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# THE THEFT OF **MEDICINES** FROM ITALIAN HOSPITALS

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## **The theft of medicines from Italian hospitals**

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Together with counterfeiting, theft of medicines is emerging as the new frontier of pharmaceutical crime. In Italy between 2006 and 2013 one hospital out of ten registered thefts of pharmaceuticals, suffering, on average, an economic loss of about 330 thousand EUR in each episode.

This report is the first study on this booming but almost unknown criminal phenomenon. In particular, it carries out:

- an exploration of the background behind pharmaceutical theft and of the drivers that influence the demand for and the supply of stolen medicines (Chapter 1);
- an analysis, based on cases reported by the Italian media, of thefts of medicines from Italian hospitals between 2006 and 2013 (Chapter 2);

The analyses provide clear evidence on the magnitude of this illicit market and on the harm caused to patients, pharmaceutical companies, and the Italian national health system's budget. In addition, they furnish important information on where and how stolen medicines are trafficked and on the actors (both criminal and legal) involved in this illicit market. There follow some summary findings:

- Between 2006 and 2013, the Italian media reported about 68 cases of thefts from Italian hospitals (51 in 2013 alone), for a total economic loss of at least 18.7 million EUR (see 2.2.1).
- Although the whole of the country seems affected, the regions of Campania and Apulia represent more than 45% of the cases (with respectively 17 and 14 thefts).
- In terms of rates, Molise (7.1 thefts for every 10 hospitals), Apulia (3.8) and Campania (3.1) record the highest values. The highest rate among northern regions is recorded by Friuli Venezia Giulia (2 for every 10 hospitals) (see 2.2.2).
- The geography of thefts confirms the hypotheses formulated in section 1.4. Southern Italy and the eastern Italian regions are more exposed to thefts of medicines because of the greater activity of organized crime groups (both Italian mafia-type and foreign OCGs, especially Eastern-European ones) and their geographical proximity to Eastern Europe and Greece, which appear to be destinations for stolen medicines (see 2.2.2).
- Indeed, a positive and statistically significant correlation between thefts and the presence of mafia groups (especially Camorra and Apulian OCGs) can be measured (see 2.2.6 for details).

- Among hospitals, the larger (in particular more than 800 beds), more complex (more than 21 disciplines) are the ones most affected because they may have a higher turnover among the medical staff and hence weaker monitoring (see 1.3.6 and 2.2.3).
- Some hospitals have been victimized more than once: in particular the Federico II hospital of Naples and the Cardarelli hospital of Campobasso have suffered respectively 5 and 3 thefts. Other hospitals have been targeted twice.
- As hypothesized (see 1.3.1), high-price medicines are the ones most frequently stolen since they can give criminals higher returns on their risk; in particular, cancer drugs (stolen in 32 cases) are those most frequently stolen, followed by immunosuppressive (13), antirheumatic (12) and biological (10) drugs (see 2.2.4).
- Most of these are Class H or Class A pharmaceuticals (see 2.2.4) fully covered by the Italian National Health System. This may confirm the hypothesis, suggested in 1.4, that stolen products are also sold on the illegal markets of foreign countries (especially Eastern Europe and Greece) where reimbursement regimes are weaker (1.3.3), or the legal supply is insufficient (1.3.5), or where they can enter the parallel trade and be exported to high-price countries (1.3.6 and 1.3.9).
- However, it cannot be excluded that stolen medicines are re-used on the internal illegal market (see 1.3.4): for instance, in the synthesis of illegal drugs, in sport doping (e.g. EPO) or in illegal healthcare structures (e.g. during medical treatment of wanted criminals at a large). Possible, but less likely, are thefts commissioned in order to create shortages in hospital pharmacies in order to favour friendly vendors (see 2.2.3).
- To be highlighted are also the overlaps between the trafficking of stolen medicines and the parallel trade (i.e. the legal trade based on price differentials across countries). It cannot be excluded that, because of loopholes in traceability systems across jurisdictions (see 1.3.7) and the high level of liberalization of the pharmaceutical market, stolen medicines re-enter the legal trade through fictitious wholesale companies (perhaps set up in foreign countries) or corrupt brokers, and are then sold to high-price countries (e.g. Germany, Sweden) or exported back to Italian hospitals or pharmacies (see 1.3.6 and 1.3.9 for details).
- All these cases confirm the crucial role played in pharmaceutical thefts by specialized and organized criminal groups able to infiltrate or corrupt medical personnel and wholesalers (1.3.9) and possessing sufficient knowledge to identify, store, transport and place stolen products on illegal markets, in Italy and abroad (1.3.8).
- These groups may be connected with indigenous mafia OCGs (e.g. Camorra in Campania), or they may be linked to foreign OCGs, especially those already involved in property crimes and organized thefts (such as some Eastern European OCGs, see 1.3.8 for details).
- Indeed, a correlation between thefts of medicines and other property crimes (especially thefts and robberies against trucks) is evident and statistically significant (see 2.2.6).

The analysis yields a picture of a criminal activity undergoing rapid expansion and often underrated. The high profitability and the low risks (to criminals) guaranteed by the theft of medicines may shift some OCGs from less profitable and more risky activities (e.g. illicit drugs, human trafficking, etc) to this new lucrative illegal trade.

Although still based on preliminary evidence, this study provides important information that could be used by law enforcement and supervisory authorities to strengthen the fight against pharmaceutical theft and the illicit trafficking of stolen medicines. However further analyses are needed, ones which also focus on other targets (e.g. trucks and couriers) and use other information and data sources (e.g. police statistics, company data).

In particular, closer attention should be paid to how the trafficking of stolen drugs may overlap and integrate with the parallel trade thanks to the complicity of corrupted wholesalers or brokers. In this regard, study of this phenomenon would certainly benefit from stronger public-private partnerships (among research institutions, law enforcement agencies, supervisory bodies and pharmaceutical companies) and from the use of better-quality data.





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# TABLE OF CONTENTS

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Executive summary	5
Table of Contents	9
Acronyms	11
Introduction	12
1. Background and drivers	14
1.1 Crime and pharmaceuticals: the reasons of an attraction	15
1.2 Crime and pharmaceuticals: not only counterfeiting	17
1.3 Theft of medicines: the drivers	18
1.4 Theft of medicines: the hypotheses	28
2. The analysis: the thefts from Italian hospitals	32
2.1 Methodology	33
2.1.1 Data and sources	33
2.1.2 Bias and limitations in the data collection	34
2.1.3 Methodology of analysis	35
2.2 Analysis	36
2.2.1 Trends and seasonality	36
2.2.2 Thefts by region and province	39
2.2.3 Thefts by type of hospital	45
2.2.4 Thefts by type of medicine	48
2.2.5 Modus operandi	50
2.2.6 Relationships with contextual factors	52
Conclusions	57
References	61
Acknowledgements	67



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## ACRONYMS

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AIFA → Agenzia Italiana del Farmaco  
ASL → Aziende Sanitarie Locali  
ATC → Anatomical Therapeutic Chemical  
EFPIA → European Federation of Pharmaceutical Industries and Associations  
EPO → Erythropoietin  
GDP → Gross Domestic Product  
ISTAT → Istituto nazionale di statistica  
LEA → Law Enforcement Agency  
NHS → National Health System  
ÖBIG → Österreichisches Bundesinstitut für Gesundheitswesen  
OCG → Organized Crime Group  
OCTA → Organized Crime Threat Assessment  
OECD → Organisation for Economic Co-operation and Development  
OSMED → Osservatorio sull'impiego dei medicinali  
OTC → Over The Counter  
R&D → Research and Development  
RFID → Radio Frequency Identification  
RP → Reference Pricing  
SHI → Social Health Insurance  
UNICRI → United Nations Interregional Crime and Justice Research Institute  
WHO → World Health Organization

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# INTRODUCTION

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The pharmaceutical industry plays a crucial role in the European economy. In 2012 its turnover in Europe was estimated at around 210 billion EUR (EFPIA, 2013), a figure higher than the gross national products of many EU countries, and it employed about 700 thousand persons. It records the highest rate of R&D investments among all business sectors (The European House-Ambrosetti, 2012), and its importance is bound to increase due to the ageing of the population and to the change of habits among consumers, who are steadily increasing their consumption of pharmaceuticals (OECD, 2009).

In this context, Italy plays a leading role, ranking second in Europe after Germany in terms of turnover (25.7 billion EUR in 2012, about 2% of its GDP) and the number of pharmaceutical companies (Farmindustria, 2013), which employ more than 70 thousand workers. Despite current difficulties, the pharmaceutical industry is still one of the most powerful drivers of the Italian economy, and among the sectors attracting the highest rates of foreign direct investments.

However, in recent years Italy has also witnessed an emerging criminal threat related to the pharmaceutical sector: the theft of medicines, which is important in terms of both volume (about 70 cases identified since 2006 considering only thefts in hospitals, see 1.2.2) and value (about 20 million EUR stolen), fuelling the illegal trade in pharmaceuticals and often overlapping both with counterfeiting (see 1.2) and the legal parallel trade (1.3.6 and 1.3.9). The Italian media have reported numerous cases of theft in hospitals, both in the south and north of Italy, but there is also a great deal of evidence on the stealing of pharmaceuticals from pharmacies, warehouses and trucks.

It is evident that the theft of medicines is a threat to people's health, to the government budget (since the stolen medicines may be covered by the national health system, and the illegally trafficked pharmaceuticals may also involve a loss of taxes), to companies' revenues, and to competition within the legal industry.

Despite this evidence, there is a lack of studies on this issue. To date, most research on crime and pharmaceuticals has focused on the counterfeiting of medicines (see 1.2), while theft has often been underrated or completely ignored.

This study intends to fill this gap. Through an analysis of 68 cases of thefts of medicines in Italy since 2006 to 2013, with a focus on those in hospitals, it aims to furnish more thorough understanding of:

- why medicines are stolen;
- what medicines are most frequently appropriated;
- where and how these thefts occur, in what types of hospitals and using what methods;
- how stolen goods may fuel the illicit trafficking of pharmaceuticals;
- what actors play a role in this criminal activity;
- what damage the theft of medicines produces in terms of patients' health and government budget, and on the legal industry.

Although this study is only a first step towards more thorough knowledge of this phenomenon, the results of the analysis may already assist not only the on-going investigations of Italian law enforcement agencies but also the prevention activities of hospitals and pharmaceutical companies.

The study is structured as follows:

- Chapter 1 provides some background information about the relationship between crime and the pharmaceutical industry, highlighting the reasons why this sector may be attractive to criminals (Section 1.1) and briefly reviewing the literature regarding the two main types of criminal activities connected to pharmaceuticals: counterfeiting and theft (Section 1.2). Section 1.3 focuses on theft, highlighting the drivers that influence the demand for and supply of stolen medicines, which are then summarized in terms of hypotheses in Section 1.4.
- Chapter 2 describes the methodology adopted for the analysis of thefts of medicines in Italy, presenting the data, sources used and their limits (Section 2.1). It then reports the main results of the analysis (Section 2.2), focusing on the quantification, trends and seasonality of thefts of medicines in Italy, on their location, and on the types of hospitals victimized. Moreover, it focuses on the kinds of medicines stolen and the *modi operandi* adopted by criminals. Finally, it analyses the relationship between thefts of medicines and the presence of organized crime groups, other property crime types, and other contextual factors.

# 01

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## BACKGROUND AND DRIVERS

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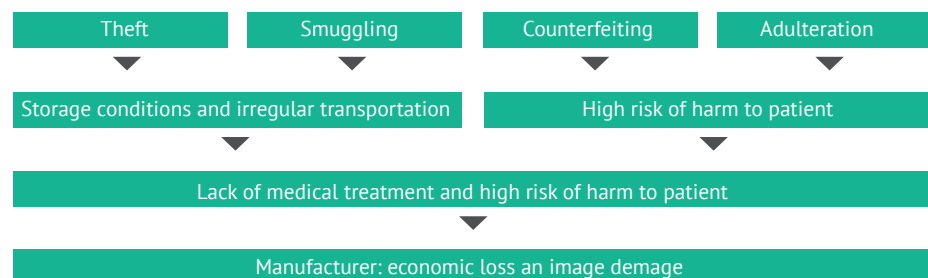
## 1.1

### CRIME AND PHARMACEUTICALS: THE REASONS OF AN ATTRACTION

Besides being a driver of the modern economies, the pharmaceutical sector has historically attracted the interest of criminals and organised crime groups. It has become commonplace to speak of *pharmaceutical crime*, defined as the “manufacture, trade and distribution of fake, stolen or illicit medicines and medical devices” (Interpol, 2012). This broad definition encompasses numerous illicit conducts, such as the counterfeiting and falsification of medical products, their packaging and associated documentation, as well as theft, fraud, illicit diversion, smuggling, trafficking, and the illegal trade of pharmaceuticals (Interpol, 2012).

It is consequently possible to refer to a *dual nature* of the pharmaceutical market consisting of a legal and an illegal component that relate across countries and regions according to the cultural, social and economic factors affecting the structure of the sector (Transcrime, 2012). As in other industries (e.g. clothing, tobacco, waste disposal, firearms), the illegal trafficking of medicines hampers the legal market by causing not only losses and image damage to the legal companies operating in the sector but also harm to patients’ health and to governments’ budgets (e.g. taxes, loss of subsidies of the national health system, etc.).

Figure 1 The illicit trafficking of medicines



Source: Grimald 2012

The reasons why the pharmaceutical sector is vulnerable to crime and to illicit trafficking are numerous. They depend both on the structure of the market and on the specific nature of the products:

- **Primary goods:** medicines are essential goods which cannot be easily replaced (Transcrime, 2010, p. 22; Vander Beken, 2007). The pharmaceutical sector hence relies on a wide and stable consumer base that may be exploited, besides by legal companies, also by counterfeiters and illegal traffickers.

