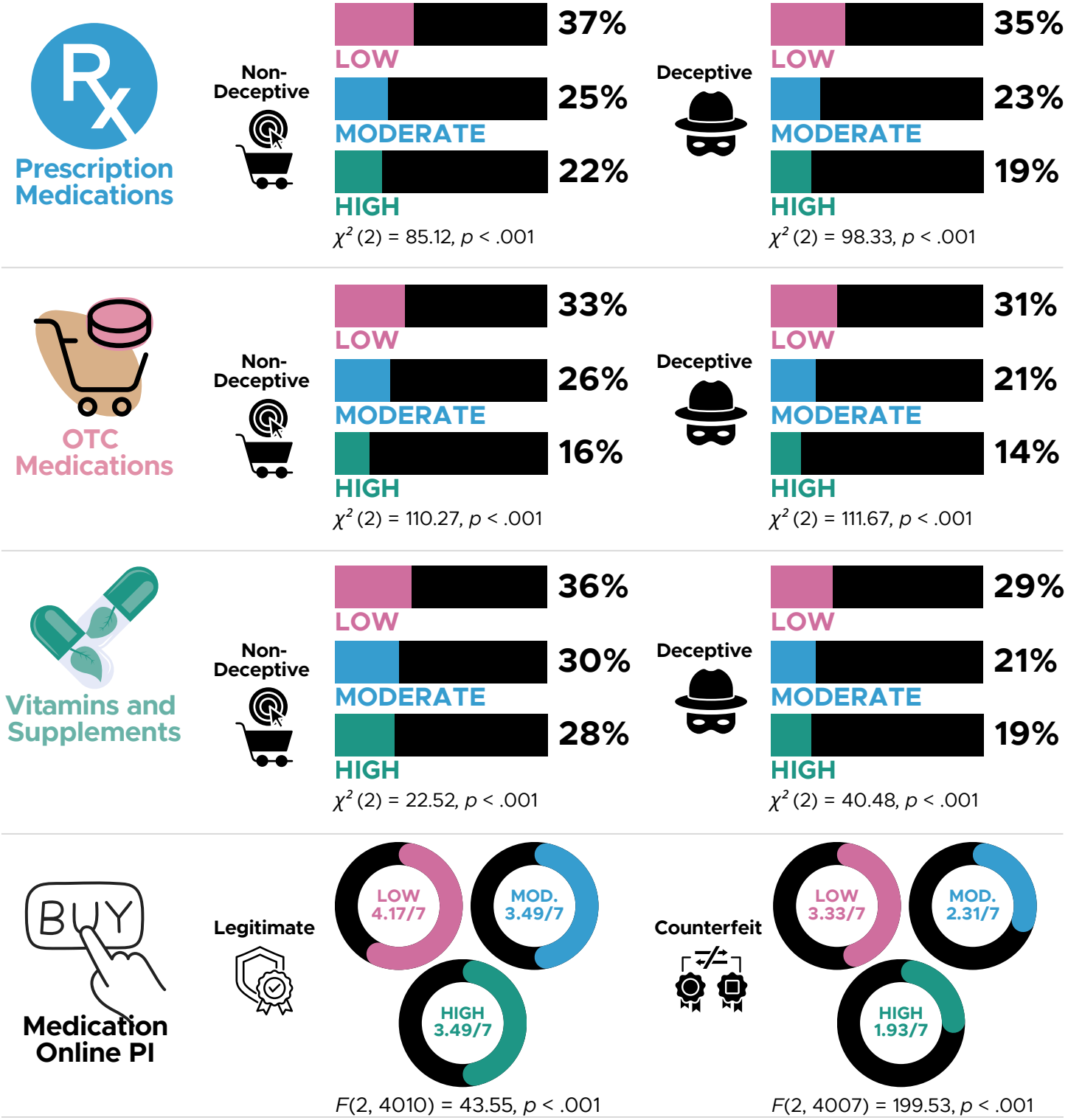


Figure 2.7.1 Differences as a function of health literacy in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, global sample.

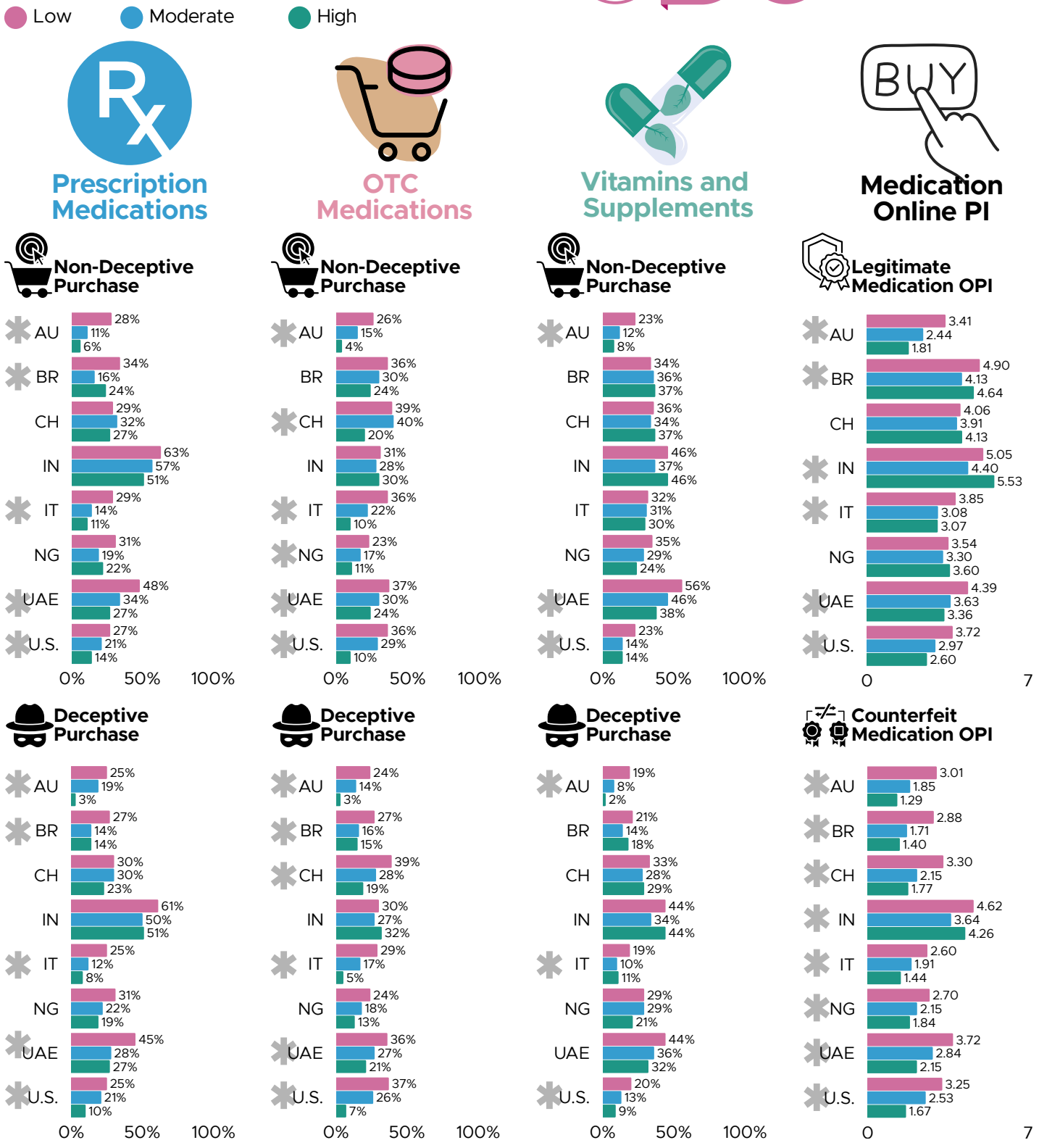
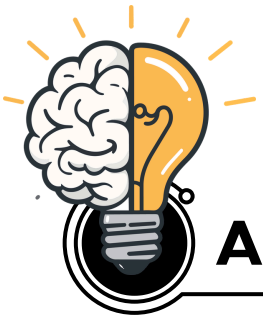


Figure 2.7.2 Differences as a function of health literacy in counterfeit medication purchase, by medication class, and online purchase intentions for legitimate and counterfeit medications, by country.

Significant differences noted with (*); AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America



Actionable Insights

Counterfeit Medication Buyers' Persona

The demographic profile of counterfeit medication buyers includes individuals who are male, younger, married, and highly educated who frequently shop online. Given higher prevalence of counterfeit medication purchase among our survey participants with these demographic attributes, anti-counterfeiting awareness-raising campaigns should prioritize targeting these segments. Segment-based strategies should also inform the messaging and content strategy, as well as platform choice.

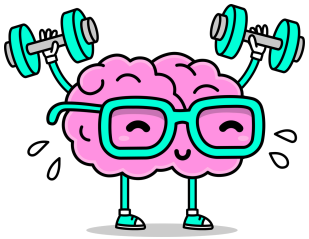
Augmenting Health Literacy

Health literacy showed a considerable role in influencing the purchase of counterfeit medications. Lower health literacy was associated with higher non-deceptive and deceptive purchase alike. Educating consumers about the dangers of counterfeit medications should take into account the health literacy levels of those who are most vulnerable to these risks. Anti-counterfeiting interventions should emphasize the importance of enhancing overall health literacy as a necessary condition for understanding the dangers of counterfeit medications. On the other hand, general health literacy interventions should incorporate education on counterfeit medications within their strategies because consuming such medications could have a long-lasting impact on consumers' health and well-being, and even cost them their lives.

3

MOTIVES

tl;dr



Motive

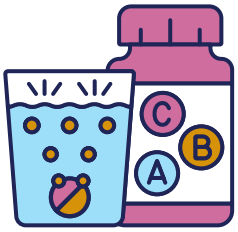
On average, participants were more likely to **buy medications online because it's convenient rather than because they need it!**

>50%

The likelihood of buying counterfeit prescription and OTC medications increased by over 50% for each one-unit increase in **necessity motives**

12%

The likelihood of being deceived into buying counterfeit OTC medications decreased by 12% for each one-unit increase in **convenience and accessibility motives**



24%

Non-deceptive purchase of counterfeit vitamins and supplements increases by 24% for each one-unit increase in **convenience and accessibility motives**

3.1 Motivations to Buy Medications Online

Between Necessity and Convenience

In the current study, we asked participants about why they resort to online marketplaces to buy medications. We grouped these responses into two broad categories: "Convenience and Accessibility" and "Necessity." Convenience and access motivations relate to the ease of buying medications online and the ability to do so. Necessity motives refer participants' need to buy medications online because they could not obtain them elsewhere, often due to lacking a valid prescription or because authentic medications were unavailable in the physical marketplace. Items were measured on a 7-point scale, with higher values indicating more agreement with the motive cluster.

Participants expressed higher convenience and accessibility motivations (4.57) for buying medication online compared to necessity motives (3.63). These global differences were mirrored in every participating country. Though it's meaningful to examine these aggregate raw means, the next section investigates how these motives predict different types of online medication purchase using statistical regression techniques to quantify the contribution of motives to the purchase of counterfeit medications.

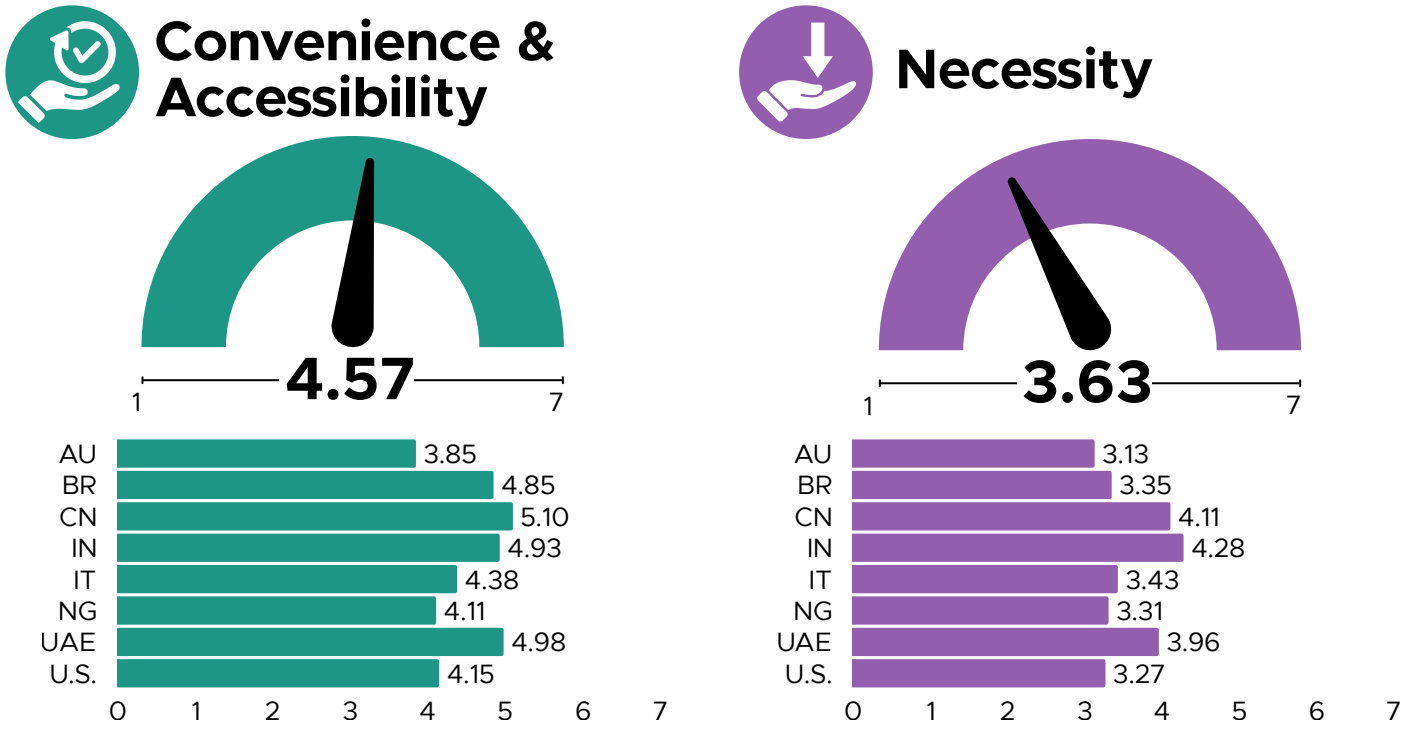


Figure 3.1.1 Mean values for the major motivations to buy medications online for the global sample (top) and by country (bottom).
AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

3.2 Prescription Medication

Non-Deceptive Purchase

Within the global sample, both motivation types significantly predicted non-deceptive purchase of counterfeit prescription medication. Specifically, convenience and accessibility motivations was not significantly associated with non-deceptive purchase, while the likelihood of knowingly buying counterfeit prescription medications increased 52% for each one-unit increase in necessity motives. Motivations significantly predicted non-deceptive purchase in all participating countries, except Nigeria. Interestingly, convenience and accessibility motives were negative predictors of non-deceptive purchase among the Chinese and Italian samples. On the other hand, necessity motives significantly and positively predicted non-deceptive purchase in the rest of the countries, with the likelihood of non-deceptive purchase increasing by 30% (India) to 123% (Australia) for each one-unit increase in necessity motives.

Deceptive Purchase

Within the global sample, a one-unit increase in convenience and accessibility motives was associated with a 9% decrease in deceptive purchase of counterfeit medications, while this likelihood increased by 67% for each one-unit increase in necessity motives. Motives predicted deceptive purchase among all the country samples with varying patterns. For all countries, except Nigeria, necessity motives positively predicted non-deceptive purchase, with an increase of 45% (India) to 171% (Australia) in deceptive purchase with each one-unit increase in these motives. Convenience and accessibility motives negatively predicted deceptive purchase among participants from Brazil, China, and Italy, yet were positive predictors among the Nigerian sample.

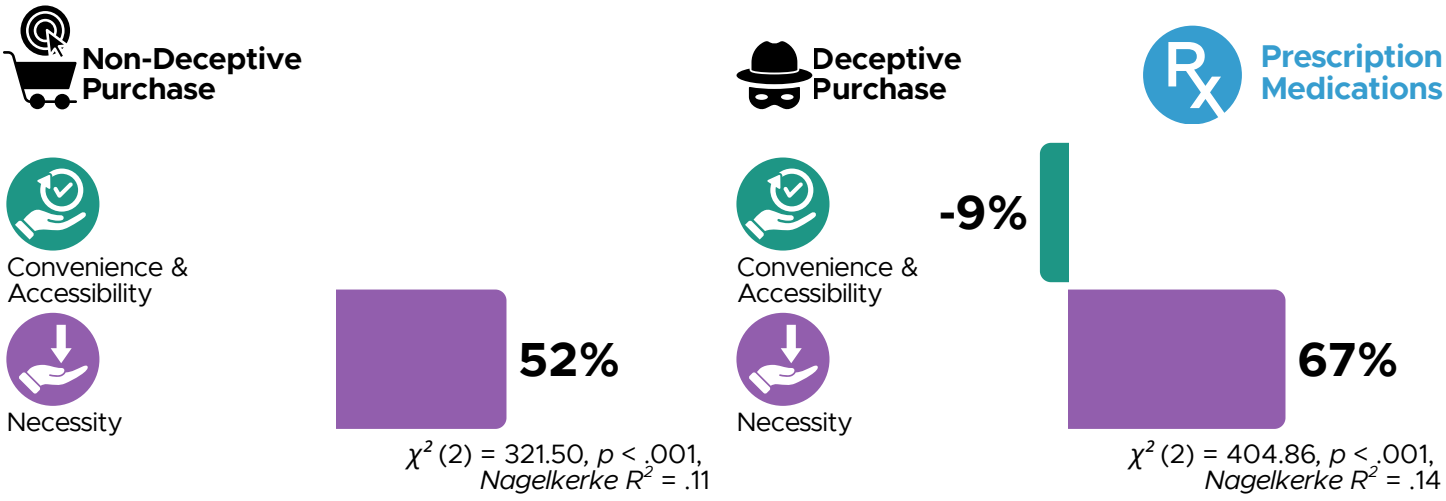


Figure 3.2.1 Significant logistic regression odds ratio values (probability) for the relationship between online medication purchase motivations and purchase of counterfeit prescription medications online (non-deceptive and deceptive), global sample.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

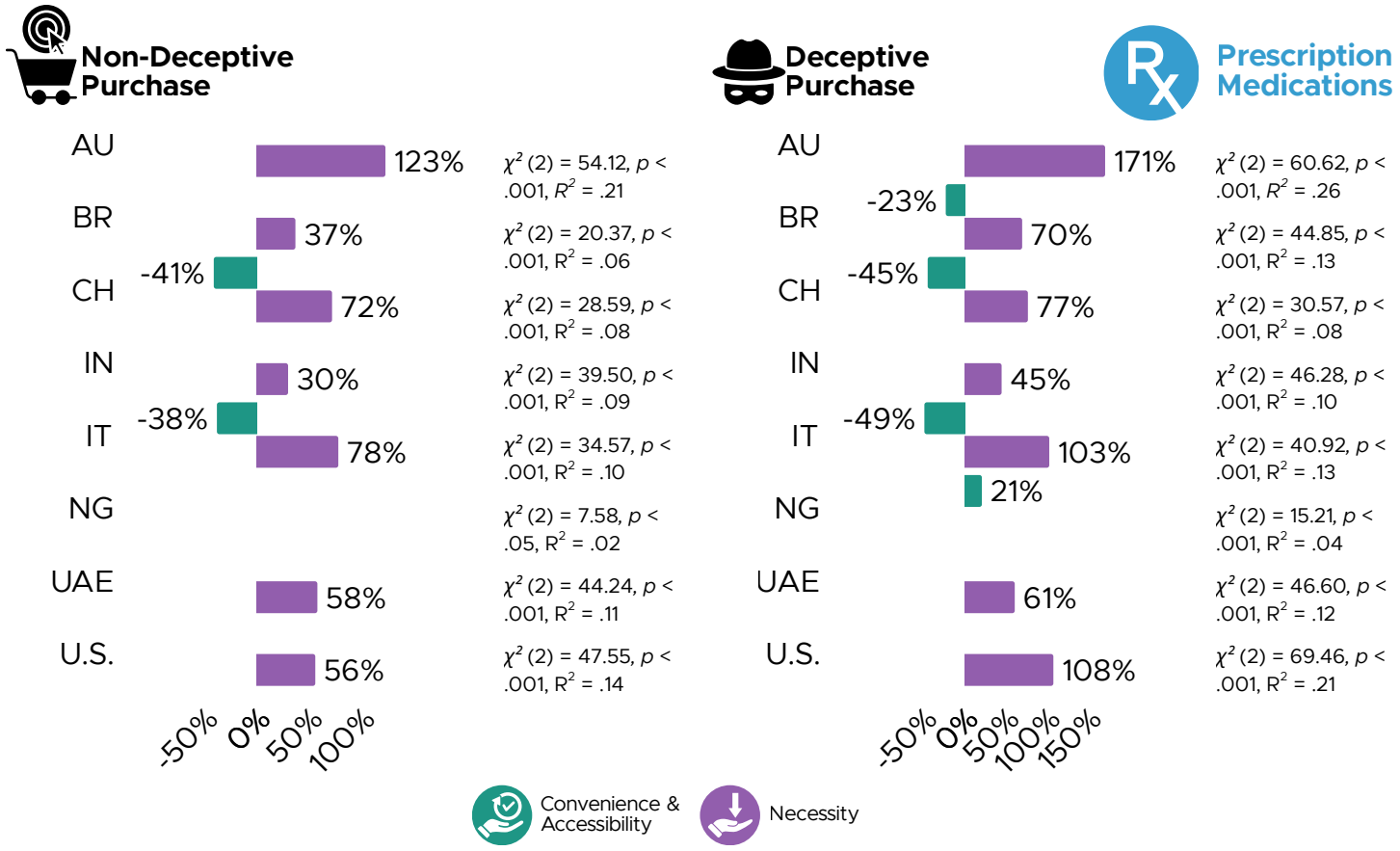


Figure 3.2.2 Significant logistic regression odds ratio values (probability) for the relationship between online medication purchase motivations and purchase of counterfeit prescription medications online (non-deceptive and deceptive), by country.
Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

3.3 OTC Medication

Non-Deceptive Purchase

Within the global sample, convenience and accessibility was not a significant predictor of non-deceptive purchase of counterfeit OTC medications, while a one-unit increase in necessity motives was associated with a 52% increase in this type of purchase. The regression models were significant for all countries, where convenience and accessibility motives negatively predicted non-deceptive purchase in China and the U.S., while necessity motives were significant predictors, with a range of increase in non-deceptive purchase likelihood ranging from 33% (Brazil and Nigeria) and 99% (Australia).

Deceptive Purchase

Within the global sample, a one-unit increase in convenience and accessibility motives decreased deceptive purchase likelihood by 12%, while necessity motives increased it by 71%. All country regression models were significant. Convenience and accessibility motives were negative predictors among only the Italian and U.S. samples, while necessity motives were positive predictors, with a range of deceptive purchase likelihood between 40% (India) and 153% (Italy) associated with each one-unit increase in necessity motives.

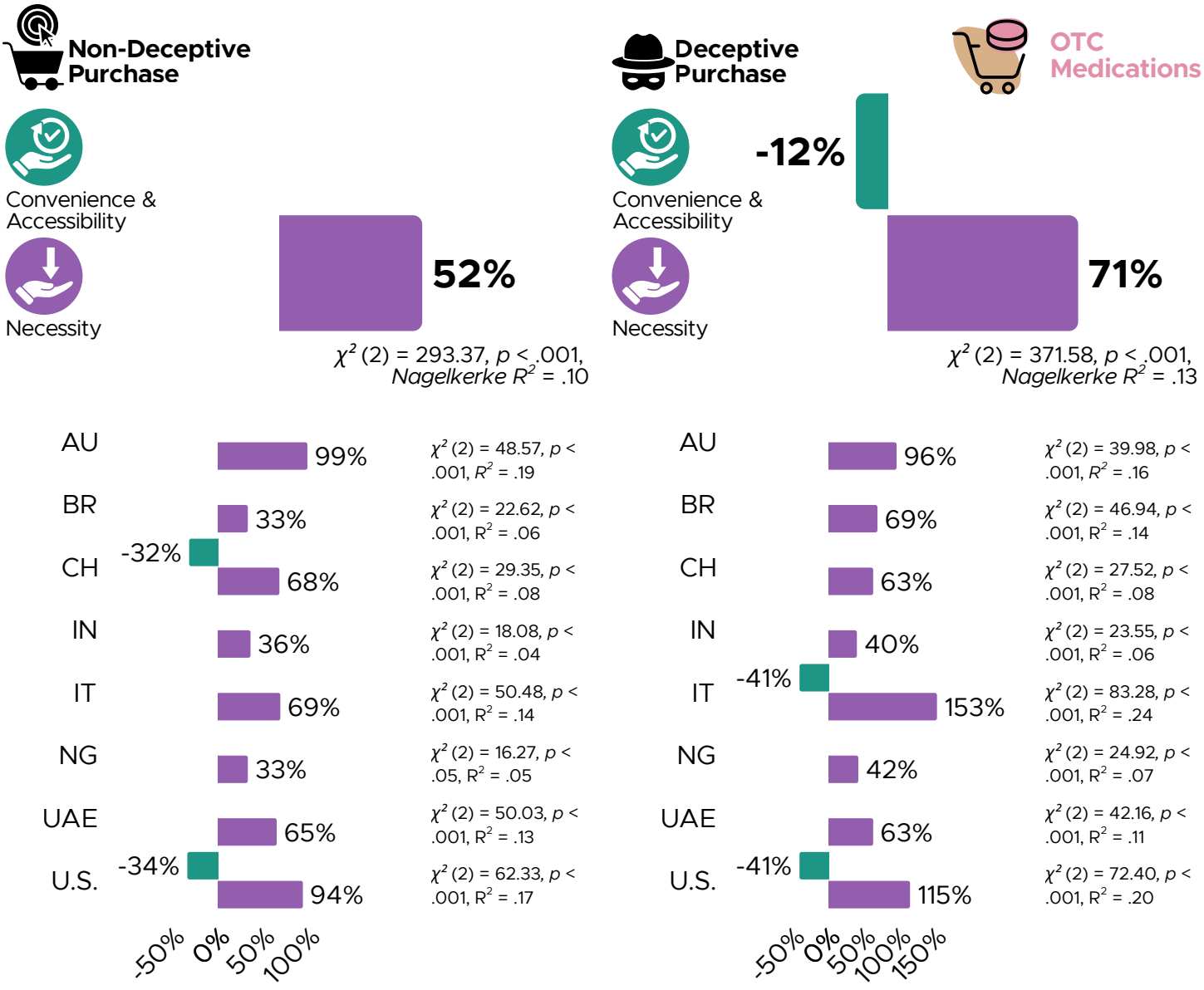


Figure 3.3.1 Significant logistic regression odds ratio values (probability) for the relationship between online medication purchase motivations and purchase of counterfeit OTC medications online for global sample (top) and by country (bottom).

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

3.4 Vitamins and Supplements

Non-Deceptive Purchase

Within the global sample, convenience and accessibility motives increased non-deceptive purchase of counterfeit vitamins and supplements by 24% compared to an increase of 17% in this purchase as a function of each one-unit increase in necessity motives. Country-level models were significant in predicting non-deceptive purchase, yet varied in terms of which motive predicted non-deceptive purchase. Convenience and accessibility motives were the only positive predictors of non-deceptive purchase in Brazil, India, and Italy, while necessity motives were positive predictors in Australia, China, Nigeria, the UAE, and the U.S.

Deceptive Purchase

Within the global sample, necessity motivation was the only significant predictor of deceptive purchase. Specifically, for each one-unit increase in necessity motives, the likelihood of being deceived into buying counterfeit vitamins and supplements increased by 53%. Country-level regression models were significant in predicting deceptive purchase. Convenience and access motives were positive predictors of deceptive purchase in Nigeria and were negative predictors in Italy. On the other hand, necessity motives positively predicted deceptive purchase among all participating countries, and the likelihood of deceptive purchase increased between 20% (India) and 116% (Italy) for each one-unit increase in necessity motives.

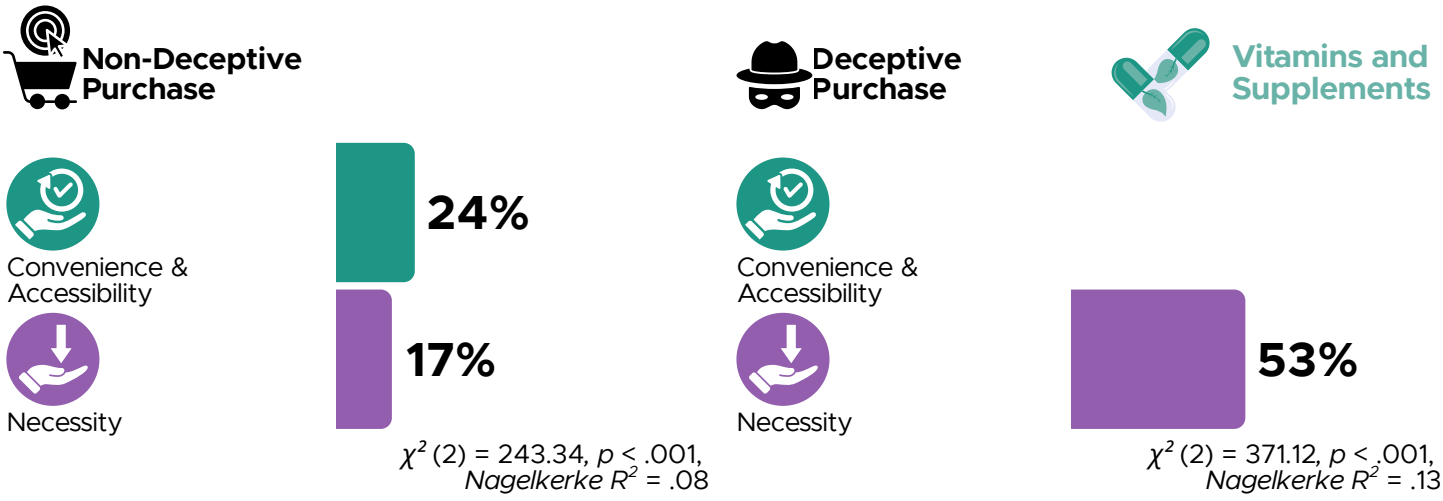


Figure 3.4.1 Significant logistic regression odds ratio values (probability) for the relationship between online medication purchase motivations and purchase of counterfeit vitamins and supplements online (non-deceptive and deceptive), global sample.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

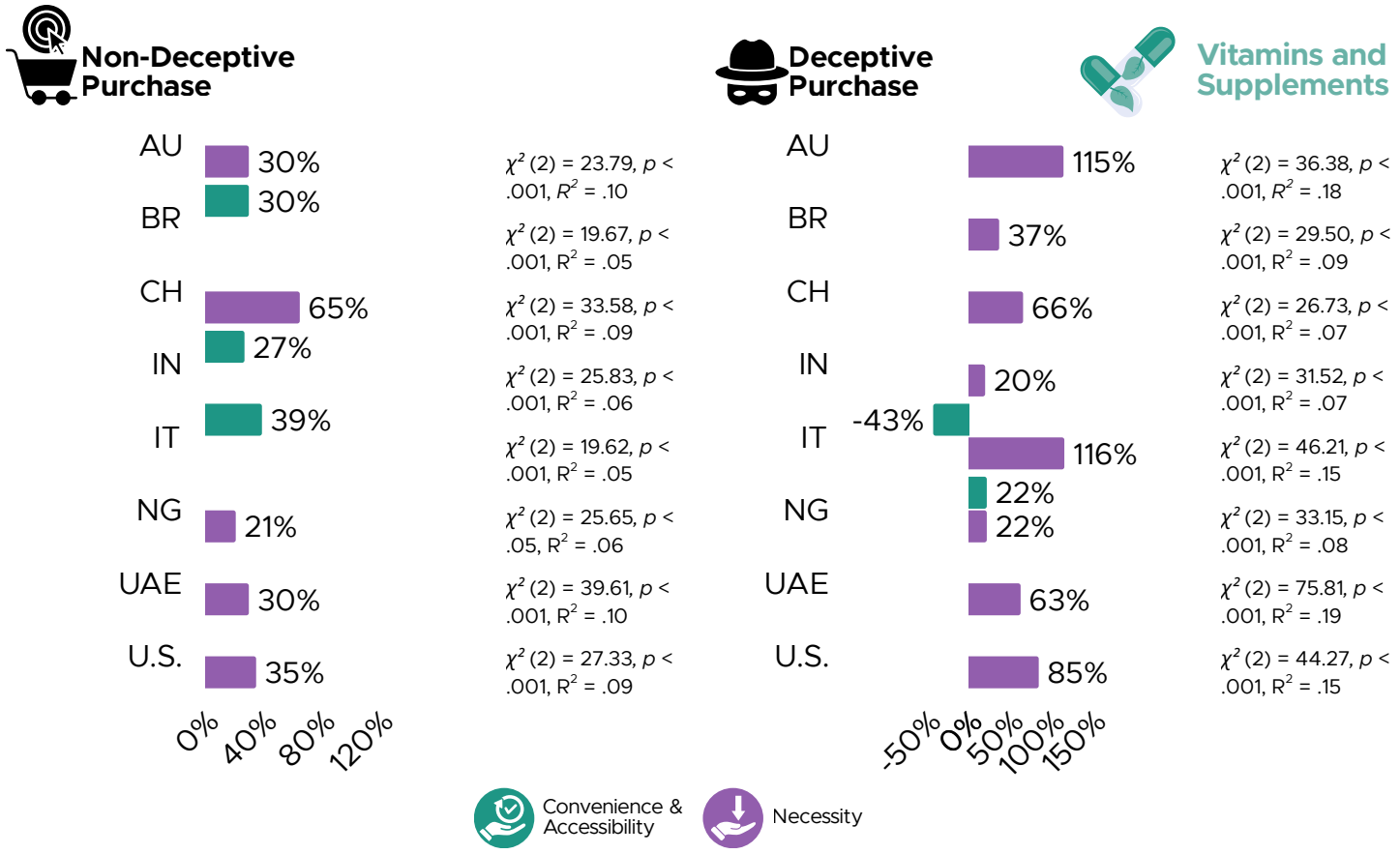


Figure 3.4.2 Significant logistic regression odds ratio values (probability) for the relationship between online medication purchase motivations and purchase of counterfeit vitamins and supplements online (non-deceptive and deceptive), by country.
Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

3.5 Medication Online Purchase Intentions

Legitimate Medication Online Purchase Intentions

Within the global sample, convenience and accessibility motives were stronger predictors of online purchase intentions for legitimate medications than necessity motives. This pattern of higher contribution from convenience and accessibility was observed in Brazil, China, India, Italy, Nigeria, and the U.S. On the other hand, necessity motives positively predicted legitimate online medication purchase intentions in Australia, India, Nigeria, the UAE, and the U.S. Specific to only the UAE, necessity motives were stronger predictors of intentions than convenience and accessibility motives.

Counterfeit Medication Online Purchase Intentions

Within the global sample, convenience and accessibility motives were negative and weaker predictors of intentions than necessity motives, and this pattern was observed among all participating countries.

