

Drug Diversion: Could be a Serious Concern in Global Healthcare System

Mayur P Dhapkas¹, Khushi S Chaudhari¹, Amit Kumar², Rahul G Ingle^{1*}

¹*Datta Meghe College of Pharmacy, Datta Meghe Institute of Higher Education & Research, Deemed to be University, Wardha, Maharashtra, India.*

²*Tahira Institute of Medical Sciences, Gorakhpur, Uttar Pradesh, India.*

Received: 05th December, 2023; Revised: 20th March, 2024; Accepted: 14th May, 2024; Available Online: 25th June, 2024

ABSTRACT

Prescription drug diversion is a significant \$25 billion-a-year problem in the US. Diversion can occur at any stage of the medicine delivery process, from manufacturing to the patient. Common diversion methods include illegal selling by doctors/pharmacists, “doctor shopping,” theft/forgery of prescriptions, and burglaries/thefts. Emerging diversion methods include theft by healthcare workers, fraud involving insurance, and theft from medicine cabinets. The main sources of diverted medications are at the practitioner-patient level, such as through “doctor shopping” and friends/family sharing prescriptions. Diversion from healthcare settings like hospitals accounts for a smaller proportion, though the exact extent is difficult to quantify. Some diversion occurs through theft from pharmacies, manufacturers, and supply chain points, but this makes up a relatively small percentage. Healthcare providers who engage in drug diversion have been linked to infectious disease outbreaks in hospitals, exposing patients to pathogens like hepatitis C. Intelligent systems and machine learning can help rapidly detect diversion anomalies. Comprehensive solutions are needed, including policy reforms, communication strategies, and a public health approach.

Keywords: Drug diversion, Patient quality of life, Public health, Supply chain.

International Journal of Pharmaceutical Quality Assurance (2024); DOI: 10.25258/ijpqa.15.2.68

How to cite this article: Dhapkas MP, Chaudhari KS, Kumar A, Ingle RG. Drug Diversion: Could be a Serious Concern in Global Healthcare System. International Journal of Pharmaceutical Quality Assurance. 2024;15(2):986-989.

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

The illegal transfer of controlled medicines from legitimate sources to the black market, or “diversion” of prescription drugs, has been a subject of much discussion since the late 1990s. According to estimates from the Drug Enforcement Agency (DEA), the prescription drug diversion business is worth \$25 billion annually. Diversion can happen at any stage of the medicine delivery process, from the manufacturing facility to a wholesale distributor, doctor’s office, retail pharmacy, or patient. Diversion can happen in a number of ways, such as doctors selling prescription drugs illegally and “loose” pharmacists selling them on the street; people “doctor shopping,” which is going to different doctors to get multiple prescriptions written down; patients and healthcare workers stealing, forging, or altering prescriptions; burglaries and thefts from pharmacies, manufacturers, and distributors; and pillaging from institutional drug supplies. Moreover, there is mounting proof that international smuggling at both the retail and wholesale sectors, along with domestic burglaries, are the main ways that substantial quantities of prescription painkillers and benzodiazepine are diverted.

Furthermore, diversion through different methods, such as “shorting” (undercounting) and theft by pharmacy technicians and pharmacy staff, and recycling of pharmaceuticals by psychiatrists and pharmacy staff, has been demonstrated in recent studies. Thefts from medicine cabinets by housekeeping and maintenance workers in residential settings; prescription theft by housekeeping and maintenance workers in hotels; and fraud involving Medicaid, Medicare, and other insurance by patients, pharmacies, and street vendors. Furthermore, it seems that adolescents who abuse pills in middle and high school get their drugs through thefts from medical cabinets, drug dealing at the classroom, and stealing and robberies of pharmaceuticals from other students. And last, some experts believe that buying prescription medications illegally can be facilitated by the internet. While numerous scientific articles have dealt with the challenges associated with distraction over the years and national surveys and tracking systems have documented widespread prescription drug abuse, empirical data regarding the extent and breadth of diversion, as well as the patterns of diverting associated with a different drug of abuse, user people, and/or other socioeconomic, socioeconomic, and