- **Growing demand:** as well as being inelastic, the demand for and the consumption of medicines is also growing. This is due to some important factors, including ageing of the population (Eurostat, 2012), changing habits in consumer lifestyles (OECD, 2009), and higher incomes which give people greater access to medicines. This growing demand may be satisfied by both a legal and an illegal supply of pharmaceuticals.
- **High price:** pharmaceuticals are generally characterized by high commercial value, especially those used in the treatment of severe diseases (e.g. cancer, multiple sclerosis, etc). By way of example, the retail price of a single package of Rebif® (interferon beta-1a)<sup>1</sup> has been fixed in Italy at about 1,300 EUR.<sup>2</sup> The high commercial value of medicines may generate huge profits for those operating on the illegal side of this market (Vander Beken, 2007, p. 14).
- **Restricted access:** not all medicines can be easily accessed on the free market. Depending on the characteristics of the national health system (see 1.3) and of the medicine itself (e.g. risk of toxicity, addiction, abuse), some categories of pharmaceuticals can only be distributed under the strict control of a medical practitioner. In Italy this is the case, for example, of Class H medicines (see 1.3.3), which can be only be administered within hospitals or other public structures by doctors (OsMed, 2012). In other cases, the access to medicines may be made more difficult by exogenous factors (e.g. an interruption in the supply chain due to cuts to the government budget or to the bankruptcy of the supplier company, see 1.3.5). In all these circumstances, consumers may be induced to obtain the medical product on the black market, thus boosting the illegal trade of pharmaceuticals and theft itself.
- **Small and light:** owing to their small size and low weight, medicines can generally be easily concealed, moved and transported (Transcrime, 2010, p. 22). This is a crucial requirement for those illegal organizations that traffic stolen or counterfeit medicines on a transnational scale.
- **New technologies:** the emergence of new technologies and skills has simplified both the production and the distribution of fake or stolen pharmaceuticals. On the production side, it has become much easier to synthesize counterfeit medicines (Vander Beken, 2007, p. 14) thanks to developments in the biological, chemical and technical sectors; on the distribution side, the Internet has allowed to set up online pharmacies from which it is possible to order or purchase illegal products. The difficulty of regulating these virtual pharmacies (EFPIA, 2012; IMPACT, 2013) allows criminals to exploit these online platforms in order to place counterfeit or stolen medicines anonymously (Europol, 2011; Interpol, 2011; UNICRI, 2012, p. 60).

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1. Rebif® is used to treat relapsing forms of multiple sclerosis (MS) to decrease the frequency of relapses and delay the occurrence of some of the physical disability that is common in people with this disease ([www.rebif.com](http://www.rebif.com)).

2. Intended as the price of a 22mcg (injectable solution) package (see Determinazione/C 2729/2011, Gazzetta Ufficiale Serie Generale n.274 del 24-11-2011).



All these reasons may explain the success of pharmaceutical crime and the increase in offences such as pharmaceutical counterfeiting or the theft of medicines, the latter of which is analysed in this study.

## 1.2

### **CRIME AND PHARMACEUTICALS: NOT ONLY COUNTERFEITING**

As explained above (see 1.1), the demand for pharmaceuticals is growing, on both the legal and illegal markets, and for a variety of reasons. Criminals seek to satisfy this illegal demand by using all possible means, including the counterfeiting or theft of medicines. These illicit activities often overlap, and criminals may exploit the same supply chains (e.g. online pharmacies or brokers) to place both fake and stolen pharmaceuticals. Moreover, stolen medicines may also be used to synthesize of fake drugs.

However, most research has to date focused on the counterfeiting of medicines. Counterfeiting concerns medicines “which are deliberately and fraudulently mislabeled with respect to identity and/or source. Counterfeiting can apply to both branded and generic products and may include products with the correct ingredients, wrong ingredients or with fake packaging” (WHO, 1999).

Several studies by scholars and agencies have analyzed this phenomenon and estimated its magnitude. For example, according to Transcrime (2010), 6% of the total value of the global pharmaceutical market may be counterfeited. This figure is confirmed by estimates which attribute a 7% share of the global trade in pharmaceuticals to fake medicines (Ministero della Salute, 2014). At European level, the Council of Europe (2012) estimates that counterfeit medicines account for 10% of the entire European pharmaceutical market, with an annual economic loss of about 500 billion EUR.

By contrast, no data or estimates have been produced about thefts of medicines. In Italy, almost all the information that can be found on this issue derives from journalistic investigations (e.g. Foschini & Tonacci (2013) and Giunti (2014)). However, to be noted is that, among others, AIFA-Agenzia Italiana del Farmaco (2014) and Farindustria are implementing projects to strengthen analysis and monitoring on thefts of medicines, especially from hospitals.

Also to be noted is that this specific kind of crime is not only an Italian problem. Some South American countries have been experiencing a similar magnitude of medicine thefts. In particular, Mexico (Cruz Martínez, 2011; El Diario, 2013) and Argentina (Caruso, 2012; Martínez Terán, 2008) are much affected by this phenomenon, which has recently also led to murders among employees of local pharmaceutical wholesalers.

To conclude, the demand for medicines is satisfied not only by the legal supply but also by an illegal one. The latter comes about not only through counterfeiting but also through the trafficking of stolen pharmaceuticals. The legal supply (especially the parallel trade), counterfeiting, and the trade in stolen drugs often overlap and interrelate with each other. Therefore, scientific studies on thefts of medicines and other related crimes (e.g. robberies of trucks) and on how theft relates with the parallel trade and counterfeiting are necessary to gain better understanding of pharmaceutical crime and effectively to deal with its growth.

## 1.3

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### **THEFT OF MEDICINES: THE DRIVERS**

Why do criminals steal medicines? What medicines are stolen, and where? To whom are the stolen goods sold? All the factors highlighted above (see 1.1) may help to explain why pharmaceutical crime in general may be attractive to criminals. But what are the drivers that influence the illegal trade of stolen medicines in particular?

The demand for stolen pharmaceuticals may be determined by a variety of factors: for example, a desire to acquire medicines at prices lower than on the legal market (if they are not reimbursed by the NHS); the need to obtain pharmaceuticals that are not supplied adequately on the legal market (e.g. because of constraints on the NHS budget); or the desire to use legal medicines or active ingredients for illegal purposes (e.g. EPO in sport doping).

The supply of stolen medicines (i.e. the theft itself and then the distribution) is also influenced by various important drivers, including the price of medicines, vulnerabilities in the supply chain, the problems caused to criminals by the traceability of pharmaceuticals, the need for high organizational skills, and the possibility of relying on corrupted wholesalers or medical staff.

All these drivers are discussed in detail below. Given the focus of this study, references are made to the Italian situation, and to theft of medicines from hospitals in particular.

#### **1.3.1 Price of medicines**

Price may influence the decision concerning what medicines to steal. In line with rational choice theory, it can be hypothesized that thieves opt for high-priced medicines that can guarantee a higher return on risk than cheaper ones. Assuming that the risk of being arrested and the effort required to steal aspirins and interferon are the same, criminals would prefer the latter, since, when sold on the illegal market, it would most likely produce higher profits.

Although very helpful, ranking pharmaceuticals according to their price is not an easy task: the pricing of medicines is the result of a complex interaction among private companies' strategies, public interventions and regulations, demand patterns and national health policies, usually conducted at country level (Espìn & Rovira, 2007); and pricing mechanisms vary widely across countries (see ÖBIG (2006) for a review at EU level).

### 1.3.2 Price differentials

Besides price itself, also price differentials are key drivers of the illicit trade in pharmaceuticals, and they influence both demand and supply. First, it is important to consider the difference between the prices of the same medicine among different countries. Price differentials still remain although, at least in the EU, pharmaceutical companies are now interested in having similar prices in order to minimize the parallel trade (Espìn & Rovira, 2007, p. 173), and although the use of international pricing benchmarks<sup>3</sup> still prevails in most countries (especially in the smallest ones unable to set their own criteria) (Espìn & Rovira, 2007).

As a result, low-priced countries may act as parallel exporters to high-priced ones. In this framework, there is evidence that Italy, owing to its low price level, is a major exporter of pharmaceuticals in the parallel trade (ÖBIG, 2006, p. 382). This feature does not exert a direct effect on the theft of medicines itself (stolen medicines, by definition, are "acquired" at zero cost and hence may guarantee a profit when sold in any market, whatever the legal price). However, it may imply the existence of a parallel network of distribution to other countries that may also be exploited by thieves of medicines (see 1.3.6), especially given the high degree of liberalization of the wholesale trade of pharmaceuticals across EU countries (Fornaro, 2014).

In this framework, corrupted wholesalers or brokers may acquire stolen medicines and then re-sell them legally to other high-priced countries (e.g. Germany, Sweden) in order to make higher profits on the parallel trade and "launder" the illicit origin of the product.

The second differential to consider is that between prices of medicines on the legal market and on the illegal one. It is likely that the wider this differential, the higher will be the demand for medicines on the black market. Unfortunately, whilst studies on the theft of pharmaceuticals are sparse (see 1.2), those analyzing the functioning and pricing of illegal pharmaceutical markets are even fewer: for instance, what would be the cost of anti-cancer drugs on the black market in Romania?

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3. Sometimes referred to in the literature as "external price referencing", i.e. the practice of comparing pharmaceutical prices across countries using various methods and different country baskets (Espìn & Rovira, 2007).

### 1.3.3 Reimbursement of medicines

Prices and price differentials must be analyzed in conjunction with another factor: the reimbursement of drugs. In most countries, the cost of medicines is not directly borne by consumers but is covered, totally or partially, by a third party, either a private entity (e.g. a private insurance) or a public one (e.g. the NHS).

Reimbursement mechanisms affect both the legal and the illegal demand for medicines: in legal markets, the higher the coverage, the greater the incentive to consume medicines (Espin & Rovira, 2007, p. 30). By contrast, in illegal markets the lower the reimbursement, the greater the incentive to resort to the illegal trade in order to acquire pharmaceuticals at lower prices.

It may hence be hypothesized that the demand for stolen medicines is higher:

- for those products that are not reimbursed;
- from those countries with lower reimbursement regimes;
- from those countries characterized by private insurance based systems.

Although cost-sharing regimes apply in almost all EU MS (Espin & Rovira, 2007, p. 34; Mrazek, 2002),<sup>4</sup> reimbursement regimes vary widely among countries depending on the national health system, the type of medicine (e.g. cancer or diabetic drugs may be reimbursed at 100%), and the type of patient/consumer (e.g. low-income people may usually benefit from higher reimbursement percentages). In some cases, the reimbursement regime may even vary within the same country – as in Italy where the “ticket” system differs significantly from region to region.

In Italy there are three classes of medicines (AIFA, 2005; ÖBIG, 2006, p. 385; OsMed, 2012):

- *Class A*: 100% reimbursed by the national health system (SSN – *Servizio Sanitario Nazionale*).
- *Class H*: 100% reimbursed by the national health system and only provided by and/or administered in hospitals;
- *Class C*: 0% reimbursement, the cost is fully covered by patients.

Class A drugs are, for example, medicines used to treat multiple sclerosis (such as interferon beta-1A), or morphines or growth hormones which may be used in sport doping (e.g. somatropin) (AIFA, 2005). Class H medicines are, for example, certain cancer drugs such as Alimta® or biological ones such as Humira® used in arthritis diseases, some types of erythropoietin or nitroglycerine.

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4. On average, reimbursement accounts for 75% of the total pharmaceutical market (Mrazek, 2002).

In Italy, whenever 100%-reimbursed medicines (i.e. Class A or H drugs) are stolen, it may hence be hypothesized that they respond to:

- an international demand from countries where these pharmaceuticals are not reimbursed or not supplied adequately (see also 1.3.5);
- an internal/international demand for the purposes of illegal use (see 1.3.4).

This latter point is discussed below.

### 1.3.4 Illegal use of legal medicines

Medicines sold on the legal market and used for healthcare treatments may also be consumed for illegal purposes or in illicit activities.

The most common example is doping in sports: exogenous erythropoietin (EPO) may be used, for instance, as an agent to stimulate erythropoiesis and hence enhance sporting performance. Although still controversial, EPO usage has been endemic to some sports (e.g. cycling) for the past twenty years (e.g. Lodewijkx & Brouwer, 2011).

Besides doping, legal medicines or legal active ingredients may be used not only for clinical treatment but also as illegal drugs or in the synthesis of illegal drugs (e.g. morphine, benzodiazepines, codeine, fentanyl<sup>5</sup> or even cough syrups),<sup>6</sup> to produce counterfeit pharmaceuticals, or in other illicit activities (e.g. nitroglycerine as explosives).

“Illegal” use of medicines is also made by illegal clinics (i.e. structures that are not authorized or do not fulfill all legal requirements), which may resort to the illegal trade, including theft, to satisfy their demand for pharmaceuticals or to reduce operating costs. In Italy, although the media periodically report that law enforcement agencies have dismantled illegal structures of this kind – often related to illegal abortions<sup>7</sup> – the extent of the phenomenon is not yet well known. A related phenomenon is the medical treatment of fugitives or most-wanted criminals (e.g. mafia bosses at large, etc), who cannot access legal healthcare structures and hence must resort to compliant doctors and acquire medicines on the illegal market (see also 1.3.8 and 1.3.9).

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5. The use of fentanyl, a potent opioid analgesic for the treatment of serious diseases including cancer, to lace heroin has been increasingly reported by the media and law enforcement agencies, especially in the United States, and it is often related to overdose deaths. See for example Mohny (2014).

6. The Pharmaceutical Society of Ireland has advised members to be cautious about people who ask for significant quantities of cough syrups, warning that they could be abused and used to make meth-amphetamines, including crystal meth (Reilly, 2012).

7. See for example De Lucia (2013).

Finally, there is wide evidence that consumers of psychopharmacological drugs or of “lifestyle” drugs<sup>8</sup> (e.g. medications used to treat impotence, erectile dysfunction, baldness, overweight or wrinkles) may prefer to access, not the legal market, but the illegal one through web pharmacies or illegal distributors (e.g. sex aid shops in the case of erectile dysfunction drugs) for many reasons, including the need to conceal their consumption habits or avoid embarrassment (IMPACT, 2013).

All these illegal usages may fuel the demand on illegal markets, thereby boosting, among other things, the theft of medicines.

### 1.3.5 Difficulties in accessing pharmaceuticals through legal channels

The structure and the vulnerabilities of the supply-chain influence both the demand and the supply of stolen pharmaceuticals.

First, the demand for medicines on illegal markets may be stronger in countries where the legal supply is not sufficient, widespread, or is liable to interruptions due to exogenous factors (e.g. NHS defaults, bankruptcy of wholesalers, etc). Some categories of medicines may be more affected than others: in Italy, for instance, problems in the availability of so-called *contingentati* (i.e. rationed) pharmaceuticals have been highlighted by some reports (Fornaro, 2014).

In all these cases, the demand not fulfilled by the legal supply may be satisfied by stolen medicines. There is evidence that the recent financial crisis has obliged some countries to reduce their budgets for healthcare or the reimbursement of pharmaceutical consumption (The European House-Ambrosetti, 2012, pp. 110-112). In Greece, for instance, some important pharmaceutical companies have apparently decreased their shipments of medicines due to delays in payments by hospitals and the NHS (Sukkar & Smith, 2013; Tamburini, 2013), thereby boosting, according to some reports, the trafficking of stolen products to the country.