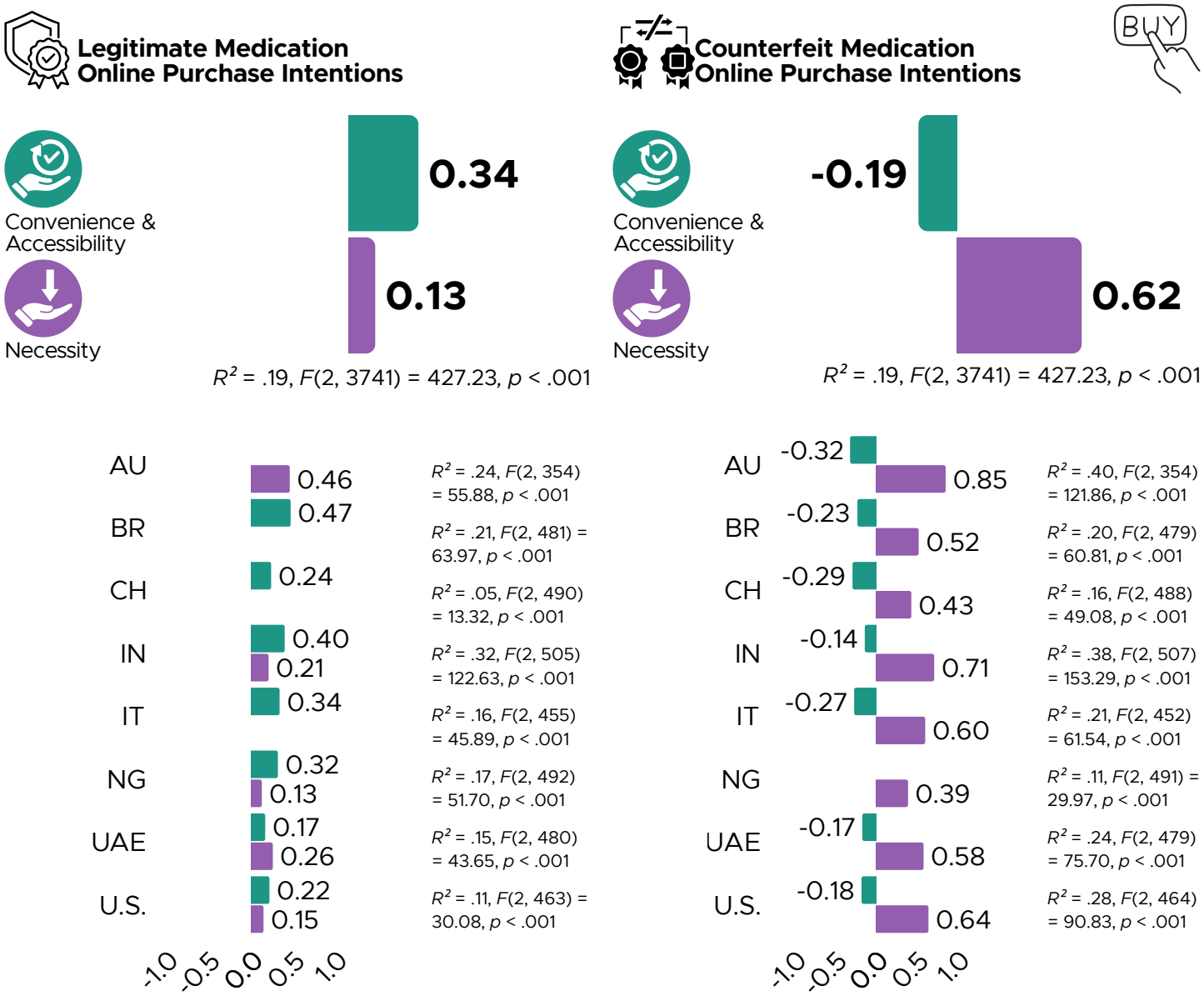
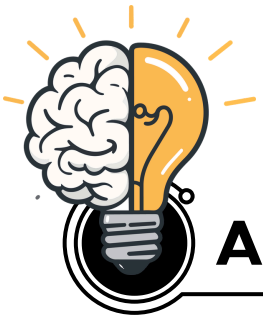
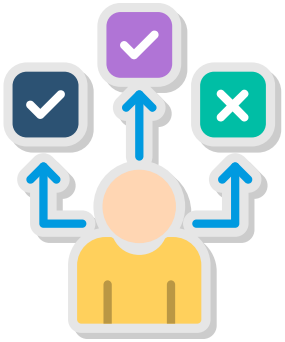


Figure 3.5.1 Significant linear regression standardized coefficients for the relationship between online medication purchase motivations and legitimate and counterfeit medication online purchase intentions for the global sample (top) and by country (bottom).
Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America



Actionable Insights

Necessity Increases Counterfeit Medication Purchase!
Despite the fact that the internet provides consumers with the convenience and 24/7 access to buying medications online, necessity motivations were far stronger in driving the risk-taking behavior of buying counterfeit medications, both knowingly and unknowingly. However, this relationship was rather different when it came to buying counterfeit vitamins and supplements, where convenience and accessibility took the driver's seat. Awareness-raising campaigns targeting consumers should consider this distinction in why consumers buy counterfeit medications, and campaign producers should understand that such risky behaviors exist within a broader ecosystem of public health challenges.



Communicating Agency and Choice
The findings highlighting the critical role of necessity as a driver for consumers to buy medications online situates the problem of counterfeit medications and their availability in online marketplaces within a broader public health context. To effectively encourage attitude and behavior changes in consumers, brand protection professionals should focus on reducing the "I had no choice" scenario by expanding legitimate access, fixing access barriers, and optimizing production and distribution of pharmaceuticals to circumvent the replacement of authentic medications by fake ones.

4

AD EXPOSURE

tl;dr

~60%

of participants saw D2C pharmaceutical ads on **TV, social media, and the web** across the three medication classes

59-64%

of participants saw posts by **social media influencers** promoting three types of medications

15%

A one-unit increase in **D2C pharmaceutical TV ad exposure** decreased counterfeit medication purchase by 15%

12%

A one-unit increase in **D2C pharmaceutical radio ads exposure** increased counterfeit prescription and OTC medication purchase by 12%

15%

A one-unit increase in exposure to **illicit seller social media posts** increased counterfeit medication purchase by 15%

16%

Across medication classes, **ad exposure** explained 16% of the variance in buying counterfeit medications **non-deceptively** (range = 10% - 23%)

24%

Across medication classes, **ad exposure** explained 24% of the variance in **deceptive** purchase of counterfeit medications (range = 21% - 28%)

0.26

Exposure to **illicit seller social media posts** was the strongest predictor of **counterfeit medication online purchase intentions**

4.1 Advertising Exposure

In the current study, we asked participants to indicate the frequency of exposure to advertising, marketing, and promotional content on traditional, social, and other types of digital media that relates to different types of medications. Participants were asked these advertising/marketing exposure questions per medication class: prescription, OTC, and vitamins and supplements (V&S) and rated each on a 7-point scale, where "1" referred to "Never" and "7" refereed to "Daily or almost daily." Overall, participants indicated exposure frequency to 13 different traditional and digital media tactics, from exposure to traditional advertising (TV, radio, outdoor) to targeted digital advertising on social media and websites, as well as direct advertising and marketing through posts and direct messages by other users, including strangers and close friends and family. It is worth mentioning that for the global sample, exposure frequency was relatively at or below the 7-point scale mid-point, generally indicating limited exposure to medication advertising and promotion efforts across the participating countries. However, inter-country differences were apparent, which we highlight in this section of the report.

Global and Country-Level Descriptives

Global sample data showed that over 50% of the sample indicated that they have been exposed to medication advertising and promotion messages across all media channels and sources, with the highest frequency for television ads (Rx = 66%, OTC = 68%, V&S = 72%), followed by web ads (Rx = 65%, OTC = 65%, V&S = 69%) and social media ads (Rx = 64%, OTC = 64%, V&S = 69%). Social media posts by illicit sellers showed the lowest frequency across medication classes (Rx = 53%, OTC = 54%, V&S = 56%). Averaged across the different media channels and sources, 59% of participants were exposed to prescription medication messages, 59% for OTC medications, and 63% for vitamins and supplements. It is worth mentioning that between 59% and 64% of participants were exposed medications posts by social media influencers and between 58% and 62% saw messages by legitimate sellers across the three medication classes.

Country-by-country means for pharmaceutical advertising and marketing follow similar patterns of rank-ordering channels as the global sample. However, it is important to note the country-level samples can be categorized as a function of comparing the country samples to the global average in this study. Countries like Australia, Italy, and the U.S. scored significantly lower than the global mean in terms of the various ad exposure channels. Brazil sits closer to the global average, where exposure to prescription medication ads was slightly lower than the global average, at the mean for OTC medications, and slightly higher than the mean for vitamins and supplements. The Indian sample reported the highest level of medication ad exposure generally and in comparison to the global average, followed by the UAE, Nigeria, and China, respectively.

4 AD EXPOSURE

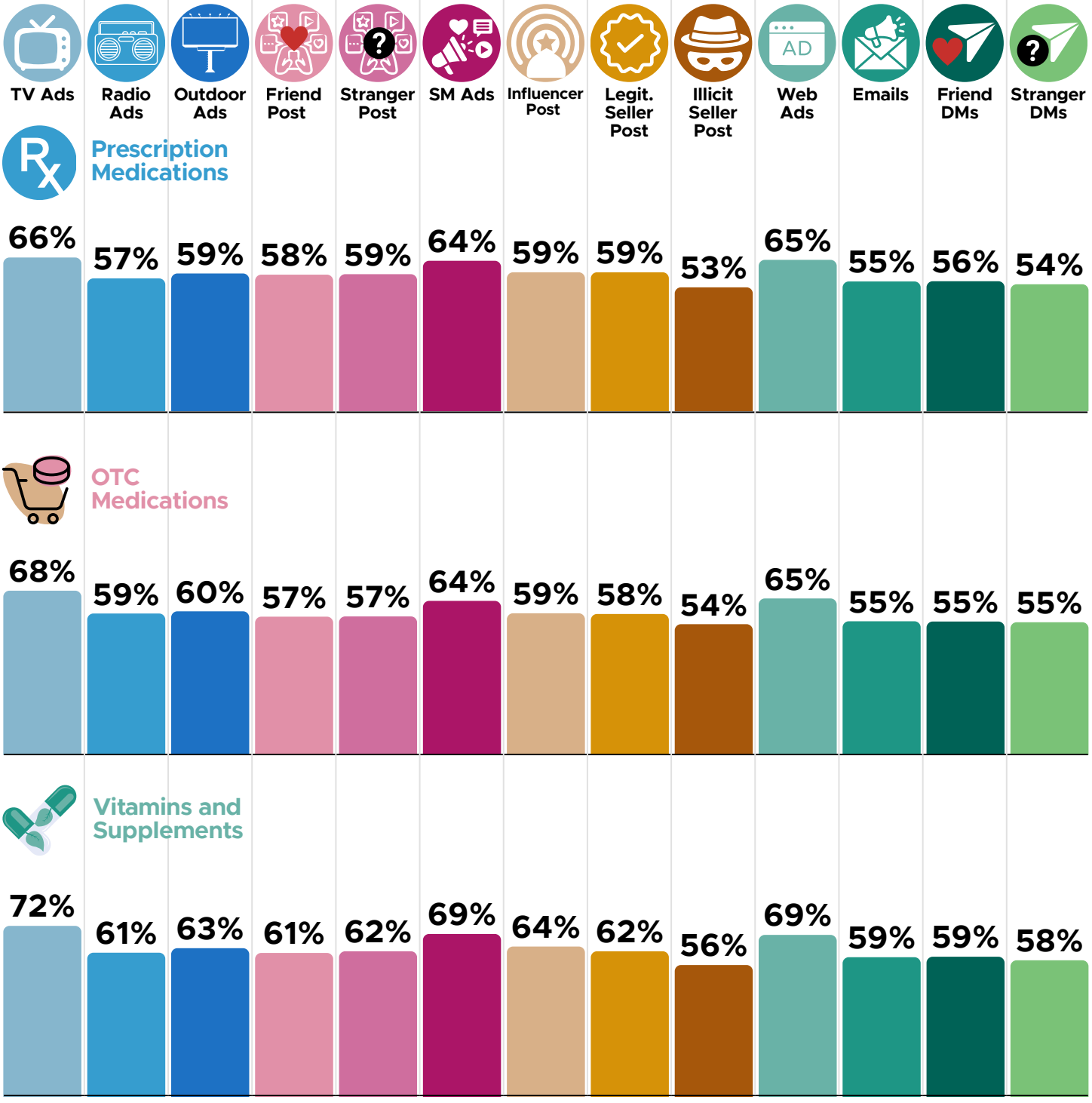


Figure 4.1.1 Frequency of participants' exposure to advertising and promotion of medications across media channels and sources, global sample.

Prescription Medications

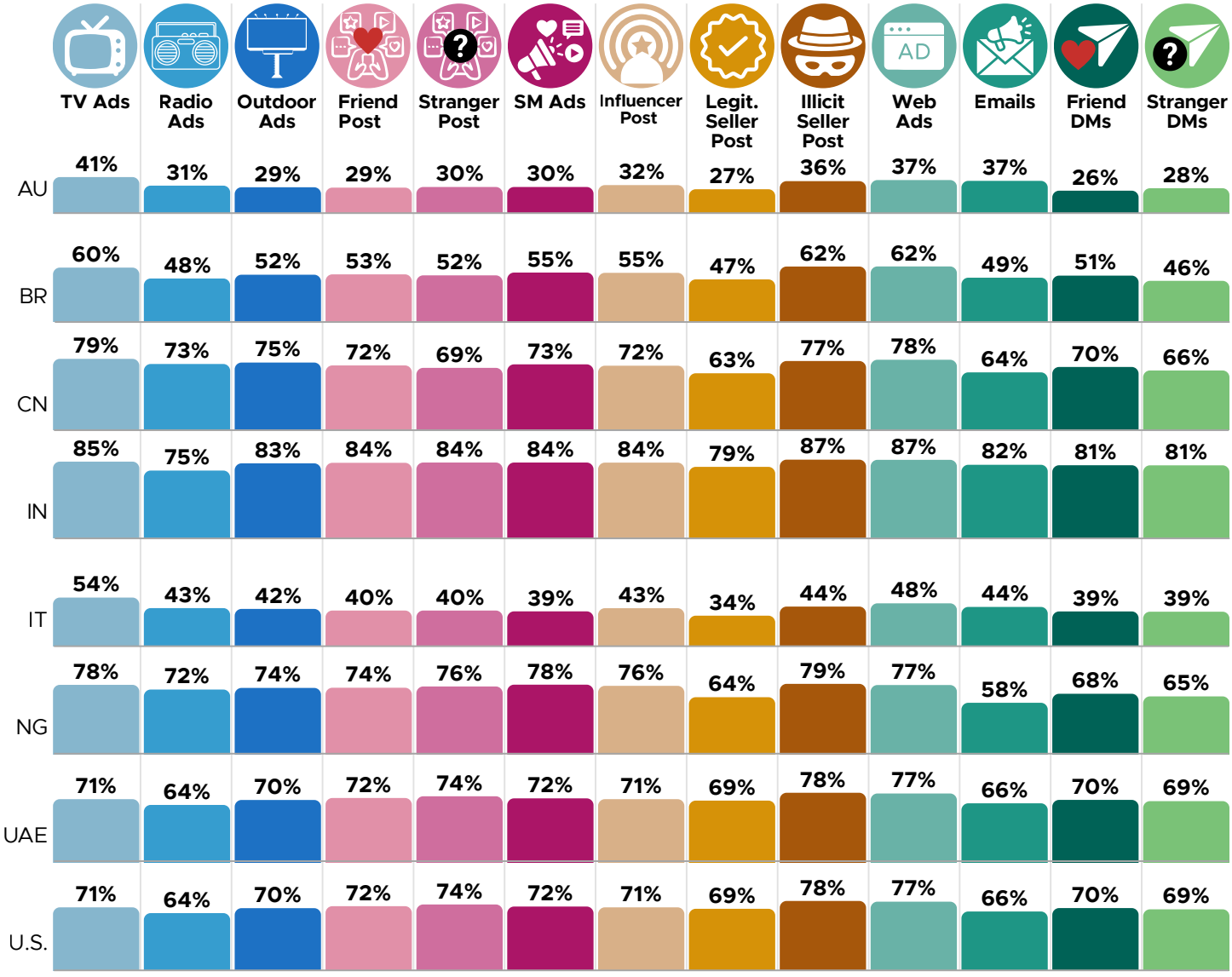


Figure 4.1.2 Frequency of participants' exposure to advertising and promotion of prescription medications across media channels and sources, by country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

OTC Medications

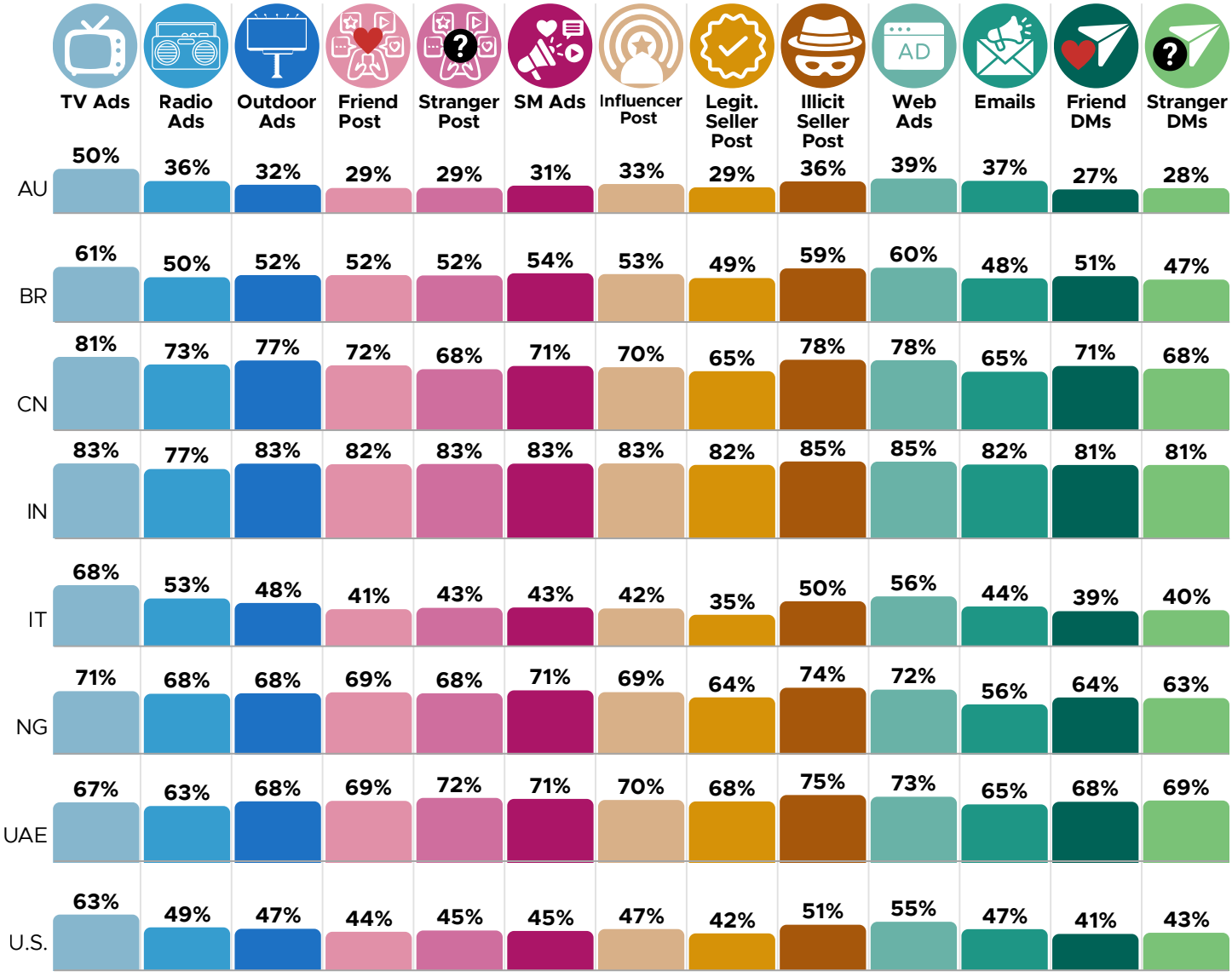


Figure 4.1.3 Frequency of participants' exposure to advertising and promotion of OTC medications across media channels and sources, by country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Vitamins and Supplements

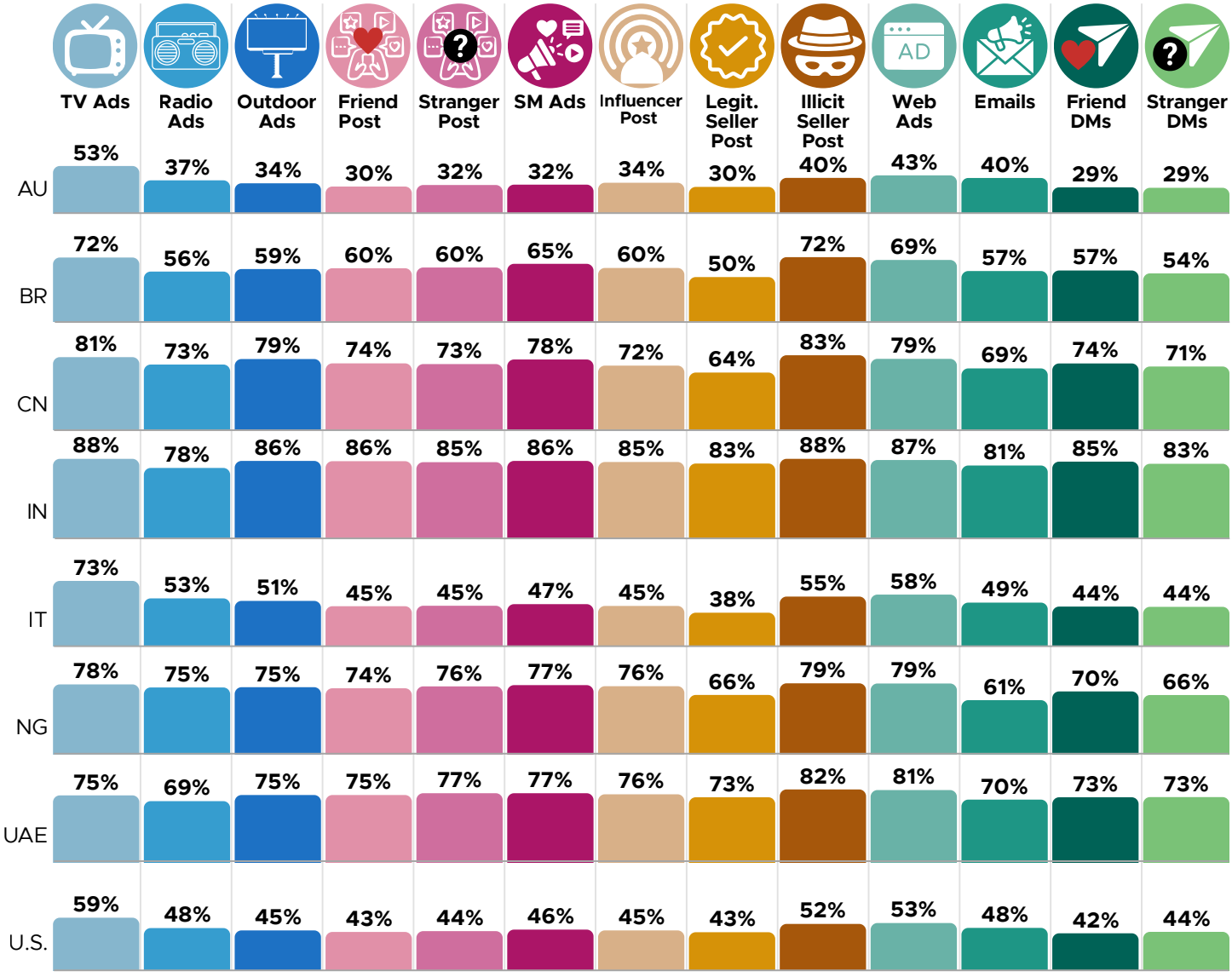


Figure 4.1.4 Frequency of participants' exposure to advertising and promotion of vitamins and supplements across media channels and sources, by country.

AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

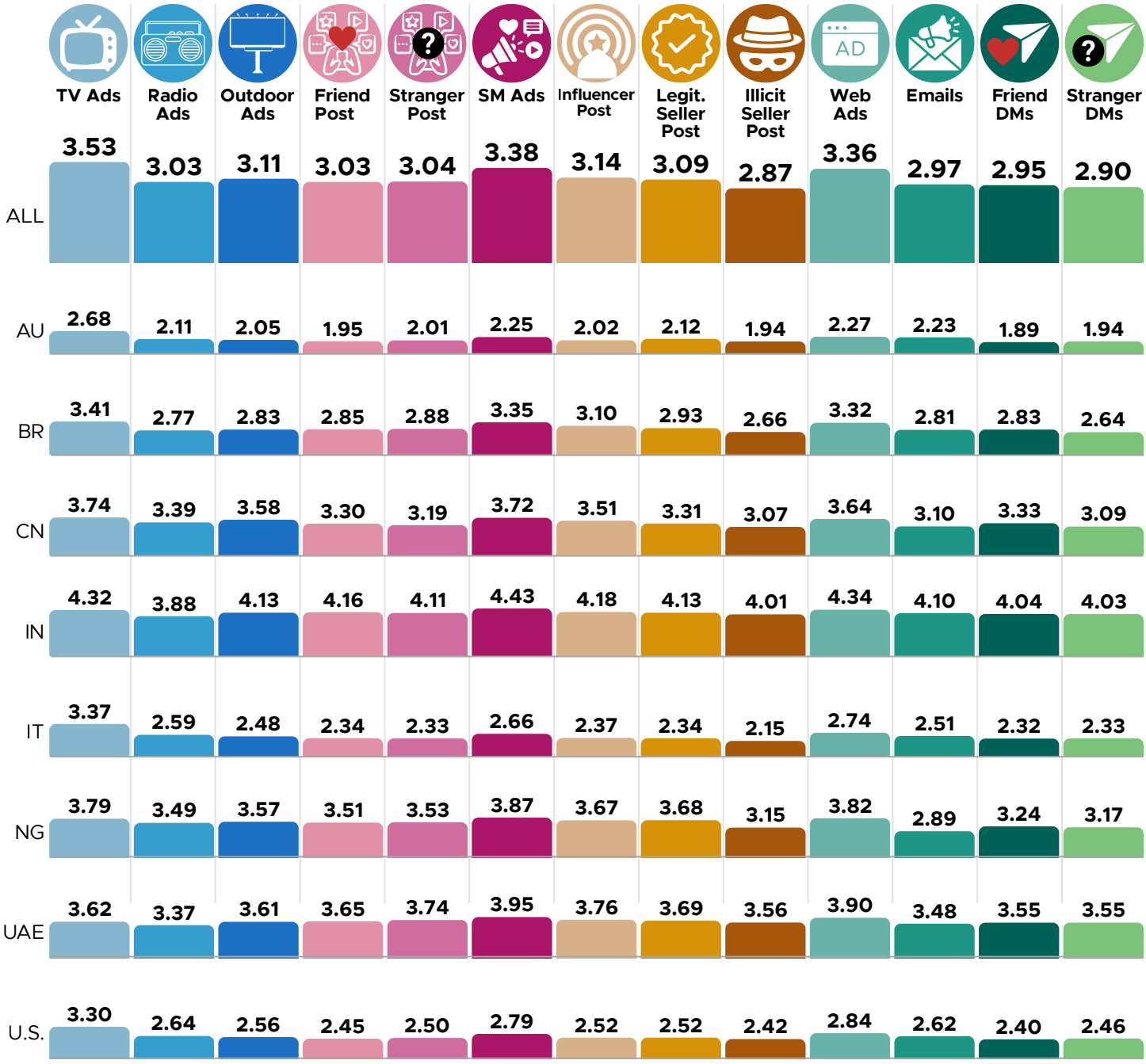


Figure 4.1.5 Mean values for exposure to advertising of medications (averaged across medication classes), by global sample and country.

ALL = Global Sample; AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

4.2 Prescription Medication

Non-Deceptive Purchase

Ad exposure factors explained 23% of the variance in non-deceptive purchase of counterfeit prescription medication at the global sample level. Television pharmaceutical ads, among the global sample, were a protective factor in that each one-unit increase in exposure to television advertising decreased the likelihood of buying counterfeit prescription medications knowingly by 11%. On the other hand, other forms of ad exposure were positively associated with non-deceptive purchase. Specifically, direct email marketing of medications increased non-deceptive purchase by 20%, followed by direct messages from friends (17%), illicit seller posts (16%), radio ads (11%), and legitimate seller posts (10%). The rest of the predictors were not significant and thus are not reported here, nor in the figures.

Country-Level Differences

- Australia: Seeing TV ads for medications decreased non-deceptive purchase by 49%, while exposure to friend posts promoting medications increased that likelihood by 86%.
- Brazil: Illicit seller posts increased non-deceptive purchase by 51%, while receiving DMs from friends increased it by 43%.
- China: Stranger posts on social media decreased non-deceptive purchase by 39%, while illicit seller posts and emails increased that likelihood by 40% and 28%, respectively.
- India: None of the media variables predicted non-deceptive purchase.
- Italy: Social media ads decreased non-deceptive purchase by 64%, while legitimate seller posts increased it by 81%, followed by illicit seller posts (41%) and email marketing (39%), respectively.
- Nigeria: Email marketing increased non-deceptive purchase by 26%.
- UAE: Radio ads increased non-deceptive purchase by 72%, and stranger posts on social media increased that likelihood by 62%.
- U.S.: Receiving DMs from strangers promoting medications increased non-deceptive purchase by 61%, and outdoor advertising increased that likelihood by 48%.

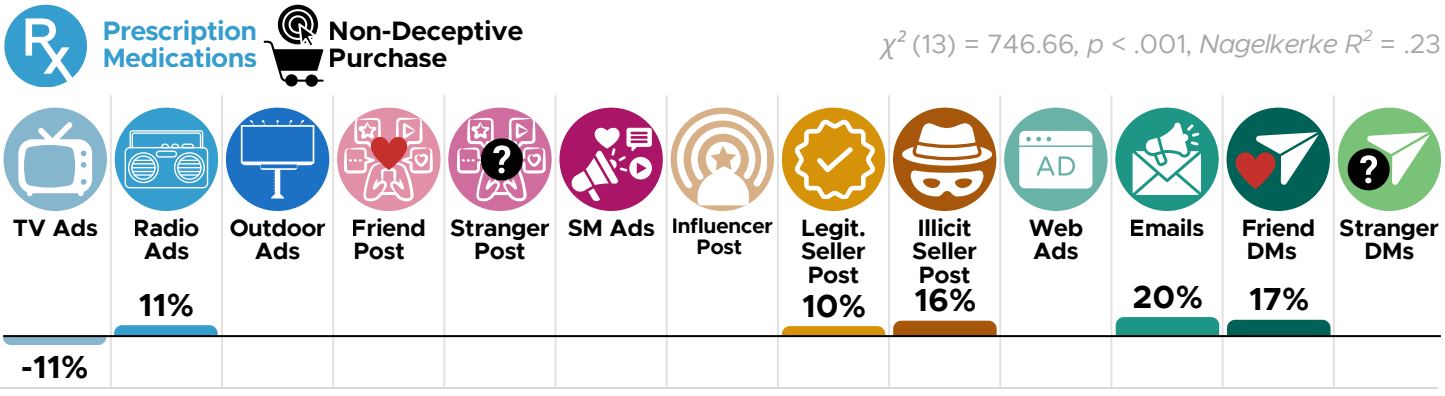


Figure 4.2.1 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and non-deceptive purchase of counterfeit prescription medications online, global sample.

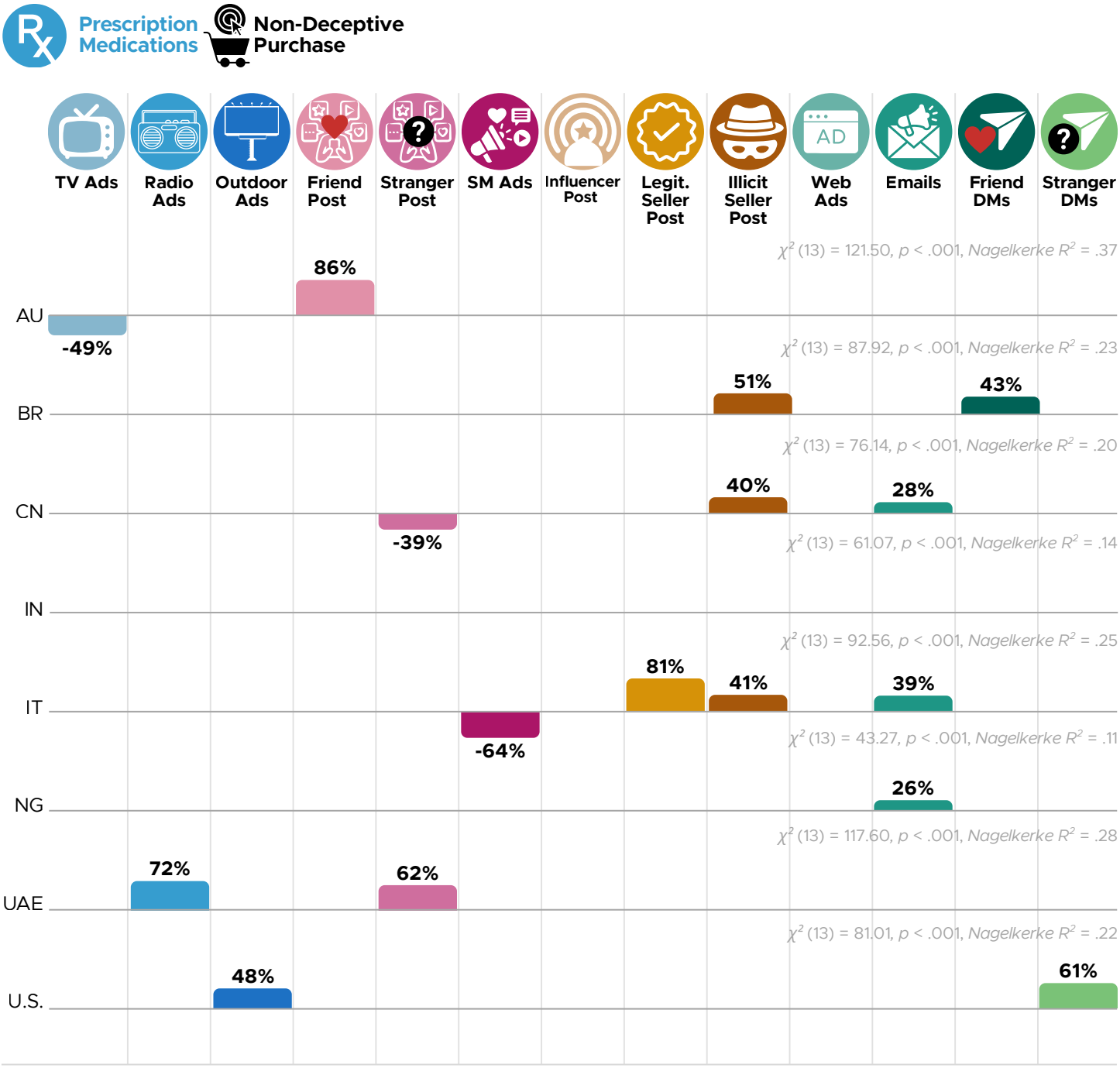


Figure 4.2.2 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and non-deceptive purchase of counterfeit prescription medications online, by country.

Missing values indicate non-significant coefficients. *AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America*

Deceptive Purchase

Exposure to medication ads and marketing explained 28% in deceptive counterfeit purchase of prescription medications. For the global sample, the likelihood of being deceived into buying such fake medications decreased by 20% for each one-unit increase in exposure to pharmaceutical ads on television. However, that likelihood increased as a function of exposure to radio ads (12%), legitimate seller posts (18%), illicit seller posts (16%), email marketing messages (16%), DMs from friends (19%), and DMs from strangers (12%). The rest of the predictors were not significant and thus are not reported here, nor in the figures.

Country-Level Differences

- Australia: Seeing outdoor pharmaceutical ads increased deceptive purchase by 85%.
- Brazil: Illicit seller posts increased deceptive purchase by 63%, and receiving DMs from friends increased that likelihood by 50%.
- China: Seeing social media posts by strangers decreased deceptive purchase by 59%, while exposure to illicit seller posts increased that likelihood by 52%.
- India: Exposure to pharmaceutical TV ads decreased deceptive purchase by 25%, while radio ads increased that likelihood by 23%.
- Italy: Exposure to pharmaceutical social media ads decreased deceptive purchase likelihood by 100%, while that likelihood increased as a function of exposure to posts from legitimate sellers (136%), illicit seller posts (48%), and email marketing (46%).
- Nigeria: None of the ad exposure channels were significant in predicting deceptive purchase.
- UAE: The likelihood of being deceived into buying counterfeit prescription medications increased by 63% as a function of exposure to radio ads and by 73% as a function of seeing posts about medications from strangers on social media, yet that likelihood decreased by 56% as a function of exposure to influencer posts.
- U.S.: The likelihood of being deceived into buying counterfeit prescription medications increased 96% for each one-unit increase in exposure to DMs from strangers and by 66% for each one-unit increase in exposure to outdoor ads, while that likelihood decreased by 35% for each one-unit increase in exposure to TV ads.

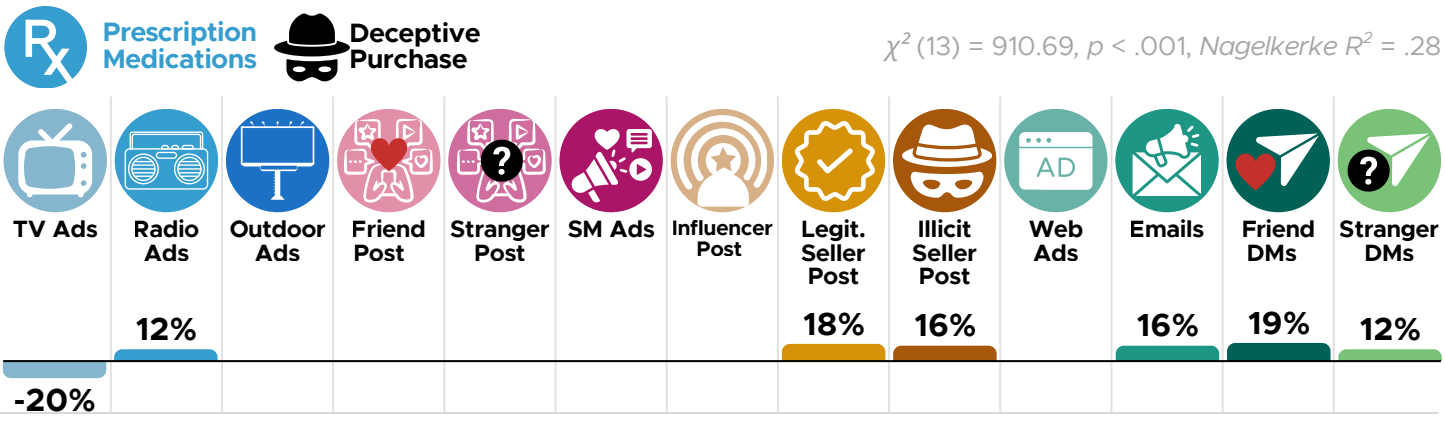


Figure 4.2.3 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and deceptive purchase of counterfeit prescription medications online, global sample.

