



Chapter 5

**An Intelligent Data Mining System
to Detect
Healthcare Fraud**

Guisseppe A. Forgionne, Aryya Gangopadhyay and Monica Adya
University of Maryland Baltimore County, USA

INTRODUCTION

There are various forms of fraud in the health care industry. This fraud has a substantial financial impact on the cost of providing healthcare. Money wasted on fraud will be unavailable for the diagnosis and treatment of legitimate illnesses. The rising costs of and the potential adverse affects on quality healthcare have encouraged organizations to institute measures for detecting fraud and intercepting erroneous payments.

Current fraud detection approaches are largely reactive in nature. Fraud occurs, and various schemes are used to detect this fraud afterwards. Corrective action then is instituted to alleviate the consequences. This chapter presents a proactive approach to detection based on artificial intelligence methodology. In particular, we propose the use of data mining and classification rules to determine the existence or non-existence of fraud patterns in the available data.

The chapter begins with an overview of the types of healthcare fraud. Next, there is a brief discussion of issues with the current fraud detection approaches. The chapter then develops information technology based approaches and illustrates how these technologies can improve current practice. Finally, there is a summary of the major findings and the implications for healthcare practice.

Previously Published in *Healthcare Information Systems: Challenges of the New Millennium* edited by Adi Armoni, Copyright © 2000, Idea Group Publishing.

This chapter appears in the book, *Effective Healthcare Information Systems* by Adi Armoni. Copyright © 2002, IRM Press, an imprint of Idea Group Inc.

BACKGROUND

Fraud in healthcare transactions refers to knowingly and willfully offering, paying, soliciting, or receiving remuneration to induce business that healthcare programs will reimburse. Healthcare fraud can result from internal corruption, bogus claims, unnecessary health care treatments, and unwarranted solicitation. As in any commercial enterprise, unscrupulous provider or payer employees can misappropriate healthcare payments for personal purposes. Providers can also issue claims for treatments that were never, or only partially, rendered. Corrupt healthcare providers also can induce patients to undergo unnecessary, or even unwanted, treatments so as to inflate charges to the payers. In addition, unethical providers can willfully solicit business from unprincipled, or unsuspecting, patients for the sole purpose of generating billable procedures and treatments.

According to a 1993 survey by the Health Insurance Association of America of private insurers' healthcare fraud investigations, the majority of healthcare fraud activity is associated with diagnosis (43%) and billing services (34%). In Medicare, the most common forms of fraud include billing for services not furnished, misrepresenting the diagnosis to justify payment, falsifying certificates of medical necessity, plans of treatment and medical records to justify payment, and soliciting, offering, or receiving a kickback (Health Care Financing Administration, 1999).

Early cases of healthcare fraud have applied to gross issues such as kickbacks, bribes, and other fairly transparent schemes. Increasingly, however, the Office of the Inspector General has demonstrated a willingness to pursue cases that are in the gray area and courts have tended to interpret antifraud statutes more broadly so as to make criminal prosecution more likely (Steiner, 1993). For instance, waiving a patient's co-payment when billing third-party payers and not disclosing the practice to the insurance carrier has been deemed as fraud and resulted in prosecution (Tomes, 1993).

Fraud has a substantial financial impact on the cost of providing healthcare. Medicaid fraud, alone, costs over \$30 billion each year in the United States (Korcok, 1997). According to CIGNA HealthCare and Insurance groups, the healthcare industry is losing an estimated \$80 to \$100 billion to fraudulent claims and false billing practices (CIGNA, 1999). Investigators have shown that fraud is found in all segments of the healthcare system, including medical practice, drugs, X-rays, and pathology tests, among others.

The timely detection and prevention of fraud will not only provide significant cost savings to insurance companies but will also reduce the rising

19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/intelligent-data-mining-system-detect/9223

Related Content

A Comprehensive Overview of Wireless Body Area Networks (WBAN)

Nourchene Bradai, Lamia Chaariand Lotfi Kamoun (2011). *International Journal of E-Health and Medical Communications* (pp. 1-30).

www.irma-international.org/article/comprehensive-overview-wireless-body-area/55998

Impact of Facebook Ads for Sexual Health Promotion Via an Educational Web App: A Case Study

Elia Gabarron, Luis Fernandez Luque, Thomas Roger Schopf, Annie Y.S. Lau, Manuel Armayones, Rolf Wynnand J. Artur Serrano (2017). *International Journal of E-Health and Medical Communications* (pp. 18-32).

www.irma-international.org/article/impact-of-facebook-ads-for-sexual-health-promotion-via-an-educational-web-app/179860

Knowledge Discovery and Data Mining Applications in the Healthcare Industry: A Comprehensive Study

Iman Barazandehand Mohammad Reza Gholamian (2016). *E-Health and Telemedicine: Concepts, Methodologies, Tools, and Applications* (pp. 1097-1118).

www.irma-international.org/chapter/knowledge-discovery-and-data-mining-applications-in-the-healthcare-industry/138447

Knowledge Management in Indian Companies: Benchmarking the Pharmaceutical Industry

John Gammack, Pranay Desai, Kuldeep Sandhuand Heidi Winklhofer (2005). *Creating Knowledge-Based Healthcare Organizations* (pp. 235-253).

www.irma-international.org/chapter/knowledge-management-indian-companies/7239

Digital-Enabled Project Management Nursing for Hemodialysis Patients With Renal Osteopathic Pain

Dongjiao Li (2026). *International Journal of Healthcare Information Systems and Informatics* (pp. 1-16).

www.irma-international.org/article/digital-enabled-project-management-nursing-for-hemodialysis-patients-with-renal-osteopathic-pain/408128