In other countries, such as some Eastern European ones, where the NHS is rapidly developing and still has to deal with some loopholes, legal providers linked to organized crime may import stolen pharmaceuticals that are then legally sold to the local public healthcare system or re-exported, legally through parallel trade channels, to high-price countries or even to the country where the medicines were first stolen (see also 1.3.2 and 1.3.6).

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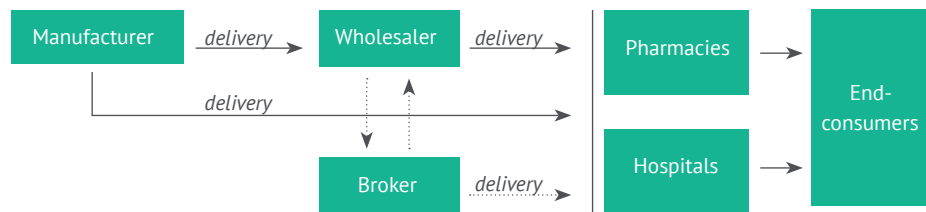
8. It is not easy to define these drugs clearly. See Møldrup (2004) for a review.

### 1.3.6 Vulnerabilities in the supply chain

The structure of the supply chain and its vulnerabilities are crucial for criminals when deciding how and where to steal medicines.

Although it has been estimated that, in Europe, 80% of medicines are distributed through wholesalers (Vander Beken, 2007, p. 38), the structure of the supply chain differs according to the country, the national health system, and/or the type of medicine. In general, once medicines have been manufactured, they may be supplied to wholesalers or directly to pharmacies and/or hospitals, where they then reach end-consumers. Brokers may sometimes play a role in the distribution at both national and international level. Because they are located in different countries or regions, all these stages involve some form of transportation (Figure 2).

Figure 2 The supply chain of pharmaceuticals



Once the demand for a certain type of drugs has been identified, therefore, criminals may decide to steal pharmaceuticals at different stages:

- at the manufacturing level;
- at the wholesale or broker level;
- in the delivery stage;
- in retail pharmacies;
- in hospitals.

To be noted is that not all these stages are necessary: for example, cancer drugs may be delivered directly from the manufacturer to the hospital without relying on wholesalers, and this obviously reduces the options available to criminals.

Whatever the structure of the distribution process may be, it is likely that criminals will target the weakest links of the supply chain.

In the Italian case, it can be hypothesized that hospitals and delivery are the stages most vulnerable to thefts and robberies of medicines, while manufacturers and retail pharmacies seem less exposed. By contrast, companies involved in wholesale/brokering may be involved directly, wittingly or otherwise, in the trading of stolen products. This hypothesis is based on the following considerations.

First, retail pharmacies may attract, even frequently, small-scale thefts of over-the-counter (OTC) drugs carried out by individuals or groups, not necessarily organized. But they will not easily attract large-scale robberies: in fact, they do not usually handle large quantities of pharmaceuticals and cannot manage high-priced medications such as Class H drugs (e.g. oncologic, immunosuppressant, etc), which are only administered within healthcare structures.

Second, manufacturing is a highly concentrated sector with a small number of enterprises and relatively high levels of corporate security. Excluding thefts by employees (see Mugellini and Caneppele (2012) for a review of crimes against businesses in Italy), wide-scale connections with organized crime groups must be ruled out.

Wholesalers and brokers may be involved in the sense that they can purchase back, wittingly or unwittingly, the stolen goods and re-sell them on the legal market, especially abroad so as to benefit from the price differentials in the parallel trade (see 1.3.2). For instance, according to police intelligence reports, in at least one case numerous medicines stolen in Italy have been found in the warehouse of a broker in the same country, apparently legally acquired from an East Europe wholesaler, and ready to be shipped to northern Europe.

Similarly, the delivery stage has high risks of theft for a variety of reasons. First, there is evidence that robberies against trucks in Italy have been increasing in recent years (+514% between 2010 and 2012)<sup>9</sup> throughout the country. Second, the transportation sector has been showing increasing signs of infiltration by organized crime groups, both mafia-type (Riccardi, 2014; Transcrime, 2013) and foreign (especially from Eastern-European OCGs), and this may lead to thefts and robberies with the complicity of the courier company itself. Finally, this sector is highly fragmented: there is a large number of *padroncini* (small single-owner transport firms) that often subcontract transportation services to even smaller businesses, with a consequent lower monitoring of pharmaceutical manufacturers and a concomitant increase in the risk of losses and thefts. To be noted is that pharmaceutical couriers in Italy often act as multi-brand agents, so that the same truck may transport different brands and different types of medicines.

Hospitals are very vulnerable. Healthcare services in Italy have historically registered infiltration by Italian mafia-type organized crime groups (Transcrime, 2013), and they represent the second business sector in terms of the rate between confiscated and registered companies (Riccardi, 2014, p. 204). The links are particularly strong in Southern Italy, where numerous public health agencies (ASL – Aziende Sanitarie Locali) have been dismantled because of mafia infiltration.<sup>10</sup> The strong connections with mafia groups may be correlated with higher levels of corruption and involvement of medical staff in criminal acts including thefts. Secondly, hospitals are generally weakly monitored structures characterized by a high turnover of medical staff (nurses, doctors, etc), which may again decrease control and increase the risk of thefts and losses.

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9. Figure calculated by Transcrime using Italian Ministry of the Interior data on reported crimes.

10. At least four local public health agencies have been dismantled since 1991 in Italy (Trocchia, 2011).



Large hospitals are those most vulnerable because of their higher personnel turnover and the greater availability of pharmaceuticals that thieves can access.

### 1.3.7 Traceability of pharmaceuticals

The good traceability of pharmaceuticals may affect the supply of stolen medicines because it makes it difficult for criminals to move and place stolen products at both national and international level without leaving trails for law enforcement agencies to follow.

At present, there are various medicine identification systems, including RFID (Radio Frequency Identification), datamatrix and/or bar codes. Although numerous countries and manufacturers have implemented traceability systems, this has often happened with incompatible proprietary coding and identification requirements (Grimald, 2012, p. 4). No mandatory international standards exist: in some countries regulations are very ambiguous and do not detail either coding or technology for code carrier (Grimald, 2012, p. 4). All these loopholes may complicate the activity of investigators while favouring criminals, especially those involved in the trafficking of stolen products across borders and jurisdictions.

In Italy, a database for the identification of medicines (*Banca dati della Tracciabilità del farmaco*) has existed since 2005 (Ministero della Salute, 2013). The system requires that each pack of medicines must be individually traceable back from the end-user to the producer, and that each actor involved in the supply chain (manufacturer, wholesaler, retail pharmacy, etc) must be attributed a unique identifier (D.m. 15 luglio 2004). The traceability system has been implemented with different timings according to the type of medicine (e.g. Class H pharmaceuticals, for hospital use only, since 2010) (Ministero della Salute, 2013). The traceability issue can be read from a different perspective. Assuming that some corrupted operators (e.g. employees, medical staff, wholesalers, etc) have always been interested in diverting medicines from the legal to the illegal trade, it may be hypothesized that the number of thefts reported to the police and the media has increased since the introduction of full traceability. Indeed, when no identification was in place (e.g. before 2010 for Class H pharmaceuticals), medicines could have been appropriated more easily or without it being necessary to commit thefts or robberies. Specifically, an increase in thefts of Class H medicines should have been recorded since 2010 (see also 2.2.1).

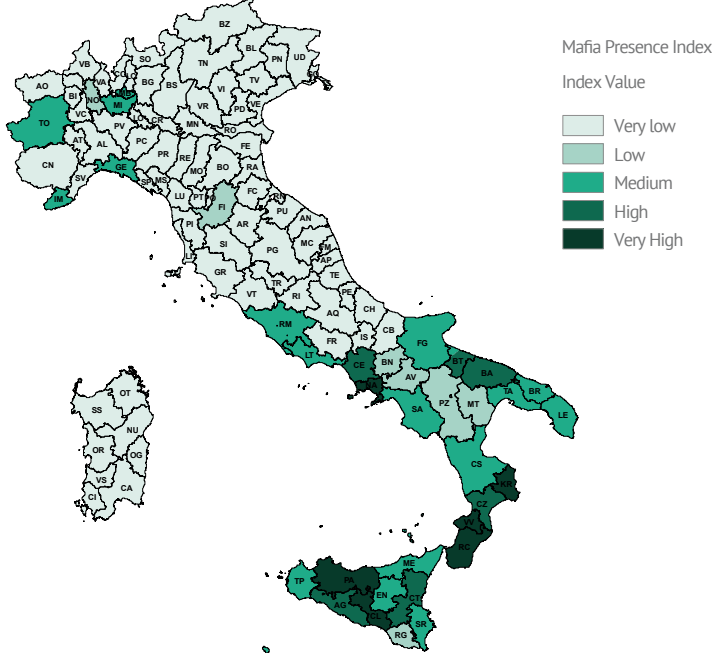
### 1.3.8 The activity of organized crime groups

Given all the factors and drivers discussed above, it is evident that in order to steal medicines it is necessary to possess a high level of organization (e.g. to steal pharmaceuticals in one country and place them in another), extensive knowledge (e.g. of patterns in the demand for medicines, of the healthcare system, of the supply chain, of the methods used to store and transport medicines), and advanced skills (e.g. the ability to enter highly-monitored buildings or to shield GPS signals sent by victimized trucks).

This means that thefts of pharmaceuticals are most likely carried out, not by individuals, but by criminal groups with a strong organization and a wide range of contacts across the whole supply chain – at both national and international level – both among “legal” actors (e.g. brokers, transportation companies, doctors) and within the illegal market. These groups may be characterized by a high level of specialization, and they may operate across the entire country, committing serial thefts and relying on a large availability of funds and cash that they can use to corrupt the medical staff of hospitals or to pay underground couriers – or, alternatively, they may rely on a high capacity to exercise intimidation, violence, and political influence.

These actors may overlap or be connected with well-established local gangs or organized crime groups (OCGs).<sup>11</sup> In Italy, mafia-type groups are widespread across the entire country, with a higher prevalence in Southern provinces (Figure 3), and according to geographical features: Camorra OCGs mainly operate in Campania and northern Apulia, Apulian OCGs (the most famous is Sacra Corona unita) in Apulia, ‘Ndrangheta in Calabria, Cosa Nostra in Sicily. The northern regions witness the simultaneous presence of all these criminals groups (see Transcrime (2013) for a detailed map of mafia OCGs in Italy). These mafia organizations can rely on a high capacity to exercise intimidation, violence, and corruption, and they have close connections with the political and administrative elite (Riccardi, 2014), including the managers of the healthcare sector. It can consequently be hypothesized that episodes of thefts and robberies of medicines are more frequent in southern provinces with a stronger presence of mafia OCGs.

Figure 3 Mafia Presence Index at provincial level



Source: Transcrime 2013

11. Although the successes and high profits of these activities may have attracted newcomer groups and criminals.

However, also foreign OCGs must be considered. In Italy, OCGs originating from the Western Balkans (Albania and former Yugoslavia) and Eastern Europe (Romania, Bulgaria, Georgia, Russia) are increasingly attracting the interest of law enforcement agencies, at both Italian (Ministero dell'Interno, 2012, p. 18) and European level (Europol, 2011). In Italy they are often linked with organized property crimes (Ministero dell'Interno, 2012, p. 18): in particular, metal thefts<sup>12</sup> and thefts/robberies against residential houses, trucks, and warehouses. They may rely on legal shell companies operating in the import-export business sector to transfer stolen goods to Eastern Europe: for example, in Apulia some Russian/Georgian clans (e.g. *Vor-Y-Zakone*) run export businesses also used to traffic stolen property (Bianconi & Santucci, 2013).

### **1.3.9 Involvement of the medical staff and of wholesalers**

Given the high level of organization required in order to steal and place stolen medicines, it cannot be excluded that those involved in the legal supply (e.g. employees of manufacturers, wholesalers, pharmacies or medical personnel) play a role in facilitating thefts of medicines. In regard to hospitals, doctors, nurses, members of the medical personnel or private guards may, for example, provide criminals with plans of the buildings, timetables, indications about when and how the structures are more vulnerable; or they may give information on how to store stolen pharmaceuticals or to whom to sell them.

Members of the medical staff may act as intermediaries (e.g. because they have been bribed or intimidated), or they may be directly involved in the illegal trafficking of stolen pharmaceuticals. For instance, they may share the profits of the illicit trade, or themselves use the stolen medicines in parallel illegal activities (e.g. doping, medical treatment of fugitives or mafia bosses, etc). They may benefit from frauds against the NHS or, less likely, they may intentionally provoke shortages in hospital stocks in order to favour friendly suppliers.

As said above (see 1.3.2 and 1.3.6), wholesalers and brokers may also be involved in the trade of stolen medicines: for example, through acquiring, wittingly or unwittingly, the stolen products and then reselling them on the legal market, within the country or in foreign countries in order to profit from price differentials in the parallel trade.

### **1.3.10 The level of law enforcement**

Effective law enforcement may impact on both the demand for and the supply of stolen medicines, in that it may dismantle illegal markets or reduce the opportunities available to criminals and thieves of pharmaceuticals. Many countries have special agencies and authorities that deal specifically with pharmaceutical crime, either the counterfeiting of medicines or their theft.

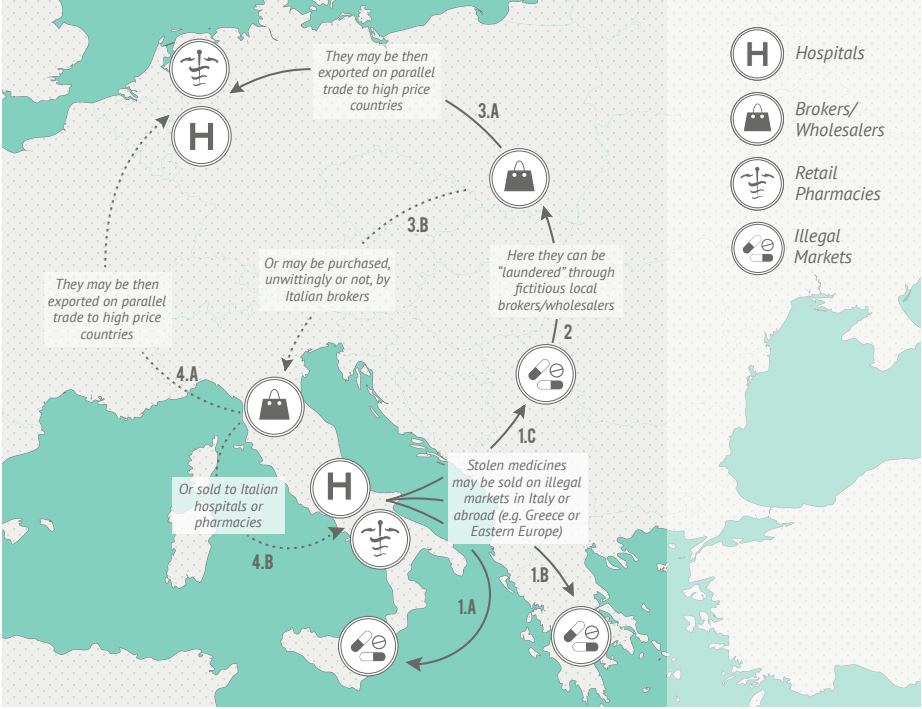
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12. About 41% of the persons arrested by the Italian police for metal theft in 2012 were Romanian, while 7.1% were from the former Yugoslavia or Bulgaria (Ministero dell'Interno, 2012).