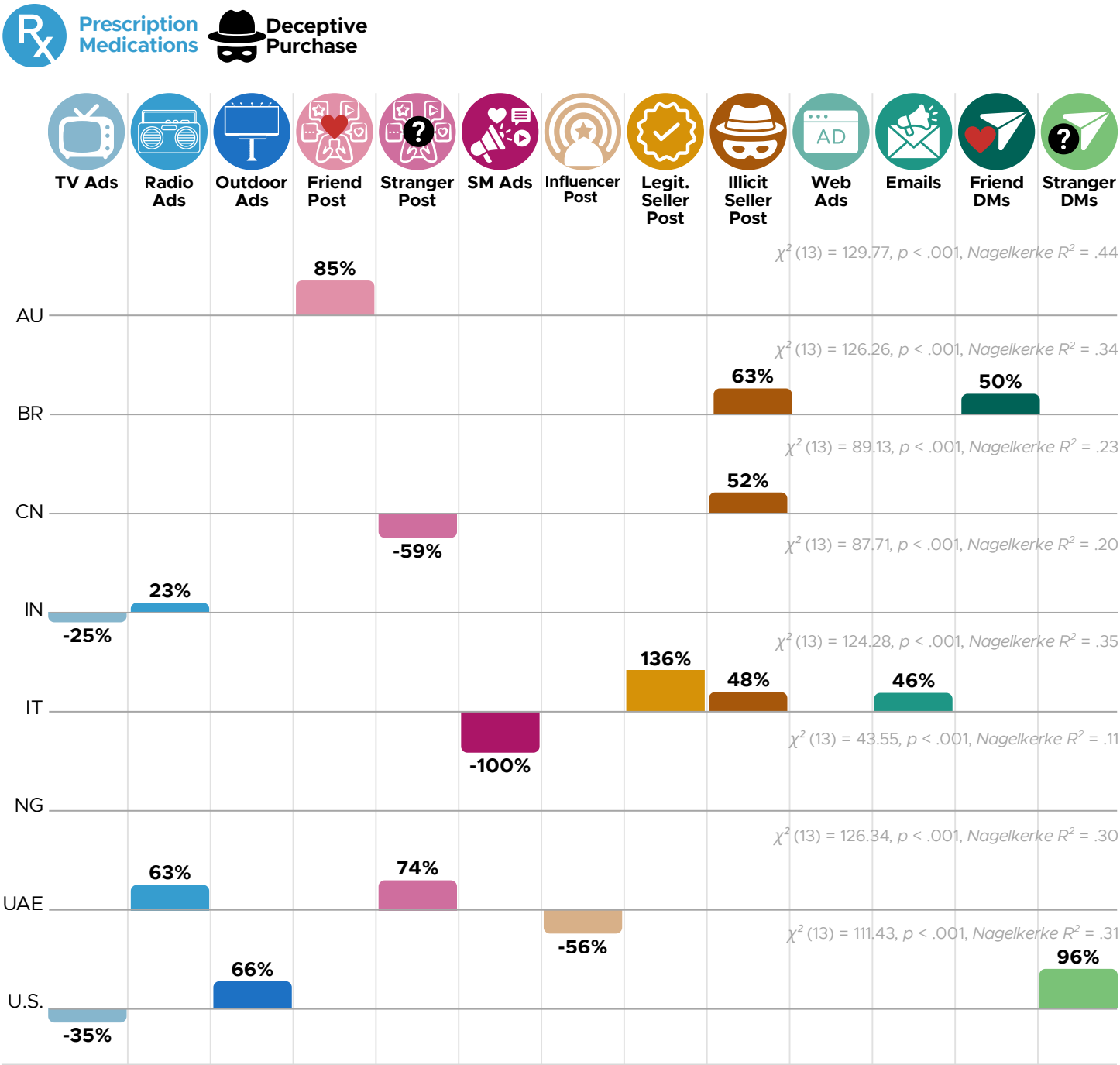


Figure 4.2.4 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and deceptive purchase of counterfeit prescription medications online, by country.

Missing values indicate non-significant coefficients. *AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America*

4.3 OTC Medication

Non-Deceptive Purchase

Ad exposure explained 15% of the variance in non-deceptive purchase of OTC counterfeit medications. The likelihood of knowingly buying counterfeit OTC medications increased by 15% for each one-unit increase in receiving pharmaceutical marketing emails, 12% for each one-unit increase in exposure to illicit seller posts, and 11% for each one-unit increase in exposure to radio ads. In contrast, non-deceptive purchase of counterfeit OTC medications decreased by 11% for each one-unit increase in exposure to web ads.

Country-Level Differences

- Australia: Exposure to pharmaceutical TV ads lowered the chances of knowingly buying counterfeit OTC medications by 52%, while exposure to outdoor advertising increased that likelihood by 85%.
- Brazil: Non-deceptive purchase likelihood increased by 46% and 28% for each one-unit increase in exposure to illicit seller social media posts and email marketing, respectively.
- China: Non-deceptive purchase likelihood increased by 44% and 32% for each one-unit increase in exposure to illicit seller posts and stranger posts on social media, respectively.
- India: Each one-unit increase in exposure to radio ads was associated with a 31% increase in non-deceptive purchase.
- Italy: No significant predictors.
- Nigeria: No significant predictors.
- UAE: Exposure to email marketing increased non-deceptive purchase likelihood by 40%.
- U.S.: Each one-unit increase in exposure to pharmaceutical ads on TV decreased non-deceptive purchase likelihood by 33%.

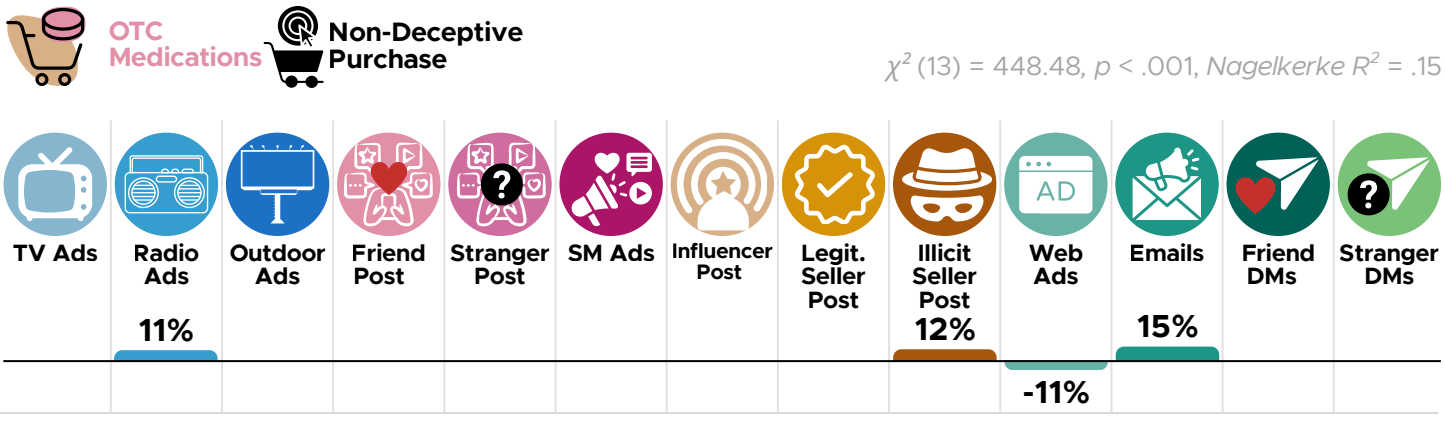


Figure 4.3.1 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and non-deceptive purchase of counterfeit OTC medications online, global sample.

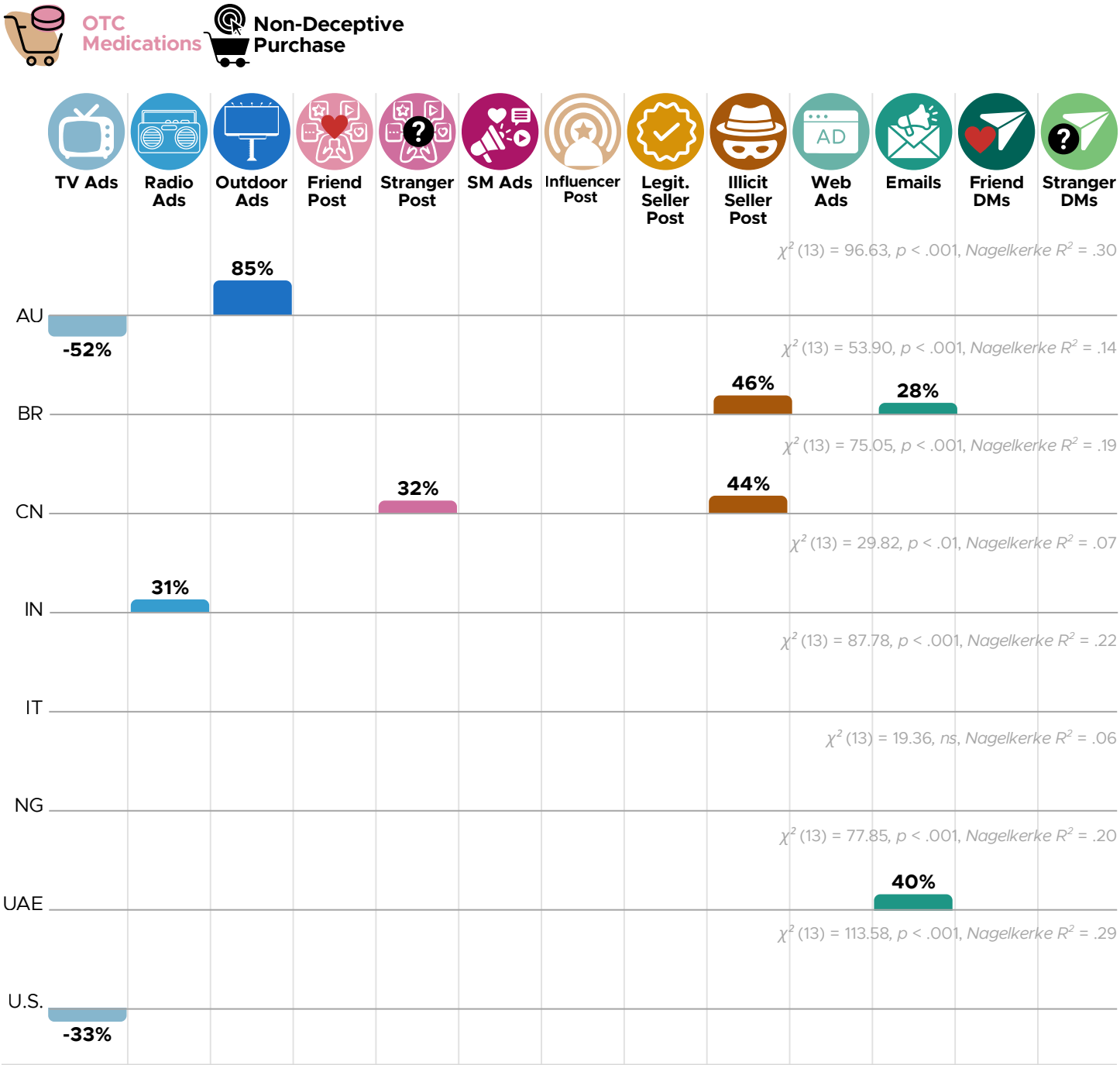


Figure 4.3.2 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and non-deceptive purchase of counterfeit OTC medications online, by country.

Missing values indicate non-significant coefficients. *AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America*

Deceptive Purchase

Ad exposure explained 21% of deceptive purchase of counterfeit OTC medications. The likelihood of being deceived into buying counterfeit OTC medications decreased by 12% for each one-unit increase in exposure to TV ads, while it increased by 15% for each one-unit increase in exposure to radio ads, 16% for exposure to illicit seller social media posts, and 14% for receiving marketing emails about medication.

Country-Level Differences

- Australia: Deceptive purchase increased by 81% for each one-unit increase in exposure to outdoor ads and by 54% for each one-unit increase in social media posts by legitimate sellers.
- Brazil: DMs from strangers decreased deceptive purchase by 45%.
- China: Stranger posts increased deceptive purchase by 44% and social media posts by illicit sellers increased it by 39%.
- India: Exposure to radio ads increased deceptive purchase by 44%, while exposure to outdoor ads decreased it by 30%.
- Italy: Exposure to TV ads decreased deceptive purchase by 35%.
- Nigeria: No significant predictors.
- UAE: Exposure to social media posts by friends decreased deceptive purchase by 43%, while email marketing increased it by 39%.
- U.S.: Exposure to TV ads decreased deceptive purchase by 39%.

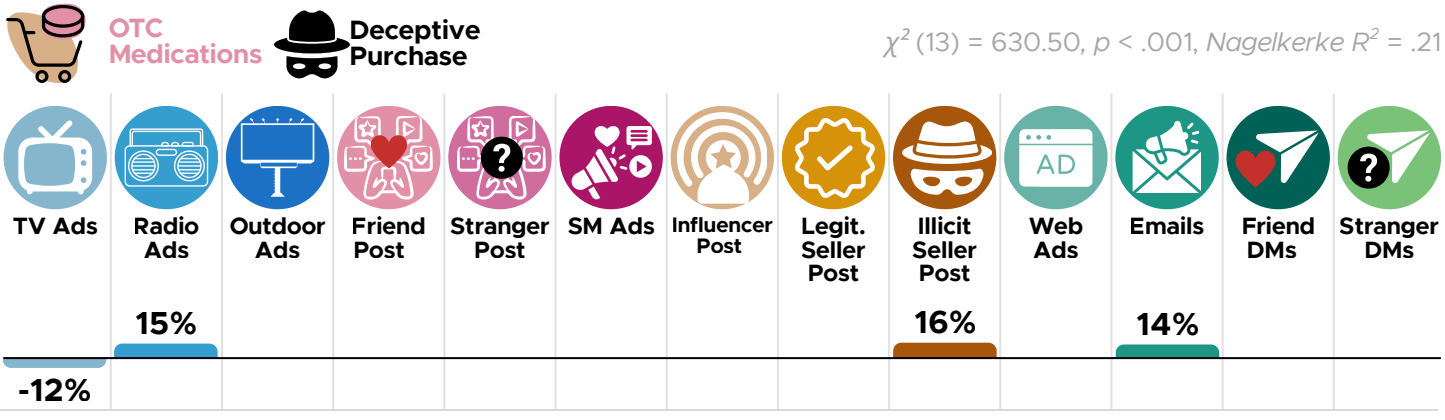


Figure 4.3.3 Significant linear regression standardized coefficients for the relationship between medication advertising exposure and deceptive purchase of counterfeit OTC medications, global sample.

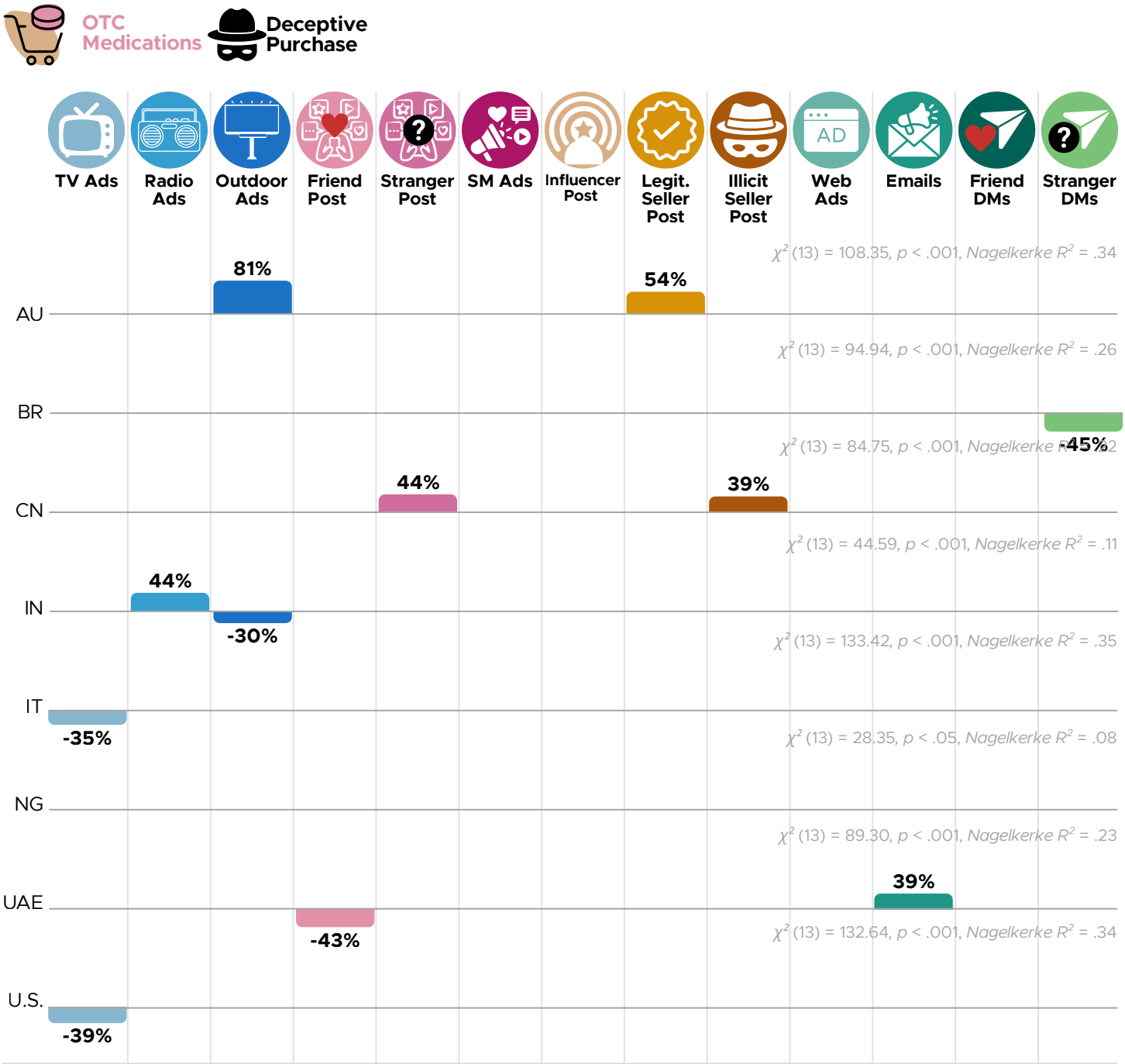


Figure 4.3.4 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and deceptive purchase of counterfeit OTC medications online, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

4.4 Vitamins and Supplements

Non-Deceptive Purchase

Ad exposure explained 10% of the variance in non-deceptive purchase of counterfeit vitamins and supplements. For each one-unit increase in exposure to medication radio ads, the likelihood of intentionally buying counterfeit vitamins and supplements decreased by 9%, while that likelihood increased by 10% for each one-unit increase in exposure to social media influencer posts, 12% for exposure to posts by illicit sellers, and 11% for receiving DMs related to medications from friends.

Country-Level Differences

- Australia: Exposure to social media posts by friends increased the likelihood of intentionally buying counterfeit vitamins and supplements by 108%.
- Brazil: No significant predictors.
- China: No significant predictors.
- India: Exposure to social media posts by illicit sellers increased non-deceptive purchase by 27%.
- Italy: Exposure to social media posts by illicit sellers increased non-deceptive purchase by 33%.
- Nigeria: Exposure to social media posts by illicit sellers increased non-deceptive purchase by 12%.
- UAE: No significant predictors.
- U.S.: Exposure to pharmaceutical TV ads increased non-deceptive purchase by 33%.

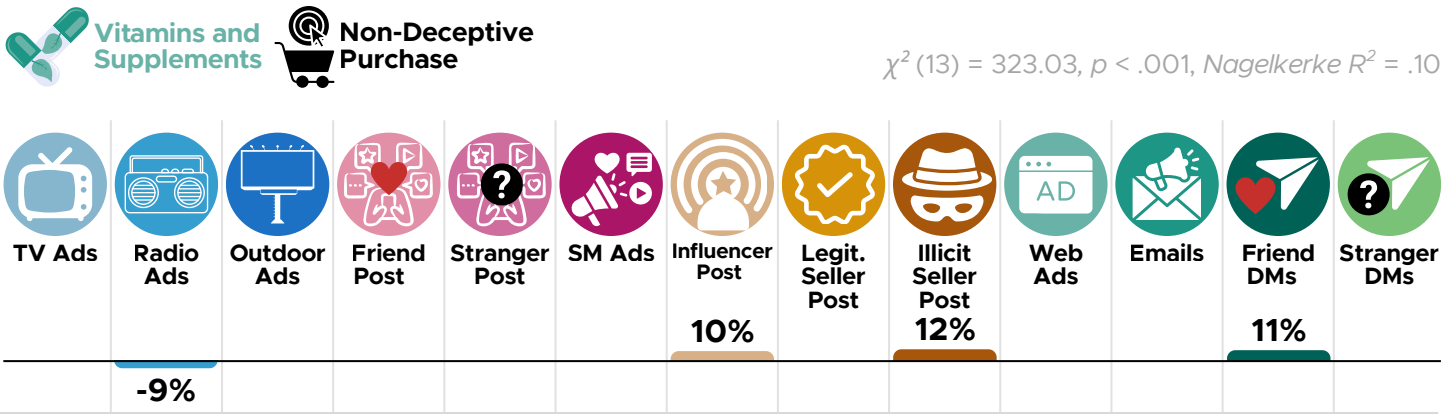


Figure 4.4.1 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and non-deceptive purchase of counterfeit vitamins and supplements online, global sample.

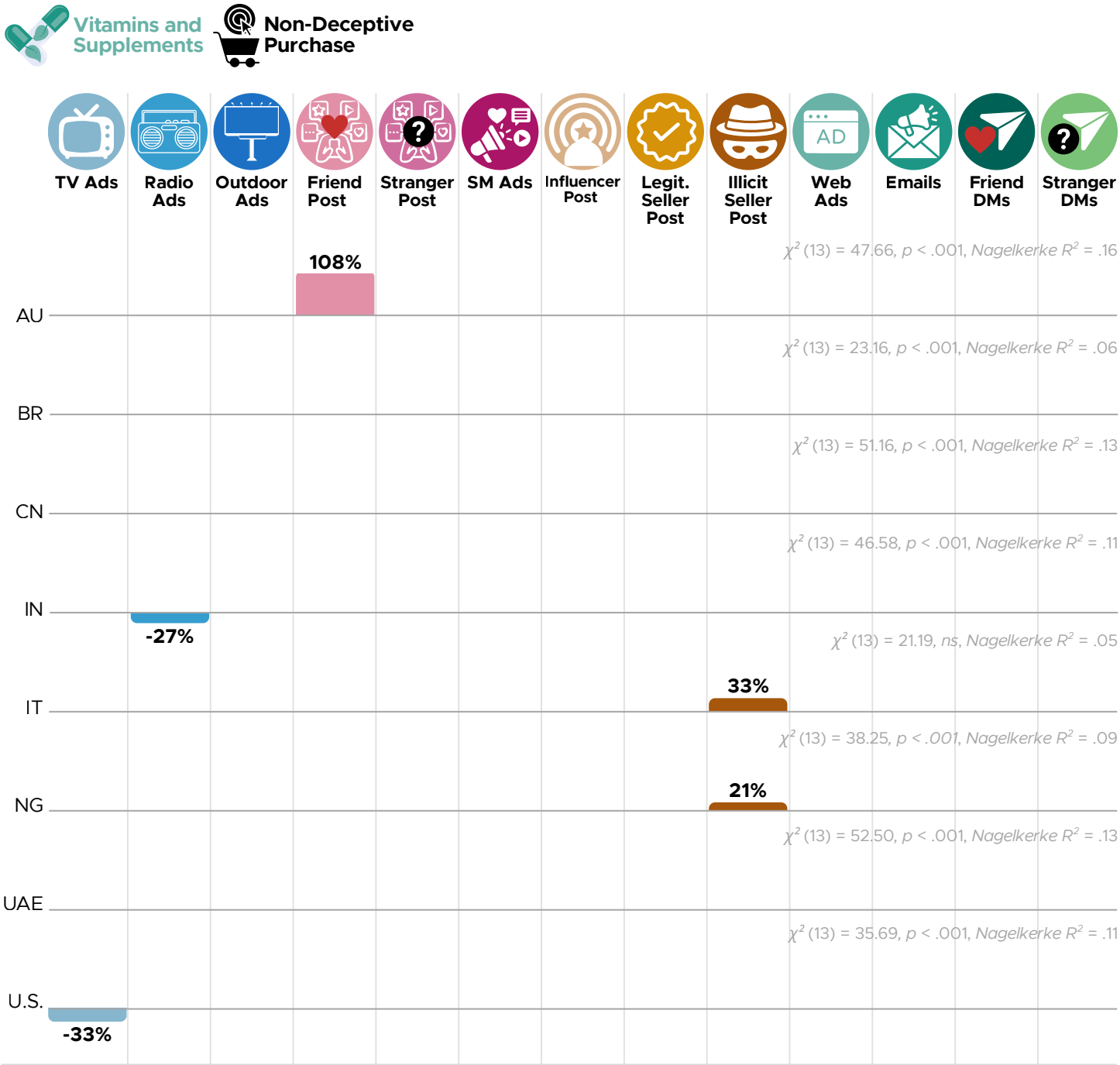


Figure 4.4.2 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and non-deceptive purchase of counterfeit vitamins and supplements online, by country.

Missing values indicate non-significant coefficients. *AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America*

Deceptive Purchase

Ad exposure explained 24% in deceptive purchase of counterfeit vitamins and supplements. Exposure to TV ads decreased deceptive purchase by 14%, while influencer posts increased it by 13% and illicit seller posts increased it by 16%.

Country-Level Differences

- Australia: Exposure to TV ads decreased deceptive purchase by 75%, while social media posts by friends increased it by 104%.
- Brazil: Exposure to social media posts by friends decreased deceptive purchase by 49%, while exposure to social media ads increased it by 42%.
- China: Exposure to social media posts by strangers increased the likelihood of deceptive purchase by 38%.
- India: No significant predictors.
- Italy: Exposure to illicit seller posts increased deceptive purchase by 44%.
- Nigeria: Exposure to illicit seller posts increased deceptive purchase by 25%.
- UAE: Exposure to illicit seller posts increased deceptive purchase by 38%.
- U.S.: Receiving DMs from friends about medications increased deceptive purchase by 73%.

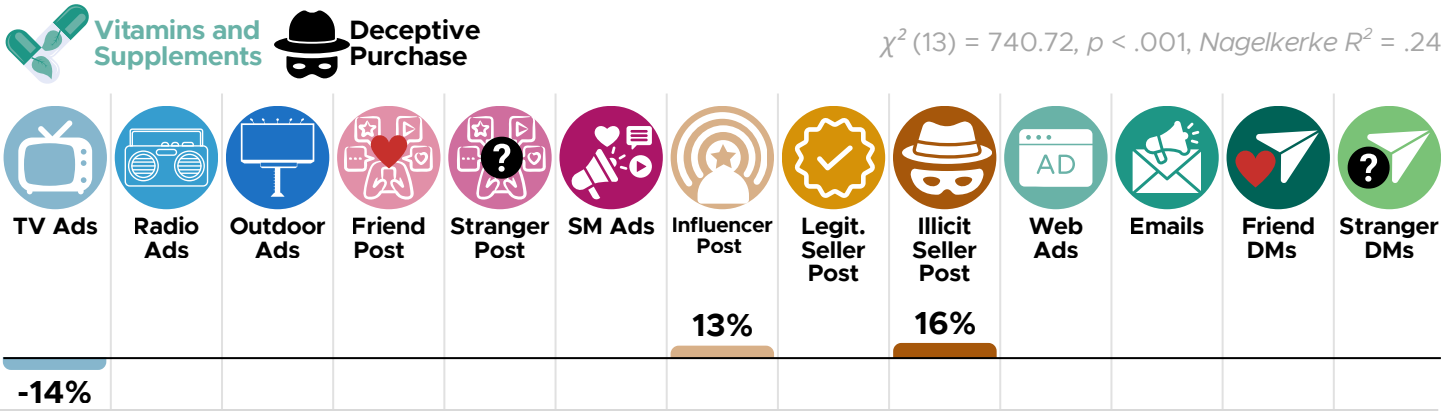


Figure 4.4.3 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and deceptive purchase of counterfeit vitamins and supplements online, global sample

Vitamins and Supplements | Deceptive Purchase

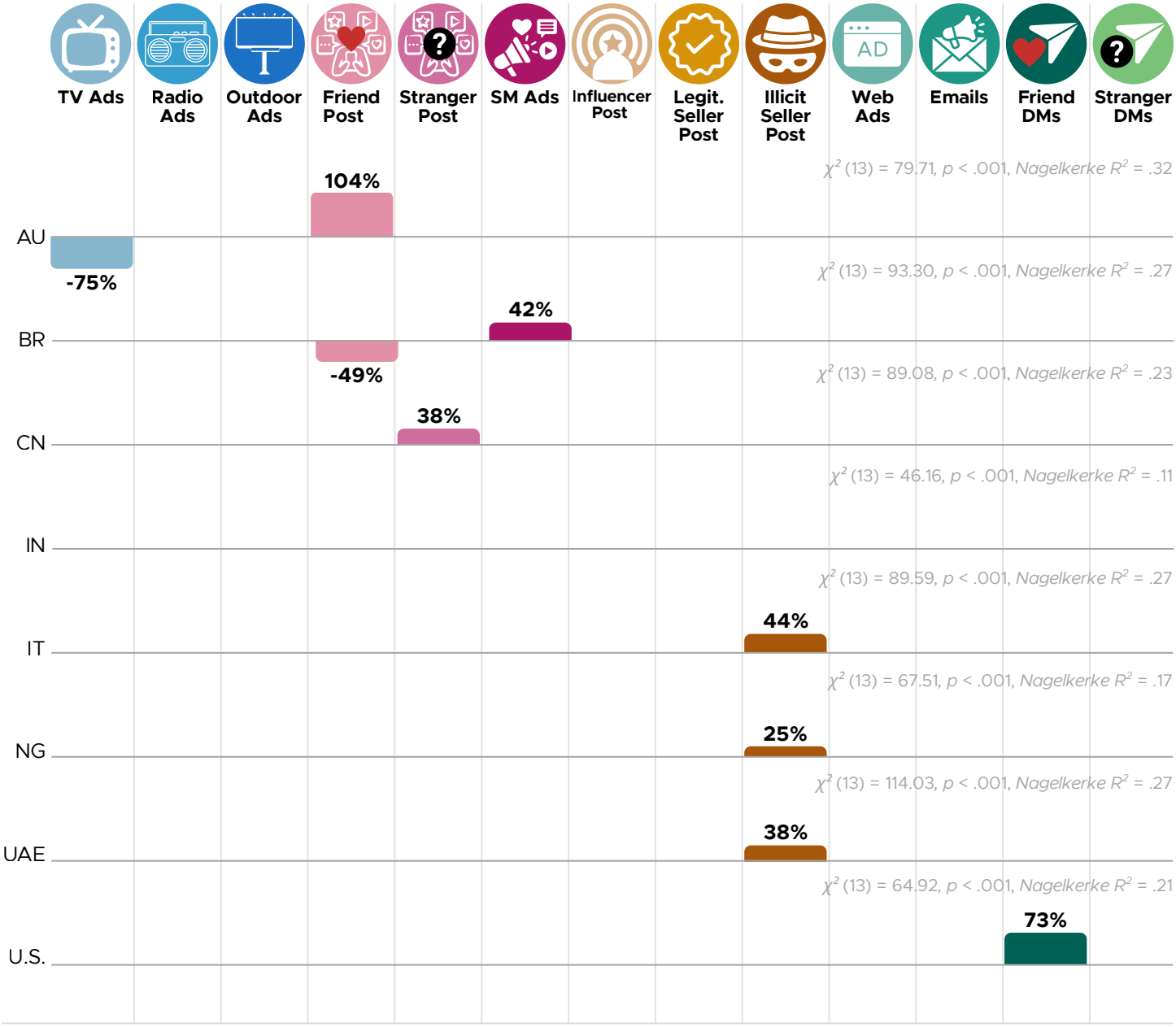


Figure 4.4.4 Significant logistic regression odds ratio values (probability) for the relationship between medication advertising exposure and deceptive purchase of counterfeit vitamins and supplements online, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

4.5 Medication Online Purchase Intentions

Legitimate Medication Online Purchase Intentions

Among the global sample, ad exposure explained 23% of the variance in online purchase intentions for legitimate medications. Exposure to social media posts by strangers decreased purchase intentions, while exposure to outdoor ads, influencer posts, web ads, posts by legitimate sellers, DMs from friends, and emails increased intentions.

Country-Level Differences

- Australia: Exposure to influencer posts and emails were positive predictors.
- Brazil: Exposure to stranger posts was a negative predictor.
- China: No significant predictors.
- India: Receiving DMs from friends was a positive predictor.
- Italy: Exposure to legitimate seller posts was a positive predictor.
- Nigeria: Exposure to legitimate seller posts was a positive predictor, while exposure to social media ads was a negative predictor.
- UAE: Exposure to outdoor ads and influencer posts were positive predictors.
- U.S.: Exposure to illicit seller posts was a positive predictor.

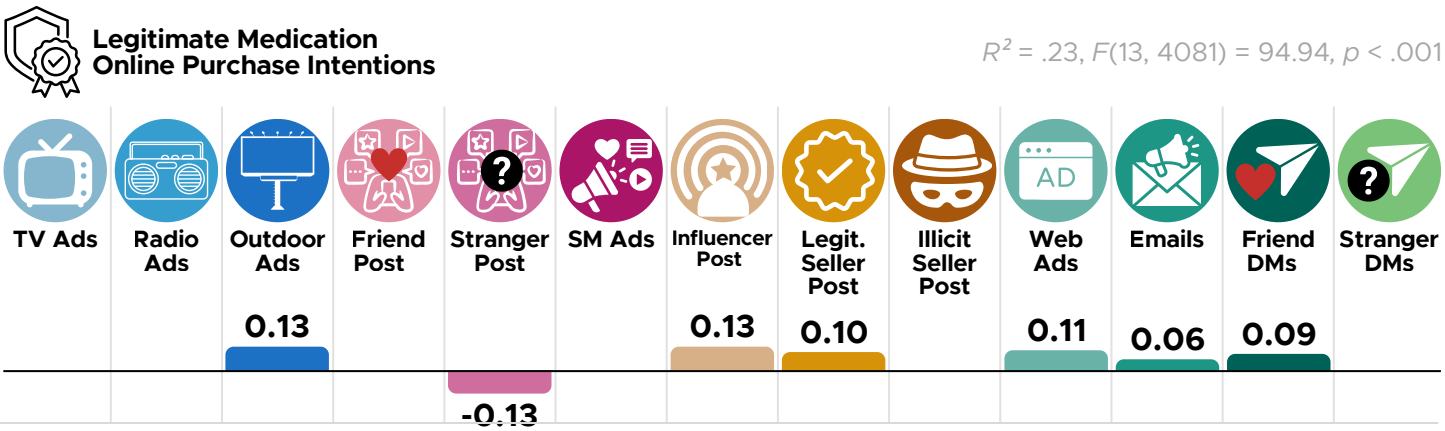


Figure 4.5.1 Significant linear regression standardized coefficients for the relationship between medication advertising exposure and legitimate medication online purchase intentions, global sample

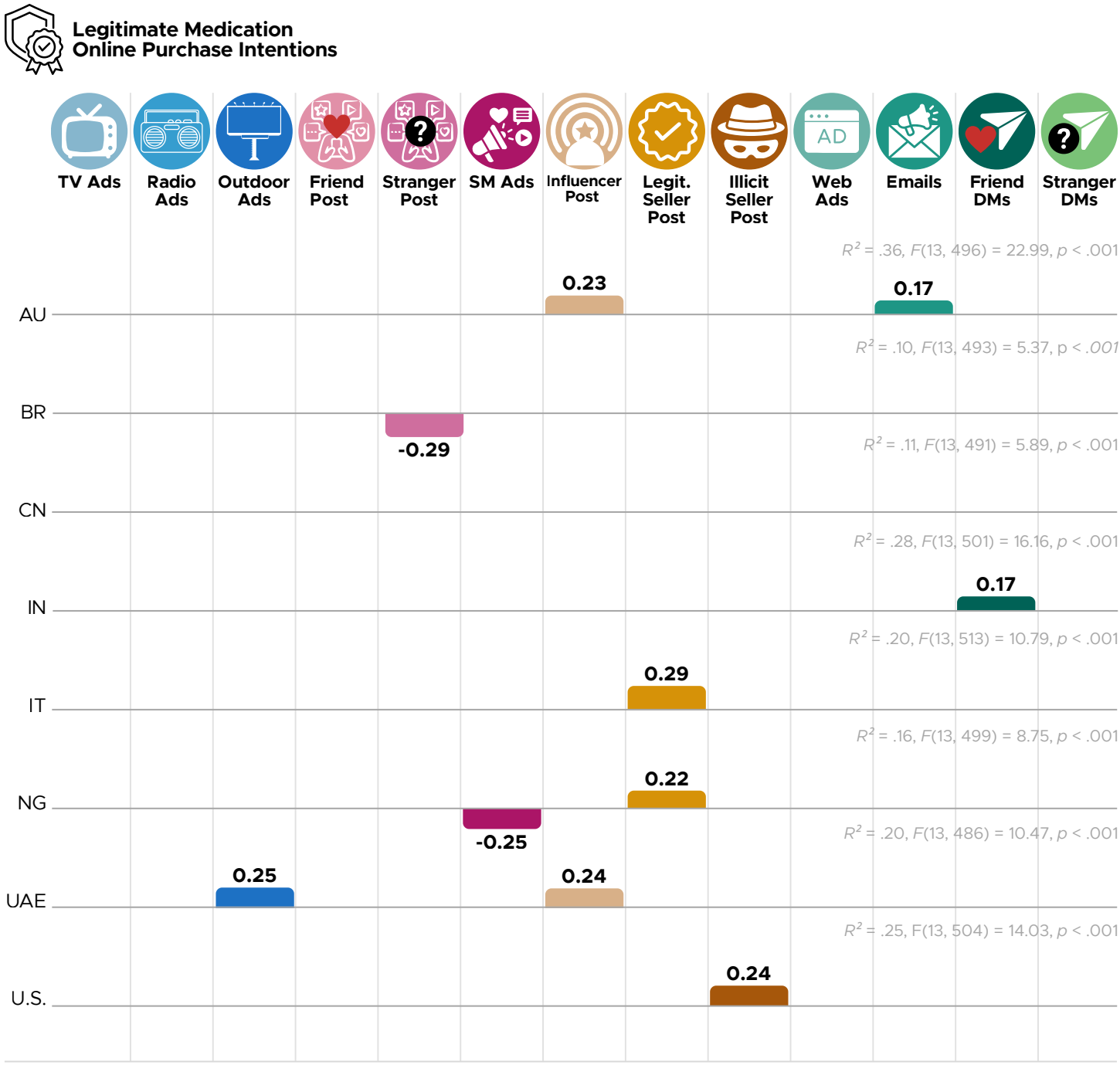


Figure 4.5.2 Significant linear regression standardized coefficients for the relationship between medication advertising exposure and legitimate medication online purchase intentions, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Counterfeit Medication Online Purchase Intentions

Among the global sample, ad exposure explained 36% in intentions to buy counterfeit medications. Exposure to web ads and TV ads negatively predicted purchase intentions, while exposure to illicit seller posts, emails, DMs by strangers, outdoor ads, and radio ads were positive predictors.

