Network
Analysis

**NEW INSIGHTS INTO HEALTHCARE
FRAUD DETECTION**

FTI CONSULTING

EXPERTS WITH IMPACT™

Contents

Network analysis

Network analysis is visualizing and evaluating relationships and flows between people, groups, organizations, infrastructure, IT systems, biological systems and other connected entities. It helps to create simple, yet powerful tools and models for understanding the behavior of complex and interconnected data. Whether investigating social networks, terrorist networks, detecting fraud or spotting hidden trends in data, network analysis is key to provide insight in a world of complexity. While there are a variety of quantitative techniques available in the marketplace, none integrate FTI Consulting's cutting edge technology and experience to provide clients with hindsight, insight and foresight. Unlike static analytics, network analysis measures the relationship between interconnected groups and isolates the connectors and leaders in a group. Our Network Analysis team can assist outside counsel, insurance providers and payers, and human resources managers (among others) to prevent and/or detect red flags in their business practices.

Our Network Analysis service offerings include:

— Data Analytics

— Visualization

— Social Network Analysis

— Fraud Detection

— Insurance Claims Analysis

— Financial Markets

— Healthcare Litigation & Audits

— Labor & Employment Litigation/Compliance

— Statistical Sampling

— Class Certification
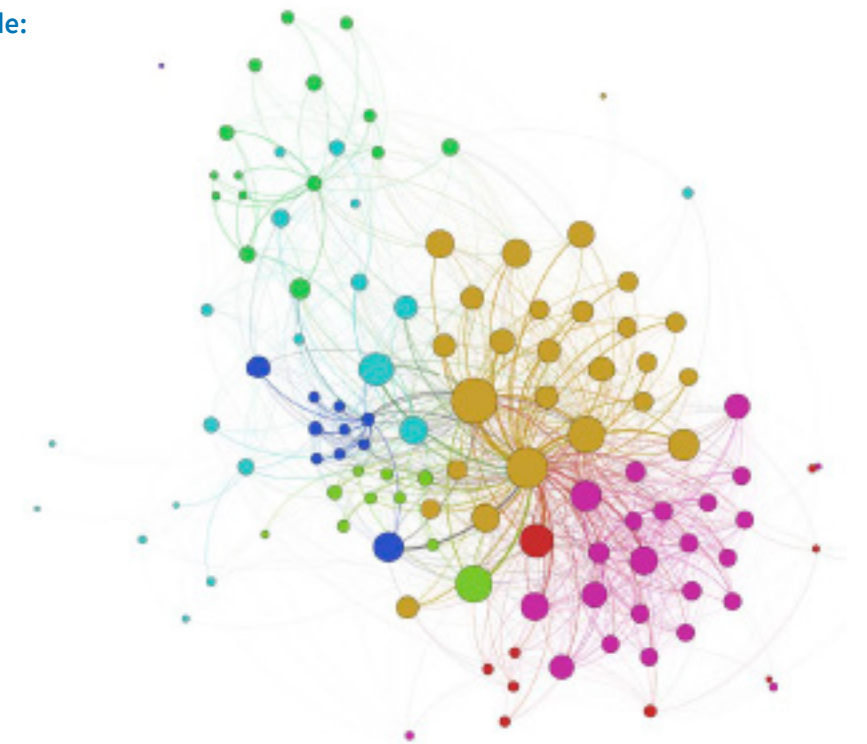
Detecting illicit behavior

FTI Consulting relies on a number of analytical methods, such as social network analysis and data visualizations, to detect fraud. We use our expertise to consolidate large disparate sources of data and perform rigorous analysis on the consolidated data to identify anomalies that help us detect fraud. For cases pertaining to the False Claims Act, our use of innovative techniques has revealed unexpected, yet systematic, relationships among physicians and other providers with respect to their common billing and claim submission patterns. These systematic relationships have been used in fraud detection and litigation proceedings to show the interconnectedness of fraud participants.

### Fighting healthcare fraud on offense or defense

Many organizations have either been victimized or are susceptible to fraud, waste and abuse. Traditional organizational approaches to fraud such as "pay and chase" often fail. In addition, the use of static analytics fails to recognize that fraudsters are clever, determined and adaptive. Whether your goal is to prevent healthcare fraud or to eliminate fraud that is occurring, network analysis is key to your success. While there are a variety of quantitative techniques available, none integrate FTI Consulting's cutting edge technology and experience that provides hindsight, insight and foresight to clients. Our network analysis can assist outside counsel, insurance providers and payers, and regulators to prevent or detect common types of healthcare fraud, including false medical certification, up-coding and unbundling, medical necessity, self-referrals, services not rendered, and prohibited services rendered.