In Italy, the AIFA, besides being the national authority responsible for regulation of the supply of medicines, also coordinates several projects and protocols aimed at combatting pharmaceutical crime. It links the government, law enforcement agencies (especially the Comando Carabinieri per la Tutela della Salute),<sup>13</sup> pharmaceutical companies, retail pharmacies, and industry representatives in combating these criminal phenomena.

Although there is close cooperation among all the institutional actors involved (government, police, industry), loopholes may arise – in both regulation and law enforcement – that may produce opportunities for those involved in the commission of medicine thefts.

Drivers influencing the <i>demand</i> of stolen medicines	Drivers influencing the <i>supply</i> <sup>14</sup> of stolen medicines
<ul style="list-style-type: none"> <li>• Price differentials</li> <li>• Reimbursement of medicines</li> <li>• Illegal use of legal medicines</li> <li>• Difficulties in accessing pharmaceuticals through legal channels</li> </ul>	<ul style="list-style-type: none"> <li>• Price of pharmaceuticals</li> <li>• Price differentials</li> <li>• Vulnerabilities in the supply chain</li> <li>• Traceability of pharmaceuticals</li> <li>• Activity of organized crime groups</li> </ul>



13. The Comando Carabinieri per la Tutela della Salute coordinates the N.A.S.- Nucleo Anti Sostificazioni department.

14. i.e. the theft and sale of stolen medicines.

## 1.4

### THEFT OF MEDICINES: THE HYPOTHESES

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All the issues discussed above lead to the various hypotheses about the theft of medicines that are discussed here. The next chapter will test some of them by focusing on thefts in Italian hospitals. Not all of these hypotheses can be verified due to a lack of information. However, some hints and suggestions are provided.

As regards the types of medicines stolen, it may be hypothesized that the most attractive ones are those with the highest prices (e.g. Class H drugs such as cancer drugs), those used in illicit activities such as sport doping (e.g. erythropoietin), or the “lifestyle” drugs (e.g. for erectile dysfunction, baldness, obesity, etc) widely sold on illegal markets or on the Web. In terms of demand, it can be hypothesized that medicines stolen in Italy address both a national and international demand: the former implies the illegal use of medicines for sport doping, illegal medical treatment (e.g. illegal clinics or healthcare of criminals at large) or frauds against the NHS. But the demand may also derive from patients in foreign countries with low reimbursement regimes, scant social protection, or an insufficiency of legal supplies due, for instance, to NHS budget constraints (e.g. Greece). Moreover, in some foreign countries (e.g. Eastern Europe) wholesalers colluding with criminals may act as brokers to “launder” the stolen products and re-export them to high-price countries (e.g. Northern Europe) through parallel trade channels.

In regard to the structures victimized, hospitals and trucks are the most vulnerable targets. In particular, hospitals are exposed to the theft of Class H medicines (e.g. cancer drugs, interferon, immunosuppressant, etc). Truck couriers, which often act as multi-brand distributors, are also exposed to the theft of “lifestyle” pharmaceuticals (e.g. Viagra, Cialis, etc). It may be hypothesized that large public hospitals are more vulnerable than small private ones (see 1.3.6).

As regards the geography of thefts, it can be assumed that southern Italian regions, characterized by a higher intensity of mafia organized crime groups (see 1.3.8), are more vulnerable than northern ones. Moreover, considering the role that can be played by foreign OCGs, in particular Eastern European ones, and the proximity of certain destination markets (e.g. Greece or Western Balkans), those regions with seaports on the Adriatic Sea or land borders with Eastern Europe (e.g. Friuli Venezia Giulia) may be more affected than others.

Given the high degree of organization needed to commit thefts (see 1.3.8), the involvement of organized crime groups may be hypothesized: in particular of Italian mafia-type OCGs (Camorra and Apulian OCGs) and Eastern European OCGs (Albanian, Romanian, Bulgarian, Russian and Georgian). The latter are already often linked to organized property crimes (see 1.3.8).

Moreover, criminal groups may rely on a facilitating role played by some members of the medical staff or wholesalers, who may be either corrupted, intimidated or fully involved in the illicit trafficking of stolen medicines, and thus share the profits of the criminal activity.

**Table 1 Theft of pharmaceuticals in Italy – Some hypotheses**

<p><b>Stolen Products</b></p>	<ul style="list-style-type: none"> <li>• High-priced drugs (e.g. oncologic, biological, etc);</li> <li>• Drugs that are used for illicit purposes (e.g. EPO);</li> <li>• “Lifestyle” drugs (e.g. Viagra, Cialis, dietetic, etc);</li> </ul>
<p><b>Demand</b></p>	<ul style="list-style-type: none"> <li>• International demand: From subjects/patients living in:             <ul style="list-style-type: none"> <li>- Countries with low reimbursement regimes;</li> <li>- Countries with private insurance based health systems;</li> <li>- Countries with not adequate or widespread legal supply (e.g. due to NHS budget problems);</li> <li>- Countries acting as brokers towards on the parallel trade towards high-price markets;</li> </ul> </li> <li>• National/international demand:             <ul style="list-style-type: none"> <li>- Use of medicines for illegal purposes (e.g. doping);</li> <li>- Illegal medical structures (e.g. illegal clinics, medical treatment of fugitives);</li> <li>- Frauds to NHS;</li> </ul> </li> </ul>
<p><b>Targets</b></p>	<ul style="list-style-type: none"> <li>• Hospitals</li> <li>• Truck couriers</li> <li>• Wholesalers</li> </ul>
<p><b>Geography of thefts</b></p>	<ul style="list-style-type: none"> <li>• Southern Italy (links with OCGs)</li> <li>• Border regions (e.g. North-eastern Italy)</li> <li>• Areas close to ports (e.g. Eastern regions on Adriatic sea)</li> </ul>
<p><b>Authors</b></p>	<ul style="list-style-type: none"> <li>• Involvement of organized crime groups (OCGs)             <ul style="list-style-type: none"> <li>- Mafia-type OCGs (e.g. Camorra, Apulian, etc)</li> <li>- Foreign OCGs (e.g. Eastern European OCGs)</li> </ul> </li> <li>• Possible involvement of:             <ul style="list-style-type: none"> <li>- corrupted medical staff;</li> <li>- wholeaslars/brokers in connection with OCGs;</li> </ul> </li> </ul>



02

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**THE ANALYSIS: THE THEFTS  
FROM ITALIAN HOSPITALS**

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After presenting the theoretical background behind pharmaceutical theft and the drivers that influence the demand for and supply of stolen medicines, this section focuses on thefts of medicines from hospitals. In particular, it presents an analysis of thefts in Italian hospitals from 2006 to 2013.

It has been decided to focus on hospitals for two main reasons. First, hospitals play a crucial role in the protection of public health, they represent a significant share of the national healthcare budget and are key drivers of the Italian economy. They therefore warrant closer attention than other victimized structures. Second, as will be better detailed in 2.1.2, information about thefts in hospitals is much more widely available than is information about thefts in other structures (e.g. trucks, wholesalers, etc) in particular considering the methodology adopted to collect data (2.1.1).

The analysis presented here tested some of the hypotheses set out in the previous chapter and provided figures, maps and charts about how frequently and where thefts occur, how they are carried out, what medicines are stolen, what the most victimized hospitals are and what the correlation is with the presence of organized crime groups and other contextual factors.

## 2.1

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### METHODOLOGY

#### 2.1.1 Data and sources

Information about thefts of medicines from Italian hospitals was gathered from open sources, specifically on-line newspaper articles and other media (television, radio) reports. To identify the cases, keyword searches were conducted on the Web and on specific search engines (e.g. Lexis Nexis).<sup>15</sup>

It was decided to rely on open sources because of the lack of scientific studies and official data, at least publicly available, regarding thefts in hospitals. In fact, although some Italian agencies and LEAs (e.g. AIFA, Comando Carabinieri per la Tutela della Salute, etc) have been compiling lists of pharmaceutical crime incidents, a comprehensive dataset of thefts in hospitals does not exist. On the other hand, administrative statistics (such as the number of thefts reported to the police) made publicly available by the Italian Ministry of the Interior, the Ministry of Justice, and the national statistical office (ISTAT) do not provide sufficiently detailed information about what is stolen and where thefts occur.

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15. A wide range of keywords, in Italian, were adopted, controlling for synonyms and word combinations.

Obviously, the use of media sources is subject to the biases and limitations that are discussed in detail below (see 2.1.2). However, it was preferred to rely on a single type of source in order to maximize the coherence of the analysis and the harmonization of the findings.

The collection of media reports led to the identification of 68 cases of thefts that occurred between January 2006 and December 2013. For each case, the following information was collected (N = number of cases for which the information was available):

- name of the hospital involved (N=68)
- municipality, province, and region of the hospital involved (N=68)
- date of the theft (N=67)
- date of the newspaper article or media report (N=68)
- hour of the theft (N=50)
- names of the medicines stolen (N=9)
- Number of medicines stolen (N=9)
- economic value of the theft (N=57)
- information about the method used to commit the theft (N=48)

In this regard, regional and local newspapers (i.e. media and newspapers covering only a limited geographic area) proved crucial in that they provided much more detailed data than major national newspapers and media, which, instead, included only little information about the incidents.

### 2.1.2 Bias and limitations in the data collection

The collection of cases through open sources has limitations and introduces biases that should be discussed.

First, the actual number of thefts may be higher than those reported by the media, so that the phenomenon may be underestimated. For example, the media may focus only on those incidents above a certain economic value (e.g. “a 5,000 thousand EUR theft is not interesting to the audience”) or involving only certain hospitals, or related only to certain types of medicines (e.g. “thefts of cancer drugs are interesting while those of ophthalmic or EPO drugs are not”).

Second, this latter issue may lead to an overestimation of the prevalence, among thefts, of certain types of medicines (e.g. cancer drugs) with respect to others (e.g. erythropoietin, ophthalmic, lifestyle medicines, etc), and to an underestimation of small-scale incidents. Moreover, given that media interest in this phenomenon has increased only in recent months, an over-representation of the thefts that occurred in 2013 with respect to those that occurred in previous years may be registered.

Finally it should be borne in mind that, generally speaking, thefts in hospitals, like any other crime against businesses, may register a high 'dark number' (i.e. a high number of incidents that are not reported to the police or in any case are not made public). Managers, in fact, may prefer not to involve police officers but to address crimes internally (e.g. through audit or corporate security) in order to avoid damage in terms of reputation or budget (Dugato, Favarin, Gergely & Agnes, 2013; Mugellini & Caneppele, 2012).

However, considering the very "public" nature of hospitals, it may be hypothesized that the dark number is lower for hospitals than for private companies (e.g. manufacturers, wholesalers, couriers) because it is more likely that thefts in hospitals are reported to the police and hence to the media.

### 2.1.3 Methodology of analysis

After collecting all the available information on the 68 cases, the data were processed with two types of analysis: a descriptive analysis and an inferential one.

The descriptive statistics focused on trends and the seasonality of thefts, distribution by region and province, types of hospitals, and types of medicines. Finally, an analysis of the *modi operandi* of thefts was carried out.

The aim of the inferential analysis was to estimate the correlation between thefts of medicines in hospitals and other contextual factors, such as the presence of organized crime groups, the intensity of property crimes, and other geographical characteristics. Various classifications and indicators were adopted in performing the analysis. In particular, hospitals were classified according to the standard classification of the Italian Ministry of Health (see 2.2.3 for details), while medicines were classified according to a compromise between the standard ATC classification and the categories mentioned by media reports (see 2.2.4 for details).

A range of proxy variables were adopted in the analysis of contextual factors (see 2.2.6 for details). In particular, the presence of mafia groups was measured through the MPI – Mafia Presence Index developed by Transcrime (Calderoni, 2011; Transcrime, 2013), while account was also taken of the number of cases of criminal association (art. 416 Italian penal code) reported by the police. By contrast, in order to measure the extent of property crimes in a province, the number and rate of thefts, thefts from trucks, robberies and robberies from trucks were considered. Finally, also dummies were used in the analysis of the geography of thefts (see 2.2.6 for details).

## 2.2

### ANALYSIS

#### 2.2.1 Trends and seasonality

The graph reported in Figure 4 shows the booming growth of thefts of medicines from hospitals in Italy over recent years. This type of crime was almost non-existent before 2011, with only 2 cases recorded, but then dramatically increased in the last three years considered, finally reaching the total number of 68 cases of thefts from hospitals reported by the media between 2006 and 2013.

Figure 4 Cumulate number of thefts of medicines from Italian hospitals. Years 2006-2013.