Country-Level Differences

- Australia: Exposure to outdoor ads and radio ads positively predicted counterfeit purchase intentions.
- Brazil: Exposure to web ads negatively predicted counterfeit purchase intentions, while intentions increased as a function of exposure to posts by illicit sellers and receiving DMs from friends.
- China: Exposure to posts by legitimate sellers was a negative predictor, while exposure to posts by illicit sellers and emails were positive predictors.
- India: Exposure to web ads was a negative predictor, while receiving DMs from strangers, exposure to posts by illicit sellers, and exposure to radio ads were positive predictors.
- Italy: Exposure to web ads decreased counterfeit purchase intentions, while exposure to illicit seller posts increased it.
- Nigeria: Exposure to email marketing increased counterfeit purchase intentions.
- UAE: Exposure to radio ads increased counterfeit purchase intentions.
- U.S.: Exposure to social media posts by strangers and TV ads decreased counterfeit purchase intentions, while exposure to illicit seller posts, DMs from friends, and radio ads increased those intentions.

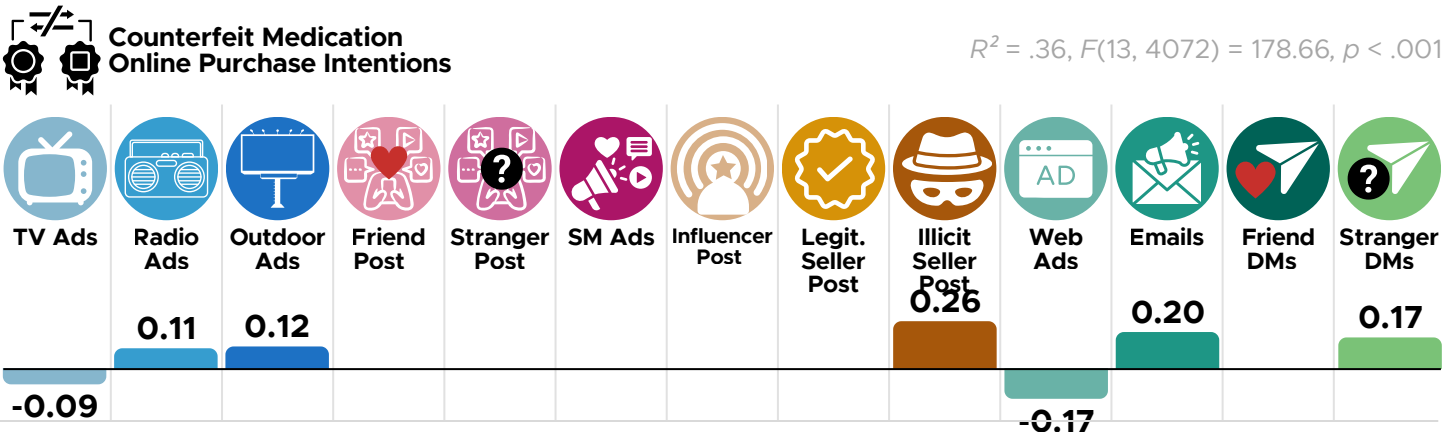


Figure 4.5.3 Significant linear regression standardized coefficients for the relationship between medication advertising exposure and counterfeit medication online purchase intentions, global sample

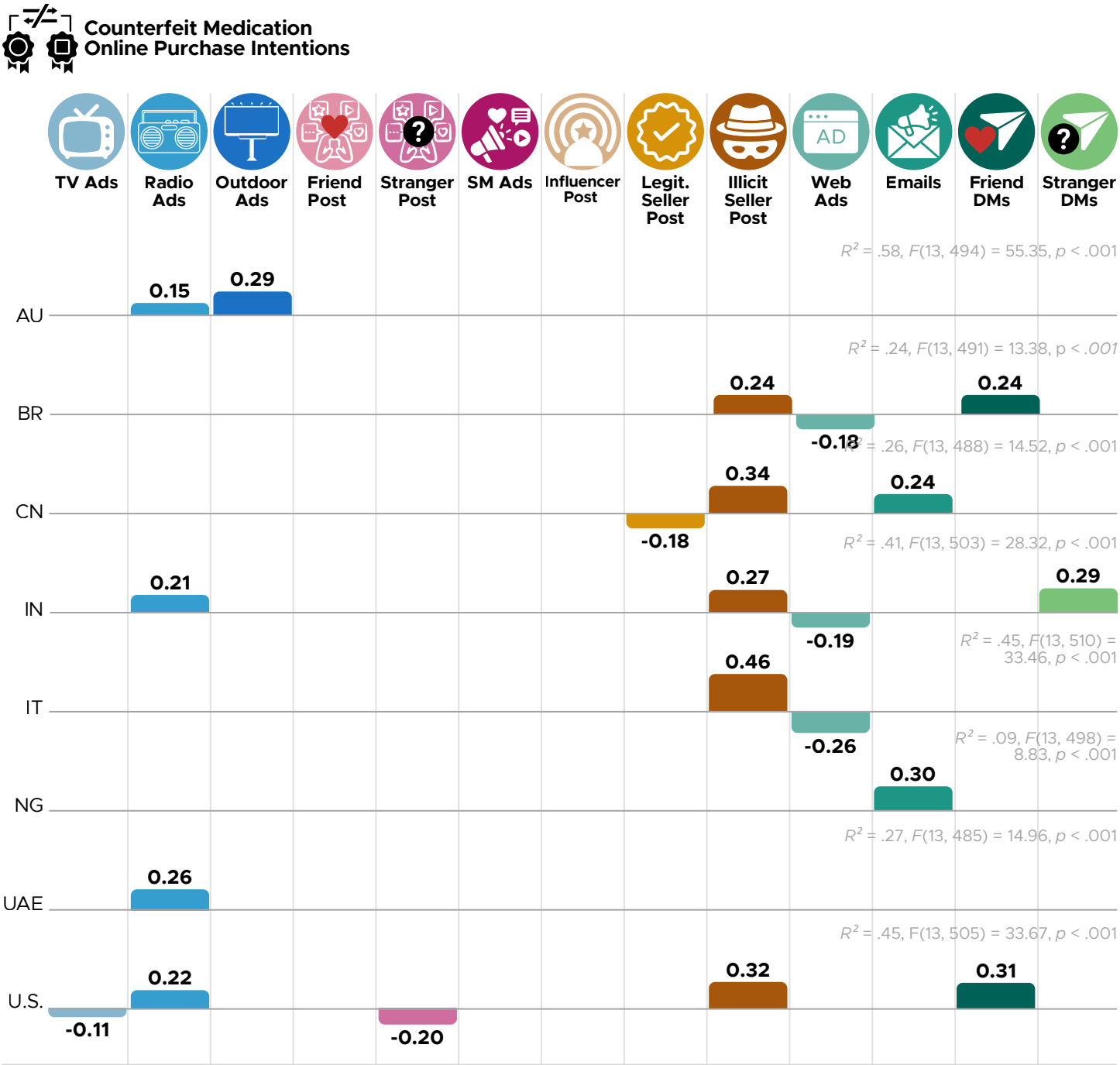
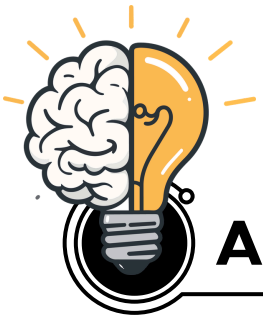


Figure 4.5.4 Significant linear regression standardized coefficients for the relationship between medication advertising exposure and counterfeit medication online purchase intentions, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America



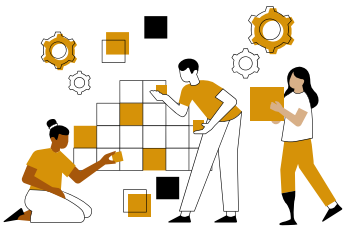
Actionable Insights

Communication Channel Choice

Fortify protective channels, while containing high-risk touchpoints. Given TV's consistent protective influence against buying counterfeit medications, emphasizing anti-counterfeit cues in pharmaceutical TV ads might enhance global and country-level strategies. At the same time, intercepting high-risk touchpoints through digital channels to counter the impact of influencer and user-generated content requires tailored approaches to communicating the risks of buying counterfeit medications.

Heightened Role of Social and Digital Platforms

Given the impact of posts by illicit sellers on counterfeit medication purchase and purchase intentions, it is critical to work collaboratively with social and digital media platforms to more effectively regulate such affordances that are currently easily accessible and increasingle leverages by illicit sellers. The considerable relationship between seeing posts by illicit sellers and consumers' actions and readiness as it relates to buying counterfeit medications should prompt more effective proactive and reactive strategies to curb counterfeiters' ability to leverage such platforms to directly target consumers, resulting in significant risk and harm to consumer health and well-being.



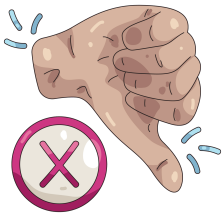
Not All Channels are Created Equal

It is important to diversify anti-counterfeit medication communication strategies by medication type in terms of channel choice. Specifically, prescription medications and OTC risks are elevated across paid and branded media messages, while influencer posts were critical in increasing the probability of being deceived into buying counterfeit vitamins and supplements. Pharmaceutical brands and related stakeholders should consider what consumers are seeing across different channels and how they are impacted to buy counterfeit medications knowingly and/or unknowingly to enhance reach of anti-counterfeit messages.

5

BEHAVIORAL PLANNING

tl;dr



5.48

Participants expressed **negative attitudes** toward buying counterfeit meds (mean = 5.48 on a 7-point scale)

30%

On average, participants estimated that **other people,** distant and close, within their social environment buy counterfeit meds

12%

A one-unit increase in **perceived behavioral control (PBC)** decreased counterfeit medication purchase by 12% across medication classes

16%

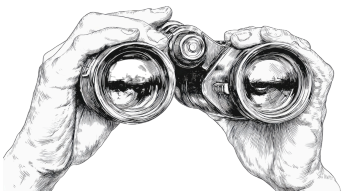
A one-unit increase in **injunctive norms (acceptance) among close friends** increased counterfeit prescription medication purchase by 16%

+.31

Having **positive attitudes** toward buying counterfeit medications was positively associated with counterfeit medication online purchase intentions (β = .31)

+.10

The more participants thought members of their family bought counterfeit medications (**descriptive norms**), the more they wanted to do it themselves (β = .10)



1%

A 1% increase in the estimated # of peers in the country and on the internet (**descriptive norms**) increased buying counterfeit OTC medications by 1% each

16%

Behavioral planning predictors explained 16% of the variance in counterfeit medication purchase, across medication classes

5.1 Theory of Planned Behavior

The Theory of Planned Behavior (TPB) posits that for an individual to enact a particular behavior, their attitudes, self-perceptions, and social perceptions have to align with the intended behavior. In other words, to predict purchase of counterfeit medications online, one needs to examine the nature of attitudes consumers have about buying medications online in terms of positive and negative associations, their perceptions about their own ability to refrain from buying counterfeits (perceived behavioral control (PBC)), their perceptions about the social acceptance of buying counterfeit medications (perceived injunctive norms), and their perceptions of how prevalent the purchase of counterfeit medications is (perceived descriptive norms). In our study, all TPB variables – except descriptive norms – were measured using a 7-point, Likert-type scale anchored by "Strongly Disagree" and "Strongly Agree," where a higher value indicates more agreement with the statements comprising the different concepts. As for descriptive norms, we asked participants to use a scale of 0-100% to indicate the percentage of social groups they think have bought counterfeit medications, with reference groups ranging from peers in the same country, local area (e.g., city, town, village), and on the internet, as well as family, close friends, and social media friends.

Global and Country-Level Descriptives

At the global level, participants generally expressed negative attitudes toward buying counterfeit medications, which was indicated by high agreement with negative attitudes statements (5.48) and low agreement with positive attitudes statements (2.58). The highest negative attitudes were expressed by participants from Brazil (5.98), and the lowest negative attitudes were expressed by participants from India (4.85). Participants from India (4.09) expressed the highest positive attitudes toward buying counterfeit medications, while participants from Nigeria expressed the lowest positive attitudes (2.01). Australian participants expressed the highest PBC (5.55), while Indian participants expressed the lowest PBC (4.90).

Global sample participants also reported a high level of perceived behavioral control (PBC) (5.32) indicating high levels of perceived ability to refrain from buying counterfeit medications.

In terms of perceived injunctive norms, the global sample had relatively low agreement with statements asking about acceptance of buying counterfeits among distant social groups (i.e., peers in the same country) and close social groups (i.e., family and friends). This pattern was consistent across all countries with the exception of India, where perceived distant (4.17) and close (4.19) injunctive norms averaged higher than the scale mid-point (7-point scale).

As for descriptive norms – or perceived prevalence of buying counterfeit medications – the global sample exhibited averages around and below one-third of each of the reference groups. Specifically, participants, on average, indicated that they thought 35% of peers in the same country bought counterfeit medications, 32% of local peers in the same town/village/city, 33% of peers on the internet, 25% of family members, 26% of close friends, and 29% of social media friends. This pattern of higher perceived descriptive norms among distant social groups, compared to closer social

groups, was observed across all countries in our study. However, there was clear country-level variability in perceived descriptive norms. Indian participants reported the highest levels of perceived descriptive norms, with the average of the estimated social group members who bought counterfeit medications around 50%. The samples from Nigeria, the UAE and the U.S. reported estimates of descriptive norms that were closer to the global average, and maintained the gap between distant and close norms. Participants from China reported the lowest descriptive norms, followed by Italy, Australia, and Brazil, respectively.

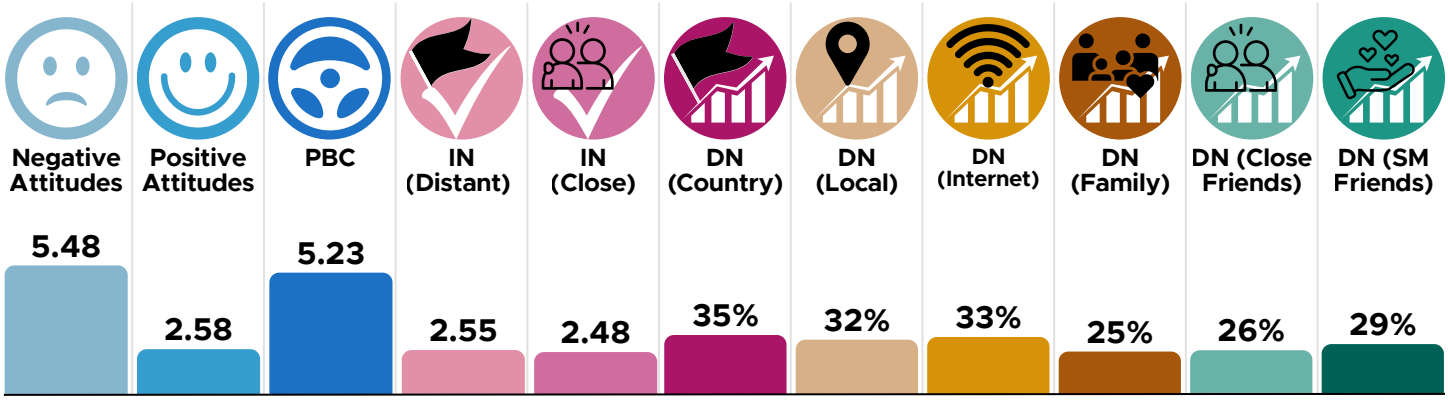


Figure 5.1.1 Mean values for theory of planned behavior variables, global sample.

Participants expressed **strong negative attitudes** toward buying counterfeit medications and indicated that they were capable of protecting themselves against the risks of buying counterfeit medications online (**perceived behavioral control**).

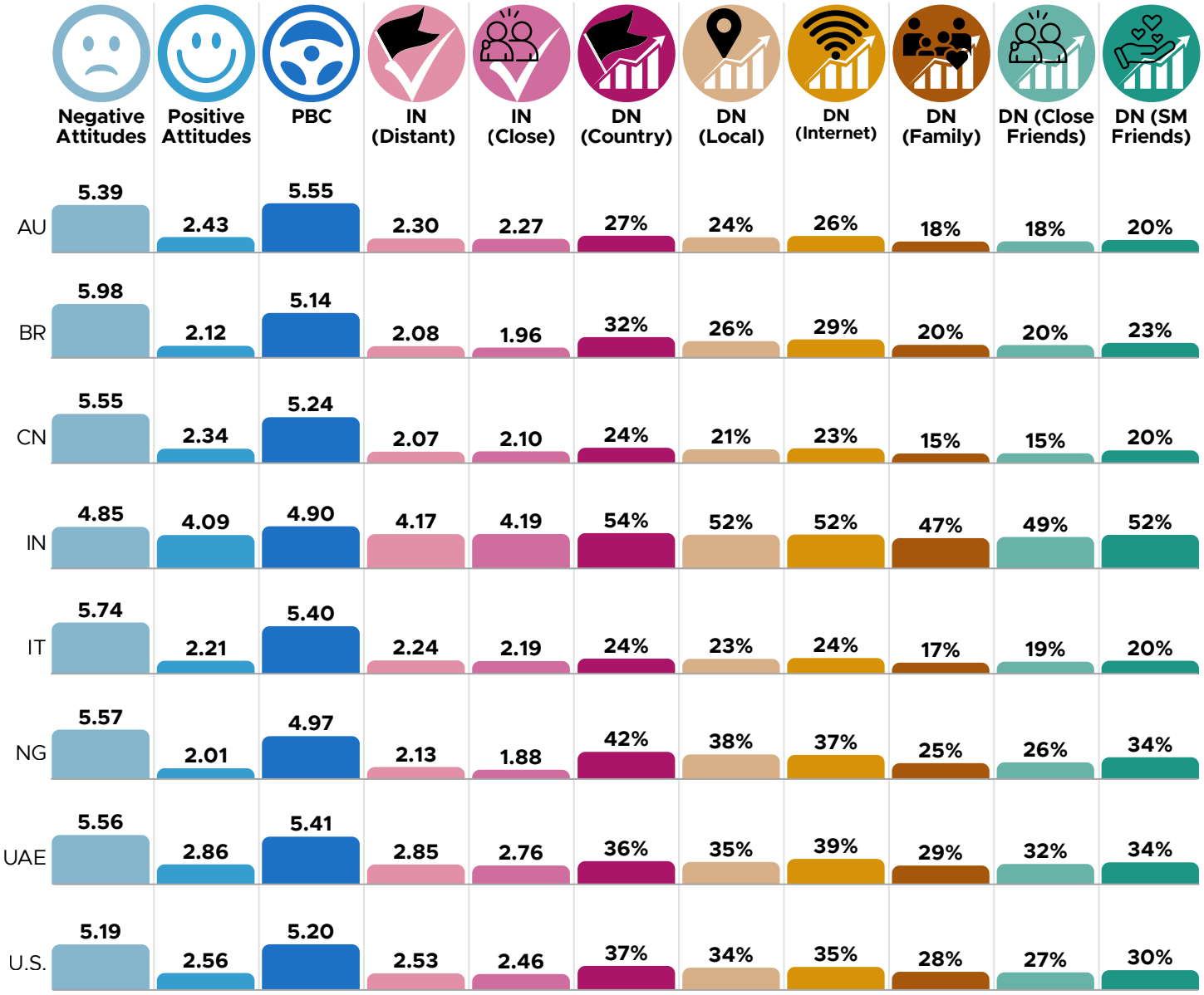


Figure 5.1.2 Mean values for behavioral planning variables, by country.
AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

5.2 Prescription Medication

Non-Deceptive Purchase

At the global level, TPB variables explained 22% of the variance in non-deceptive purchase of counterfeit prescription medications. Specifically, for each one-unit increase in positive attitudes, purchase likelihood increased by 13%. A one-unit increase in PBC decreased purchase by 8%. Perceived injunctive norms (acceptance) among close family and friends increased counterfeit purchase by 15%. Finally, for each one-unit increase in descriptive norms among family members and social media friends, the likelihood of intentionally buying counterfeit prescription medications increased by 1%.

Country-Level Differences

- Australia: Positive attitudes increased non-deceptive purchase by 47%, while PBC decreased it by 28%.
- Brazil: Injunctive close norms increased non-deceptive purchase by 61%, while descriptive norms among peers on the internet and family members each increased it by 2%.
- China: No significant predictors.
- India: Descriptive norms among peers in the same country decreased non-deceptive purchase by 1%.
- Italy: No significant predictors.
- Nigeria: Positive attitudes increased non-deceptive purchase by 23%.
- UAE: No significant predictors.
- U.S.: Descriptive norms among peers in the same country decreased non-deceptive purchase by 2%.

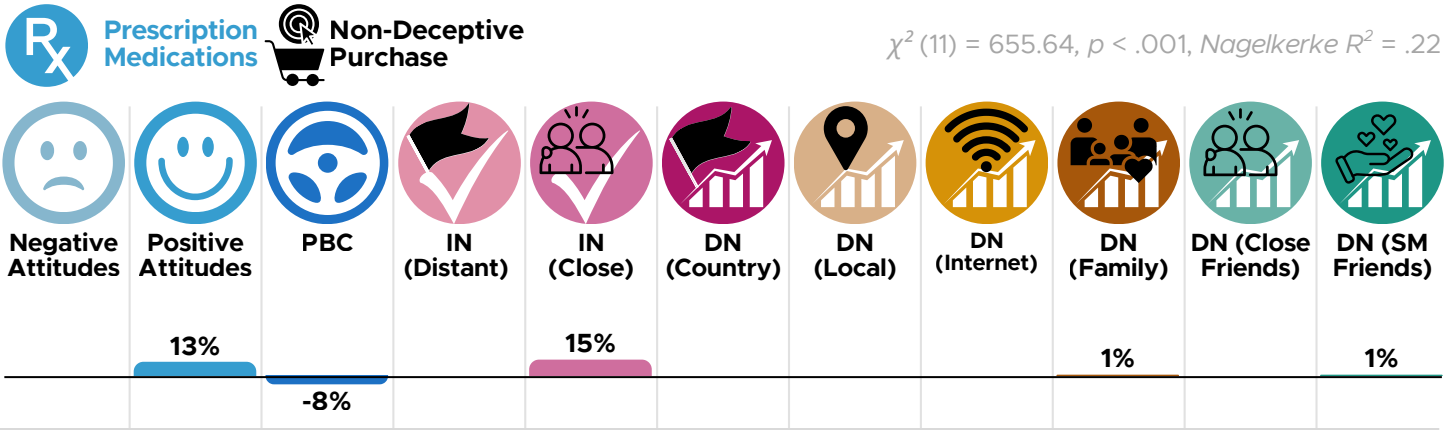


Figure 5.2.1 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and non-deceptive purchase of counterfeit prescription medications online, global sample.

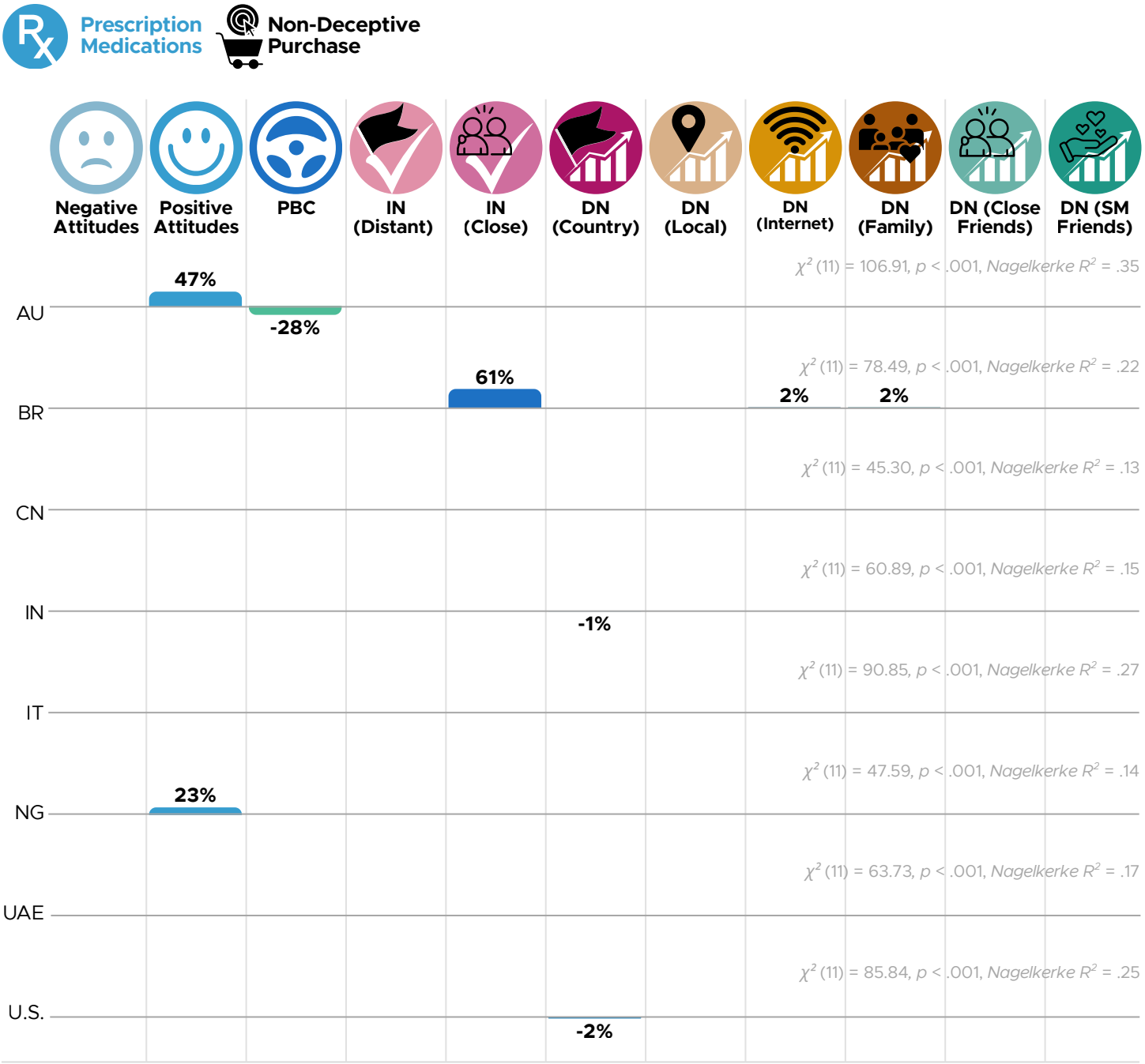


Figure 5.2.2 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and non-deceptive purchase of counterfeit prescription medications online, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Deceptive Purchase

At the global level, TPB variables explained 27% of the variance in deceptive purchase of counterfeit prescription medications. Specifically, for each one-unit increase in positive attitudes toward buying counterfeit medications, deceptive purchase increased by 15%. PBC decreased deceptive purchase by 16%. Injunctive norms among close family and friends increased deceptive purchase by 17%. Finally, descriptive norms among peers on the Internet and social media friends each increased deceptive purchase by 1%.

Country-Level Differences

- Australia: Positive attitudes increased deceptive purchase by 67% and descriptive norms among social media friends increased it by 2%, while PBC decreased it by 61%.
- Brazil: Injunctive norms among close family and friends increased deceptive purchase by 106%.
- China: No significant predictors.
- India: Descriptive norms among peers in the same country decreased deceptive purchase by 2%, while descriptive norms among peers in the same town, city, or village increased it by 1%.
- Italy: Injunctive norms among distant social groups (peers in the country) increased deceptive purchase by 52% and descriptive norms among family members increased it by 3%, while PBC decreased it by 35%.
- Nigeria: Positive attitudes increased deceptive purchase by 24%, while PBC decreased it by 19%.
- UAE: No significant predictors.
- U.S.: Injunctive norms among close family and friends increased deceptive purchase by 38%, while descriptive norms among social media friends decreased it by 2%.

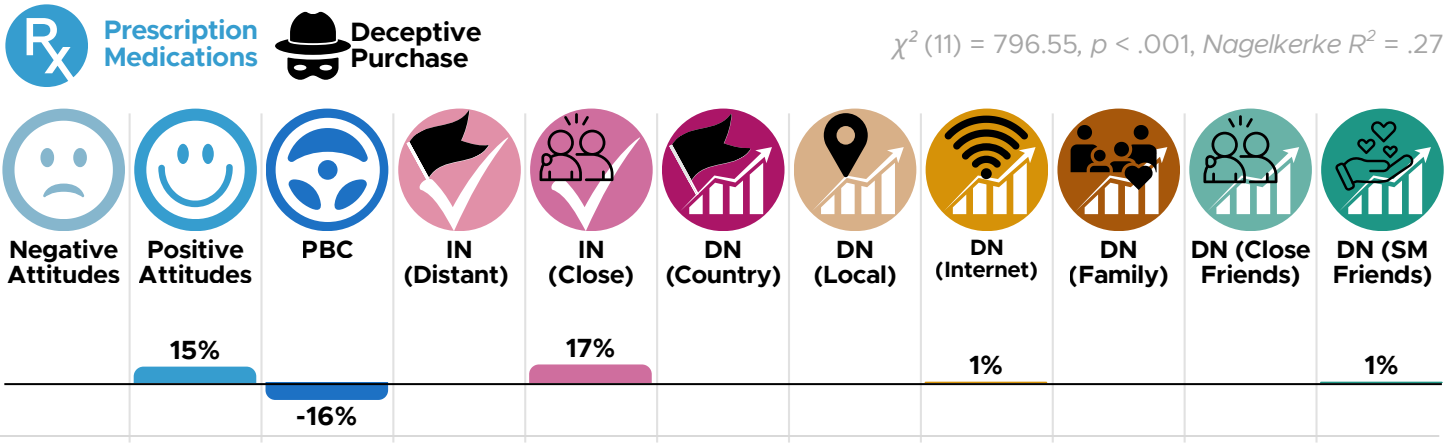


Figure 5.2.3 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and deceptive purchase of counterfeit prescription medications online, global sample.

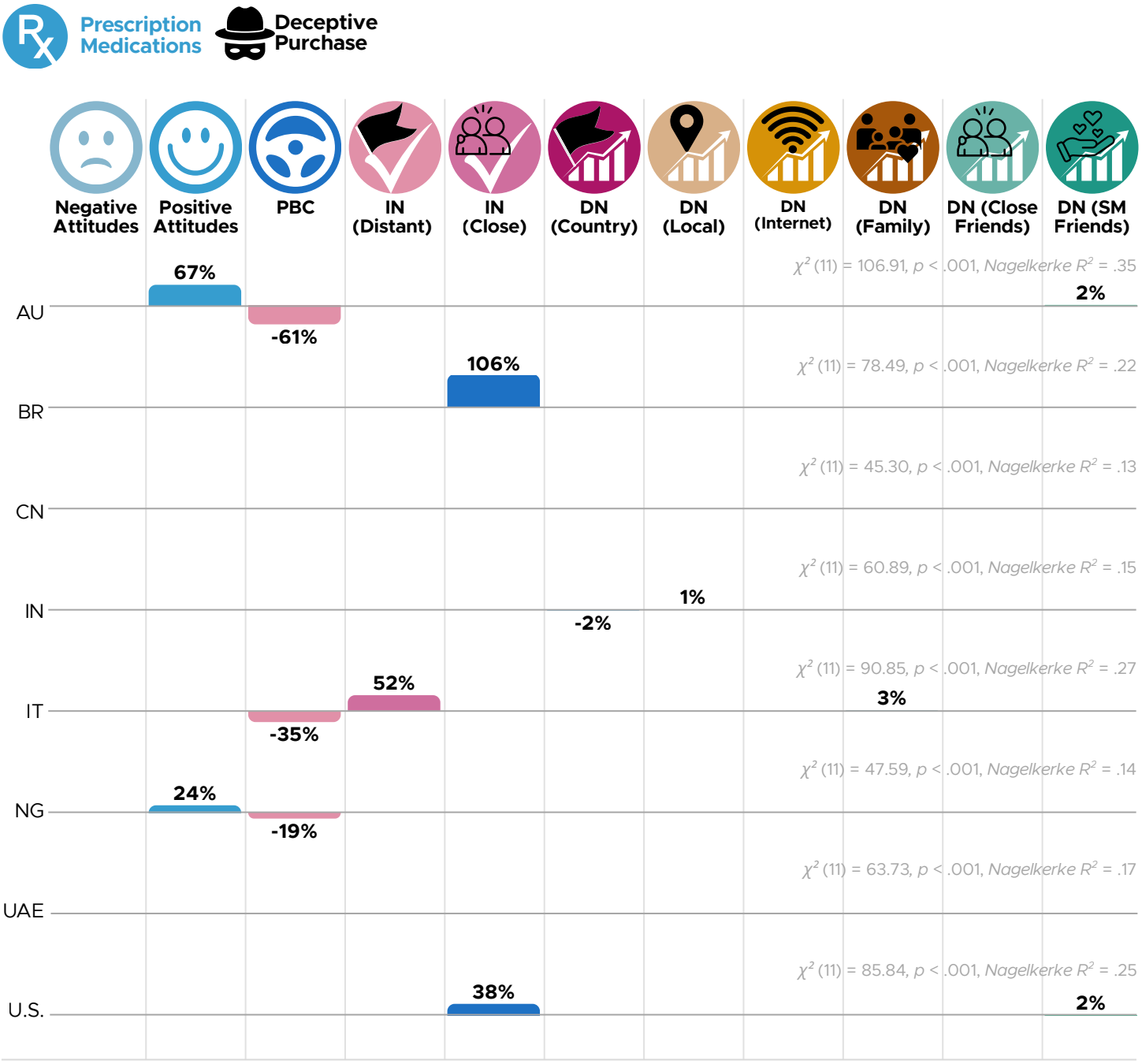


Figure 5.2.4 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and deceptive purchase of counterfeit prescription medications online, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

5.3 OTC Medications

Non-Deceptive Purchase

At the global level, TPB variables explained 13% of the variance in non-deceptive purchase of counterfeit OTC medications. Specifically, a one-unit increase in positive attitudes toward buying counterfeit medications increased the likelihood of intentionally buying counterfeit OTC medications by 13%. PBC decreased non-deceptive counterfeit OTC medications purchase by 12%.

Country-Level Differences

- Australia: Descriptive norms among peers in the same country decreased non-deceptive purchase by 3%.
- Brazil: No significant predictors.
- China: Local descriptive norms decreased non-deceptive purchase by 2%, while descriptive norms among close friends increased it by 4%.
- India: No significant predictors.
- Italy: No significant predictors.
- Nigeria: PBC decreased non-deceptive purchase by 18%.
- UAE: Positive attitudes increased non-deceptive purchase by 28%.
- U.S.: Injunctive close norms increased non-deceptive purchase by 40%.