*Author for Correspondence: rahul.pharmacy@dmier.edu.in

psychosocial variables, are largely not accessible and keep absent from the literature. Indeed, at a recent College upon Problems of Drug Dependence-sponsored conference on the “Impact of Drug Development on the Misuse Risk, Safety, and Regulatory Decisions,” officials from government oversight organizations, the pharmaceutical sector, and the scientific community reached the following consensus:¹

Very little information is available on the amount of a certain kind of diversion.

- No systematic statistics exist about the route taken by the vast amounts of prescription pharmaceuticals that are misused before ending up on the streets.
- No empirical data are available to support regulatory choices or the creation of risk management and preventive strategies for prescription drugs.

One way to characterize diversion is as a disjointed, profit-driven sector. The word “disorganized” refers to the wide range of participants in the phenomenon, which includes pharmacists, physicians, and other medical workers; drug addicts; patients; students; street vendors; professional criminals; tourists; saloonkeepers; and various service providers, to mention a few. Furthermore, there is such a wide spectrum of diversion that the responses to questions about the main sources of diversion really vary depending on the person asking. According to federal authorities, incorrect distribution by pharmacists, inappropriate prescription methods by physicians, and “doctor shoppers” are the major ways that diverted pharmaceuticals end up on the black market. Federal officials have also determined that the main source of diversion is internet sales. In contrast, the authors conducted a survey in 2005 of diversion investigators from 300 police and regulatory agencies across the country as an add-on to a post-marketing surveillance program to track illicit use and abuse of oxycodone and several other prescription opioids. These survey respondents provided answers that demonstrated a broader range of diversionary tactics. For instance, a number of additional pathways were also identified, despite the fact that nearly three-fourths of survey respondents believed that drug abusers acting as patients—through doctor visits and prescription theft/forgery—were the primary cause of diversion. This paper states on qualitative interview and focus group results obtained on four distinct populations of prescription substance abusers in Miami, Florida: club addicts, street-based narcotics users, maintenance methadone patients, and those with HIV who neglect and/or divert drugs. The goal of this research is to better understand how specific drug populations are diversifying synthetic opioids and other medicine or obtaining prohibited substances that are already diversioned.¹

Definition

The unlawful distribution, misuse, or use of prescription medications for purposes other than those for which they were prescribed constitutes drug diversion. As prescription medications are supplied from the supplier to wholesale distributors, pharmacies, or patients, diversion of prescription pharmaceuticals can happen at any time.²

Points of Diversion of Drugs

It’s challenging to assess the sources of medications that have been diverted. Although diversion can happen anywhere in the supply chain, it usually happens at or after the practitioner-patient encounter. Prescription medication diversion primarily targets primary health care; however, it can also affect GPs’ continued prescribing practices. Drugs given to patients upon hospital discharge may also be diverted.

Research on the usage of prescription drugs by prisoners in the year before their incarceration revealed that 21% of them got them directly from a doctor, while 43% had received them via a friend or relative. Drug traffickers and purchases from friends or relatives were additional sources. A very tiny percentage of prisoners claimed stealing or falsifying prescriptions.² Similar to how few prescription medications are gotten by breaking into pharmacies, warehouses, and labs. Prescription medicines are occasionally reported to be recovered from pharmaceutical waste (sharps bins), redirected by medical staff in hospitals, and obtained illegally from elderly patients in assisted living homes; nevertheless, it is challenging to determine how much of these incidents result in diversionary usage (Table 1).³

Ways of Drug Diversion

- Medication replacement/substitution
- Falsified wasting of a controlled substance
- Pocketing loose pills
- Pocketing expired medication
- Diluting medication drips