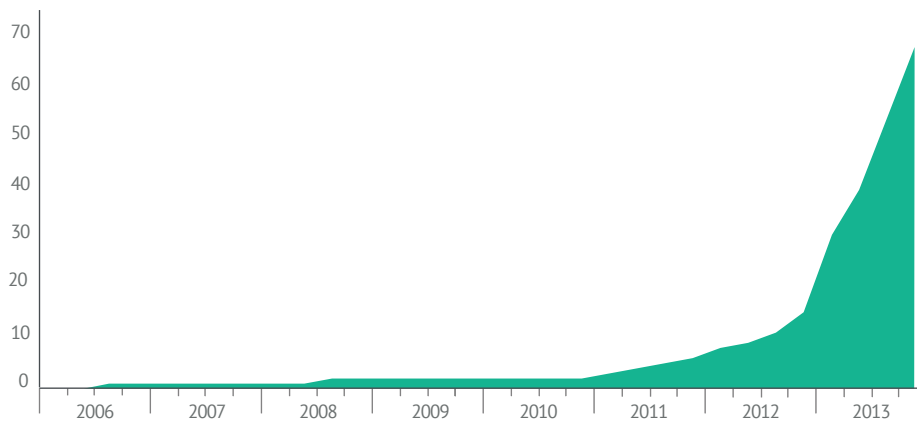
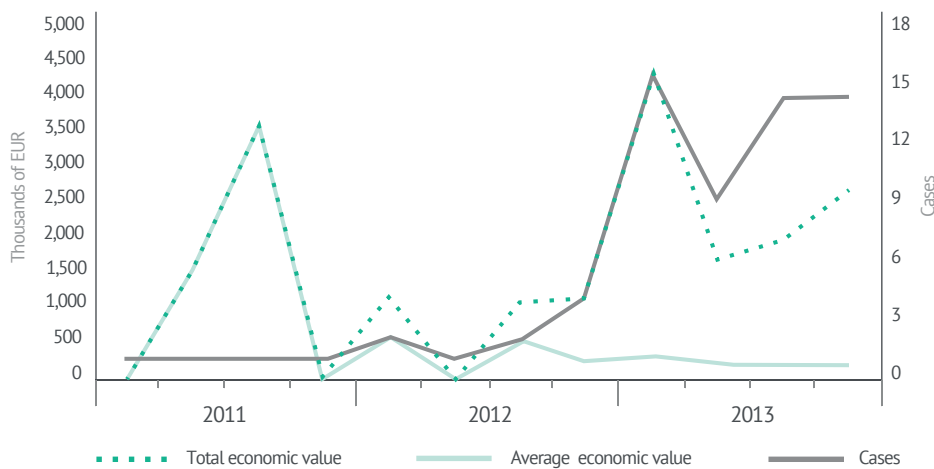


Figure 5, which focuses on the period 2011-2013, shows how the number of thefts (grey line) increased after the second half of 2012, reaching a total number of 51 events reported by the Italian media in 2013 alone (75% of the total number of thefts).

Figure 5 Number of thefts from Italian hospitals and economic value stolen (average and total). Years 2011-2013.



The total number of reported thefts increased by 1175% after 2011 (Table 2). As discussed in detail in 2.1.2, this value may probably be underestimated owing to the bias in the methodology adopted for the data collection. However, it gives a clear indication of how this criminal phenomenon is important and topical.

The high number of cases is also reflected by the total value of the medicines stolen (Table 1), which almost doubled from 2011 to 2013, reaching a total amount of 18,719,000 EUR (10,452,000 EUR in 2013 alone). Interestingly, this escalation was associated with a significant decrease in the average value stolen.

**Table 2 Total and average economic value stolen by year. Years 2011-2013.**

Year	Total Value (EUR)	Average Value <sup>16</sup> (EUR)	# Thefts
2011	5,000,000	2,500,000	4
2012	3,252,000	406,500	10
2013	10,452,000	227,217	51
Total 2006-2013	18,719,000	328,404	68
Variation 2011-2013	+ 109%	- 91%	+ 1,175%
Variation 2012-2013	+ 221%	- 44%	+ 410%

There are various reasons for the dramatic increase in thefts from hospitals in the last two years considered. As hypothesized in Section 1, they may be related to both demand drivers (e.g. an increase in the illegal use of medicines – see 1.3.4 – and the stronger demand from foreign countries such as Greece or Eastern European ones – see 1.3.5) and to supply drivers (e.g. a surge in organized property crimes committed by some OCGs active in Italy such as Eastern European groups – see 1.3.8 – or a shift of OCGs’ activities from risky activities such as drug trafficking to more profitable and less risky ones, such as pharmaceutical theft).

However, as hypothesized in 1.3.7, some of the experts suggest that this rise may have been “artificially” inflated by the introduction, in 2010, of the new traceability system (better known as the *bollini* system, see 1.3.7) for Class H medicines. This improvement in tracking and tracing may have made it more difficult to conceal fraudulent inventory shortages, forcing corrupt employees to report or claim fictitious thefts in order to account for these shortages. The finding of the stolen medicines abandoned not far from the victimized hospitals in a couple of cases (see for example Coluzzi (2013)) can be seen as confirmation of this hypothesis.<sup>17</sup>

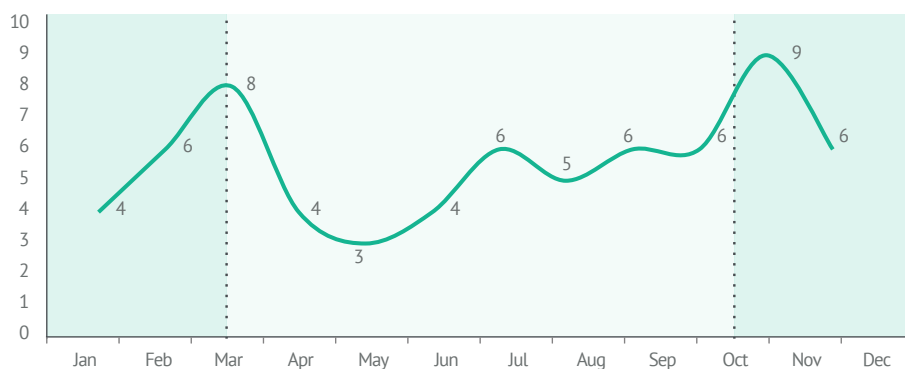
16. The average value was calculated considering only those cases in which information about the total amount stolen was available.

17. However, some other experts discard this possibility by emphasizing the wide time lag from the introduction of the system for Class H drugs (2010) to the rise of the number of thefts (2012). Moreover, they suggested that frauds through fake inventory shortages are not so widespread and profitable as to explain this growth, and hence that the increase in the reported thefts may have been due to a kind of crime displacement to this emerging and profitable illicit business.

Finally, as mentioned in 2.1.2, considering the specific data collection method adopted, the increase in cases reported by the media in 2012-2013 may also have been due to greater public concern with this phenomenon, which produced a higher amount of newspaper articles and media reports.

Figure 6 and Table 3 analyze the seasonality of the thefts. To be noted is that the cases recorded were slightly more concentrated in autumn and winter (58% occurred between October and March), and therefore in the “coldest” months of the year. In particular, November and March are the months with the highest number of events. This pattern may be connected in part with the weather, which facilitates the transport and storage of stolen medicines in refrigerated conditions, avoiding the risk of damage due to high temperatures. However, the differences are very small and do not allow identification of clear seasonal patterns.

**Figure 6 Total number of thefts from Italian hospitals by month. Years 2006-2013.**



**Table 3 Total and average value stolen by month. Years 2006-2013.**

Month	Average Value (EUR)	Total Value (EUR)	# Thefts
January	442,000	1,326,000	4
February	384,000	1,920,000	6
March	275,500	2,204,000	8
April	866,666	2,600,000	4
May	133,333	400,000	3
June	48,666	146,000	4
July	672,000	4,032,000	6
August	237,500	950,000	5
September	370,000	1,480,000	6
October	400,000	800,000	6
November	146,000	1,314,000	9
December	255,333	1,532,000	6

<b>COLD MONTHS</b>	227,400	9,096,000	39
<b>HOT MONTHS</b>	369,538	9,608,000	28
<b>HOT MONTHS*</b>	244,320	6,108,000	27

\*Excluding the theft from Federico II Naples of July 2011

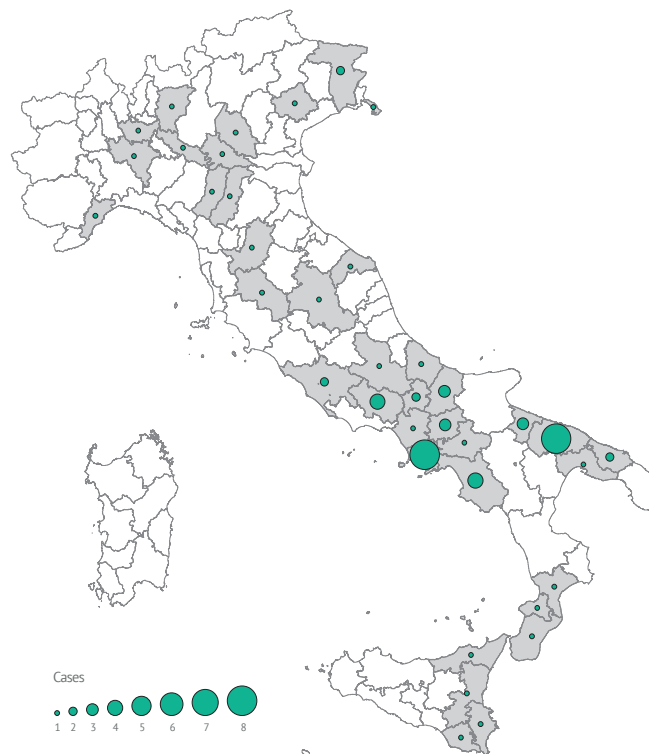
Surprisingly, both the total and average amount stolen are slightly higher in the hottest months. But excluding the theft against the Polyclinic Federico II of Naples occurred in July 2011 (3,500,000 EUR stolen value), the total value stolen during the “cold” semester exceeds by 30% the hottest ones.

### 2.2.2 Thefts by region and province

Thefts of medicines from hospitals are highly concentrated geographically. Some Italian regions seem to be particularly exposed to this type of crime, while others are totally or almost unaffected. There are many possible reasons for these differences, and they have been suggested in Section 1.4. The next sections will discuss the findings when the hypotheses set out above were tested.

Figure 7 shows the geographical distribution of thefts throughout the country. In particular, 38 out of 110 Italian provinces<sup>18</sup> (35%) experienced at least one theft of medicines from hospitals in the period considered. The ones most affected were Bari and Naples with 8 cases each. These two provinces represented almost 24% of the total number of thefts from hospitals. Among Italian regions (see Table 3), Campania and Apulia recorded the highest number of cases, respectively 17 (25% of the total) and 14 (20.6%).

Figure 7 Total number of thefts from hospitals by province. Years 2006-2013.



18. Provinces in Italy are the territorial units corresponding to the NUTS 3 level of disaggregation, while regions are NUTS 2-level territorial units. In particular, Italy has 110 provinces and 20 regions.

Figure 8 shows the evolution of the spatial distribution of thefts by province between 2012 and 2013. It can be seen that no spatial patterns nor particular concentrations of the crimes can be identified in 2012. The cases are few in number and irregularly distributed, although Apulia and Campania begin to appear as the most interested areas. Only 3 out of 10 thefts in 2012 occurred outside these regions.

After early 2013, the phenomenon started to spread, and some sizeable clusters emerged. In particular, thefts tended to be concentrated more in time and space, highlighting the presence of geographical patterns: for example the “hot spot” in the area around Bari in the first quarter of 2013; the cluster of cases in Calabria and East-Sicily in the third quarter; and the rising number of thefts affecting the north of the country (especially Lombardy and Friuli-Venezia Giulia) in the last three months of the year. These patterns suggest that, apart from Apulia and Campania which appear to be constantly affected over time, other regions of Italy may be targeted, as hypothesized in 1.3.8, by the activity of specialized criminal groups that move around the country plundering different areas for a short period of time (see also 2.2.6).

Figure 8a Thefts from hospitals by provinces. Quarterly evolution, 2012-2013.

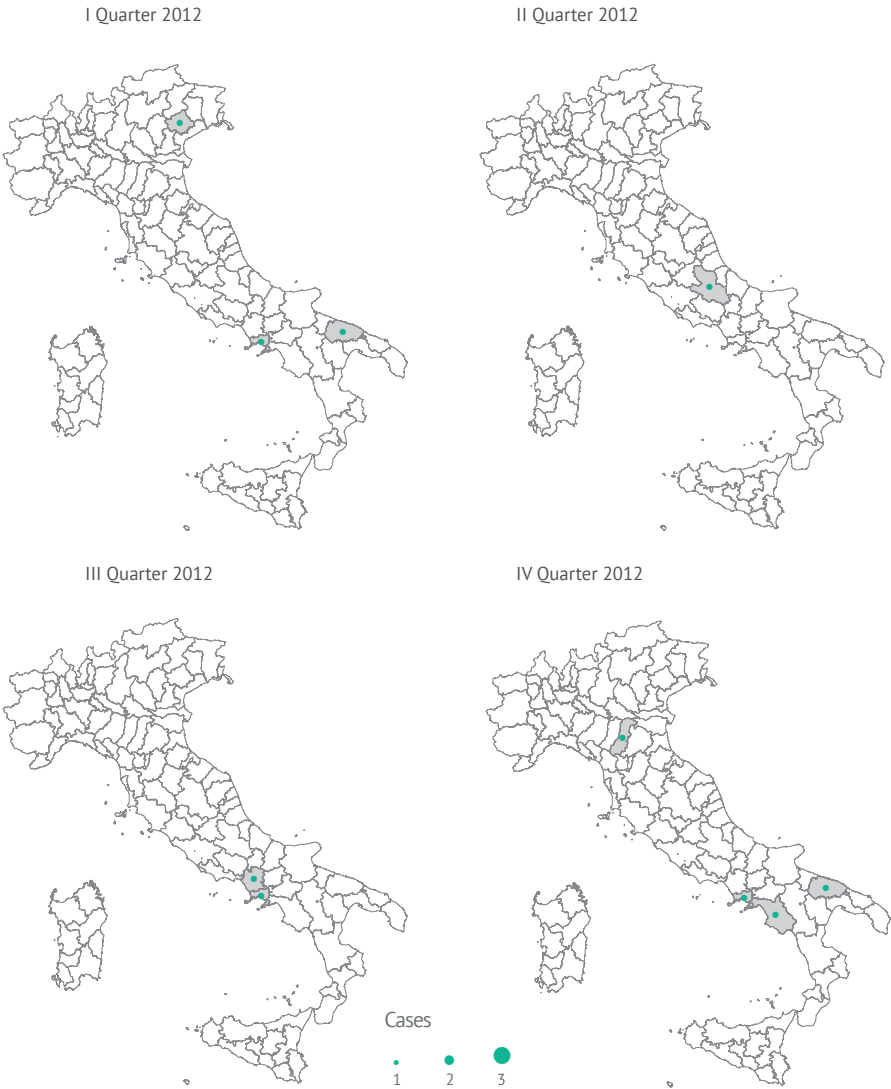
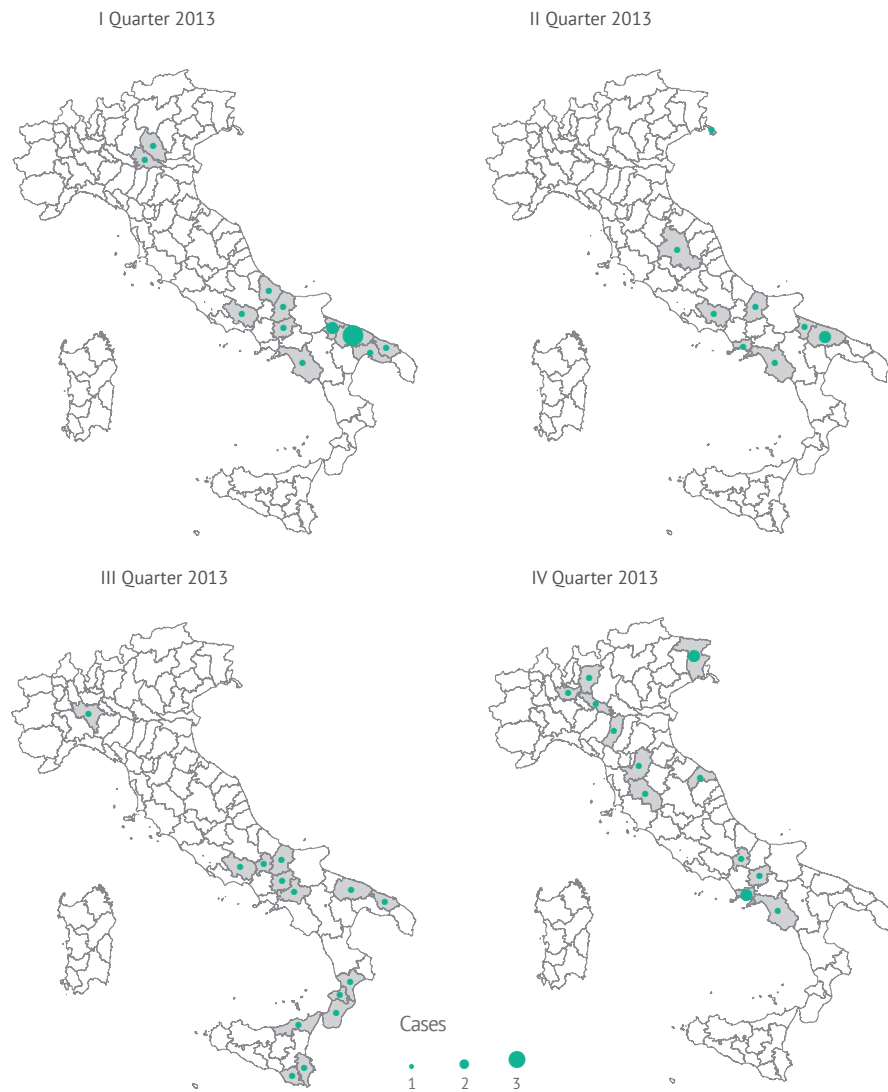