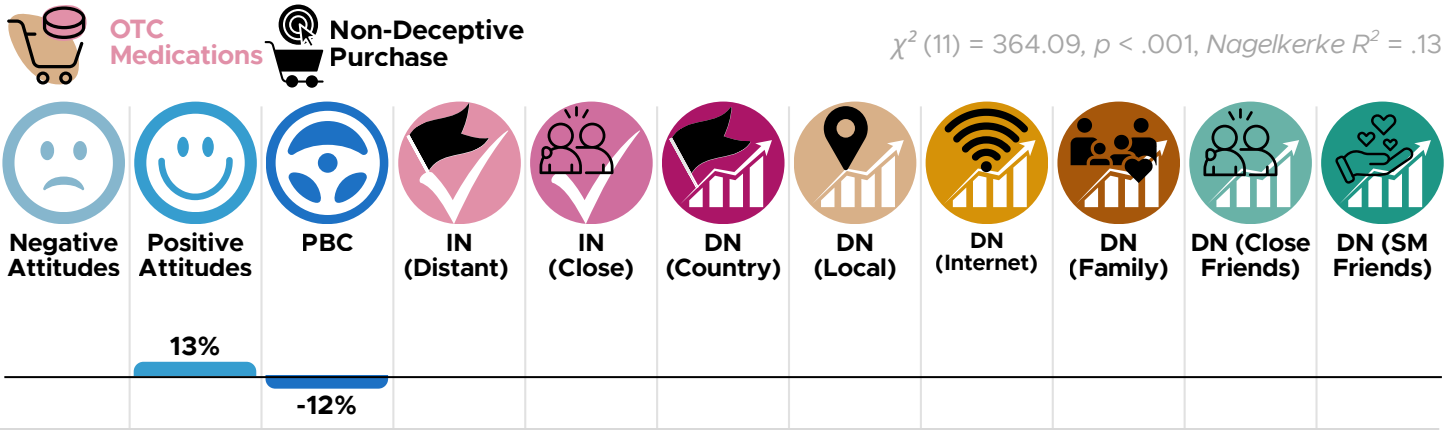


Figure 5.3.1 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and non-deceptive purchase of counterfeit OTC medications online, global sample.

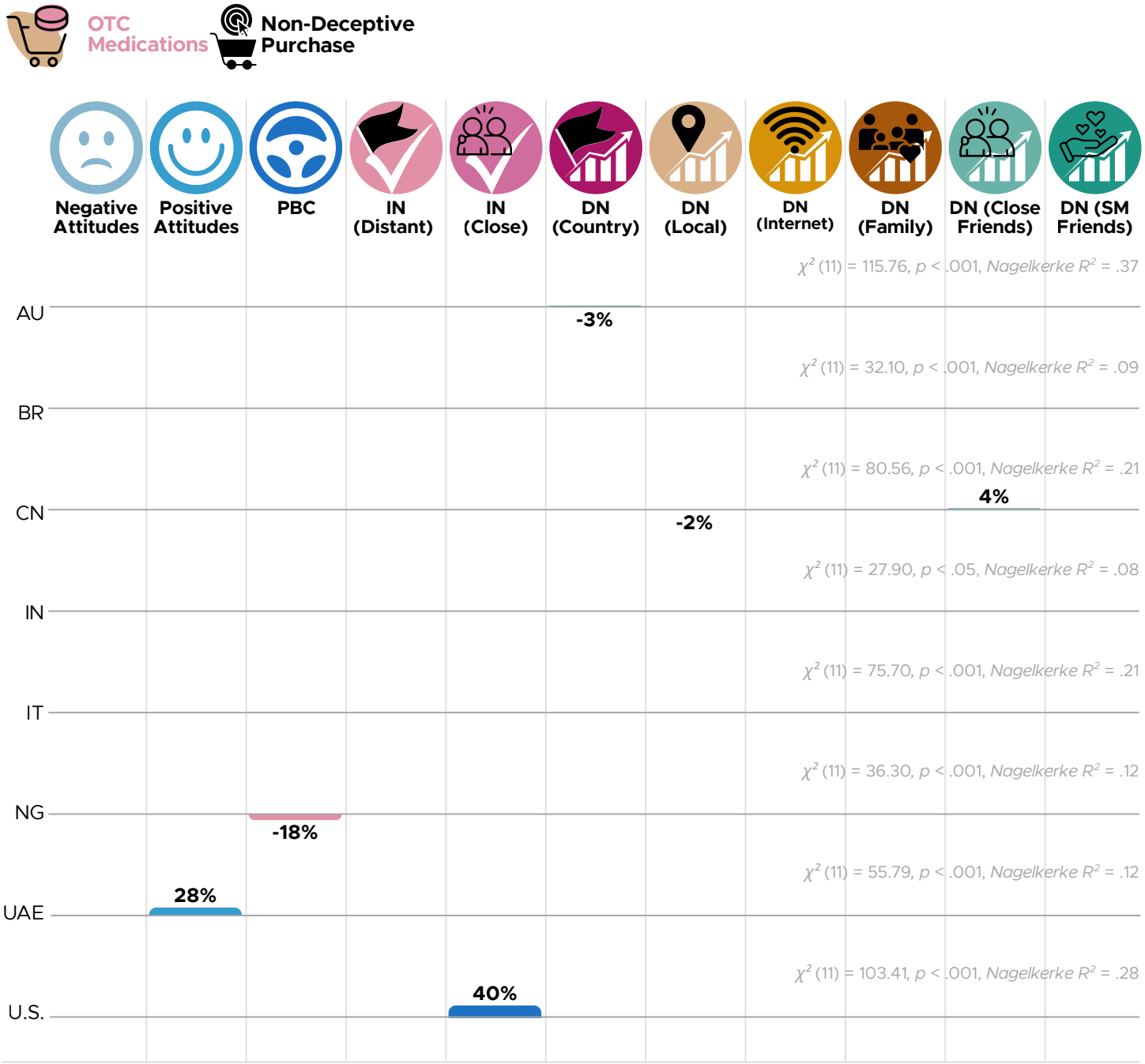


Figure 5.3.2 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and non-deceptive purchase of counterfeit OTC medications online, by country.

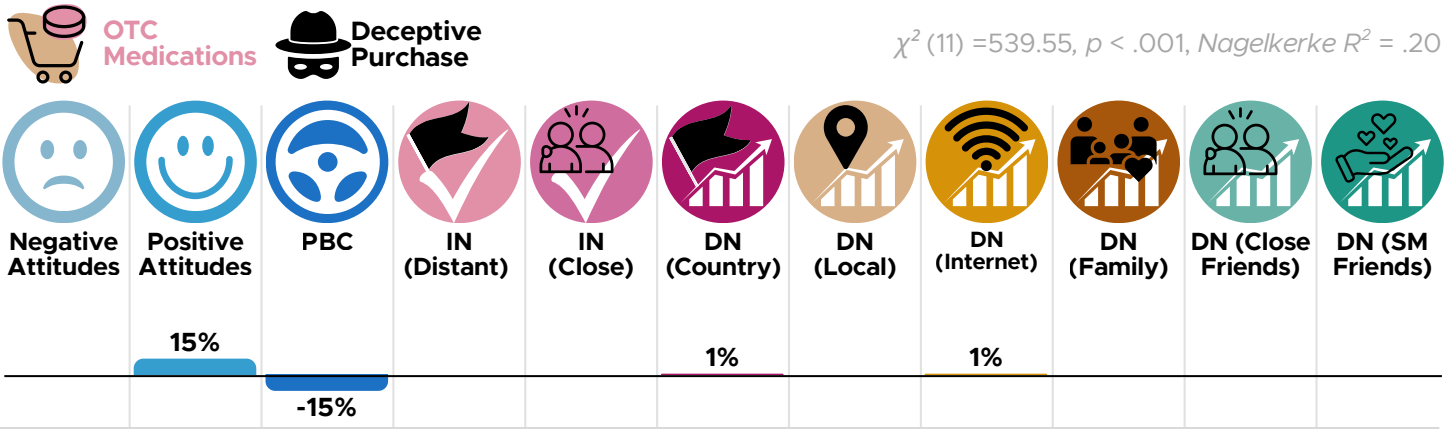
Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Deceptive Purchase

At the global level, TPB variables explained 20% of the variance in deceptive purchase of counterfeit OTC medications. Specifically, a one-unit increase in positive attitudes was associated with a 15% increase in the likelihood of being deceived into buying counterfeit OTC medications. PBC decreased deceptive purchase by 15%. Descriptive norms among peers in the same country and on the internet each increased deceptive purchase by 1%.

Country-Level Differences

- Australia: Injunctive close norms increased deceptive purchase by 60%.
- Brazil: No significant predictors.
- China: Positive attitudes increased deceptive purchase by 31% and descriptive norms among close friends increased it by 3%.
- India: No significant predictors.
- Italy: No significant predictors.
- Nigeria: No significant predictors.
- UAE: No significant predictors.
- U.S.: Negative attitudes decreased deceptive purchase by 23% and injunctive close norms increased it by 41%.



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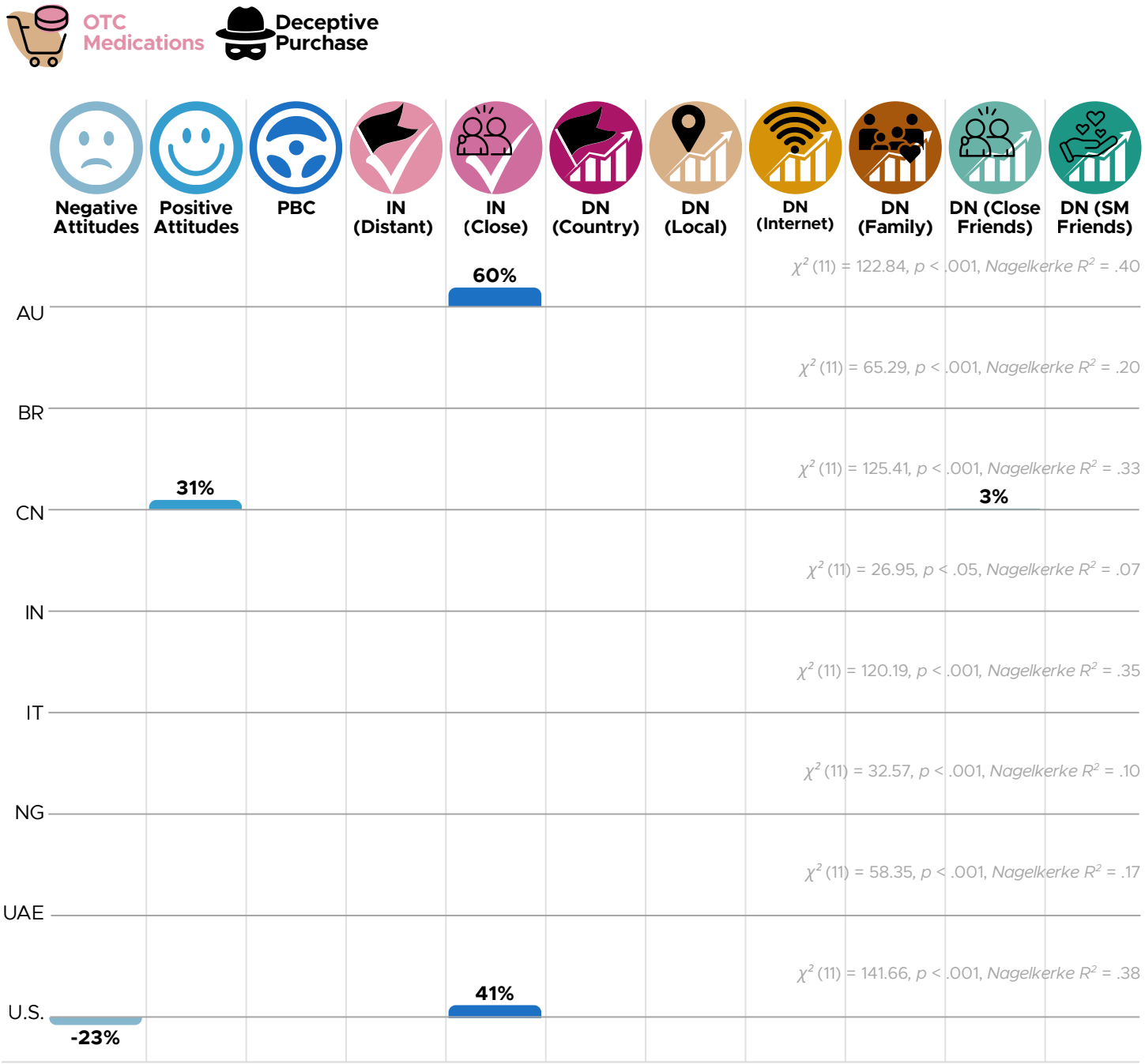


Figure 5.3.4 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and deceptive purchase of counterfeit OTC medications online, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

5.4 Vitamins and Supplements

Non-Deceptive Purchase

At the global level, TPB variables explained 6% of the variance in non-deceptive purchase, where a one-unit increase in negative attitudes was associated with an 11% increase in the likelihood of buying counterfeit vitamins and supplements knowingly. Additionally, a one-unit increase in descriptive norms of internet peers was associated with a 1% increase in the likelihood of buying counterfeit vitamins and supplements.

Country-Level Differences

- Australia: Injunctive norms among close friends increased non-deceptive purchase by 50% and descriptive norms among internet peers increased it by 2%
- Brazil: No significant predictors
- China: Descriptive norms among internet peers increased non-deceptive purchase by 2%
- India: No significant predictors
- Italy: Descriptive norms among local peers increased non-deceptive purchase by 2%
- Nigeria: Positive attitudes increased non-deceptive purchase buy 22%
- UAE: Negative attitudes increased non-deceptive purchase by 23%
- U.S.: Descriptive norms among internet peers increased non-deceptive purchase by 2%

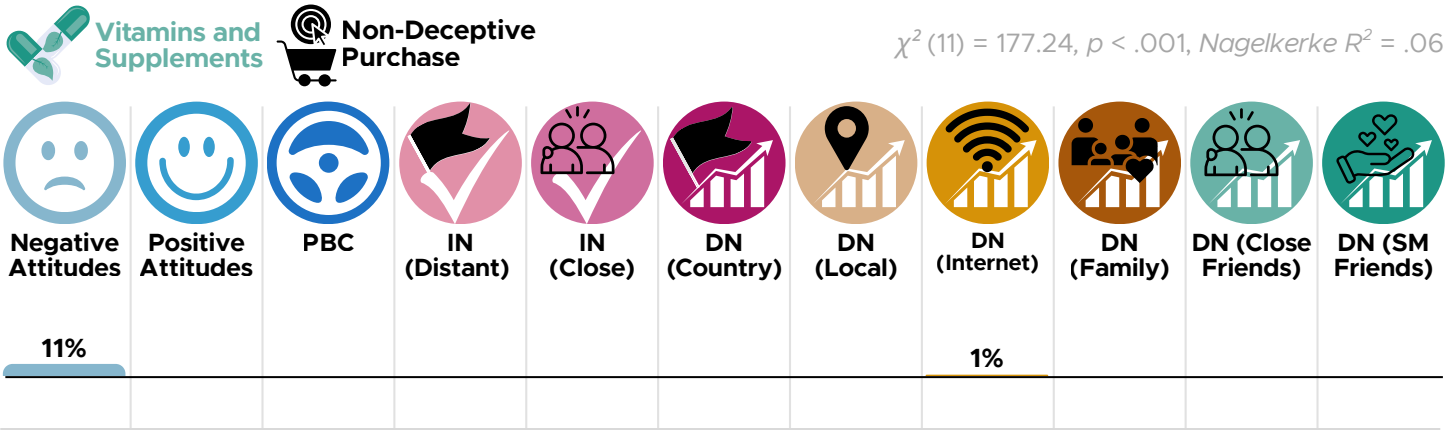


Figure 5.4.1 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and non-deceptive purchase of counterfeit vitamins and supplements online, global sample.

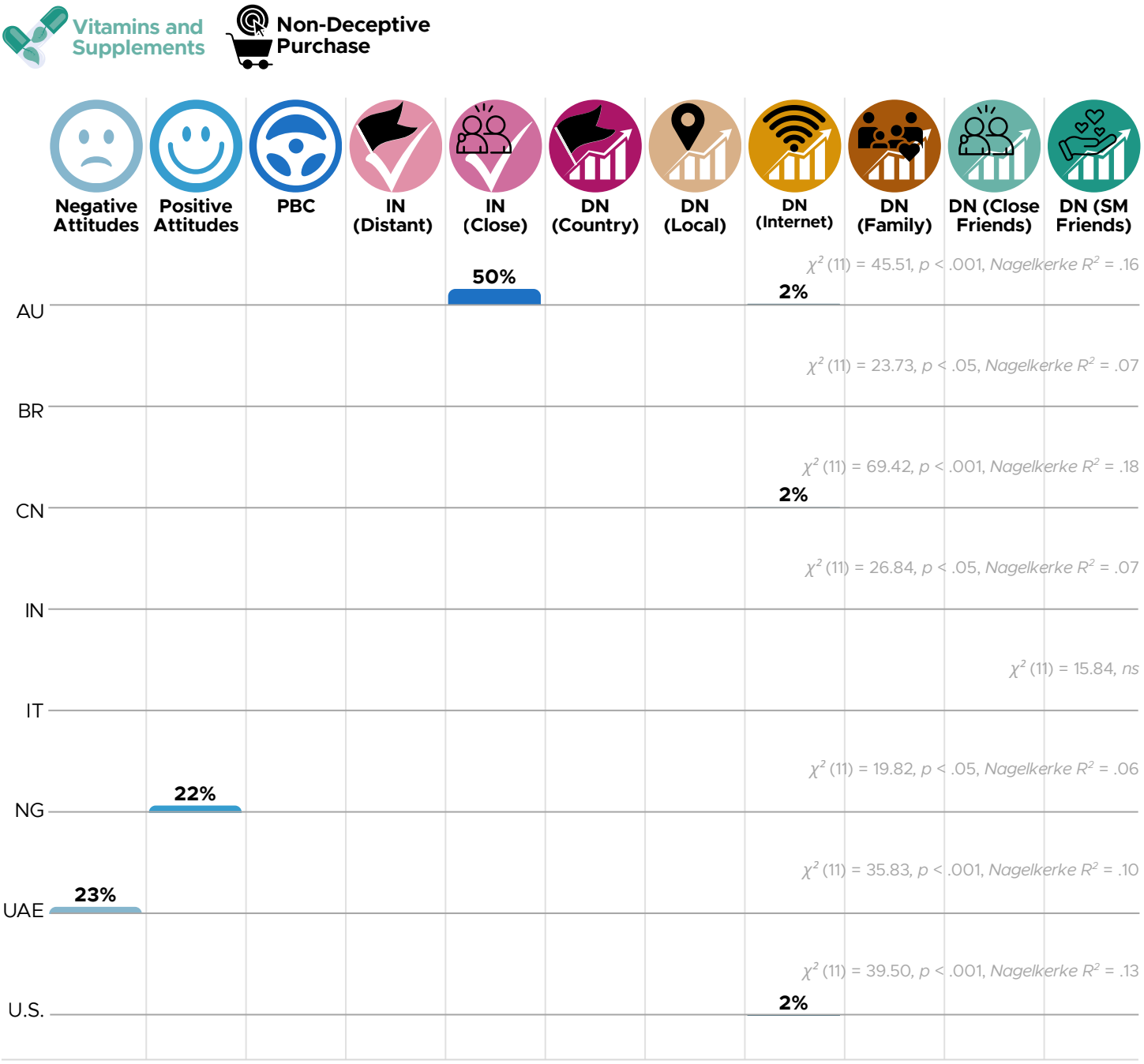


Figure 5.4.2 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and non-deceptive purchase of counterfeit vitamins and supplements online, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Deceptive Purchase

At the global level, TPB variables explained 16% of the variance in deceptive purchase of counterfeit vitamins and supplements. Specifically, for each one-unit increase in negative attitudes, the likelihood of being deceived into buying counterfeit vitamins and supplements increased by 11%. PBC decreased deceptive purchase by 11%. Injunctive close norms increased deceptive purchase by 11%. Descriptive norms among internet peers increased deceptive purchase by 1%.

Country-Level Differences

- Australia: Injunctive norms among close friends increased deceptive purchase by 64%, while descriptive internet norms increased it by 3%.
- Brazil: Descriptive norms among internet peers increased deceptive purchase by 2%.
- China: Descriptive norms among internet peers increased deceptive purchase by 2%.
- India: Descriptive norms among family members increased deceptive purchase by 1%.
- Italy: PBC decreased deceptive purchase by 41%.
- Nigeria: Descriptive norms among social media friends increased deceptive purchase by 1%.
- UAE: Negative attitudes increased deceptive purchase by 28% and descriptive norms among peers in the same country increased it by 2%.
- U.S.: Injunctive close norms increased deceptive purchase by 53%.

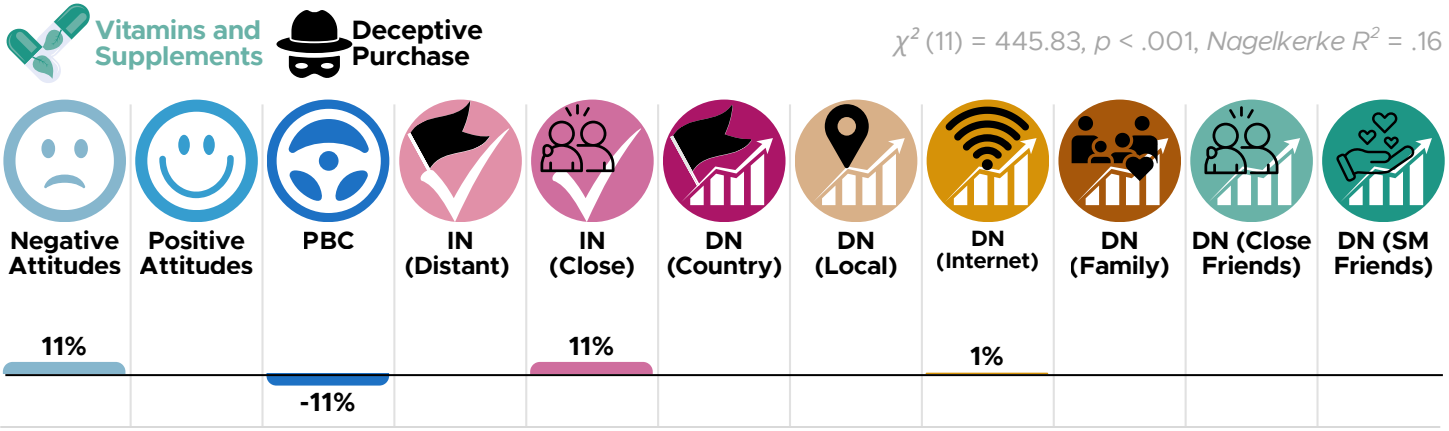


Figure 5.4.3 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and deceptive purchase of counterfeit vitamins and supplements online, global sample.

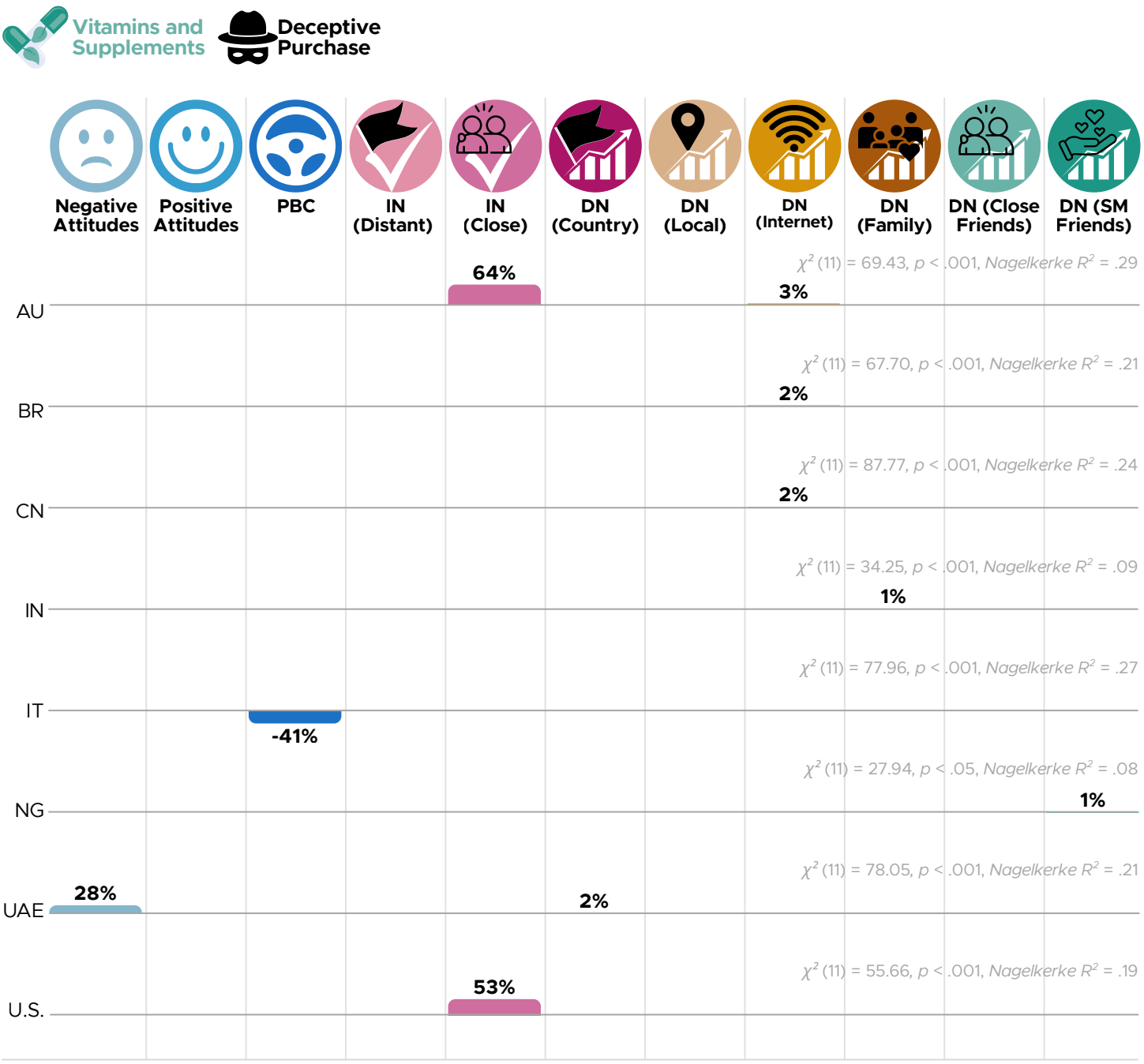


Figure 5.4.4 Significant logistic regression odds ratio values (probability) for the relationship between theory of planned behavior variables and deceptive purchase of counterfeit vitamins and supplements online, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

5.5 Medication Online Purchase Intentions

Legitimate Medication Online Purchase Intentions

At the global level, TPB variables explained 18% of the variance in participants' intentions to buy legitimate medications online. Specifically, intentions to buy legitimate medications online were significantly and positively predicted by negative attitudes, positive attitudes, injunctive close norms, and descriptive norms among close friends.

Country-Level Differences

- Australia: Positive attitudes positively predicted intentions to purchase legitimate medications online.
- Brazil: Negative attitudes and PBC were positive predictors of intentions to purchase legitimate medications online.
- China: Negative attitudes positively predicted intentions to purchase legitimate medications online.
- India: Negative attitudes, injunctive close norms, internet descriptive norms, and PBC were all positive predictors of intentions to purchase legitimate medications online.
- Italy: Injunctive close norms were a positive predictor of intentions to purchase legitimate medications online.
- Nigeria: Both positive and negative attitudes were positive predictors of intentions to purchase legitimate medications online.
- UAE: Both positive and negative attitudes were positive predictors of intentions to purchase legitimate medications online.
- U.S.: Positive attitudes and PBC were positive predictors of intentions to purchase legitimate medications online.

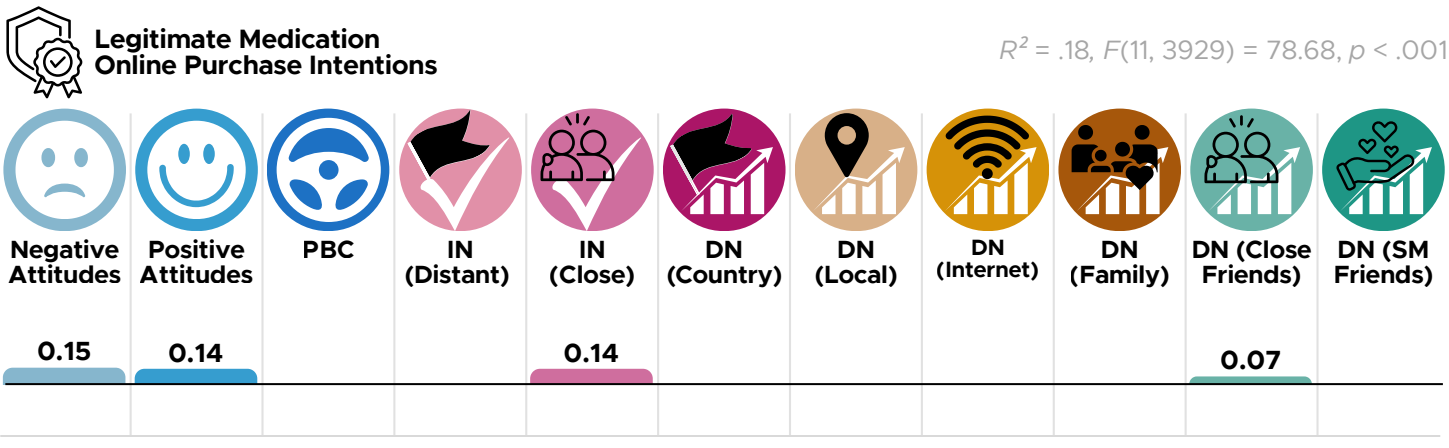


Figure 5.5.1 Significant linear regression coefficients for the relationship between theory of planned behavior variables and legitimate medication online purchase intentions, global sample.

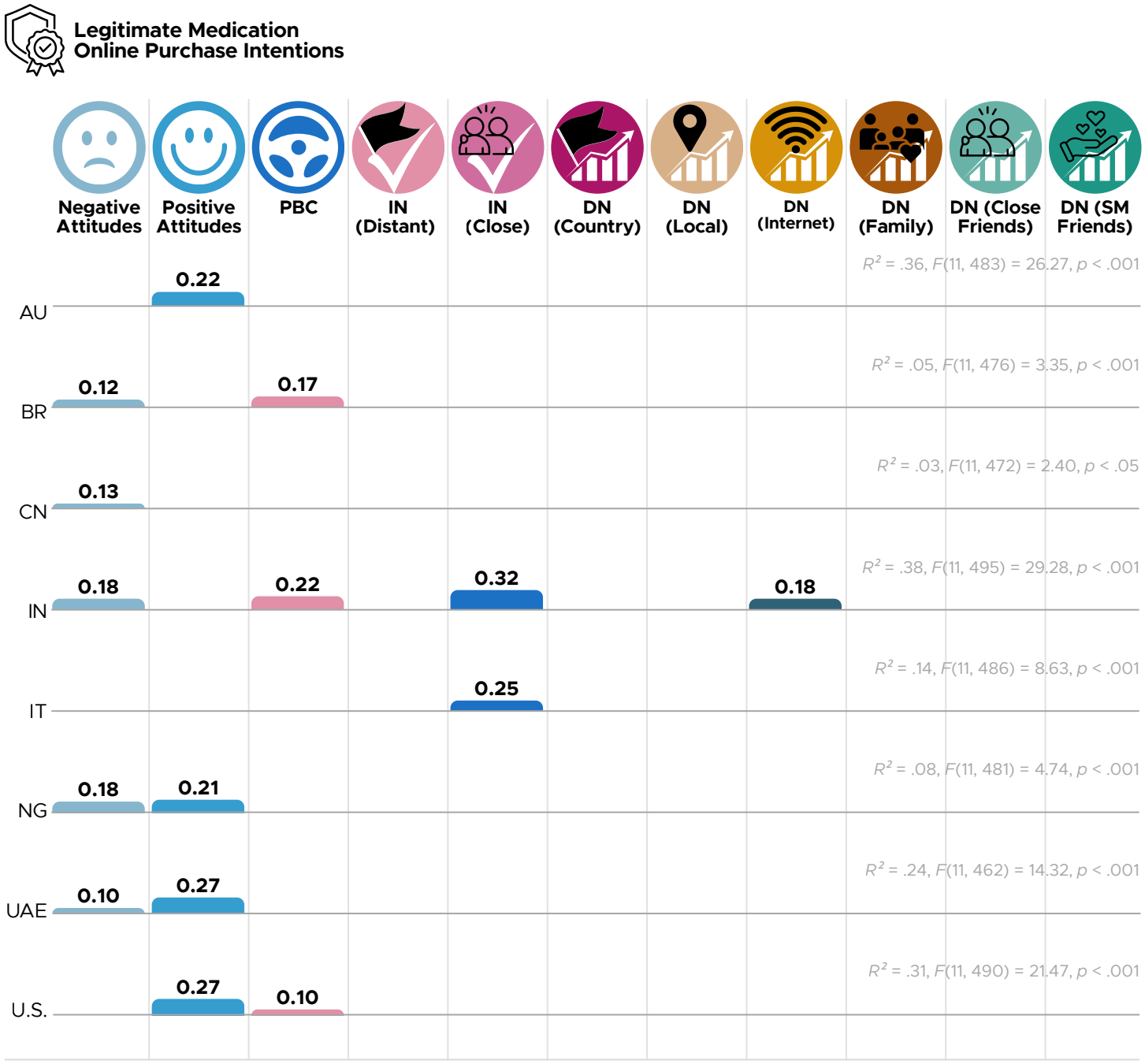


Figure 5.5.2 Significant linear regression standardized coefficients for the relationship between theory of planned behavior variables and legitimate medication online purchase intentions, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Counterfeit Medication Online Purchase Intentions

At the global level, TPB variables explained 64% of the variance in intentions to buy counterfeit medications online. Specifically, counterfeit medication purchase intentions were positively predicted by positive attitudes, injunctive distant norms, injunctive close norms, and descriptive norms among family members, while these intentions were negatively associated with PBC.

Country-Level Differences

- Australia: Negative attitudes, positive attitudes, injunctive distant and close norms, as well as descriptive norms among family members, were all positive predictors of counterfeit purchase intentions, while PBC was a negative predictor.
- Brazil: Negative attitudes were negatively associated with counterfeit purchase intentions, while positive attitudes and injunctive close norms were positive predictors.
- China: Positive attitudes, injunctive close norms, and descriptive norms among family members were positive predictors of counterfeit purchase intentions, while these intentions were negatively associated with PBC.
- India: Negative attitudes negatively predicted counterfeit medication online purchase intentions, while positive attitudes and injunctive norms (both distant and close) were positive predictors.
- Italy: Positive attitudes, distant injunctive norms, and descriptive norms among family members were all positive predictors of counterfeit purchase intentions.
- Nigeria: Positive attitudes, injunctive norms (distant and close), and descriptive norms among family members were all positive predictors of counterfeit purchase intentions.
- UAE: Positive attitudes and injunctive close norms were all positive predictors of counterfeit purchase intentions.
- U.S.: Positive attitudes, injunctive close norms, and descriptive norms among close friends were all positive predictors of counterfeit purchase intentions.

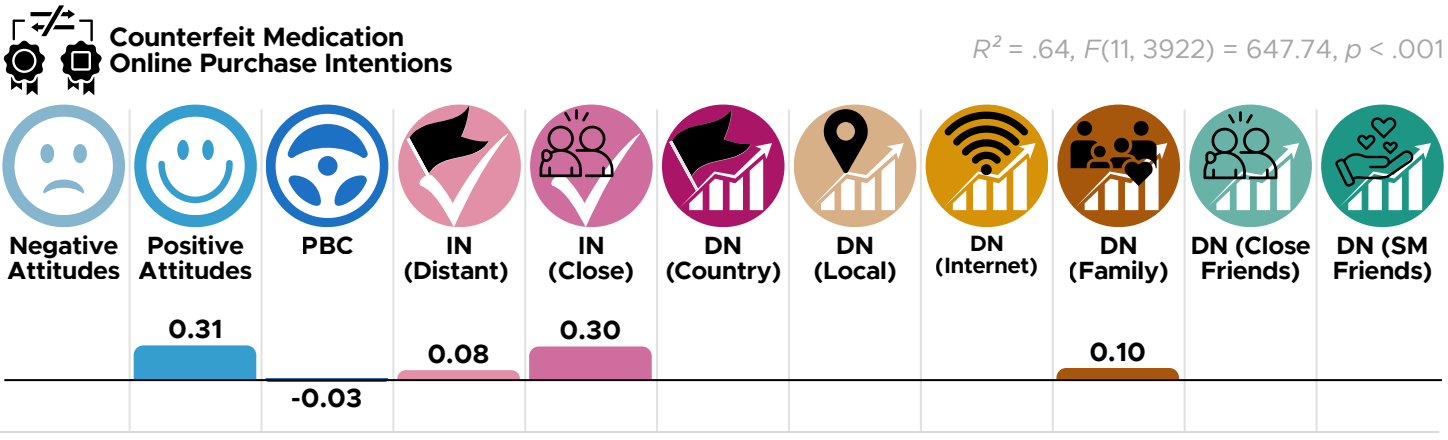


Figure 5.5.3 Significant linear regression coefficients for the relationship between theory of planned behavior variables and counterfeit medication online purchase intentions, global sample.