Impact of Drug Diversion on Patients Life

Different kinds of healthcare providers who are drug dealers are hurting patients who are seeking help. Patients who have their prescriptions diverted may experience more pain, and if a caregiver is incompetent, they may receive care that is of worse quality. Keith Bergh and William Lanier, doctors at the Mayo Clinic, examined scientific literature and CDC data pertaining to drug-related illness outbreaks in the United States that occurred between January 2000 and December 2013. Over a ten-year period starting in 2004, the researchers discovered six infectious outbreaks, all of which happened in hospital settings. Three nurses and one technician, a nurse anesthetist, were among the healthcare personnel involved. Injectable restricted drugs can be tampered with to propagate infections. In two outbreaks, patient-controlled analgesia pumps were used to tamper with opioids, which led to 34 cases of gram-negative bacteremia. In the four remaining outbreaks, 84 people contracted the hepatitis C virus as a result of tampering with needles or vials containing fentanyl. The healthcare provider who was the cause of each of these infections got infected with a virus known as hepatitis C. As a result, notifications recommending testing were sent to around 30,000 people who may have been exposed to blood-borne infections. The CDC graphic (see the following page) summarizes infectious outbreaks that occurred between 1983 and 2013 as a result of medication diversion by healthcare personnel who interfered with injectable medicines.

Table 1: List of Commonly Diverted Drugs³

| Class of Drugs | Drugs |
|------------------|--|
| Benzodiazepines | All |
| Opioids | All |
| Stimulants | Dexamphetamine, pseudoephedrine, methylphenidate |
| Antipsychotics | Olanzapine, quetiapine |
| Anesthetic drugs | Ketamine, propofol |
| GABA agonists | Gabapentin, pregabalin |

Prevention Strategies

Governments, pharmacies, regulatory agencies, and individual prescribers must work together to reduce prescription drug abuse and diversion. The goal of these guidelines is to decrease the diversion of prescription drugs. A plan known as the National Prescription Drug Misuse Agenda for Action was created in reaction to the growing abuse of prescription opioids.⁹ This attempts to lower possible abuse and enhance the quality of pharmaceutical usage. It covers a number of important topics, such as enhanced drug management systems, more assistance for pharmacists and prescribers, health literacy and education advancements, harm reduction, and better regulation.

Drug Monitoring

The System for Electronic Monitoring and Reporting of Controlled Substances is a crucial component of the Framework. It was first implemented in 2012, but as of right now, it's limited to Tasmania. However, there are intentions to make it nationwide. Prescribers and pharmacists should be able to obtain real-time information on prescriptions for prohibited drugs thanks to the medication monitoring system. At the moment, qualified prescribers can access Medicare's Prescription Ordering Information Services without getting permission from patients. The only patients it can identify are those who see more than five clinicians, receive more than 50 prescriptions, or obtain 25 banned products in the span of three months. There are other monitoring systems in place, but they are retroactive in nature and require patient approval. All prescribers' specific prescription numbers can be monitored with the agreement of the patient, however, the reports that are supplied to the asking doctor only include the last three months' worth of prescription usage. Drug monitoring programs are not without flaws, and there is disagreement on both a national and international level over how efficient they are in preventing drug diversion. They may, nonetheless, be seen as a single component of a well-thought-out strategy to assist prescribers.

General Concepts of Prevention and Detection

The fact that drug leakage is a significant issue in the workplace is not well-known among HCWs. Therefore, extensive educational initiatives that highlight the nature and severity of the issue, indications of potential addiction and diversion, and appropriate actions to take in the event that diversion is suspected must be put in place. The risks that drug diversion poses to one's life and job should be made known to the

whole workforce, not just those with easy access to CSs. Such training ought to be a part of new hire orientation, and it ought to continue throughout an HCW's tenure. To reduce patient damage, addiction sickness connected to diversion, and drug-related mortality, it is important to inform all personnel about the protocols in place to aid in identification and discourage diversion.