Figure 8b Thefts from hospitals by provinces. Quarterly evolution, 2012-2013.



In order to better understand the relevance of this crime across Italian regions and provinces, Table 4 and Figure 9 show the rates calculated dividing the number of thefts by the number of hospitals and of hospital beds.<sup>19</sup> On average in Italy 1 hospital out of 10 has suffered a theft of medicines in the period 2006-2013. Molise (more than 7 cases every 10 hospitals), Apulia (almost 4 victimized out of 10), Campania (3.1) and Friuli-Venezia Giulia (2 out of 10) emerge as the most affected regions, having values higher than the national average considering both the rates.

19. The number of hospital beds was considered to be a proxy for a hospital's size.

**Table 4 Total number of thefts and rates by region. Years 2006-2013.**

Year	# Thefts	Rate by 10 Hospitals*	Rate by 10,000 Hospital Beds*
Abruzzi	2	0.95	4.88
Apulia	14	3.78	10.72
Basilicata	0	0.00	0.00
Calabria	3	0.83	6.05
Campania	17	3.09	12.74
Emilia-Romagna	2	0.74	1.27
Friuli-Venezia Giulia	3	2.00	6.82
Lazio	6	0.87	3.23
Liguria	1	0.83	1.52
Lombardy	5	0.83	1.49
Marche	1	0.31	1.89
Molise	5	7.14	34.06
Piedmont	0	0.00	0.00
Sardinia	0	0.00	0.00
Sicily	4	0.60	2.97
Trentino - Alto Adige	0	0.00	0.00
Tuscany	2	0.48	1.64
Umbria	1	0.91	3.49
Valle d'Aosta	0	0.00	0.00
Veneto	2	0.53	1.12
<b>ITALY</b>	<b>68</b>	<b>1.09</b>	<b>3.51</b>

\*The values above the national average are highlighted

In regard to Italian provinces (Figure 9), Trieste, Campobasso, Bari, Isernia and Benevento record the highest rates between thefts and hospitals, whereas Frosinone, Vibo Valentia and again Campobasso, Isernia and Benevento are the ones most affected on considering the total number of hospital beds.

The spatial distribution of thefts confirms the hypotheses formulated in 1.3 and 1.4: a larger prevalence in southern (especially Campania and Apulia) and eastern Italian regions. As will be shown better in 2.2.6, these patterns are related to the presence and activity of criminal groups (Italian mafias and foreign OCGs) but also to geographical factors such as the availability of seaports on the Adriatic Sea (e.g. Apulia, Marche, etc) or of borders with Eastern Europe (e.g. Friuli Venezia Giulia). See 2.2.6 for more details.

Figure 9 Rate by hospital and by 1,000 hospital beds. Provinces. Years 2006-2013.

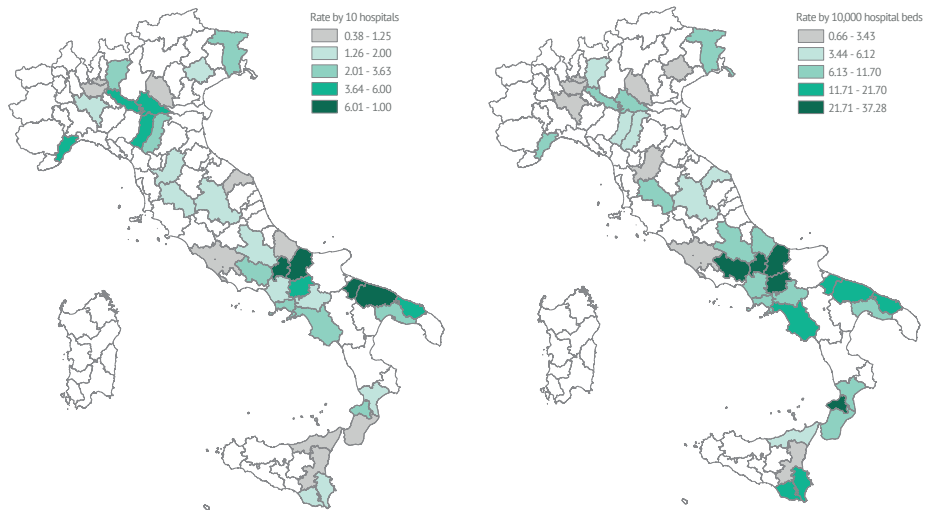
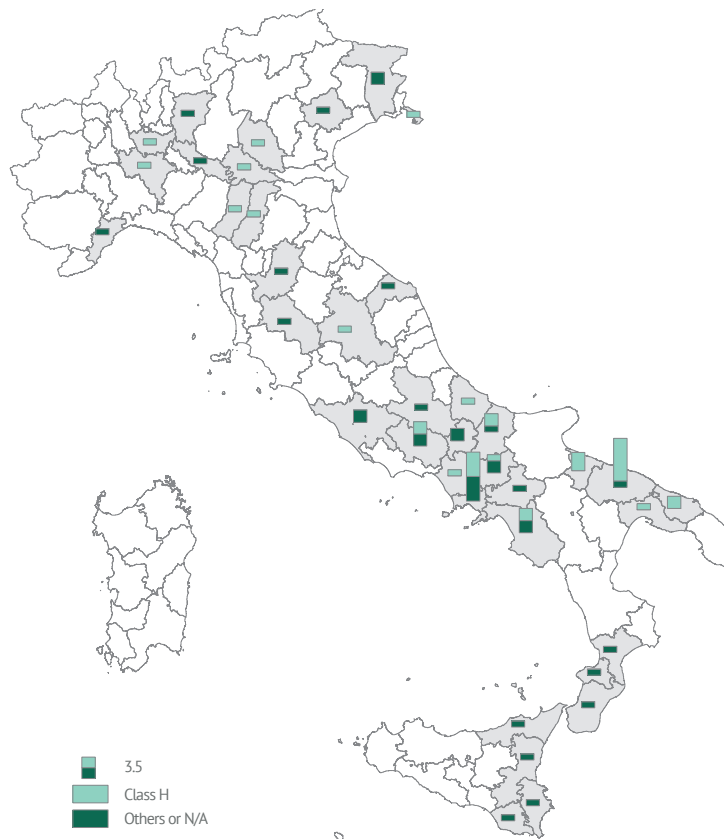


Figure 10 Thefts by class of medicines stolen. Provinces. Years 2006-2013.

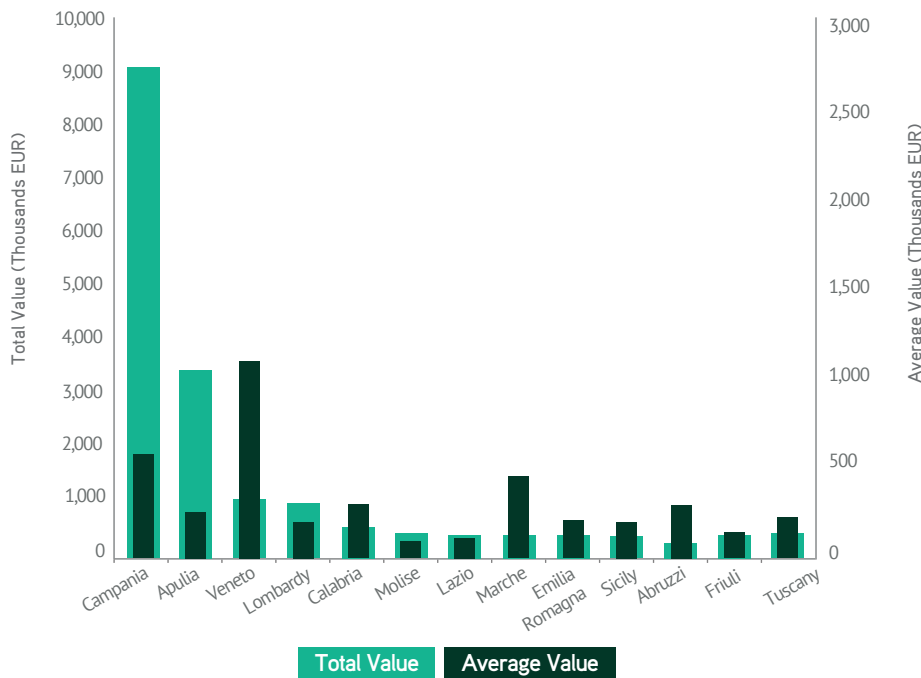


Inspection of the geographical distribution of thefts by class of medicine stolen, and in particular if the theft involved Class H drugs (Figure 10), clearly shows that the theft of medicines of this type is even more concentrated in a few regions. Campania and Apulia recorded 21 cases, about 61.7% of all thefts of Class H medicines. This may confirm the high level of organization needed to steal medicines, and in particular Class H drugs (see 1.3.8), and it suggests, as hypothesized in 1.4, the crucial role of specialized criminal groups that move around the country, possess sufficient skills and contacts with illegal networks, and are able to receive and sell the stolen medicines, especially abroad (see

1.4). Campania and Apulia are the regions that recorded the highest values in terms of economic loss, respectively about 9.1 million EUR in Campania (48.5% of the total value stolen) and almost 3.5 million EUR in Apulia (18.7%) (Figure 11).

These figures clearly show the huge impact of thefts of medicines on the health system's budget, especially if one considers that most of the stolen medicines are Class H drugs (see 2.2.4), which are entirely covered by the Italian NHS.

**Figure 11 Total and average value stolen by region. Years 2006-2013.**



On average, each theft between 2006 and 2013 produced an economic loss amounting to 328,404 EUR. This figure alone explains the huge profitability of this new illicit activity, although stolen medicines may be sold at lower prices on the illegal market or in the parallel trade (see 1.3.1 and 1.3.2). With one single theft, criminals can acquire assets which may be equivalent in value to four high-class SUV cars, or to 6.3 kilos of heroin, a quantity that (at the retail price in Italy) may satisfy more than 200 heroin consumers for one year. Thefts of medicines may hence open new prospects for criminal groups, which can shift from more risky and less profitable activities to this less risky and more lucrative market (see 1.4), using it as a “bank” from which to withdraw proceeds then invested in other illegal markets (e.g. to acquire illegal drugs) or in the legal economy.

Only three regions exceed the Italian average: Campania, Marche and Veneto. Although these two latter regions record 1 theft each,<sup>20</sup> particularly impressive is Veneto, whose mean value is more than three times the national average. Instead, the average loss caused by the 17 thefts in Campania amounted to 567,187 EUR.

20. The number of hospital beds was considered to be a proxy for a hospital's size.

### 2.2.3 Thefts by type of hospital

As anticipated in 1.3.6, it is interesting to analyze whether certain types of hospitals are more exposed than others to medicines thefts. Unfortunately, on the basis of the information available from media reports, it was not possible to carry out a detailed exploration, although some analyses are reported here below.

First, the types of hospital<sup>21</sup> that suffered most thefts of medicines (73.1%) were “Ospedali a gestione diretta presidio A.S.L.” (Hospitals managed by the local public health authority) (see Table 5). This is not surprising, since this type is also the most common in Italy (72.2% of all the hospitals listed in the database of the Italian Ministry of Health). By contrast, it is interesting to note that the hospitals classified as “Aziende Ospedaliere”<sup>22</sup> (hospitals managed by independent healthcare companies, either public or private), although they constitute only 9.8% of the total of Italian hospitals, represent 23.1% of the victimized structures. This difference is statistically significant ( $p \leq 0.01$ ) notwithstanding the small sample considered.

**Table 5 Number of victimized hospitals by type. Year 2006-2013.**

Type <sup>23</sup>	#	% of victimised H	% of total Italian H	Total Value (EUR)	Average Value (EUR)
Aziende ospedaliere ,	12	23.1%***	9.8%	12,223,000.00	1,018,583.33
<i>Azienda ospedaliera integrata con il S.S.N.</i>	2	3.8%	1.3%	6,193,000.00	3,096,500.00
<i>Azienda ospedaliera integrata con Università</i>	5	9.6%**	2.9%	3,130,000.00	626,000.00
<i>Azienda ospedaliera con il S.S.N.</i>	5	9.6%	5.6%	2,900,000.00	580,000.00
Istituto di ricovero e cura a carattere scientifico pubblico	1	1.9%	2.9%	600,000.00	600,000.00
Ospedale a gestione diretta presidio A.S.L.	38	73.1%	72.2%	5,098,000.00	134,157.89
Ospedale classificato o assimilato (ART 1 L.132/1968)	1	1.9%	4.6%	173,000.00	173,000.00

Differences between proportions are statistically significant at \* $p < 0.1$  ; \*\* $p < 0.05$  ; \*\*\* $p < 0.01$

21. The following analyses were conducted only on the 52 victimised hospitals that it was possible to identify in the database of the Italian Ministry of Health according to the information reported by the newspaper articles.