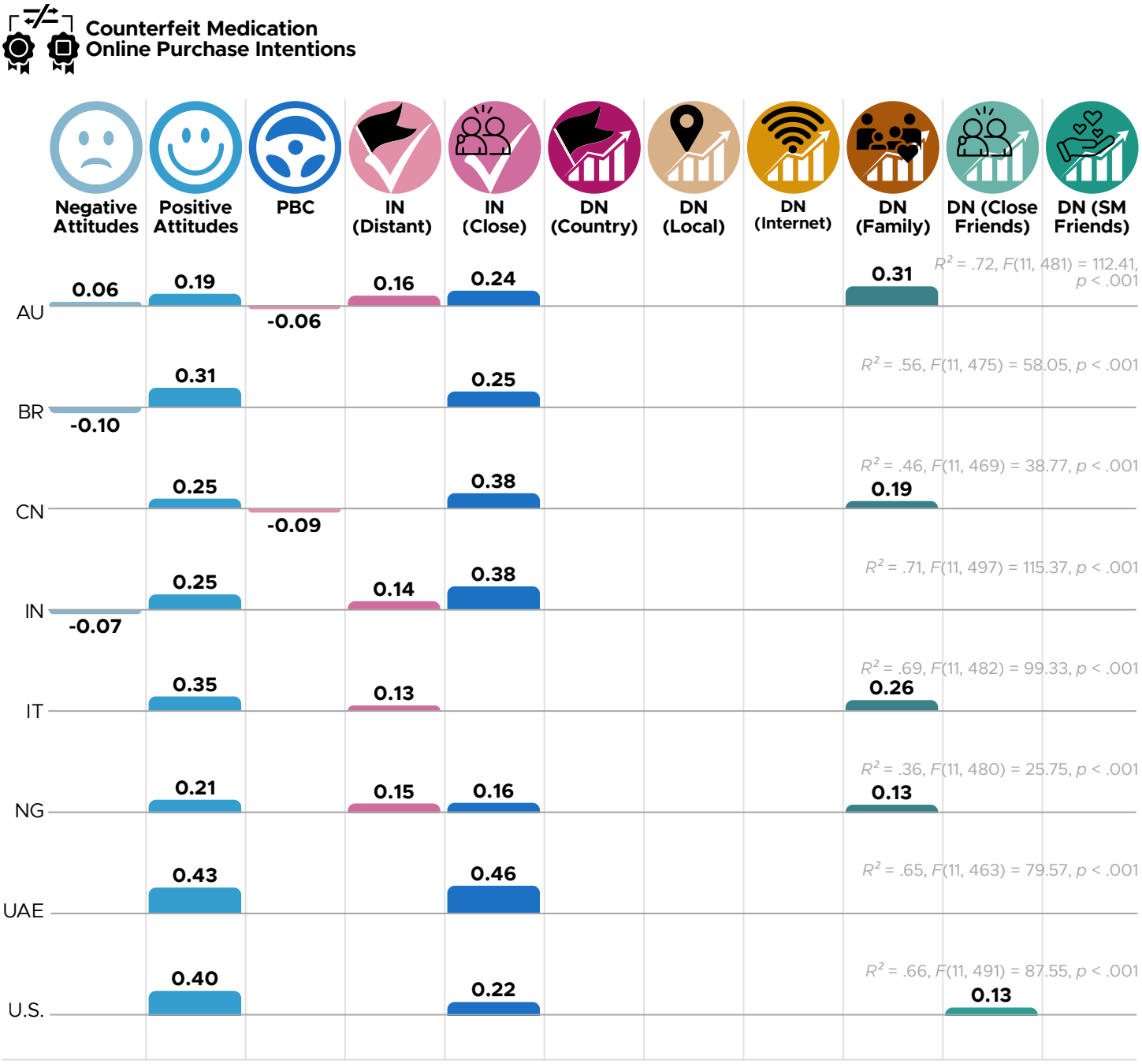
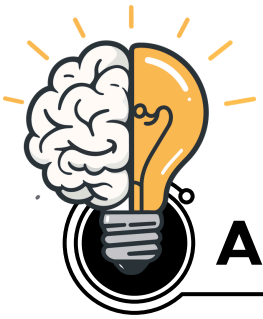
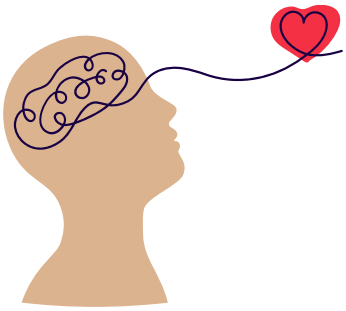


Figure 5.5.4 Significant linear regression standardized coefficients for the relationship between theory of planned behavior variables and counterfeit medication online purchase intentions, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America



Actionable Insights



Favorable Perceptions of Counterfeit Medications

Though participants expressed highly negative attitudes toward buying counterfeit medications, such perceptions did not significantly predict counterfeit purchase behavior. It was, in fact, positive associations (attitudes) with buying counterfeit medications that significantly and positively predicted counterfeit medication purchase behavior. Anti-counterfeit awareness-raising campaigns should target such positive associations and change the tenor (valence) of how consumers think about buying counterfeits as a precursor to their behavior change.

Social Norms Increased Buying Counterfeit Meds

Social norms had considerable association with counterfeit purchase behavior. Specifically, thinking that close family and friends are accepting of counterfeit purchase behavior increased the chances of buying counterfeit medications – both intentionally and unintentionally. Anti-counterfeit awareness-raising campaigns should leverage close relationships and influence of social norms among close reference groups as a means of influencing consumer attitudes and behaviors.

Exercising Behavioral Control

Perceived behavioral control was a protective factor, in that it lowered the chances of buying counterfeit medications. This factor is critical to motivating consumers to refrain from buying counterfeit products. Anti-counterfeiting awareness-raising interventions should enhance consumers' ability to resist the pervasive prevalence of counterfeit medications online to reduce harm to self, others, and society.

6

RISK PERCEPTIONS

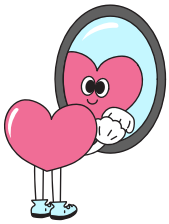
tl;dr

4.93

Participants agreed that risks of buying counterfeit medications are high (**severity**) (mean of 4.93 on a 7-point scale)

4.09

Participants indicated they're **susceptible** to counterfeit medication risks (mean of 4.09 on a 7-point scale)



5.22

Participants were confident in their ability to distinguish legitimate and counterfeit medications (**self-efficacy**) (mean of 5.22 on a 7-point scale)

-32%

A one-unit increase in **threat severity perceptions** decreased counterfeit medication purchase by 32%

32%

A one-unit increase in **threat susceptibility perceptions** increased counterfeit medication purchase by 32%

17%

A one-unit increase in **self-efficacy,** or the confidence to distinguish legitimate and counterfeit medications, increased counterfeit medication purchase by 17%

-18%

A one-unit increase in **response efficacy**, or thinking protective behavior enacted on digital platforms are effective, decreased counterfeit medication purchase by 18%

26%

Higher perceptions that not buying counterfeit medications would be costly (**response cost**), the likelihood of counterfeit medication purchase increased by 26%

6.1 Protection Motivation Theory

Protection Motivation Theory (PMT) posits that individuals are motivated to enact protective behaviors as a function of their perceptions about the nature of the risk (threat appraisal) by assessing the severity of the risk and their own susceptibility to that risk. Their protective behaviors are also influenced by their perceptions about their ability to deal with those risks (coping appraisal) by assessing their own efficacy (self-efficacy), the effectiveness of protective responses (response efficacy), and their thoughts about what they would lose if they enacted protective behaviors (response costs).

Global and Country-Level Descriptives

Within the global sample, participants exhibited high threat appraisal when it came to buying medications online. Specifically, they indicated high levels of perceived threat severity (M = 4.93) and moderate levels of perceived threat susceptibility (4.09). Participants reported high levels of perceived self-efficacy (5.22) and response efficacy (4.41) and moderate levels of response cost (4.07).

With regard to country-level descriptive data, participants from the UAE indicated the highest level of perceived threat severity, while Chinese participants scored the lowest on this variable. Indian and UAE participants reported the highest level of perceived threat susceptibility, while Italian participants scored the lowest. In regard to self-efficacy, Brazilian participants scored the highest, while U.S. participants scored the lowest. Regarding response efficacy, Indian participants reported the highest levels, while U.S. participants scored the lowest. Finally, regarding response cost, Indian participants scored the highest, while Nigerian participants scored the lowest.

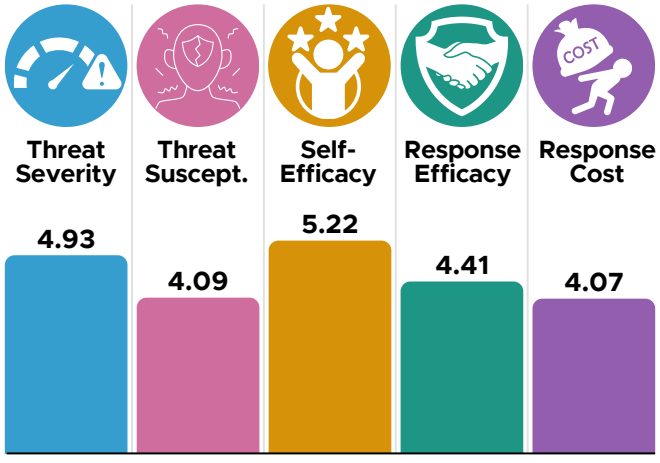


Figure 6.1.1 Mean values for protection motivation theory variables, global sample

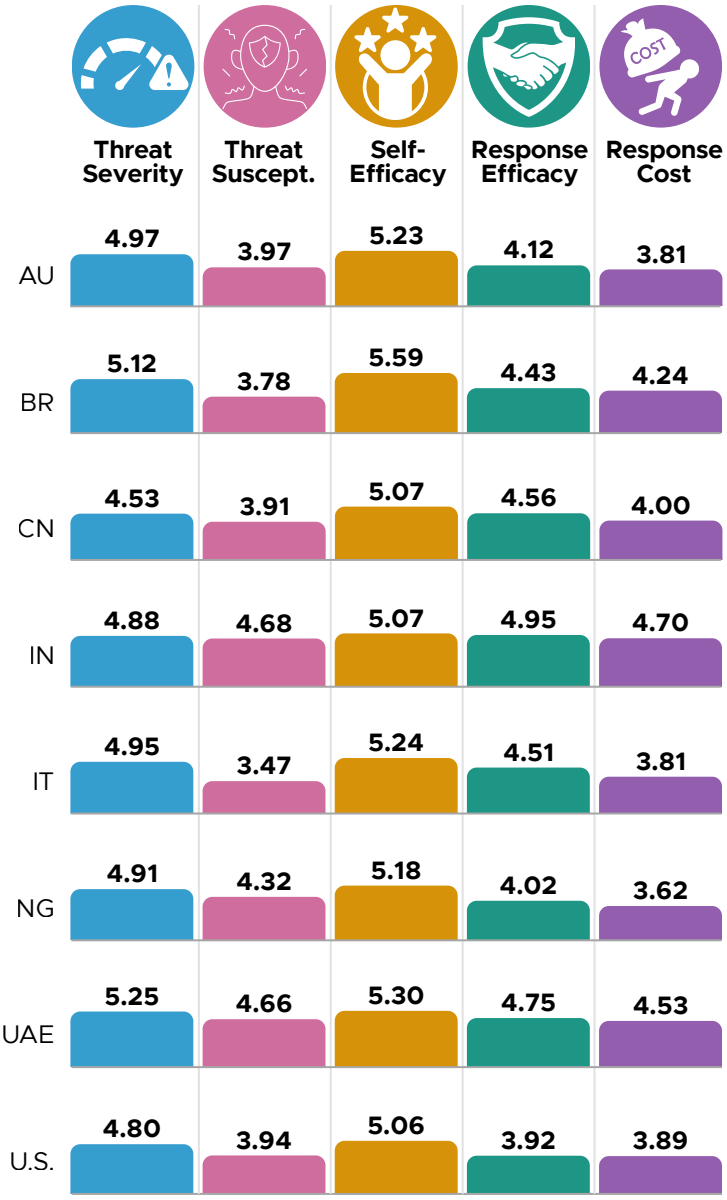


Figure 6.1.2 Mean values for protection motivation theory variables, by country.
AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

6.2 Prescription Medication

Non-Deceptive Purchase

Among the global sample, threat-related variables explained 13% of the variance in non-deceptive purchase of counterfeit prescription medications. For each one-unit increase in perceived threat severity, non-deceptive purchase decreased by 43%, while that likelihood increased by 34% for each one-unit increase in threat susceptibility. Non-deceptive purchase likelihood increased by 22% for each one-unit increase in self-efficacy, decreased by 16% for each one-unit increase in response efficacy, and increased by 27% for each one-unit increase in response cost.

Country-Level Differences

- Australia: Threat severity decreased non-deceptive purchase by 67%, threat susceptibility increased it by 35%, self-efficacy increased it by 36%, response efficacy decreased it by 37%, and response cost increased it by 65%.
- Brazil: Threat severity decreased non-deceptive purchase by 27%, threat susceptibility increased it by 24%, self-efficacy increased it by 19%, response efficacy decreased it by 30%, and response cost increased it by 22%.
- China: Threat severity decreased non-deceptive purchase by 33%, while threat susceptibility increased it by 52%.
- India: Response cost increased non-deceptive purchase by 22%.
- Italy: Threat severity decreased non-deceptive purchase by 96%, threat susceptibility increased it by 51%, and response cost increased it by 37%.
- Nigeria: Threat severity decreased non-deceptive purchase by 41%, while self-efficacy increased it by 19%, response efficacy increased it by 21%, and response cost increased it by 18%.
- UAE: Threat severity decreased non-deceptive purchase by 52%, threat susceptibility increased it by 20%, self-efficacy increased it by 30%, and response cost increased it by 23%.
- U.S.: Threat susceptibility increased non-deceptive purchase by 28% and self-efficacy increased it by 35%, while response efficacy decreased it by 37%.

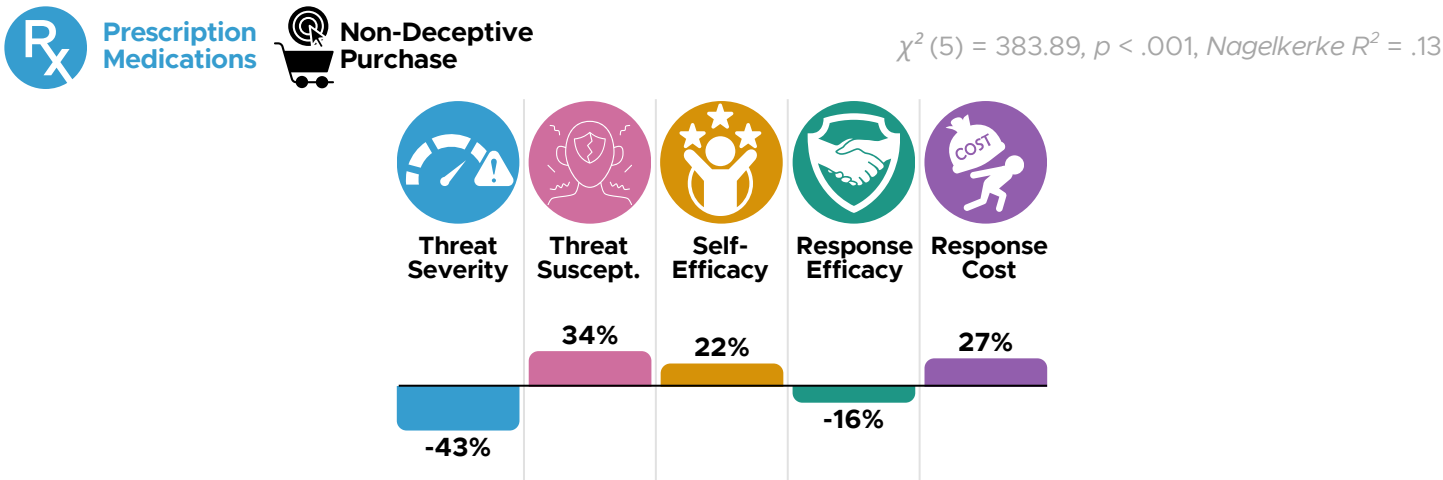


Figure 6.2.1 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and non-deceptive purchase of counterfeit prescription medication, global sample.

Prescription Medications

Non-Deceptive Purchase

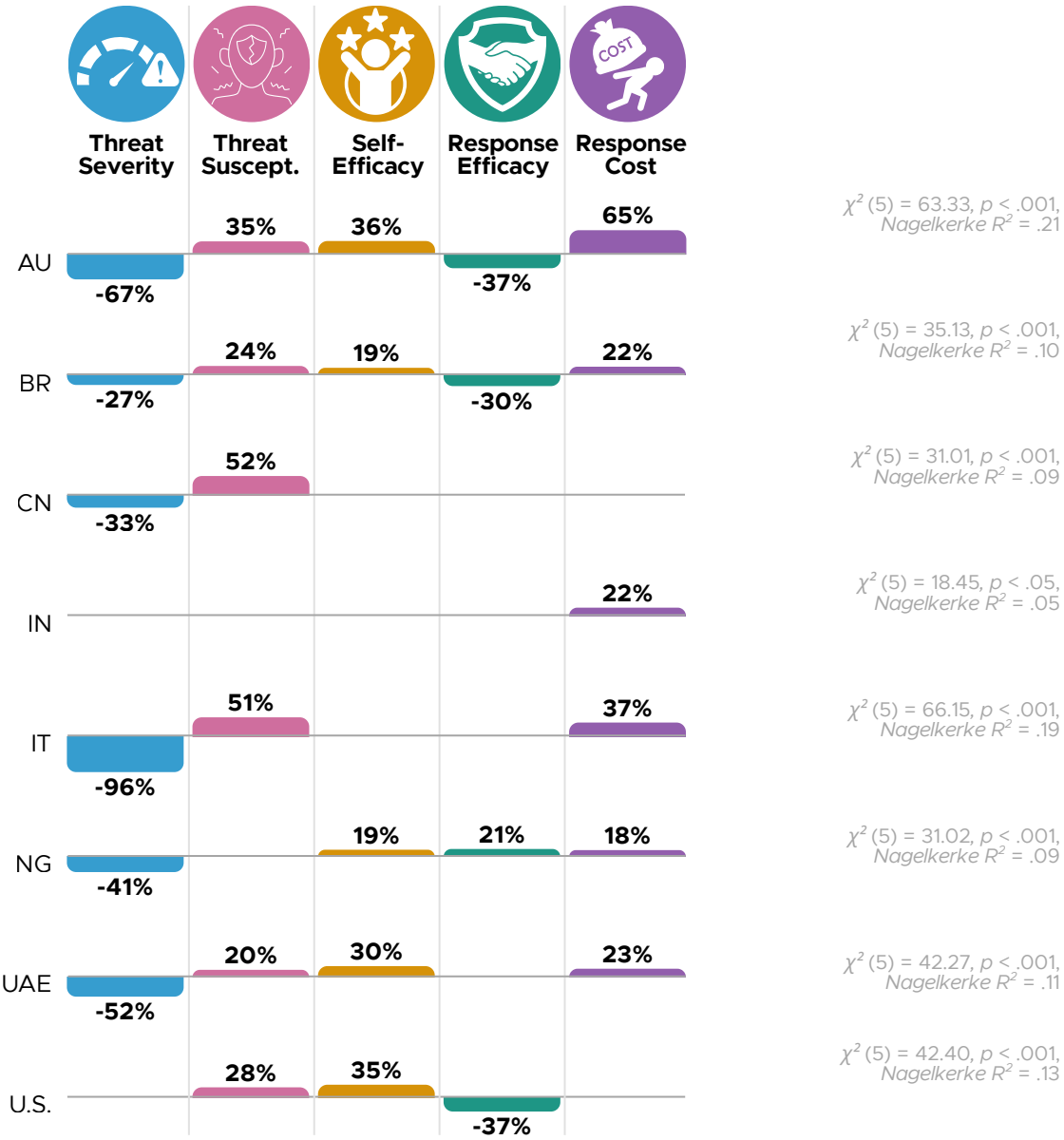


Figure 6.2.2 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and non-deceptive purchase of counterfeit prescription medication, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Deceptive Purchase

Among the global sample, threat-related variables explained 15% of the variance in deceptive purchase of counterfeit prescription medications. For each one-unit increase in threat severity, deceptive purchase decreased by 43%, while that likelihood increased by 43% for each one-unit increase in threat susceptibility. Deceptive purchase likelihood increased by 23% for each one-unit increase, decreased by 23% for each one-unit increase in response efficacy, and increased by 29% for each one-unit increase in response cost.

Country-Level Differences

- Australia: Threat severity decreased deceptive purchase by 56%, threat susceptibility increased it by 32%, self-efficacy increased it by 40%, response efficacy decreased it by 45%, and response cost increased it by 67%.
- Brazil: Threat severity decreased deceptive purchase by 45%, threat susceptibility increased it by 45%, self-efficacy increased it by 34%, response efficacy decreased it by 75%, and response cost increased it by 45%.
- China: Threat severity decreased deceptive purchase by 41%, while threat susceptibility increased it by 62%.
- India: Response cost increased deceptive purchase by 34%.
- Italy: Threat severity decreased deceptive purchase by 100%, threat susceptibility increased it by 64%, self-efficacy increased it by 24%, and response cost increased it by 27%.
- Nigeria: Threat severity decreased deceptive purchase by 28%.
- UAE: Threat severity decreased deceptive purchase by 39%, threat susceptibility increased it by 22%, self-efficacy increased it by 33%, and response cost increased it by 27%.
- U.S.: Threat susceptibility increased deceptive purchase by 33% and self-efficacy increased it by 34%, while response efficacy decreased it by 43%.

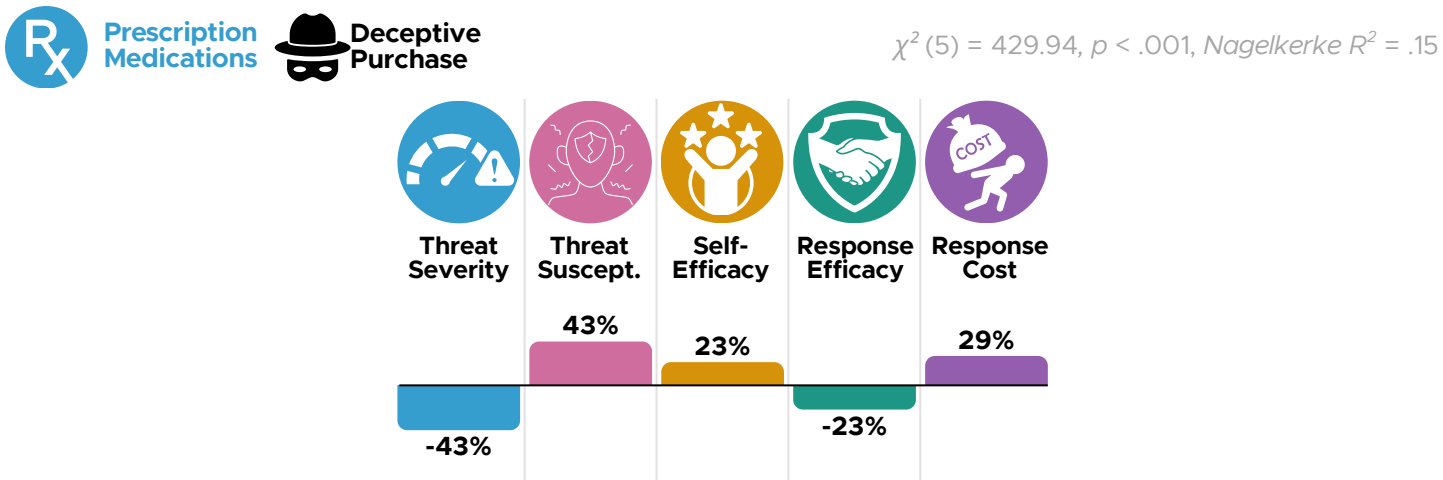


Figure 6.2.3 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and deceptive purchase of counterfeit prescription medication, global sample

Prescription Medications | Deceptive Purchase

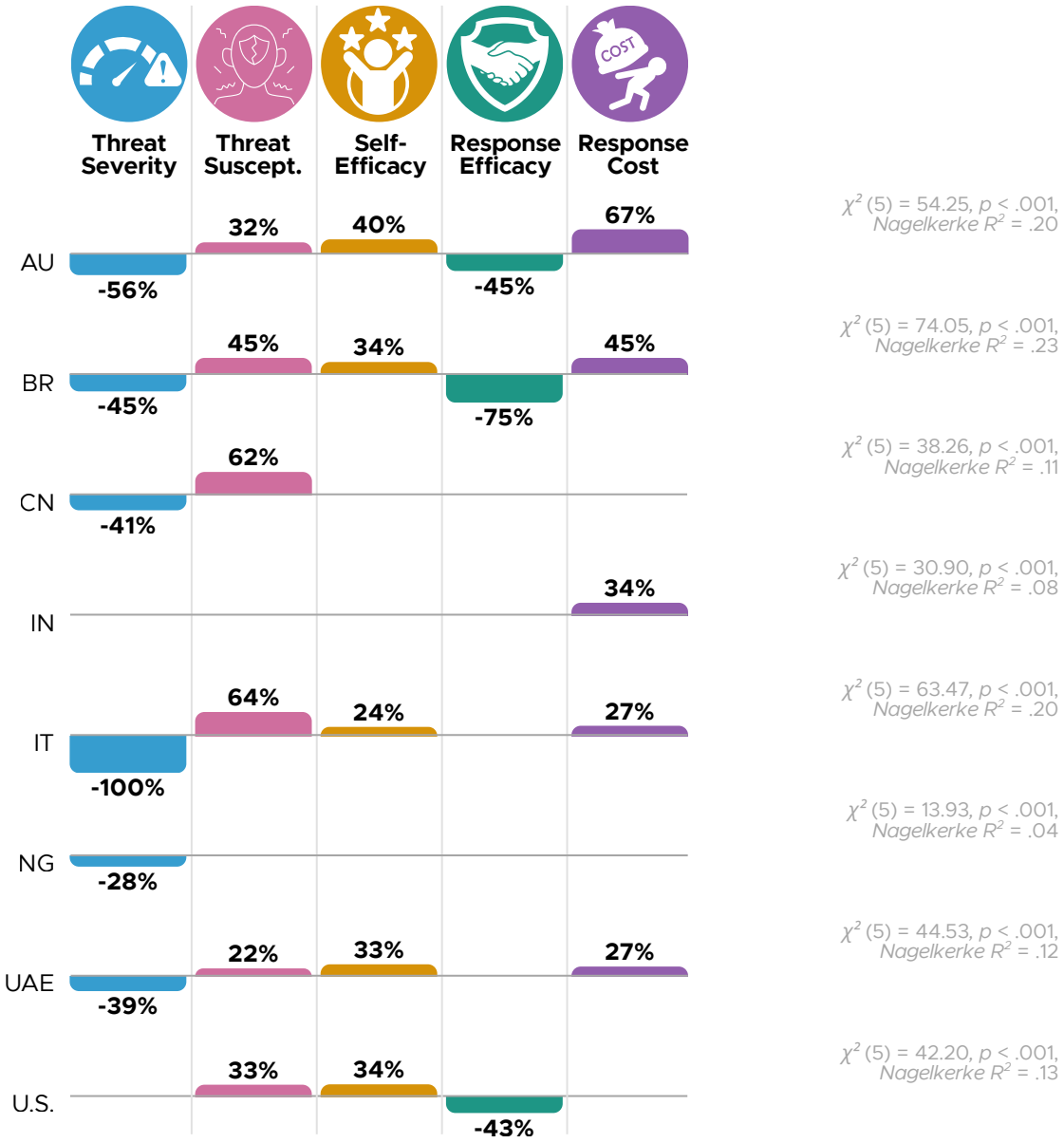


Figure 6.2.4 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and deceptive purchase of counterfeit prescription medication, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

6.3 OTC Medication

Non-Deceptive Purchase

Among the global sample, threat-related factors explained 8% of the variance in non-deceptive purchase of counterfeit OTC medications. For each one-unit increase in threat severity, non-deceptive purchase decreased by 30%, while that likelihood increased by 23% for each one-unit increase in threat susceptibility. Self-efficacy increased non-deceptive purchase by 13%, response efficacy decreased it by 16%, and response cost increased it by 25%.

Country-Level Differences

- Australia: Threat severity decreased non-deceptive purchase by 69%, threat susceptibility increased it by 47%, self-efficacy increased it by 38%, response efficacy decreased it by 33%, and response cost increased it by 28%.
- Brazil: Response efficacy decreased non-deceptive purchase by 22%.
- China: Threat susceptibility increased non-deceptive purchase by 53%, self-efficacy decreased it by 20%, and response cost increased it by 23%.
- India: No significant predictors.
- Italy: Threat severity decreased non-deceptive purchase by 75%, while threat susceptibility increased it by 40%.
- Nigeria: Self-efficacy increased non-deceptive purchase by 11%, response efficacy decreased it by 25%, and response cost increased it by 22%.
- UAE: Threat severity decreased non-deceptive purchase by 47%, threat susceptibility increased it by 35%, and response cost increased it by 45%.
- U.S.: Threat severity decreased non-deceptive purchase by 33%, threat susceptibility increased it by 34%, self-efficacy increased it by 39%, response efficacy decreased it by 49%, and response cost increased it by 27%.

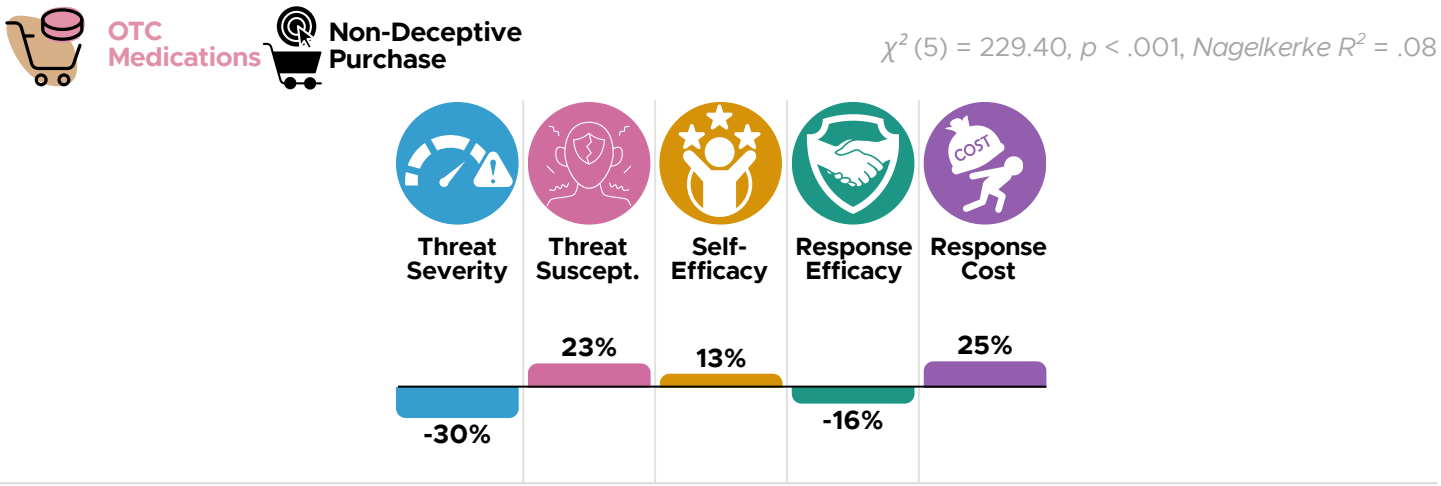


Figure 6.3.1 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and non-deceptive purchase of counterfeit OTC medication, global sample.

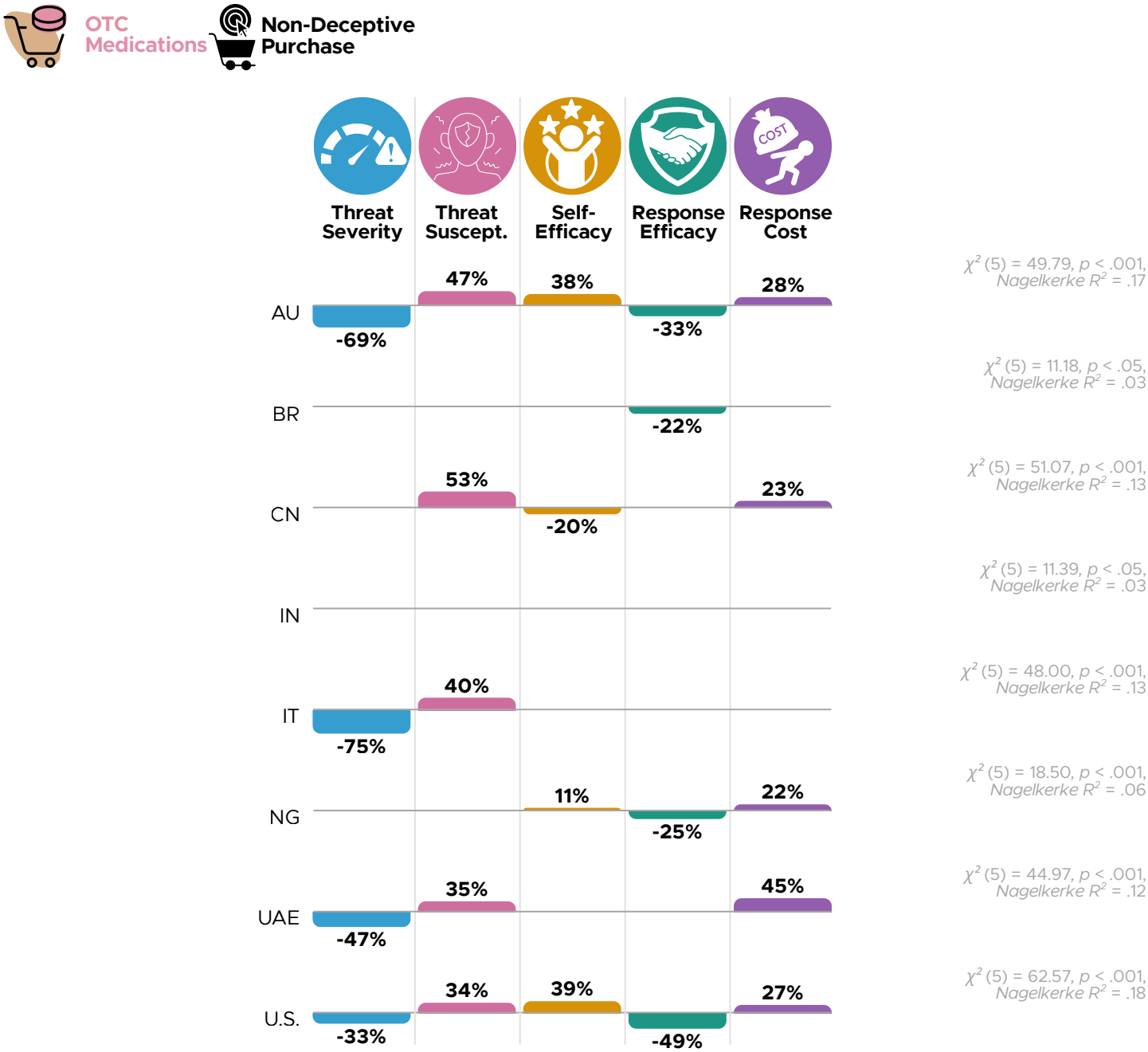


Figure 6.3.2 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and non-deceptive purchase of counterfeit OTC medication, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Deceptive Purchase

Among the global sample, threat-related variables explained 13% of the variance in deceptive purchase of counterfeit OTC medications. Threat severity was associated with a 37% decrease in deceptive purchase, while threat susceptibility increased it by 41%. Self-efficacy increased deceptive purchase by 14%, response efficacy decreased it by 25%, and response cost increased it by 31%.

Country-Level Differences

- Australia: Threat severity decreased deceptive purchase by 75%, threat susceptibility increased it by 46%, self-efficacy increased it by 37%, response efficacy decreased it by 37%, and response cost increased it by 42%.
- Brazil: Threat susceptibility increased deceptive purchase by 40%, response efficacy decreased it by 52%, and response cost increased it by 24%.
- China: Threat susceptibility increased deceptive purchase by 60%, response efficacy decreased it by 33%, and response cost increased it by 40%.
- India: No significant predictors.
- Italy: Threat severity decreased deceptive purchase by 96%, threat susceptibility increased it by 79%, and response cost increased it by 36%.
- Nigeria: Response cost increased deceptive purchase by 26%.
- UAE: Threat severity decreased deceptive purchase by 33%, threat susceptibility increased it by 26%, and response cost increased it by 38%.
- U.S.: Threat severity decreased deceptive purchase by 49%, threat susceptibility increased it by 54%, self-efficacy increased it by 52%, response efficacy decreased it by 69%, and response cost increased it by 30%.