When staff members think diversion is taking place, they should also be trained on how to use the resources that are out there. To support these training objectives, Mayo Clinic is now developing a Web-based learning module on the subject of diversion. The possibility of requiring an effective completion of this course as a component of yearly staff competence evaluations is being considered. A very comprehensive program that incorporates expertise from the fields of pharmaceutical sciences, law enforcement, behavioral and biologic science, information technology, credentialing and license specialists, and industrial loss-prevention sciences is the perfect approach to drug diversion and prevention. Medical facilities' attempts to prevent and identify diseases vary greatly; they range from well-developed proactive strategies to haphazard reactive procedures. This is a developing area, and despite best attempts, the perfect scenario where drug diverting and its detrimental effects are almost nonexistent has not yet been reached. Over the last few years, Mayo Clinic has been creating and refining a consistent approach to possible diversion.¹

Future Prospective

Drug diversion's potential future is a major worry for communities, patients, and healthcare facilities. Drug diversion in healthcare settings is a multi-victim crime that poses serious hazards to patients, employers, and coworkers. Patients may get subpar care or contract diseases from an addicted treatment professional. The issue is not exclusive to outpatient settings; hospitals and other healthcare institutions are also quite vulnerable to medication diversion. Healthcare professionals are more likely to abuse drugs; in the US, 10% of HCWs abuse controlled substances, a percentage that is comparable to the country's overall drug abuse rate. According to data from the US Behavioral and Mental Wellness Administration, the majority of drug diversion by healthcare workers goes unnoticed and, when it does, is frequently not reported or penalized. Strict chain-of-custody regulations and past reports from automated dispense cabinets are two examples of traditional ways of detecting drug diversion. However, these approaches have a number of drawbacks, such as their slowness in detecting diversion, their inability to detect diverting when the diverting party actively conceals their abnormal usage, and their frequent mistake of falsely identifying clinicians who are not switching. The need to use cutting-edge techniques, such as data-driven analytics and machine learning, to enhance drug diversion detection procedures for hospitals and other hospitals is developing in response to these issues. Machine learning models have the potential to identify known diversion cases more quickly than current detection techniques, which

could enhance patient safety, minimize harm to the individual being diverted, lessen the effect of substance use disorders on public health, and reduce the risk of serious liability for pharmacy staff and their organizations. A diversion program director, protection manager, legal, supervisors, IT, a pharmaceutical trained or partner, and a head nurse are just a few of the multidisciplinary team members that make up the multidisciplinary team approach that has become the focus of best practices in addition to technology advancements. In order to promptly remove anomalies that have valid explanations and then instantly concentrate the program's work on those that do not, it is imperative that this technique be used for synthesize unique abilities, expertise, and views.

Organizations should also pay attention to the importance of training on drug diversion and awareness culture, as they are the first to detect suspicious behavior or behaviors that may lead to drug abuse or addiction. Monitoring and evaluation of programs should be strengthened to address poor program outcomes related to drug addiction. In summary, future hope for drug reform requires a multifaceted approach that includes best practices, technological innovations, and education and awareness about drug addiction. By addressing these issues, healthcare organizations can improve patient safety by reducing harm to diverse populations, reducing the public health risks of medication use, and reducing significant risks to pharmacists and their organizations.⁴

Points of Future Prospective

Technology innovation

Learn how to use data analysis tools, medication management plans (PDMPs), and electronic systems to identify and prevent medication diversion. Paolo Zital Research. Information may be provided on how effective PDMPs are in reducing overdose deaths from opioids.⁵

Intelligent systems and machine learning

Discover how machine learning and AI-based algorithms can be used to predict the risk of opioid overdose and identify trends in drug addiction. Fernandes *et al.* may provide information on using machine learning technology to predict opioid overdose.⁶