22. This category groups together the categories “Azienda ospedaliera integrata con il S.S.N.”, “Azienda ospedaliera integrata con Università” and “Azienda ospedaliera”.

23. The categories used are taken from the definitions used by the Italian Ministry of Health.

Although there are some differences due to the different regional legislations, the “Aziende Ospedaliere” are usually bigger medical structures with a higher level of economic and managerial independence. Both those characteristics, as suggested in 1.3.7, may enhance criminal opportunities and explain their attractiveness to thieves. The following Table 6 and Table 7 confirm the hypotheses presented in 1.4. They show that the larger and more complex the hospital is, the more it will be at risk of being victimized. In fact, hospitals with more than 21 disciplines (which may suggest greater complexity) and between 801-1500 beds (larger size) are both overrepresented in the sample of victimized structures in comparison with the total Italian population of hospitals. Both of these differences are statistically significant.

**Table 6 Number of victimized hospitals by number of disciplines. Years 2006-2013.**

Number of Disciplines	#	% of victimised H	% of total Italian H	Total Value (EUR)	Average Value (EUR)
< 5	3	5.8%	24.6%	400,000.00	133,333.33
5-10	8	15.4%	23.5%	1,218,000.00	152,250.00
11-20	19	36.5%	29.7%	2,546,000.00	134,000.00
20-30	16	30.8%***	15.7%	4,807,000.00	300,437.50
>30	6	11.5%*	6.5%	9,123,000.00	1,520,500.00

Differences between proportions are statistically significant at \*p<0.1 ; \*\*p<0.05 ; \*\*\*p<0.01

**Table 7 Number of victimized hospitals by number of hospital beds. Years 2006-2013.**

Number of Hospital beds	#	% of victimised H	% of total Italian H	Total Value (EUR)	Average Value (EUR)
0-120	6	11.5%	33.5%	1,328,000.00	221,333.33
121-400	23	44.2%	40.6%	2,769,000.00	120,391.30
401-600	6	11.5%	10.2%	2,113,000.00	352,166.67
601-800	5	9.6%	7.3%	1,181,000.00	236,200.00
801-1500	11	21.2%***	6.9%	9,603,000.00	873,000.00
>1500	1	1.9%	1.4%	1,100,000.00	1,100,000.00

Differences between proportions are statistically significant at \*p<0.1 ; \*\*p<0.05 ; \*\*\*p<0.01

The following Table 8 lists hospitals that, according to media reports, suffered at least 1 episode of theft of medicines. As will be seen, some hospitals were victimized more than once: in particular, the hospitals Federico II of Naples, Cardarelli of Campobasso, S. Paolo of Bari and the ASL - Azienda Sanitaria Locale of Cerreto Sannita (Benevento) were victimized respectively 5, 3 and 2 times.

**Table 8a List of victimized hospitals by number of thefts. Years 2006-2013.**

Name of the hospital	Municipality	Province	# Thefts
Federico II	Naples	Naples	5
Cardarelli	Campobasso	Campobasso	3
S. Paolo	Bari	Bari	2
ASL - Azienda Sanitaria Locale	Cerreto Sannita	Benevento	2
Miulli	Acquaviva delle Fonti	Bari	1
S. Giuseppe	Albano Laziale	Rome	1
Asur	Ancona	Ancona	1
S. Ottone	Ariano Irpino	Avellino	1
S.S. Filippo e Nicola	Avezzano	L'Aquila	1
Policlinico Bari	Bari	Bari	1
Giovanni Paolo II	Bari	Bari	1
Dimiccoli	Barletta	BAT	1
Rummo	Benevento	Benevento	1
Umberto I	Bisceglie	BAT	1
Perrino	Brindisi	Brindisi	1
S.S. Anna e Sebastiano	Caserta	Caserta	1
S. Scolastica	Cassino	Frosinone	1
Azienda Unità Sanitaria Locale	Castellaneta	Taranto	1
TA 1	Catania	Catania	1
Vittorio Emanuele	Catanzaro	Catanzaro	1
Pugliese	Cattinara	Trieste	1
Ospedale di Cattinara	Ceccano	Frosinone	1
Civile	Chieti	Chieti	1
S.S. Annunziata	Conversano	Bari	1
Jaia	Cremona	Cremona	1
Ospedale Maggiore	Empoli	Empoli	1
S. Giuseppe	Francavilla Fontana	Brindisi	1
Camberlingo	Frosinone	Frosinone	1
Spaziani	Gemona	Udine	1
Ospedale Civile	Isernia	Isernia	1
Veneziale	Mantua	Mantua	1
Poma	Modena	Modena	1
Policlinico Modena	Modica	Ragusa	1
Ospedale Maggiore	Monopoli	Bari	1
Hospice San Camillo	Montecchio di Reggio	Reggio Emilia	1
Franchini	Emilia	Naples	1
Cardarelli	Naples	Salerno	1
Umberto I	Nocera Inferiore	Messina	1
Barone Romeo	Patti	Salerno	1
Luigi Curto	Polla	Napoli	1
ASL Distretto 34	Portici	Napoli	1

**Table 8b List of victimized hospitals by number of thefts. Years 2006-2013.**

Name of the hospital	Municipality	Province	# Thefts
S. Maria delle Grazie	Pozzuoli	Napoli	1
S. Michele in Monte Laureto	Putignano	Bari	1
Ospedali Riuniti	Reggio Calabria	Reggio Calabria	1
Pertini	Rome	Rome	1
Ruggi	Salerno	Salerno	1
ASL	Salerno	Salerno	1
S. Paolo	Savona	Savona	1
Policlinico delle Scotte	Siena	Siena	1
ASP 8	Siracusa	Siracusa	1
S.S. Trinità	Sora	Frosinone	1
S. Matteo	Spoleto	Perugia	1
Ospedale	Tolmezzo	Udine	1
S. Nicola Pellegrino	Trani	BAT	1
Ospedale Treviglio Caravaggio	Treviglio	Bergamo	1
Ca' Foncello	Treviso	Treviso	1
Ospedale	Tropea	Vibo Valentia	1
SS. Rosario	Venafro	Isernia	1
Borgo Roma	Verona	Verona	1
Ospedale Civile	Vigevano	Pavia	1
Ospedale	Vizzolo Predabissi	Milano	1

#### 2.2.4 Thefts by type of medicine

Analysis of what types of medicine were stolen from Italian hospitals is crucial not only to gain better understanding of the demand behind thefts of pharmaceuticals (e.g. internal demand for illegal use or international demand from foreign countries: see 1.4 for details), but also to collect information on the perpetrators of the thefts.

Again, given the lack of information available from media reports,<sup>24</sup> it was difficult to carry out a comprehensive analysis, however some interesting features can be already highlighted.

First, it is important to note that in 26 out of the 68 thefts considered (38.2%) the thieves stole more than one type of medicine. Secondly, as can be seen in Figure 12, which shows the number of times a particular category of medicine was reported by the media as having been stolen, in 32 cases (47% of the total) the booty included oncologic medicines, which appear by far the most attractive type of drug to criminals. The other most frequently stolen drugs are immunosuppressive (13 cases), antirheumatic (12) and biological pharmaceuticals (10).

24. For example, the media may not report the name of the medicine stolen (available only in 9 cases) but only the category, or they may use a non-standard classification of medicines. Whenever the name was available, a more accurate categorization was possible; otherwise, the classifications reported in the articles or press releases were used (see Figure 12).

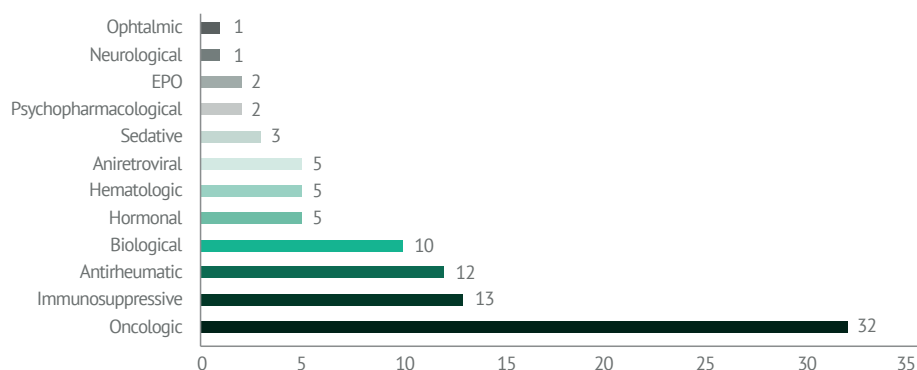


These results confirm the hypothesis formulated in 1.4, in that all these are high-priced medicines that may yield higher profit margins when sold on the illegal market, and hence, in line with *rational choice* theory, may be preferred by criminals in terms of return on risk.

At the same time, however, most of these are Class A or Class H pharmaceuticals (see Table 9) covered by the Italian NHS, which indicates, as suggested in 1.4, that they may be destined not for internal but foreign illegal markets. For example, they may be transported to countries where the public reimbursement regime is weaker (see 1.3.3), where the legal supply is insufficient for structural or budgetary reasons (as in Greece: see 1.3.5) or where they can be “laundered” by fictitious wholesale companies and then exported in the parallel trade to high-price countries or back to Italy (see 1.3.2, 1.3.6 and 1.3.9 for details). However, as suggested by the experts contacted and hypothesized in 1.4, the demand for this type of medicines may also derive from private local illegal clinics or doctors involved in illegal medical treatments (e.g. in the health care of mafia bosses at a large).

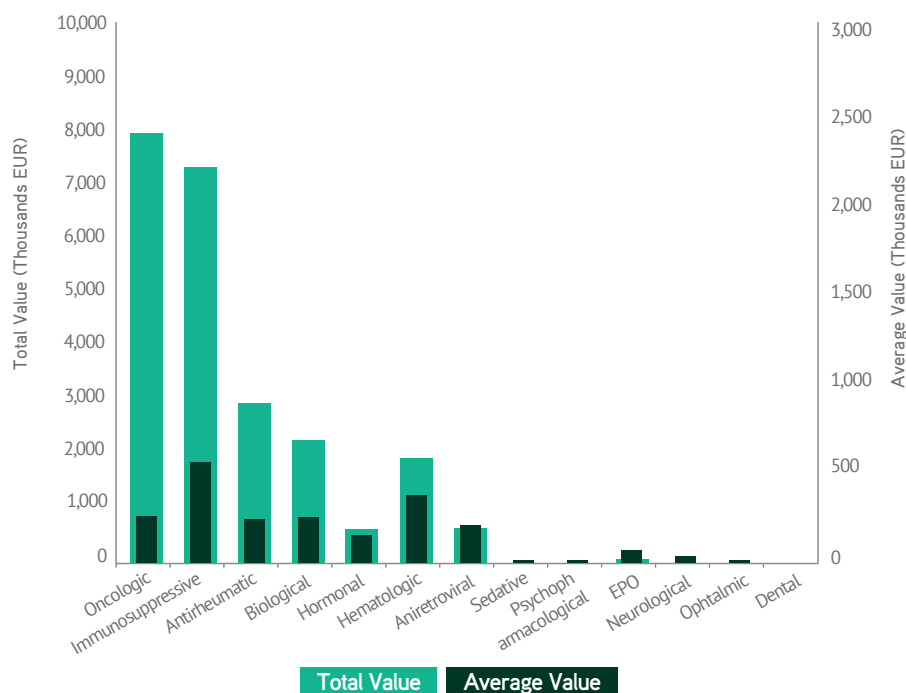
At the same time, the low number of cases involving EPO or psychopharmacological drugs suggests that thefts do not usually fulfill the demand, both internal or foreign, for an illegal use of medicines (e.g. in sport doping). However, it should be borne in mind that in 32 cases (Table 9) information about the category of the stolen pharmaceuticals was not available, and these may also have included medicines not mentioned above; in addition, as highlighted in 2.1.2, the media may focus on large-scale thefts of cancer or biological drugs and not report thefts of other classes such as EPO, ophthalmic, etc.

**Figure 12 Number of thefts by type of medicine stolen. Years 2006-2013.**



Considering what was said above, it is not surprising that thefts involving oncologic and immunosuppressive medicines are those with the highest values stolen (Figure 13). However, it is also interesting to note that the theft of immunosuppressive drugs seems to yield the best average profit for criminals (Figure 13), amounting to 653,076.92 EUR. This figure is almost twice the average value of thefts involving oncologic drugs.

Figure 13 Total and average value of thefts by type of medicine stolen. Years 2006-2013.



On considering the reimbursement category of stolen medicines, it can be noted that, as anticipated above, Class H drugs were involved in almost all the thefts from hospitals analyzed (Table 9), which might be obvious since Class H medicines can only be administered by authorized medical structures (see 1.3.3).

Table 9 Number of thefts and value stolen by class of medicine taken. Year 2006-2013.

Class	Average Value (EUR)	Total Value (EUR)	# Thefts
H	265,766.67	7,973,000.00	32
A	3,500,000.00	3,500,000.00	2
A and H	800,000.00	1,600,000.00	2
Others or N/A	235,250.00	5,646,000.00	32

### 2.2.5 Modus operandi

For those cases on which information was available, an analysis of the *modus operandi* (i.e. of how the theft was conducted) was attempted.

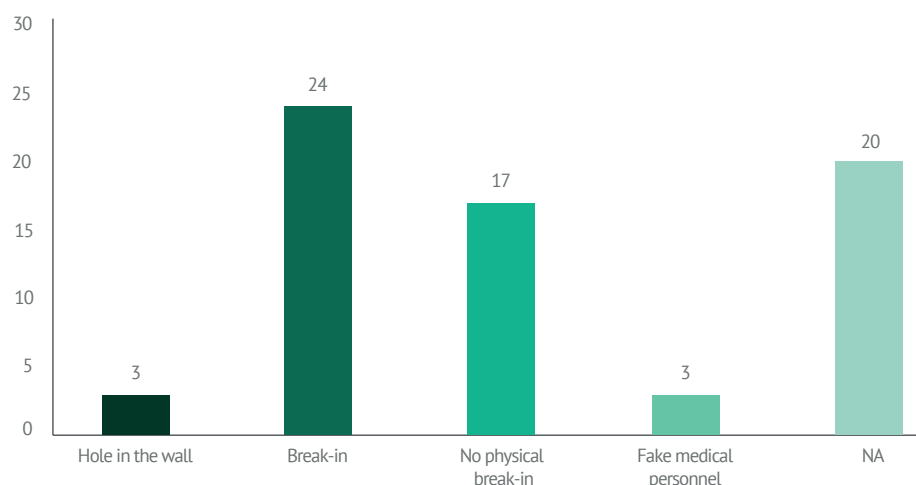
According to the available information, the majority of the thefts (64.7%) took place at night. This is probably due to the reduced nighttime activity of hospitals and the lower number of personnel, which may increase the likelihood of success for the criminals. Moreover, the thefts committed at night were related to significantly higher average economic values (Table 10).