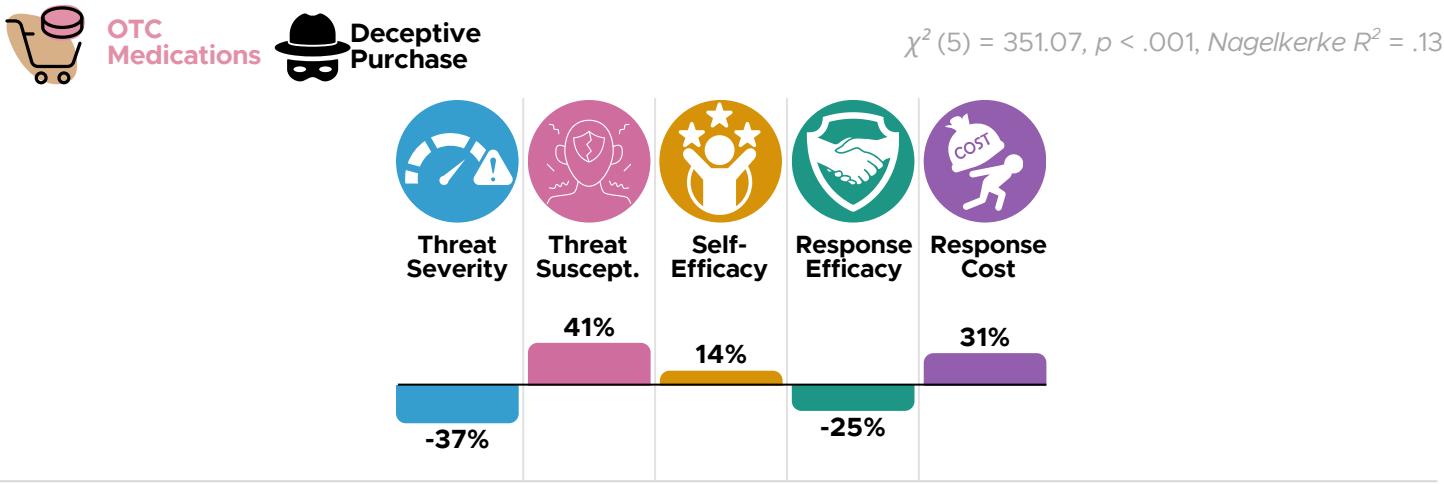


Figure 6.3.3 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and deceptive purchase of counterfeit OTC medication, global sample.

OTC Medications

Deceptive Purchase

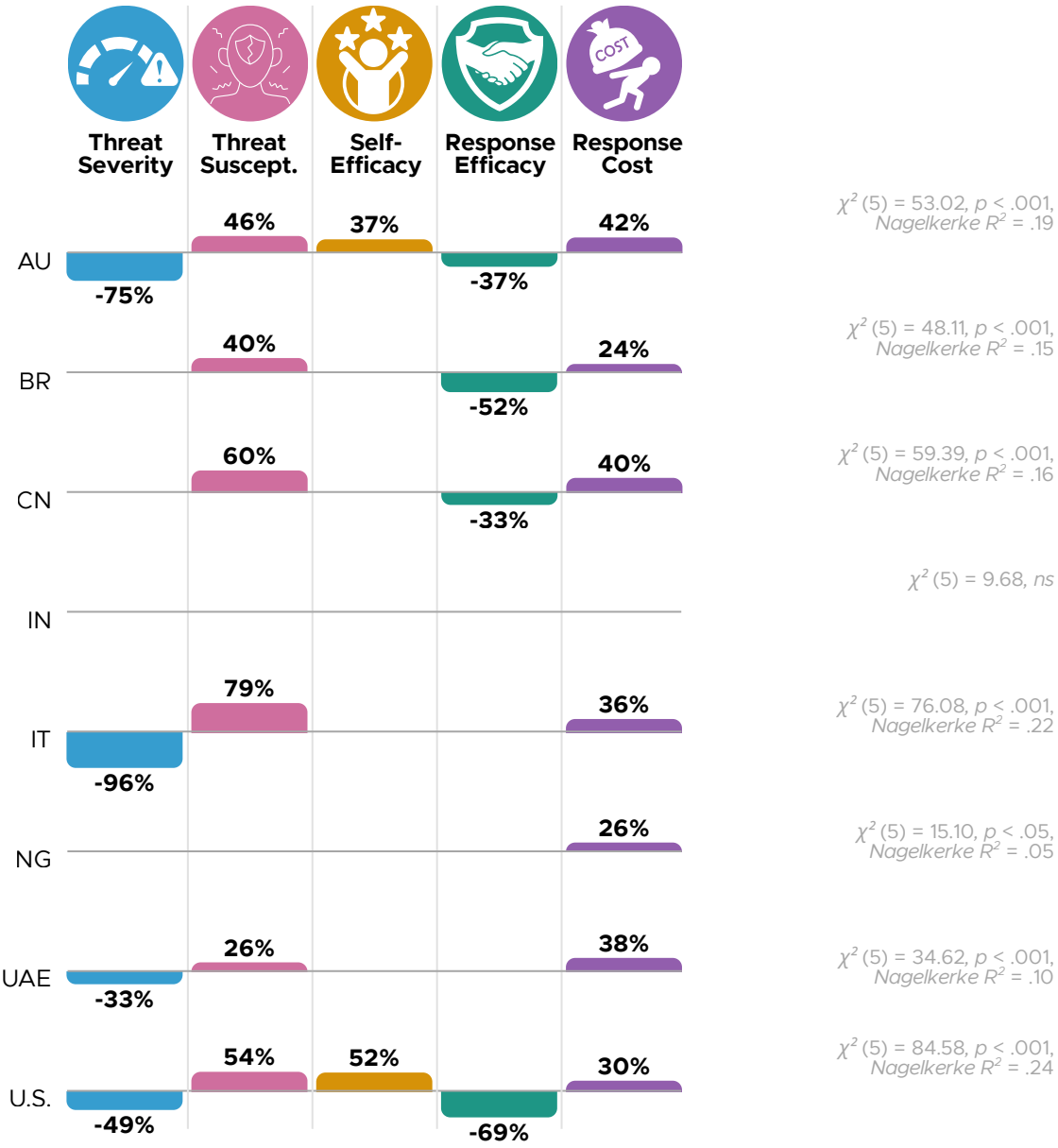


Figure 6.3.4 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and deceptive purchase of counterfeit OTC medication, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

6.4 Vitamins and Supplements

Non-Deceptive Purchase

Among the global sample, threat-related factors explained 5% of the variance in non-deceptive purchase of counterfeit vitamins and supplements. Threat severity decreased non-deceptive purchase by 9%, while threat susceptibility increased it by 12%. Self-efficacy increased non-deceptive purchase by 13%, response efficacy decreased it by 6%, and response cost increased it by 18%.

Country-Level Differences

- Australia: Self-efficacy increased non-deceptive purchase by 25%, response efficacy decreased it by 25%, and response cost increased it by 26%.
- Brazil: No significant predictors.
- China: Threat susceptibility increased non-deceptive purchase by 40%, response efficacy decreased it by 45%, and response cost increased it by 39%.
- India: Self-efficacy increased non-deceptive purchase by 37%.
- Italy: Threat severity decreased non-deceptive purchase by 15%.
- Nigeria: Response cost increased non-deceptive purchase by 22%.
- UAE: Response cost increased non-deceptive purchase by 30%.
- U.S.: Threat severity decreased non-deceptive purchase by 37%, while threat susceptibility increased it by 41%.

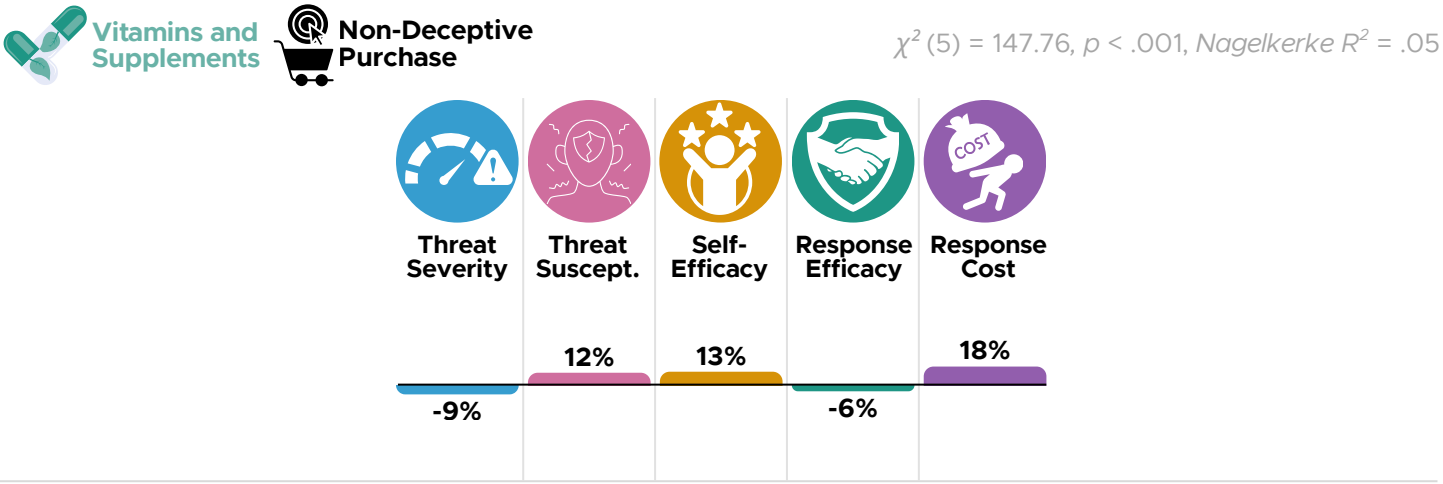


Figure 6.4.1 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and non-deceptive purchase of counterfeit vitamins and supplements, global sample.

Vitamins and Supplements

Non-Deceptive Purchase

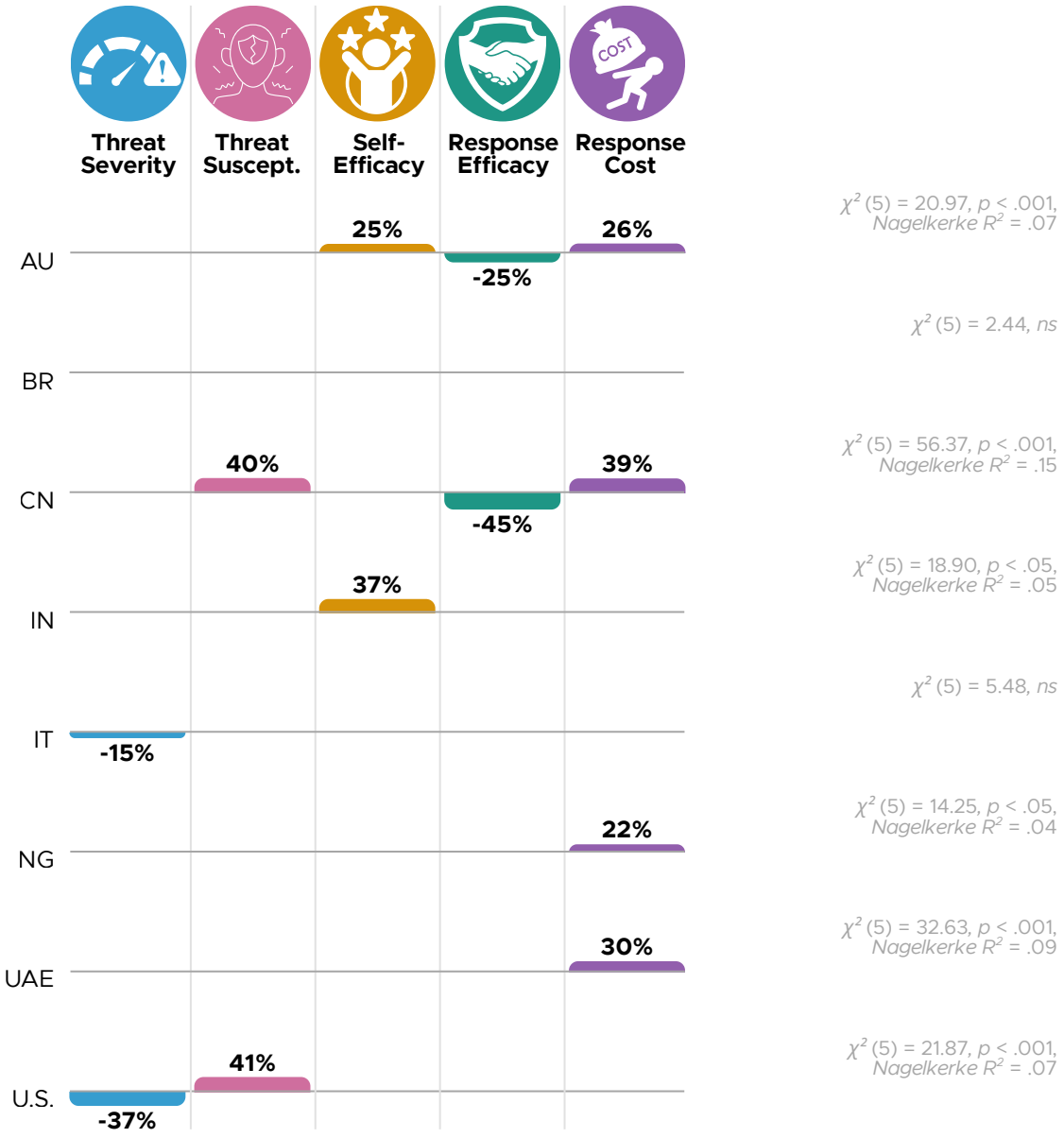


Figure 6.4.2 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and non-deceptive purchase of counterfeit vitamins and supplements, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Deceptive Purchase

Among the global sample, threat-related factors explained 12% of the variance in deceptive purchase of counterfeit vitamins and supplements. Threat severity decreased deceptive purchase by 28%, threat susceptibility increased it by 39%, self-efficacy increased it by 17%, response efficacy decreased it by 20%, and response cost increased it by 25%.

Country-Level Differences

- Australia: Threat severity decreased deceptive purchase by 56%, threat susceptibility increased it by 60%, self-efficacy increased it by 23%, and response efficacy decreased it by 28%.
- Brazil: Threat susceptibility increased deceptive purchase by 44%, self-efficacy increased it by 19%, and response efficacy decreased it by 27%.
- China: Threat susceptibility increased deceptive purchase by 53%, response efficacy decreased it by 47%, and response cost increased it by 45%.
- India: Threat severity decreased deceptive purchase by 23%, while self-efficacy increased it by 27%.
- Italy: Threat severity decreased deceptive purchase by 75%, while threat susceptibility increased it by 62%.
- Nigeria: Response cost increased deceptive purchase by 24%.
- UAE: Threat susceptibility increased deceptive purchase by 20% and response cost increased it by 45%.
- U.S.: Threat severity decreased deceptive purchase by 32%, while threat susceptibility increased it by 51%.

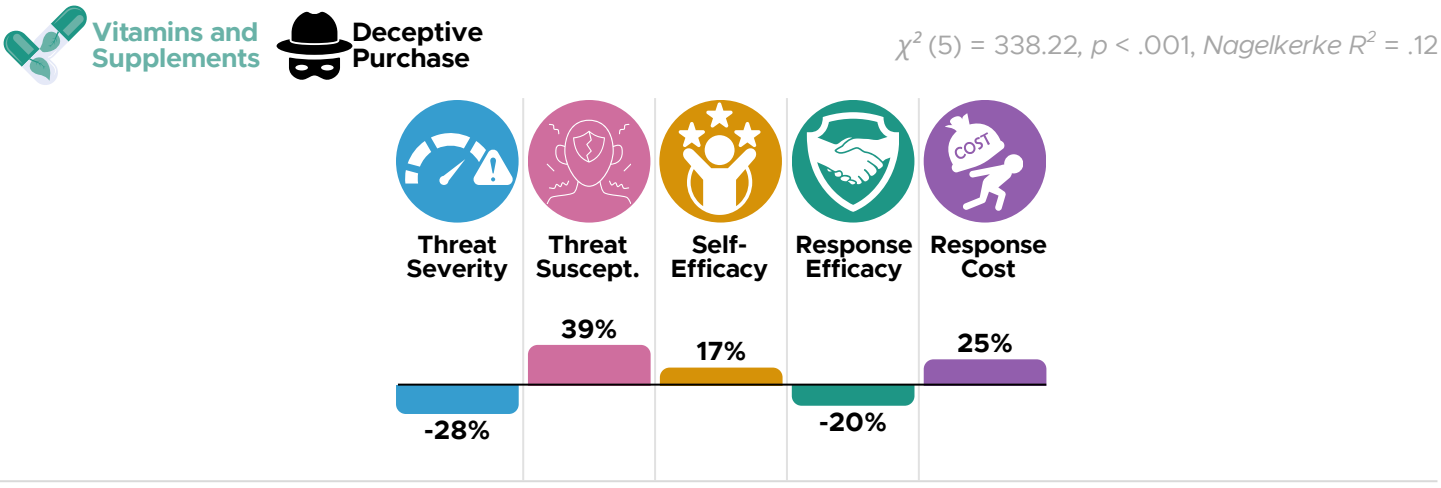


Figure 6.4.3 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and deceptive purchase of counterfeit vitamins and supplements, global sample.

Vitamins and Supplements | Deceptive Purchase

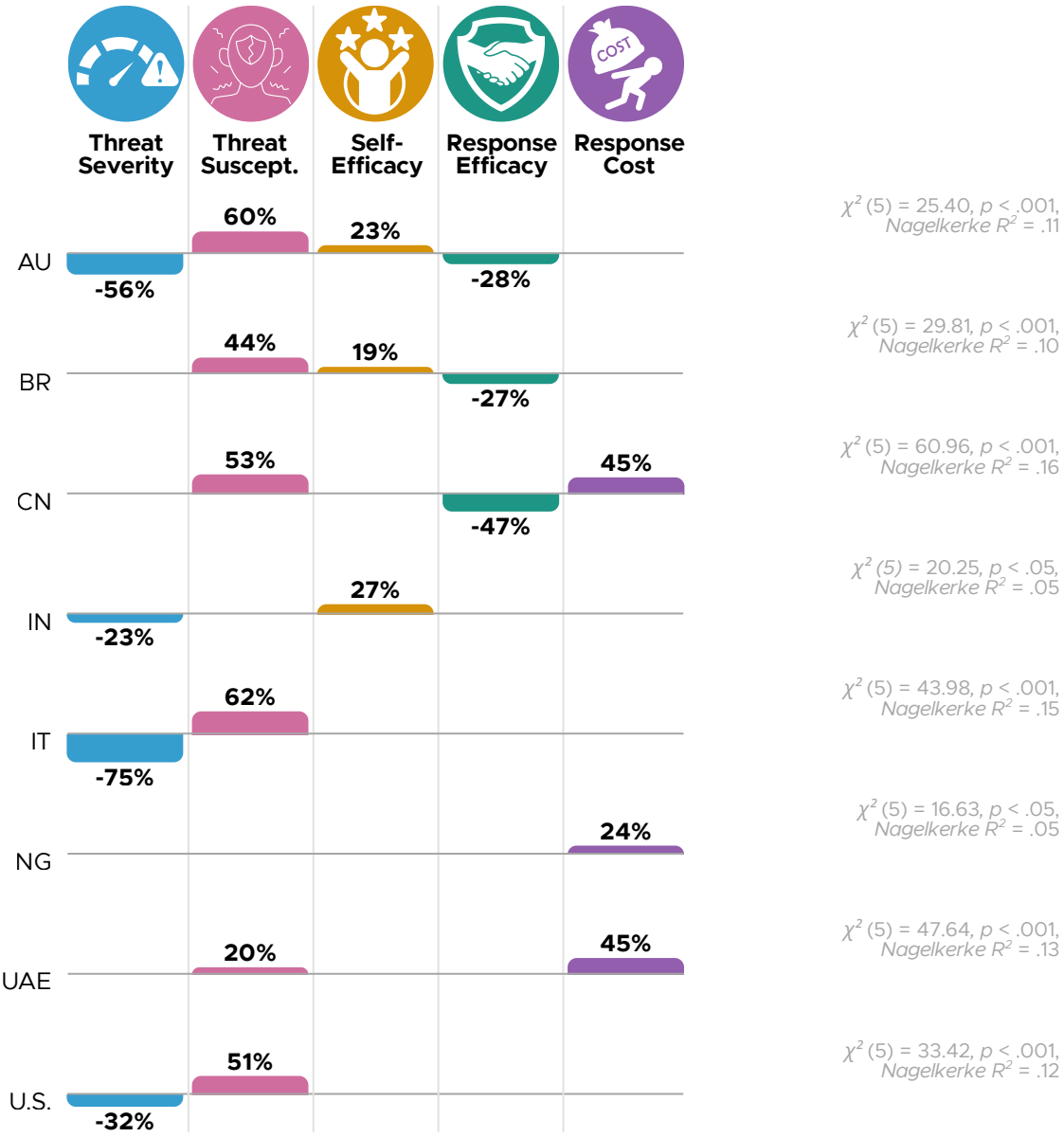


Figure 6.4.4 Significant logistic regression odds ratio values (probability) for the relationship between risk perceptions and deceptive purchase of counterfeit vitamins and supplements, by country.

Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

6.5 Medication Online Purchase Intentions

Legitimate Medication Online Purchase Intentions

Among the global sample, threat-related factors explained 16% of the variance in legitimate medication online purchase intentions. Threat severity negatively predicted intentions, while threat susceptibility, self-efficacy, and response cost were positive predictors.

Country-Level Differences

- Australia: Threat severity and response efficacy were negative predictors of purchase intentions, while self-efficacy and response cost were positive predictors.
- Brazil: Threat severity was a negative predictor of purchase intentions, while self-efficacy, response efficacy, and response cost were positive predictors.
- China: Response efficacy was the only significant and positive predictor of purchase intentions.
- India: Self-efficacy, response efficacy, and response cost were all significant positive predictors of purchase intentions.
- Italy: Threat severity was a negative predictor of purchase intentions, while self-efficacy and response cost were positive predictors.
- Nigeria: Threat susceptibility was a negative predictor of purchase intentions, while self-efficacy and response cost were positive predictors.
- UAE: Threat severity was a negative predictor of purchase intentions, while self-efficacy and response cost were positive predictors.
- U.S.: Threat severity was a negative predictor of purchase intentions, while self-efficacy and response cost were positive predictors.

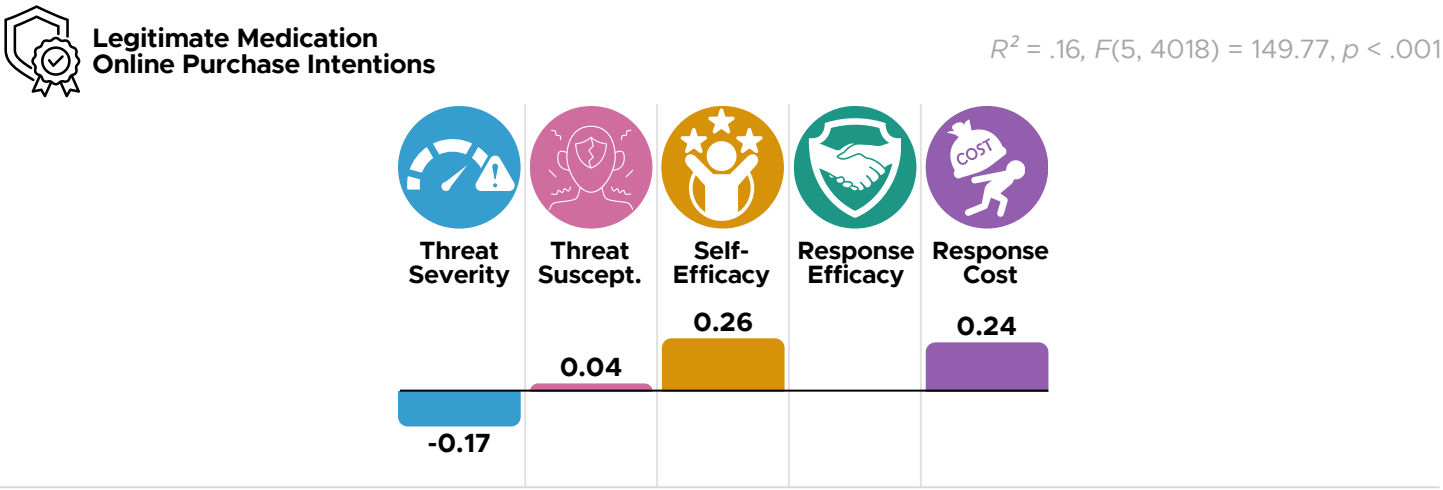


Figure 6.5.1 Significant Linear regression coefficients for the relationship between risk perceptions and legitimate medication purchase intentions, global sample.

Legitimate Medication Online Purchase Intentions

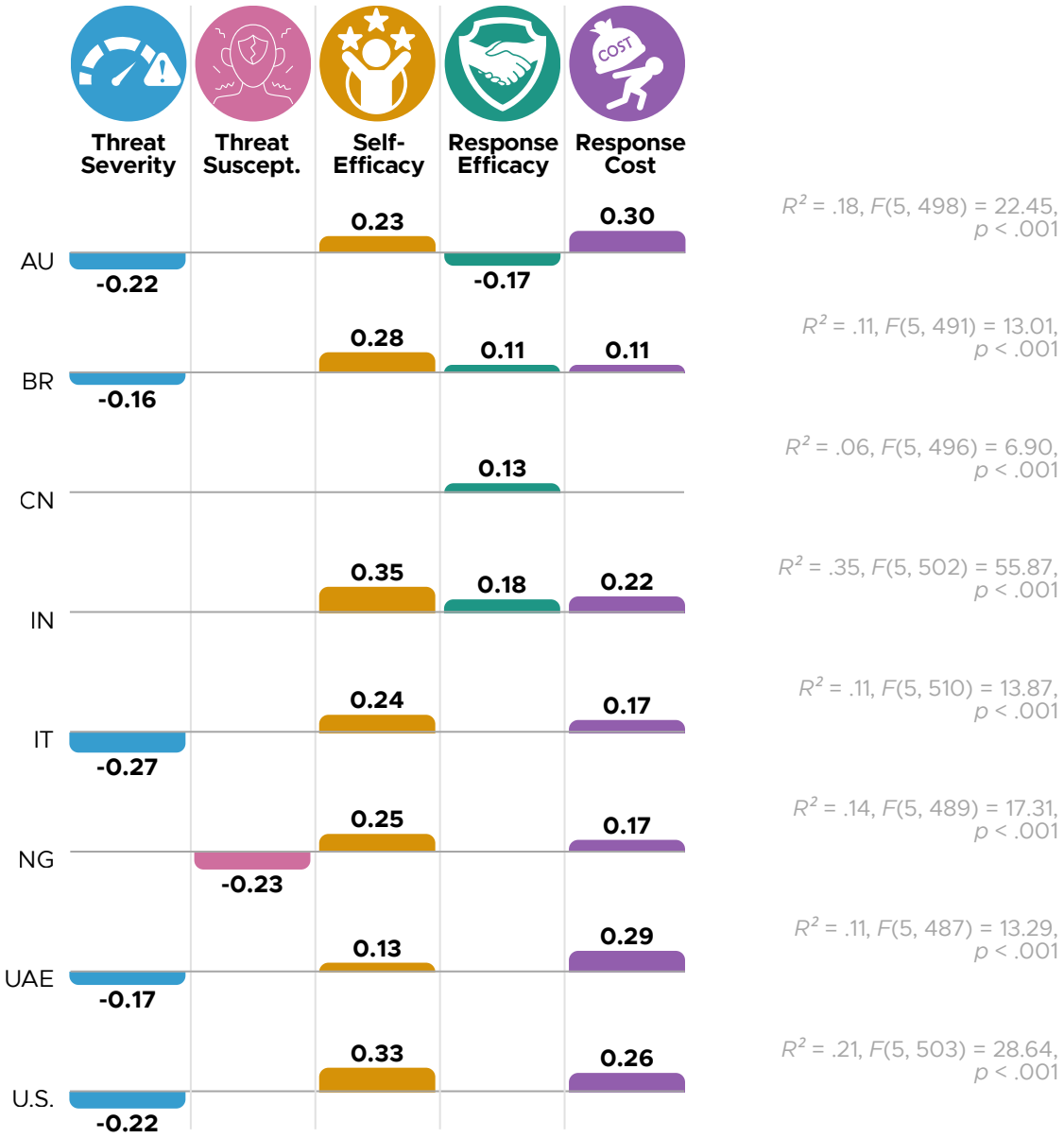


Figure 6.5.2 Significant Linear regression coefficients for the relationship between risk perceptions and legitimate medication purchase intentions, by country.
Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America

Counterfeit Medication Online Purchase Intentions

Among the global sample, threat-related factors explained 27% of the variance in counterfeit medication online purchase intentions. Threat severity and response efficacy both were significant negative predictors of counterfeit medication online purchase intentions, while threat susceptibility, self-efficacy, and response cost were all positive predictors.

Country-Level Differences

- Australia: Threat severity and response efficacy negatively predicted purchase intentions, while threat susceptibility, self-efficacy, and response cost were all positive predictors.
- Brazil: Threat severity and response efficacy negatively predicted purchase intentions, while threat susceptibility, self-efficacy, and response cost were all positive predictors.
- China: Threat severity and response efficacy negatively predicted purchase intentions, while threat susceptibility and response cost were positive predictors.
- India: Threat severity was a negative predictor of purchase intentions, while threat susceptibility, self-efficacy, and response cost were all positive predictors.
- Italy: Threat severity was a negative predictor of purchase intentions, while threat susceptibility, self-efficacy, and response cost were all positive predictors.
- Nigeria: Threat severity was a negative predictor of purchase intentions, while threat susceptibility, self-efficacy, and response cost were all positive predictors.
- UAE: Threat severity and response efficacy negatively predicted purchase intentions, while threat susceptibility, self-efficacy, and response cost were all positive predictors.
- U.S.: Threat severity and response efficacy negatively predicted purchase intentions, while threat susceptibility, self-efficacy, and response cost were all positive predictors.

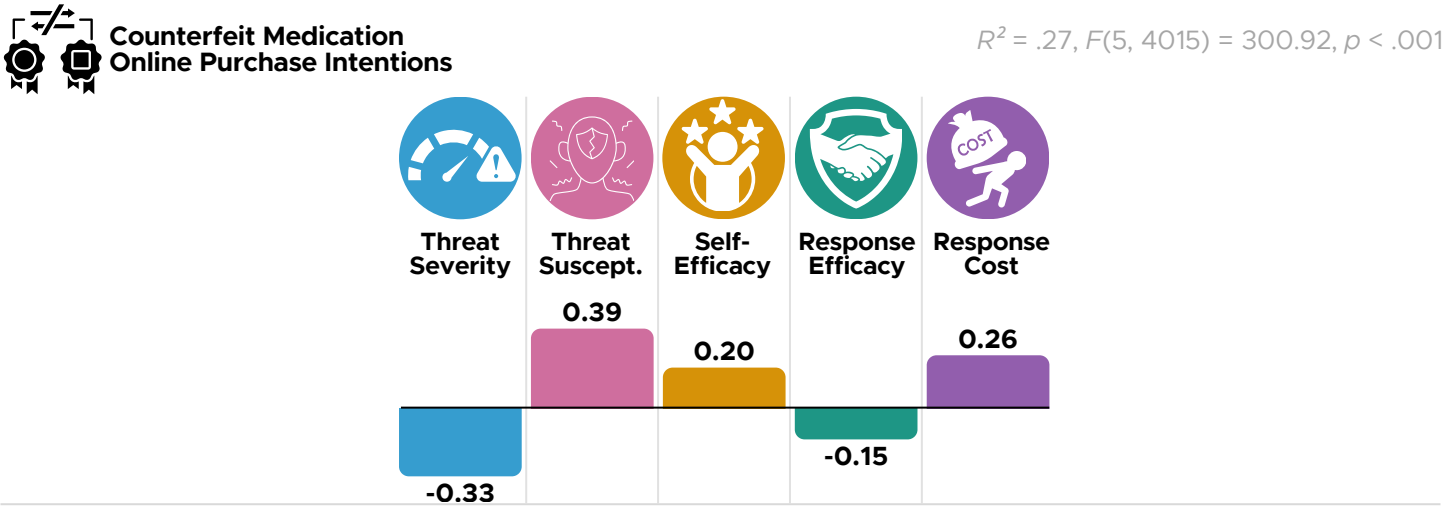


Figure 6.5.3 Significant Linear regression coefficients for the relationship between risk perceptions and counterfeit medication purchase intentions, global sample.

Counterfeit Medication Online Purchase Intentions

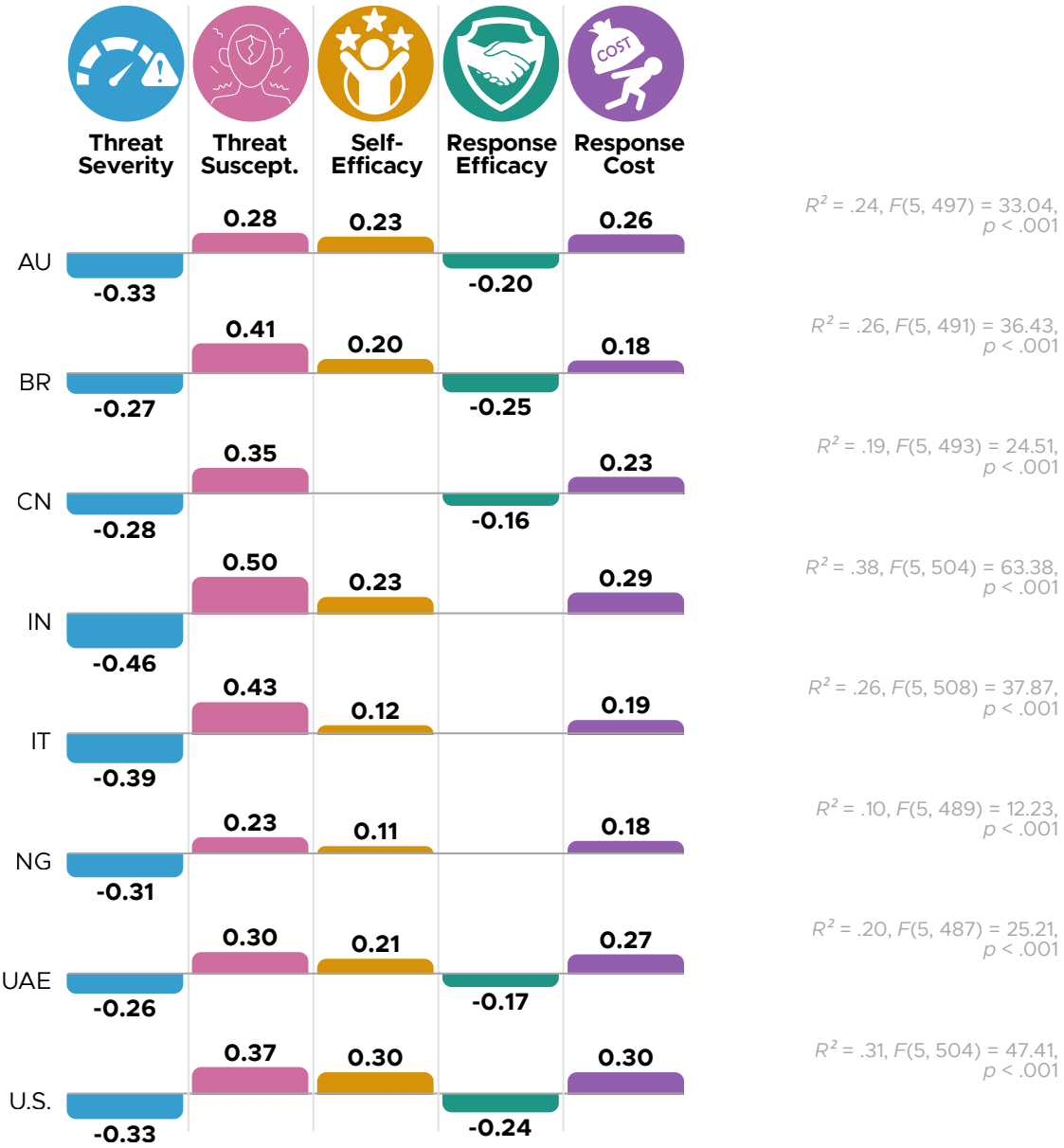
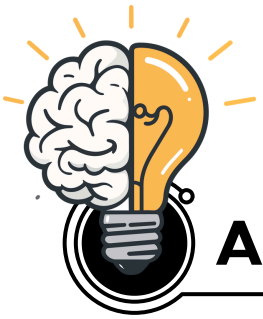
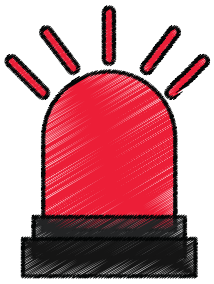


Figure 6.5.4 Significant Linear regression coefficients for the relationship between risk perceptions and counterfeit medication purchase intentions, by country.
Missing values indicate non-significant coefficients. AU = Australia; BR = Brazil; CN = China; IN = India; IT = Italy; NG = Nigeria; UAE = United Arab Emirates; U.S. = United States of America



Actionable Insights



Make Threat Severity Salient, But Actionable!

Anti-counterfeiting campaigns should emphasize the risks associated with buying and using counterfeit medications and provide an action plan that's easy to follow to ensure that consumers recognize misleading and illicit cues. Such strategies should be prioritized in countries where severity perceptions are low (e.g., China), while reinforced in countries with high levels of threat severity perceptions (e.g., UAE and Italy). Stopping at raising consumers' awareness about the risks of buying counterfeit medications is not sufficient to activate protective behaviors!

Turn Vulnerability Into Agency!