Reforms and policy interventions

Look for items that address regulatory measures to reduce drug diversion, such as tighter controls on pharmacies and prescribers. Policy solutions to address the opioid epidemic and reduce deviance can be found in reports published by the National Academy of Medicine and others.⁷

Communication and healthcare solutions

Research to understand how telemedicine impacts medication substitution and opioid prescribing. An understanding of the problems and possibilities presented by telemedicine in avoiding changes can be obtained from Barnett *et al.*⁸

Public health approach

The research evaluates public health measures designed to prevent drug use and reduce inequality. Reports from the

National Institute on Chemical Abuse can provide insight into the public health approach to drug use and development.⁹

CONCLUSION

The well-being of society, healthcare systems, and general health are all seriously threatened by drug diversion. It has a significant impact on the opioid epidemic, rising healthcare expenses, deteriorating public confidence in the healthcare system, and sustaining drug addiction diseases. But thanks to a combination of legislative actions, technology advancements, awareness campaigns, preventative initiatives, and interdisciplinary cooperation, there is hope for the future. Promising routes for fighting medication diversion include better monitoring, blockchain technology, alternate pain management approaches, and comprehensive preventative initiatives. Through the implementation of these techniques in a coordinated and consistent manner, we can endeavor to minimize the detrimental impacts of drug diversion, minimize its prevalence, and protect people's health and safety both individually and as a community.

ACKNOWLEDGMENTS

The authors are thankful to the Datta Meghe Institute of Higher Education and Research, Wardha, for their financial support.

REFERENCES

1. Berge KH, Dillon KR, Sikkink KM, Taylor TK, Lanier WL, "Diversion of Drugs Within Health Care Facilities, a Multiple-Victim Crime: Patterns of Diversion, Scope, Consequences, Detection, and Prevention," *Mayo Clin. Proc.* 2012, 87(7):674–682. Jul. 2012, doi: 10.1016/j.mayocp.2012.03.013.
2. Laven DL. "Introduction: Drug Diversion and Counterfeiting, Part I," *J. Pharm. Pract.* 2006, 19(3):135–139. doi: 10.1177/0897190006292939.
3. Wood D. "Drug diversion.," *Aust. Prescr.*, 2015, 38(5):164–166. doi: 10.18773/austprescr.2015.058.
4. Inciardi JA, Surratt HL, Kurtz SP, Cicero TJ. "Mechanisms of Prescription Drug Diversion Among Drug-Involved Club- and Street-Based Populations," *Pain Med.*, 2007, 8(2):171–183. doi: 10.1111/j.1526-4637.2006.00255.x.
5. Paulozzi LJ, Kilbourne EM, Desai HA. "Prescription Drug Monitoring Programs and Death Rates from Drug Overdose," *Pain Med.*, 2011, 12(5):747–754. doi: 10.1111/j.1526-4637.2011.01062.x.
6. Pisano S, Honarvar H, Parikh RB, Das RK. "Electronic health record (EHR)-based machine learning (ML) to predict disease recurrence after surgical resection of early-stage non-small cell lung cancer (eNSCLC).," *J. Clin. Oncol.*, 2023, 41(16_suppl):6626–6626. doi: 10.1200/JCO.2023.41.16_suppl.6626.
7. Rosenblum A, Marsch LA, Joseph H, Portenoy RK. "Opioids and the treatment of chronic pain: Controversies, current status, and future directions.," *Exp. Clin. Psychopharmacol.*, 2008, 16(5):405–416. doi: 10.1037/a0013628.
8. Barnett ML, Olenski AR, Jena AB. "Opioid-Prescribing Patterns of Emergency Physicians and Risk of Long-Term Use," *N. Engl. J. Med.*, 2017, 376(7):663–673. doi: 10.1056/NEJMsa1610524.
9. Almutairi A. "Principles of drug addiction treatment: a review," *Int. J. Med. Dev. Ctries.*, 2021, 1523–1527. doi: 10.24911/IJMDC.51-1609883100.