**Table 10 Number of thefts and value stolen by time of the theft. Year 2006-2013.**

Period	Average Value (EUR)	Total Value (EUR)	# Thefts	% on Total
<b>Night</b>	358,170.73	14,685,000.00	44	64.7%
<b>Week End</b>	197,500.00	790,000.00	5	7.3%
<b>N/A</b>	270,333.33	3,244,000.00	19	27.9%

Figure 14 and Table 11 show that in 35.3% of the cases criminals physically broke into the hospitals, usually by forcing a door or a grating, which was the method most frequently used by thieves to enter the hospitals. However, in one theft out of four the thieves entered without any physical break-in. This solution suggests the complicity of the hospital's personnel (see 1.3.9 and 1.4), which may be involved in the criminal activity through bribes, intimidation or a share of the illicit profits. In these cases, the average value stolen is also significantly higher than in the previous ones, suggesting that insiders' information helped the thieves not only to enter but also to identify the most valuable pharmaceuticals. Only marginal was the number of events in which the criminals entered the hospital through a hole in the wall or by acting as fake medical personnel.

**Figure 14 Number of thefts by type of entry. Years 2006-2013.**



**Table 11 Number of thefts and value stolen by type of entry. Years 2006-2013.**

Entrance	# Thefts	Average Value (EUR)	Total Value (EUR)
<b>Hole in the wall</b>	3	591,000.00	1,773,000.00
<b>Break-in</b>	24	211,391.30	4,862,000.00
<b>No physical break-in</b>	17	518,500.00	7,259,000.00
<b>Fake medical personnel</b>	3	350,000.00	700,000.00
<b>NA</b>	21	275,000.00	4,125,000.00

According to media reports, in 12 cases out of 68 (17.6%) the investigators presumed that the perpetrators of the thefts were connected to specialized criminal groups or organizations. Moreover, those cases recorded a significantly higher average value stolen (Table 12), suggesting that these groups focus on large-scale and high-profit thefts. These results are in line with the hypothesis that most of these crimes are connected with criminal organizations able to corrupt or infiltrate the medical personnel and then manage the storage, transport and placement of stolen medicines on illegal markets, either in Italy.

**Table 12 Number of thefts and value stolen by presumed perpetrators. Years 2006-2013.**

Supposed Authors	# Thefts	Average Value (EUR)	Total Value (EUR)
<b>Organized criminal group</b>	12	489,300.00	4,893,000.00
<b>N/A</b>	56	294,170.21	13,826,000.00

### 2.2.6 Relationships with contextual factors

As discussed above, thefts of medicines from Italian hospitals exhibit high levels of concentration: hospitals in some areas of the country are much more likely to be victims of thefts than others (see 2.2.2 for details). In order to gain better understanding of the reasons for these differences, analysis was made of the relationship between the theft of medicines and some contextual factors of Italian provinces.

In particular three hypotheses suggested in 1.4 were tested:

1. the number of thefts is higher where the activity of criminal organizations is greater;
2. the number of thefts is higher where the number of property crimes is higher, owing to the presence of criminal groups specialized in this illicit activity (e.g. Eastern-European OCGs);
3. the number of thefts is higher in geographical areas closer to Eastern Europe or Greece.

For each of these characteristics, one or more proxy variables (described in detail below) were used. These proxies were then linearly correlated with (A) the recorded number of thefts from hospitals per province (expressing the concentration of the phenomenon) and (B) the rate of thefts by total number of hospitals in the province (expressing the relative risk of a hospital being victimized).

1. *The number of thefts is higher where the activity of criminal organizations is greater*

As suggested in 1.3.8 and 1.4 and already described in 2.2.4 and 2.2.5, medicine thefts often involved a high level of organization, advanced skills and networks that suggest the involvement of organized crime groups. It is therefore likely that the provinces with a stronger presence of Italian mafias or other criminal organizations (e.g. foreign OCGs) also

record a higher number of thefts. The variables used to proxy the presence of mafias and in general of criminal organizations were, respectively, the Mafia Presence Index<sup>25</sup> and the rate of reported cases of criminal association<sup>26</sup> per 10,000 inhabitants.

The correlation matrix (Table 13) shows that the number of thefts reported was positive and significantly correlated with the presence of Italian mafia OCGs in the province. This crime therefore concentrated in areas where Italian mafias were particularly active. In particular, the correlation is stronger where the presence of Camorra and Apulian OCGs was greater. Indeed, the thefts concentrated in the provinces under the influence of these groups, and also the relative risk of a medical structure being victimized was positive and significantly correlated. This conclusion is in line with the evidence cited in the previous sections and the hypotheses formulated above.

Moreover, the level of criminal associations proxied by the number of reported cases of art. 416 Italian penal code was positively correlated, but not as significantly as with the Mafia Presence Index.

**Table 13 Correlations between thefts from hospitals and level of criminal organizations (N= 107 provinces)**

	A) Number of thefts	B) Rate of Thefts by hospitals
<b>Mafia Presence Index (all Italian OCGs)</b>	0.432***	0.109
Mafia Presence (Cosa Nostra)	- 0.072	- 0.047
Mafia Presence (Camorra)	0.248*	0.310***
Mafia Presence ('Ndrangheta)	- 0.217**	- 0.199**
Mafia Presence (Apulian OCGs)	0.307***	0.197**
Mafia Presence (Others Italian OCGs)	- 0.095	- 0.116
<b>Reported cases of criminal association</b>	0.103	0.105

\*p<0.01 ; \*\*p<0.05 ; \*\*\*p<0.001

2. *The number of thefts is higher where the number of property crimes is higher*

A second hypothesis is that theft of medicines from hospitals is only a subtype of property crime. Therefore, its distribution across Italian provinces should approximately replicate that of other property crime types. The analysis now reported correlated the number and rate of thefts from hospitals with the general rate of reported cases of thefts and robberies per 10,000 inhabitants. Moreover, the phenomenon was related with theft and robberies from trucks, which require similar skills in terms of organization and management of the stolen goods, and which is often linked to specialized crime groups such as foreign OCGs (in particular Eastern-European ones).

25. The Mafia Presence Index is a composite indicator of the Italian mafia organizations' spatial distribution developed by Transcrime for the Italian Ministry of Interior (Transcrime, 2013).

26. This crime refers to article 416 of the Italian criminal code.

The correlations reported in Table 14 show that thefts of medicines from hospitals are positively and significantly correlated with thefts from trucks, robberies (all types) and robberies from trucks, while in general the rate of thefts is not significantly associated. These results confirm that thefts from hospitals in the period considered were distributed similarly to more complex and organized property crimes, such as robberies and thefts from trucks. In particular, the findings may confirm that the same criminal organizations associated with property crimes (such as Eastern-European OCGs: see 1.3.8) are also involved in pharmaceutical thefts.

**Table 14 Correlations between thefts from hospitals and other property crimes (N= 107 provinces)**

	A) Number of thefts	B) Thefts by hospitals in the province
Thefts	- 0.014	- 0.072
Thefts from trucks	0.192**	0.168*
Robberies	0.383***	0.047
Robberies from trucks	0.333***	0.052

\*p<0.01 ; \*\*p<0.05 ; \*\*\*p<0.001

3. *The number of thefts is higher in geographical areas closer to Eastern Europe or Greece*

As widely discussed above, medicines stolen from hospitals in Italy may not only feed the internal illegal market but also be moved and sold in foreign countries, and in particular Eastern-European countries and Greece where problems in terms of reimbursement (1.3.3), legal supply (1.3.5) or parallel trade (1.3.6 and 1.3.9) can be identified.

Should this hypothesis be confirmed, then thefts concentrate in geographical areas closer to Italy’s eastern borders in order to facilitate the transfer of stolen pharmaceuticals to the destination countries (both by sea or overland). Accordingly, those provinces on the Adriatic Sea (often with seaports) or in north-eastern regions like Friuli Venezia Giulia should be more exposed than others. Moreover, border provinces may be more vulnerable to the influence and operation of foreign criminal organizations that, alone or in cooperation with Italian criminal groups, manage the illegal market of stolen medicines.

In order to test this hypothesis, a dummy variable was created to distinguish Italy’s eastern provinces<sup>27</sup> from the others. As shown in Table 15, this dummy was not statistically correlated with the number of thefts, but it was positively associated with the relative risk of victimization (the rate between number of thefts and number of hospitals). In other words, geographical proximity to Italy’s eastern borders may slightly increase the likelihood of a hospital suffering a theft.

**Table 15 Correlations between thefts from hospitals and proximity with eastern borders (N= 107 provinces)**

	A) Number of thefts	B) Thefts by hospitals in the province
East border regions	0.091	0.205**

\*p<0.01 ; \*\*p<0.05 ; \*\*\*p<0.001

27.Those belonging to the following regions: Apulia, Molise, Abruzzi, Marche, Emilia Romagna, Veneto, Friuli Venezia Giulia.







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# CONCLUSIONS

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This report sheds some light on the illicit trafficking of stolen medicines, and specifically on thefts of pharmaceuticals from Italian hospitals. It is the first study to analyze this booming but almost unknown criminal phenomenon.

In particular it has presented:

- an exploration of the background behind pharmaceutical theft and the drivers that influence the demand for and the supply of stolen medicines (Chapter 1);
- an analysis, based on cases reported by the media, of thefts of medicines from Italian hospitals between 2006 and 2013 (Chapter 2).

In regard to the background (Chapter 1), the demand for stolen medicines may be determined by a variety of drivers: the price of medicines (see 1.3.1), the price differentials among countries and between the legal and the illegal market (1.3.2), the regimes of reimbursement of medicines (1.3.3), difficulties in accessing medicines through legal channels (1.3.5) or the need to use legal pharmaceuticals for illegal purposes (e.g. EPO in sport doping or fentanyl to synthesize illegal drugs, see 1.3.4).

By contrast, the supply (i.e. the theft and marketing) of stolen medicines may be influenced also by the structure and the vulnerabilities of the legal supply chain (from the manufacture to the patient, see 1.3.6), by the opportunities provided by the differences in the traceability of medicines (1.3.7) and law enforcement (1.3.10) across jurisdictions, by the interest and the activity of organized crime groups (1.3.8) and their ability to rely on networks of contacts among corrupted pharmaceutical wholesalers or brokers, or within hospital medical staff (1.3.9).

There emerges a picture of a very lucrative criminal activity that may overlap with the legal market (in particular with the parallel trade, i.e. the legal trade based on price differentials across countries) and that is often conducted by specialized OCGs, which may shift from more risky and less profitable illicit markets (e.g. drugs, human trafficking, etc) to this emerging criminal phenomenon.

Focusing on thefts of medicines from Italian hospitals, there is clear evidence of an increase in episodes: between 2006 and 2013 the media reported around 68 cases of thefts, but most of them occurred between 2012 and 2013 (see 2.2.1). While the total economic loss in these cases can be estimated at least 18.7 million euros (2.2.1), on average each theft produced a loss of 330 thousand euros (2.2.1).

In terms of spatial distribution, the regions of Campania and Apulia represented more than 45% of the cases (with respectively 17 and 14 thefts) while in terms of rates, Molise (7.1 thefts every 10 hospitals), Apulia (3.8) and Campania (3.1) recorded the highest values (see 2.2.2). Among northern regions, Friuli Venezia Giulia (2 in every 10 hospitals) presented the highest rate, while Lombardy (5 thefts) and Lazio (6 thefts) were the most victimized.

The geography of thefts confirms the hypothesis concerning the prevalence of thefts in southern Italy and eastern Italian regions owing to the stronger activity of organized crime groups (both Italian mafia-type and foreign OCGs such as Eastern-European ones) and geographical proximity to Eastern Europe and Greece, possible destinations for stolen medicines (see 2.2.2).

The most victimized types of hospital are the larger (in particular with more than 800 beds), more complex (above 21 disciplines) and public ones, since they may have weaker monitoring due to higher staff turnover (see 1.3.6 and 2.2.3).

High-price medicines and in particular cancer drugs (stolen in 32 cases), immunosuppressive (13), antirheumatic (12) and biological (10) drugs are the medicines most frequently stolen (see 2.2.4). Considering that these are often Class A or Class H medicines, fully reimbursed by the Italian NHS, it is likely that the stolen products are sold in foreign countries (especially Eastern Europe and Greece) where reimbursement regimes are weaker (1.3.3), or the legal supply is insufficient (1.3.5) or where the products can enter the parallel trade and be exported to high-price countries.

As regards contextual factors (2.2.6), thefts are positively and significantly correlated with the presence of Italian mafia-type OCGs (especially Camorra and Apulian OCGs) and with the rate of other property crimes (especially thefts and robberies against trucks), which are often connected with the activity of Eastern-European OCGs (see 1.3.8). Finally, the concentration of thefts is slightly higher in eastern Italian regions (on the Adriatic Sea and on the borders) that may facilitate the transport (by sea or by land) of stolen medicines to Eastern Europe.

Although these results provide some important information about medicine thefts, there is a need for further studies addressing this issue. In particular, it is necessary:

- to perform the analysis on evidence collected also from other data sources, such as police statistics and data provided by the hospitals themselves or pharmaceutical companies;
- to focus on other targets as well, and in particular on trucks and couriers, which, for a variety of reasons (see 1.3.6), appear as exposed as hospitals to medicine thefts;

- to investigate the interactions between the illicit trafficking of stolen medicines and the legal parallel trade, and in particular analyze how, by exploiting the differences in terms of traceability across jurisdictions, stolen drugs may re-enter the legal market;
- to identify the loopholes in the regulation of the pharmaceutical trade which may create opportunities then exploited by OCGs for the trade of stolen products.

In this regard, stronger public-private partnerships (among researchers, law enforcement agencies, supervisory bodies, pharmaceutical companies and industry representatives) could engage in the wider sharing of perspectives, data, and information in order to enhance understanding of this almost unknown phenomenon.



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