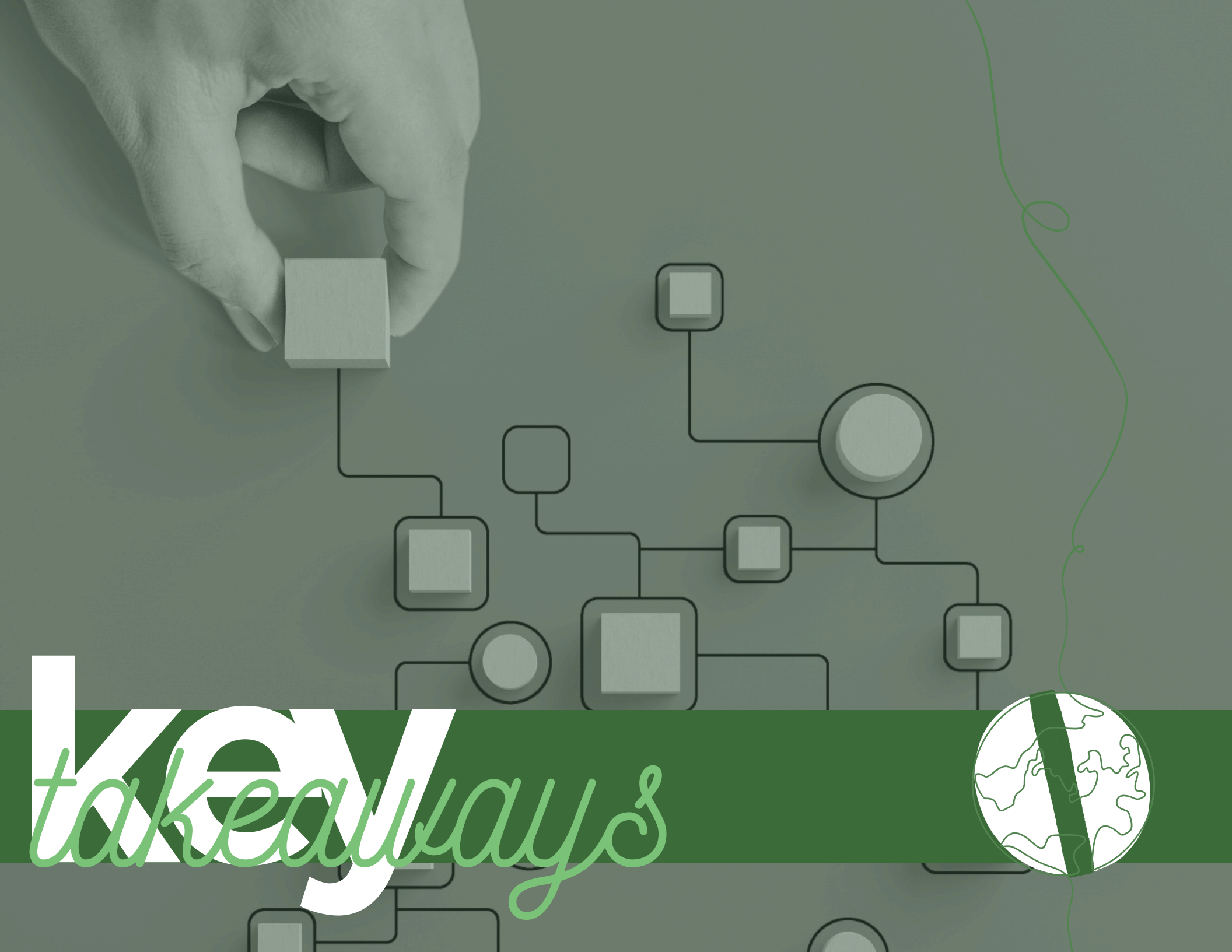
Our findings suggest that high feelings of susceptibility are associated with heightened counterfeit purchase risks. For consumers who feel most vulnerable, it is important to move away from fear-inducing messages that further enhance the sense of fatalism and emphasize individual agency in protecting one's self against the risks of buying counterfeit medications.

Enhance Confidence in a Realistic Way

Our findings showed that participants' self-efficacy or the confidence in their ability to protect themselves against the risks of buying counterfeit medications was not a protective factor. Moreover, the more participants felt they would incur a loss by not buying counterfeit medications (response cost), the more likely they bought counterfeit medications. Anti-counterfeiting interventions should focus on further enhancing self-efficacy, yet provide consumers the ability to learn in more realistic settings and highlight accessible and affordable means of acquiring legitimate medications.

It's All About the Platforms!

Consistently, participants' perceptions that actions they have taken or could take to protect themselves while shopping for medications online are bound to be effective. Enhancing the ability to detect authenticity cues in these environments based on proactive strategies by the platforms could provide consumers with more effective means of mitigating counterfeit medications risks.


key
takeaways

key takeaways

Our study surveyed consumers in eight countries around the world with the intent of deciphering the determinants of non-deceptive and deceptive purchase of counterfeit medications online. With the exponential growth in online pharmacies and the increasing availability of medications sold through e-commerce and social media platforms, it is critical to understand this phenomenon in terms of describing the extent of the issue, as well as what predicts different patterns of buying counterfeit medications.

SIZE OF THE PROBLEM

Availability of Counterfeit Medications is on the Rise!
Amid rapid technological advances, consumers are increasingly turning to e-commerce, social commerce, and online pharmacies to obtain medications. Across our eight-country sample, approximately one-fifth to one-quarter of participants reported purchasing counterfeit medications online—either knowingly or unknowingly—and this prevalence is likely to grow. While most online purchases were for personal use, a substantial share of respondents also reported buying medications for family members and friends.

Although online marketplaces offer convenience, these behaviors carry significant financial and health risks. More than 10% of participants reported experiencing injury or other negative health consequences after using counterfeit prescription or over-the-counter medications, and many also reported harms experienced by people close to them. These findings should serve as a clear alarm for rights holders, digital platforms, and policymakers to implement urgent, coordinated, and both proactive and reactive strategies to eliminate the availability of counterfeit medications. The impacts are tangible and demand multi-stakeholder intervention to reduce risk and protect consumers.

Participants who discovered that their online purchases were counterfeit reported no clear course of action. The most common response was to dispose of the products; however, the second most common action was to keep and use them, thereby increasing the likelihood of harm. This underscores the need for immediate investment in consumer education—not only about the dangers of counterfeit medications, but also about clear, accessible steps for responding safely when such products are identified.

key takeaways

2 SOCIODEMOGRAPHICS

Demographic Profile of Counterfeit Medication Buyers

Consumers who intentionally and unintentionally buy counterfeit medications tend to be male, younger, married, more educated, and from higher income households. Such demographic attributes are important in identifying the most vulnerable groups of consumers to guide strategic communication decisions in the fight against counterfeit medications. Though these demographic attributes point to targeting decisions, such insights should not preclude brands and other stakeholders from devising tailored strategies that target other demographic groups. Additionally, it is important to situate these indicators in combinatory ways to understand patterns of counterfeit medication purchase. Specifically, while our findings related to higher prevalence of counterfeit medication purchase among the more educated and those from higher income households, this should not translate into an understanding that more educated consumers and consumers with more disposable income are inclined to purchase counterfeits more than those who are less educated and from lower income households. What this translates to is an understanding of the socioeconomic status profile of counterfeit medication consumers. Those who are more educated and have higher income are also those with more resources, but more importantly, with higher chances of having access and connectivity to search for and buy medications online.

In addition to demographic predictors, we looked at two critical psychographic attributes of consumers who participated in our study. Specifically, we looked at the role of health literacy and online shopping frequency. It is clear from our findings, and in confirmation to our previous insights regarding the role of socioeconomic status (SES) and digital access in facilitating opportunity for counterfeit medication purchase, that those who shop online more are more likely to also buy counterfeit medications, both intentionally and unintentionally. Given higher access and affordances garnered by counterfeit medication buyers, anti-counterfeiting awareness-raising strategies should capitalize on this for channel choices to match access and affordances with opportunities to intercept such communication by illicit sellers at the virtual point-of-purchase. Finally, the role of health literacy is critical in guiding our understanding of the global risks posed by the prevalence of counterfeit medications in digital and online marketplaces. Such a finding should drive action to incorporate medication literacy into general and digital health literacy interventions executed across channels, including opportunities for raising health literacy and medication literacy at physicians' offices and health care facilities, as well as physical and online pharmacies.

key takeaways

3 MOTIVATIONS

Understanding the *WHY* of Counterfeit Medication Purchase

Our study inquired about two broad types of motivations to buy medications online: (1) convenience and accessibility and (2) necessity. The proliferation of digital and online marketplaces has warranted consumers the convenience of buying medications from the comfort of their digital devices. And indeed, when looking at the raw means, our findings showed that more consumers gravitate toward expressing such motives as major drivers for their purchase of medications online. However, our regression-based analyses showed that across different medication types and for instances of non-deceptive and deceptive purchase of counterfeit medications, necessity motivations more strongly predicted such purchases compared to convenience and accessibility. This finding entails significant insights at multiple levels. First, for pharmaceutical companies and brands, it is critical to track demand-side data for the purchase and consumption of counterfeit medications to better optimize production and distribution of pharmaceutical products, specifically to countries and regions where such brands and medications are not available to consumers. As we live in a globally-connected digital world, consumers have access not only to medications online, but also to information about specific medication types and brands. The necessity motivations help explain why the demand from the consumer side further drives continued prevalence of counterfeit medications within the value chain. However, necessity motives do not only express desired demand by consumers, but also cover the need for medications in low supply within a particular market. Governments and policy makers should emphasize the importance of facilitating fair and equitable access to medications through informed regulatory practices. When consumers are in need of medications that they cannot access or afford, they succumb to buying counterfeit medications, despite the dire impact this could have on their own health. Importantly, use of counterfeit medications can also broadly burden the entire health care system, which can increase costs and limit resources.

4 AD EXPOSURE

Pharmaceutical Ads: Tug of War between Legitimate and Illicit Sources

Our findings showed that exposure to pharmaceutical advertising through traditional media channels lowered the risks of buying counterfeit medications, yet in some instances for certain countries, information about medications shared through radio and outdoor channels increased the chances of buying counterfeit medications. It is important to understand that efforts to

market pharmaceutical products to consumers through traditional and digital direct-to-consumer channels may raise consumers awareness and recognition of these medications. At the same time, these efforts may also raise consumers' needs to acquire these medications, and in some instances when the authentic brands are not available or financially unattainable, consumers may turn to buying the counterfeit products. When coupled with lack of supply or hardship in acquiring these products (e.g., no prescription, high cost), illicit sellers intercept this media chain and provide alternatives to medication access and price, thus elevating the availability of these products for both non-deceptive and deceptive purchase.

In addition to the role of traditional and direct-to-consumer advertising channels, our findings showed that user-generated content, as well as content disseminated by social media influencers, heightened the risks of buying counterfeit medications, both intentionally and unintentionally. There is a greater role that social and digital media platforms can play in better moderating the digital environment to more effectively regulate the dissemination of such content.

BEHAVIORAL PLANNING

Weak Predictive Power of Theory of Planned Behavior

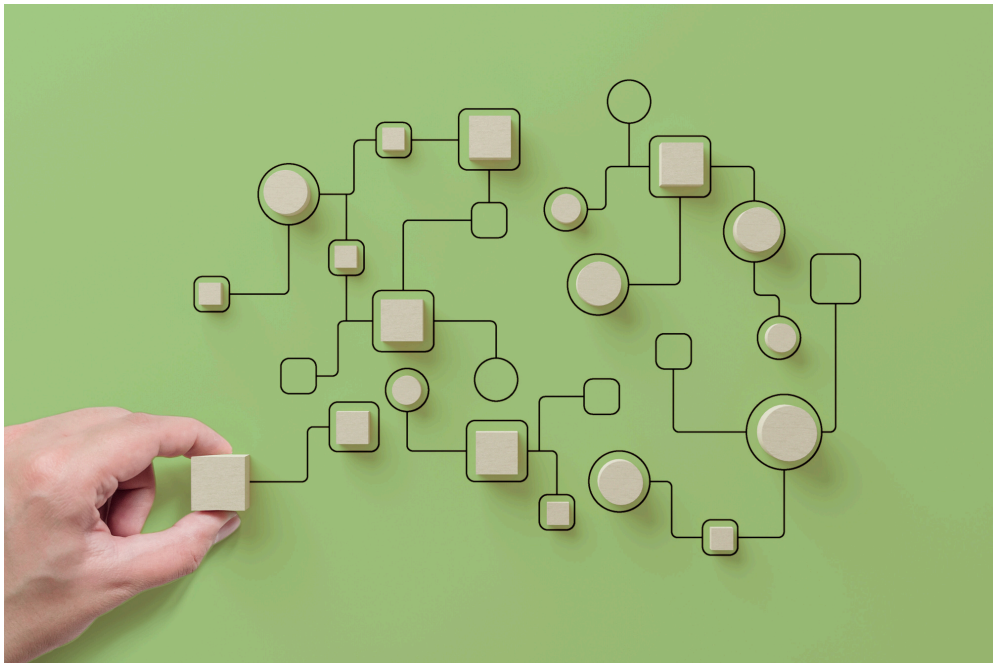
Our findings related to the Theory of Planned Behavior showed great variability in the predictive power of behavioral planning variables as it relates to buying counterfeit medications across different medication classes. Across all types of purchases, having positive associations with buying counterfeit medications increased the risks of acquiring illicit drugs, both non-deceptively and deceptively. Changing these associations is critical to confronting such risks. At the same time, personal agency was apparent here, as well. Having the mindset to refrain from buying counterfeit medications significantly lowered the risks of buying them. Finally, proximal social norms, or thinking that close friends, family members, and social media friends accept the idea of buying counterfeit medications and buy them themselves, significantly drove consumers' decisions to buy fake medications knowingly, as well as increased the chances of them being deceived into buying such medications. Anti-counterfeit medication campaigns should emphasize the role of personal connections and personal norms as a means of adjusting and correcting these misconceptions related to buying counterfeit medications.

It is worth mentioning that, overall, the predictive power of the Theory of Planned Behaviors, especially at the country level, was rather limited, which suggests that engaging in this risky behavior might not be validly explained as a premeditated, thoughtful, and elaborative process within the consumer mind. Thus, there is value in extending our understanding of these behaviors beyond the typical consumer behavior approaches linking psychological mechanisms to behavioral readiness and actions.

6 RISK PERCEPTIONS

How Consumers Understand Counterfeit Medications Risks!

Our findings indicate that consumers have a high level of awareness of the risks associated with buying counterfeit medications. They understand what is at stake. At the same time, they feel incredibly vulnerable to these risks when looking for medications across online platforms, which facilitates a sense of fatalism. This offers a great opportunity in understanding the role of response efficacy in guiding consumer decision making. Response efficacy deals with consumers' perceptions that actions they take online to protect themselves are effective. The higher the response efficacy, the less likely that consumers will enact behaviors that put their lives and the lives of their loved ones at risk due to using counterfeit medications. Taken together, awareness-raising efforts should embrace this complexity within the consumer psyche and strive to diversify the messaging appeals to ensure higher effectiveness of such interventions. Specifically, it is critical to understand that such complexity within the risk perceptions associated with buying counterfeit medications should urge various stakeholders to move from solely communicating about these risks using fear appeals, which may negatively affect consumers and lead to cognitive shut-down. While consumers feel vulnerable, they also have an inflated sense of confidence that they are capable of protecting themselves. It is important to emphasize their agency in protecting themselves through easy-to-follow and clear cues for detecting counterfeit medication listings online and, more importantly, what to do with counterfeit medications that they have been deceived into buying.




method

method

Survey Design

This is a cross-sectional survey conducted online (via Qualtrics Panels) in Australia, Brazil, China, India, Italy, Nigeria, the United Arab Emirates, and the United States that was approved as exempt by the Michigan State University Institutional Review Board (IRB). The countries were chosen to ensure geographical representation and based on counterfeit product seizure data (see OECD/EUIPO, 2019, 2025). The survey was developed in English and translated to and back-translated from Arabic, Brazilian Portuguese, Chinese, and Italian. Language preference was set based on geographic location, yet participants could choose to complete the survey in any of the five available languages. The translation was conducted by a professional vendor. Participants completed the survey online and were rewarded with participation incentive based on vendor guidelines. Survey data underwent a quality check for missing responses and other metrics (e.g., speeding, chatbot responses, straightlining, etc.). Responses that did not meet the criteria were removed and replaced with additional responses to meet the response quota.

Participants

Participants (*N* = 4,758) had a mean age of 39 years old (*SD* = 14.97), where age ranged from 18 to 85 years old, with 12% of the sample who belonged to the Boomers+ generational cohort (born 1964 or earlier), 21% to Gen X (born 1965-1980), 42% to Gen Y (born 1981-1996), and 25% to Gen Z (born 1997-2012). The sample was split in terms of gender with 48% self-identifying as male, 51% self-identifying as female, and 1% selecting other categories or refusing to answer. More than half of the sample were married (54%). More than half of the sample (53%) reported having at least one child, and about half (49%) reported living in a household of three individuals or more. A small minority of the sample (6%) indicated they had not shopped online in the past year. In terms of income level, 30% of the sample had low income, 41% had medium income, and 29% had high income. Finally, 30% of the sample reported having a high school diploma or less, 53% were college-educated, and 17% had advanced degrees.

method

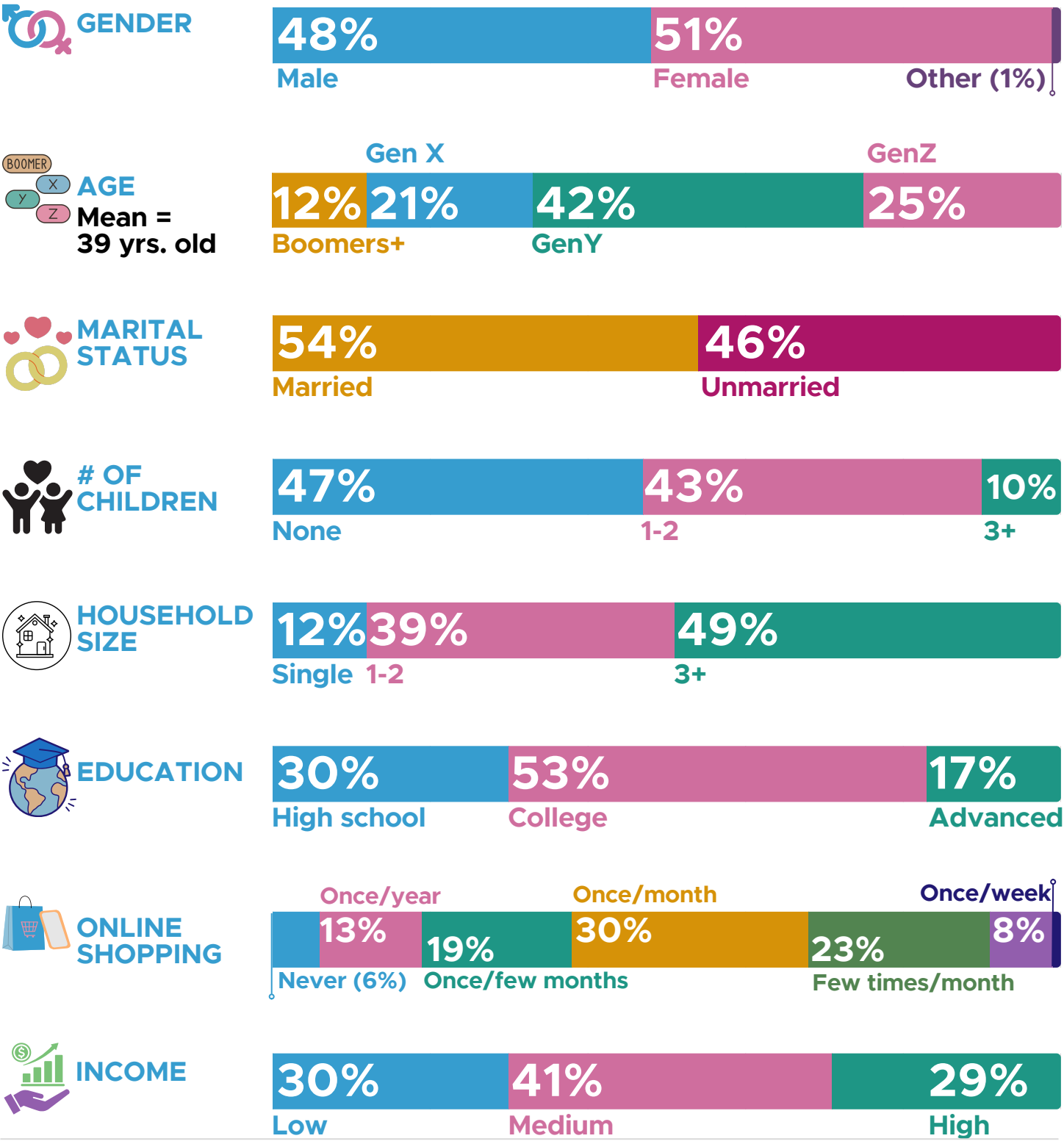


Figure 7.1.1 Global sample demographics.

Measures

Legitimate and Counterfeit Medication Purchase

Participants were asked several questions related to their online purchase of medications, including counterfeit medications.

- **Legitimate medication purchase:** Participants were asked to indicate the frequency of purchasing legitimate medications from physical pharmacies and online sources (Scale ranging from "Never" to "Several times a week") for each of the medication classes. For ease of reporting and interpretation, these variables were dichotomized into 1 = purchased and 0 = did not purchase.
- **Types of medications purchased online:** Participants indicated, using a check-all-that-apply question, whether or not they have purchased any of 42 different medication types over the past 12 months.
- **Legitimate and Counterfeit Medication Purchase Across Channels:** Participants who have indicated they have bought legitimate medications online were asked to indicate the frequency of buying the three medication classes – measured for both legitimate and counterfeit medications – from e-commerce platforms, social media platforms, and online pharmacies (Scale ranging from "Never" to "Several times a week." For ease of reporting and interpretation, these variables were dichotomized into 1 = purchased and 0 = did not purchase.
- **Use and Consequences of Counterfeit Medications:** For each medication class, participants indicated how they used the counterfeit medications they bought online (personal use, gave to a friend, gave to a family member), how they performed (worse, as expected, better), what they did with medications after knowing they were counterfeit (e.g., kept them, returned to seller, etc.), and experienced consequences of using counterfeit medications (e.g., personal injury, negative health effects, money loss, etc.).

Demographic Variables

- **Gender**: Participants were asked to indicate their gender (female, male, self-describe, decline to answer)
- **Age**: Participants were asked to indicate their birth year. Based on that, we calculated participants age by subtracting 2023 from birth year. We also coded birth year into generational cohorts.
- **Employment Status**: Participants indicated their current employment status (e.g., working (paid employee), working (self-employed), not working (multiple variations)).
- **Education Level**: Participants indicated their highest earned degree ranging from "no formal education" to "professional degree (JD, MD).
- **Marital Status**: Participants indicated their current relationship status (married, widowed, divorced, separated, never married, other, and decline). Because the sample was somewhat evenly split between married and not married individuals, we dichotomized this variable.
- **Number of Children and Household size:** Participants were asked to indicate the number of children under the age of 18 who lived with them and the number of individuals living in the same household. The variable was recoded into "none", "1-2", and "3 or more."
- **Frequency of Online Shopping:** Participants were asked to indicate the frequency of buying products from any online sources with options ranging from "never" to "daily or almost daily."

- **Income**: Participants were asked to indicate their household income (annual or monthly, based on country norms) using seven categories, where the middle category included the country's median income and the rest reflected lower and higher income brackets. By-country responses were recoded into low, medium, and high income and were aggregated for the entire sample, per participant.
- **Health literacy**: We used Duong et al.'s (2019) short-form health literacy instrument (HLS-SF12) to measure health literacy, where participants indicated the difficulty (1 = very easy; 7 = very difficult) of performing 12 relevant health-related activities.

Theoretical Variables

Variables, items, and validity and reliability statistics are provided in Table 1. Unless otherwise noted, all variables were measured using 7-point likert-type scales.

- **Motivations to Buy Medications Online:** We developed 16 statements related to reasons for buying medications online based on previous systematic literature review (Almomani et al., 2023). Only participants who previously indicated they bought medications online rated the motivations statements per medication class. The 16 items were reduced to two factors: convenience and accessibility motives (8 items) and necessity motives (5 items).
- **Ad Exposure:** Participants indicated the frequency (1 = never to 7 = daily or almost daily) of exposure to information about medications across 13 different channels, including television ads, radio ads, posts by influencers, posts by legitimate sellers, direct messages, etc.
- **Protection Motivation Theory Variables:** Adapting measures from Rogers (1975), we asked participants to indicate their perceptions about the severity (3 items), susceptibility (3 items), response efficacy (10 items), self-efficacy (3 items), and response cost (5 items).
- **Theory of Planned Behavior variables:** Attitudes toward purchasing counterfeit medications were assessed with negative (6 items) and positive (6 items) belief scales developed by the research team. Injunctive norms captured perceived approval from distal ("most people my age in my country") and proximal ("close friends") reference groups. Descriptive norms measured estimated prevalence of counterfeit purchasing across multiple referents (country, local area, internet users, family, close friends, social media friends). Perceived behavioral control was assessed with 5 items.

Table 1. Items, factor analysis, and reliability analysis

Health Literacy

On a scale from very difficult to very easy, how easy would you say it is to...

Find information on treatments of illnesses that concern you?
Understand the leaflets that come with your medicine?
Judge the advantages and disadvantages of different treatment options?
Call an ambulance in an emergency?
Find information on how to manage mental health problems like stress or depression?
Understand why you need health screenings (such as breast exam, blood sugar test, blood pressure)?
Judge which vaccinations you may need?
Decide how you can protect yourself from illness based on advice from family and friends?
Find out about activities (such as meditation, exercise, walking, Pilates, etc.) that are good for your mental well-being?
Understand information in the media (such as the internet, newspaper, magazine) on how to get healthier?
Judge which everyday behavior (such as drinking and eating habits, exercise, etc.) is related to your health?
Join a sports club or exercise class if you want to?

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.74 - .84	7.69	64.06%	.95

Convenience & Accessibility Motivations to Buy Medications Online

I buy medications online because...

It is easier than going to the physical pharmacy.
To avoid long waiting line.
Delivery was fast.
Could order them anytime (24/7).
It is cheaper.
Could choose from a wide variety of products.
Could choose from a wide variety of brands for the same medicine.
Of the high quality of the product.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.61 - .85	5.03	62.90%	0.91

Threat Severity

Please indicate your disagreement or agreement with each of the following statements...

Buying counterfeit medications online poses a severe threat to my health.
There is a high risk that any medication bought online would be counterfeit.
Buying counterfeit medications online is a serious illegal/criminal behavior.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.70-.87	2.00	66.35%	.74

Table 1. *(continued)*

Threat Susceptibility

Please indicate your disagreement or agreement with each of the following statements...

When shopping online, I am at a high risk of buying counterfeit medications.
It is likely that the medications I buy online are counterfeit.
When shopping online, it is possible that the medications I buy are counterfeit.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.86 - .890	2.30	76.92%	.85

Response Efficacy

Please rate the effectiveness of each of the following strategies used to protect against buying counterfeit medications.

Simply avoiding buying medications from online sources.
Not clicking on a link to buy medications online.
Leaving a questionable website.
Assessing the legitimacy of website or platform for sale of medications.
Reading customer reviews.
Refraining from buying medications online from unknown sellers.
Refraining from clicking on medication referrals on social media platforms.
Refraining from buying medications from sellers on social media platforms.
Evaluating the reputation of the online source for buying medications.
Searching for more information about online medication sellers.
Verifying the legitimacy of the medication seller.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.62-.84	6.89	62.63%	.94

Self-Efficacy

Please indicate your disagreement or agreement with each of the following statements:

I can identify counterfeit medications online.
I can distinguish between counterfeit and legitimate medications online.
I am confident in my ability to identify counterfeit medications online.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.93	2.60	86.56%	.92

Table 1. *(continued)*

Response Cost

Please indicate your disagreement or agreement with each of the following statements...

Because a person does not have information about the dangers of buying medications online, they cannot take action to protect themselves from the harms of buying counterfeit medications.
Restricting people from buying medications from online sources might harm people's health.
Avoiding online purchases of medications will make it harder for people's health to improve
When legitimate medicines are not readily available, it will be harmful to people's health if they don't buy medications online even though they might be counterfeit.
The harm to one's health from not taking counterfeit medications is much greater than that of not taking the medication at all.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.68-.80	2.89	57.62%	.82

Negative Attitudes

Please indicate your disagreement or agreement with each of the following statements...

People who buy counterfeit medication are committing a crime.
People who sell counterfeit medications are committing a crime.
Counterfeit medications hurt the economy.
Counterfeit medications hurt the companies that manufacture legitimate medications.
Producing counterfeit medications is immoral.
Counterfeit medications can lead to negative health effects.
Counterfeit medications can cause death.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.72-.90	5.25	74.97%	.94

Positive Attitudes

Please indicate your disagreement or agreement with each of the following statements:

In general, counterfeit medications bought online are of similar quality to medications bought at physical pharmacies.
Considering value for the money, counterfeit medications are better than legitimate medications.
Buying counterfeit medications online is a better choice.
Buying counterfeit medications online benefits the consumer.
There is nothing wrong with buying counterfeit medications online.
There is nothing harmful about using counterfeit medications.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.89-.92	4.95	82.53%	.96

Table 1. *(continued)*

Distal Injunctive Norms (Country)

Most people my age in the country where I live...

Approve of me buying counterfeit medications online.
Endorse my buying of counterfeit medications online.
Would support that I buy counterfeit medications online.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.95-.96	2.73	91.03%	.95

Proximal Injunctive Norms (Close Friends)

Most of my close friends...

Approve of me buying counterfeit medications online.
Endorse my buying of counterfeit medications online.
Would support that I buy counterfeit medications online.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.96-.97	2.79	93.14%	.96

Perceived Behavioral Control

Please indicate your disagreement or agreement with each of the following statements:

For me, it is easy to refrain from buying counterfeit medications while shopping online.
I have the resources, knowledge, and ability to not buy counterfeit medications.
It is mostly up to me whether I buy counterfeit medications online.
I have control over whether I buy counterfeit medications online.
If I wanted to, I could easily refrain from buying counterfeit medications.

Factor Loadings	Eigenvalue	% of Var. Explained	Cronbach's α
.79-.75	3.61	72.28%	.90

Methodological Considerations & Limitations

Given the cross-sectional design and convenience sampling technique of the current survey, it is important to emphasize that findings cannot be generalized to the entire population in each of the surveyed countries. Even though we used a quota-based sampling procedures to ensure gender, age, and income level representation, the findings must be interpreted as reflective of this current sample rather than the entire population in each country. That said, results, specifically descriptive results, should be interpreted with caution as they might not accurately reflect true values in the general population. It is also important to note that our sampling technique relied on recruiting participants using online survey panels, thus, participants are inherently considered internet users. Though this can be seen as a strength of the current study given its focus on online purchase of medications, it is important to note that the findings are limited as they do not include individuals who are not internet users.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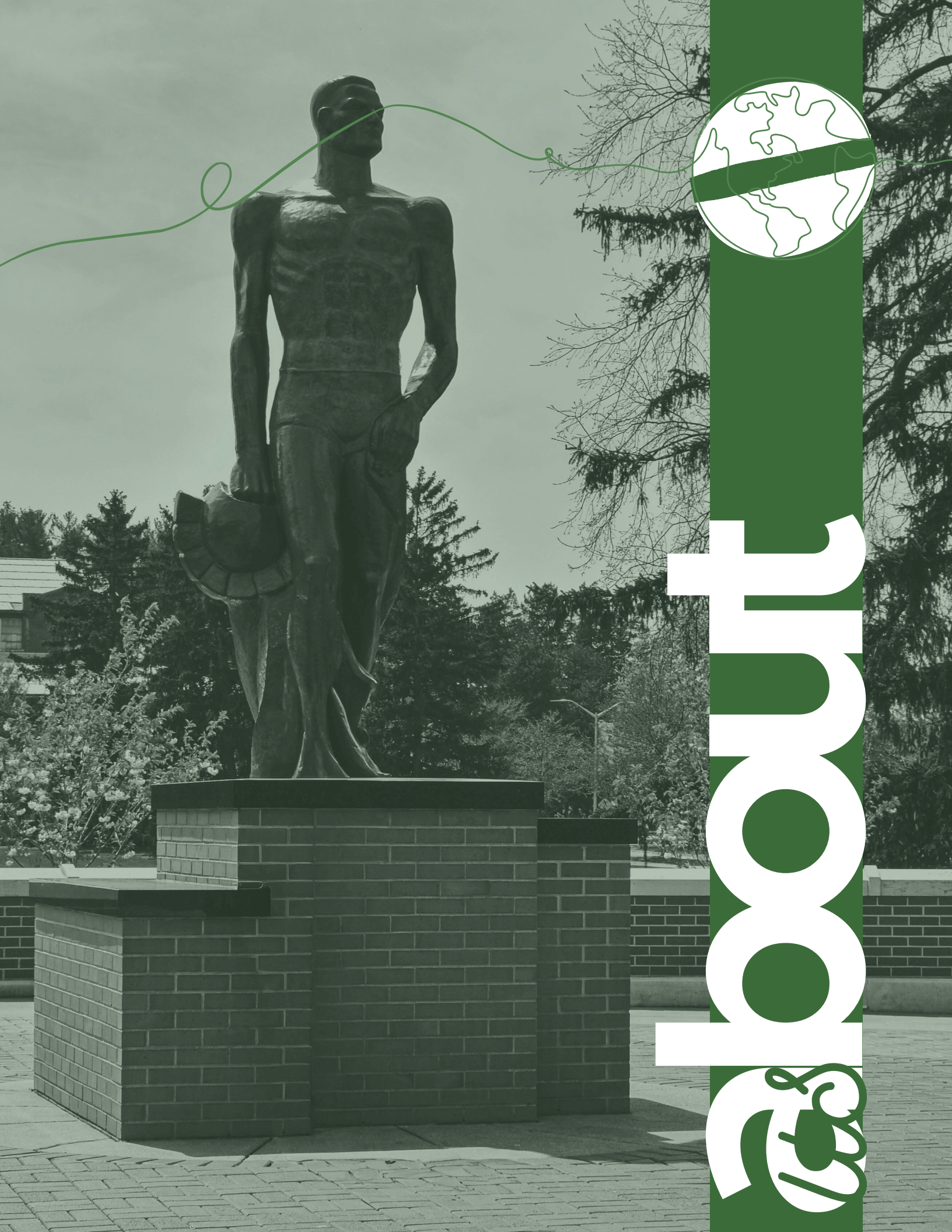

About

about us

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Obtaining Additional Marketing Insights. This report is not intended to be marketing advice for your organization. For assistance with individualized marketing strategies incorporating anti-counterfeiting messaging and the survey findings with your audience, please contact the A-CAPP Center.

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Johnson&Johnson MERCK

about us

Center for
Anti-Counterfeiting
and Product Protection
MICHIGAN STATE UNIVERSITY

OUR **MISSION**

Identify and examine the complex issue of trademark counterfeiting from a practical, actionable, academic nexus/ viewpoint, working collaboratively with brand protection practitioners and communities worldwide.

OUR **VISION**

Combat trademark counterfeiting through our research, education, and outreach.

OUR **TEAM**

We are a small and committed team passionate about brand protection and anti-counterfeiting. We rely on partnerships with others in the brand protection community for funding and engagement as well as data for our research. *Brand protection is an umbrella term that describes how brand owners (companies), law enforcement, academics and related technology and other vendors work together to stop trademark counterfeiting and protect the public.

OUR **VALUES**

As a public, research-intensive, land-grant university funded in part by the State of Michigan, our university mission is to advance knowledge and transform lives. At the Center for Anti- Counterfeiting and Product Protection, these same values are at the core of what we do, as applied to the brand protection field. Through our vision, we live out these values by helping create solutions on a global scale to problems with significant health, safety and other risks. We also help train a diverse cadre of current and future industry professionals.

WE ARE **INTER-DISCIPLINARY**

At MSU and at other institutions, we work with scholars in the many disciplines that make up our field, including but not limited to: Law, Criminal Justice, Business, Supply Chain, Marketing, Packaging, Engineering, Pharmacy, Advertising and Public Relations and Global Health. We also work closely with the team in International Studies and Programs, the Broad College's International Business Center/Global Business Club, the Axia Institute, and others from all over campus and across the globe. We are working to develop additional relationships across a broad spectrum of potential partners.

WE ARE **COLLABORATIVE**

We work with everyone imaginable in the brand protection and anti- counterfeiting community, from academics to members of law enforcement, vendors and brand owners. We do not endorse others' solutions, allow sales of services or products, or give away our partners' information to be used for sales. This policy has helped us build relationships of trust with our partners.

WE ARE **INDEPENDENT**

Our research and related work are independent. Although we raise funding for our research and other activities as a self-sustaining unit at Michigan State University through gifts and contracts, we do not accept funding that would require us to promote a specific viewpoint or perspective.
We proactively seek to be knowledgeable about current events and updates in our field and produce research and resource tools applicable in the practice of brand protection.

WE ARE **INCLUSIVE**

We are INCLUSIVE AND PROMOTE INCLUSIVITY in all we do. We recognize that the field of brand protection is made better by being as inclusive as possible. We work actively to ensure that our events, programs, and team are inclusive and that our educational programs view lessons and delivery through an inclusive lens. We seek to have as diverse an array of partners as possible through significant and strategic outreach.

WE PRIORITIZE **LEARNING**

We PRIORITIZE EDUCATING AND LEARNING. We are committed to educating the current and next generation of brand protection professionals through our self-guided online courses, as well as various types of experiential education and traditional university courses. Our internship programs include mentoring and other state-of-the-art career development tools to both educate new members of the profession and create learning opportunities for their mentors.

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