Identifying the primary driver of healthcare fraud, waste & abuse—people

Traditional fraud detection methods based on claims, invoices and receipts data produce poor results. Even more sophisticated predictive models produce poor results and have little ability to identify the fraudulent activity. These data are not the fraud, waste and abuse itself, but are the symptoms of the fraud. The primary reason for such poor performance is that these techniques fail to incorporate any insights about the primary fraud driver – people. Our innovative methods build on your existing analyses, incorporating people and relationships into fraud detection to reveal previously unknown relationships, influences and commonality among the actual drivers of the illicit behavior.

Detecting elements and patterns of healthcare fraud, waste & abuse

Network analysis has already been successful at examining large amounts of data, visualizing relationships across claims, providers, patients and doctors, connecting seemingly disparate and unrelated parties and allowing for the discovery and recognition of new and unusual patterns of activity. Further, network analysis allows us to cost-effectively enhance traditional health care fraud detection and investigative techniques by identifying and quantifying the underlying drivers of fraudulent claims, fraudulent providers, and fraudulent beneficiaries. The results of a network analysis can also be very helpful in determining whether the illicit behavior is being performed sporadically by a rogue employee or systematically by an administrator at the top.
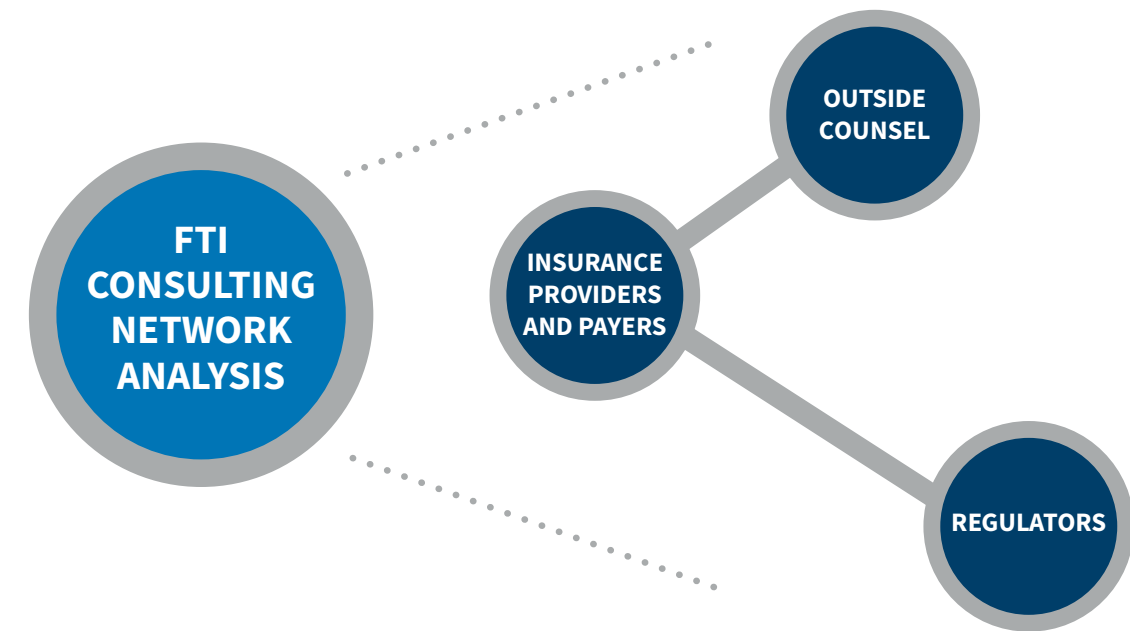
Doing the equivalent of an "MRI" scan of your data

Network analysis techniques, such as provider/ patient relationships and CPT/specialty clustering analyses, provide the ability to effectively identify and quantify data anomalies and other suspicious billing patterns. Traditional anomaly or outlier detection models typically identify a set of suspicious claims based on statistical models. These statistical models can be very reliable in terms of identifying claims that are truly fraudulent, but at the same time, they can also return a lot of "false positives." Our approach is to do the equivalent of an MRI, to mine deeper into your claims data and to identify key drivers of truly fraudulent claims. This process provides the ability to reduce the number of "false positives." In addition, it allows investigators to focus their efforts on claims that offer a high probability of requiring additional review.

Birds of a feather flock together

Fraudulent people are more likely to be connected to other fraudulent people and legitimate people are more likely to be connected to other legitimate people. This is often a reasonable assumption because of the strong and pervasive interaction between an individual and his/her social network. For the purposes of an investigation, this concept is important in establishing a data analytic approach to identifying the fingerprint, or DNA, of a fraudulent scheme or illicit behavior. The assumption that underlies the unique success of this type of analysis is that the perpetrators operate with a degree of regularity that exhibits a pattern in the transaction data. This can be revealed only through our network analysis.

Our experience in healthcare related topics

FTI Consulting's Network Analysis team has experience across the healthcare spectrum bringing unique insights and solutions to audit and litigation problems by being able to visualize and capture the complex relationships in healthcare data and allowing for solutions traditional analyses fail to capture.

The MRI into fraud, waste & abuse

For a large insurance plan, we provided a retrospective that detected fraud, waste and abuse for over $2.5 billion dollars of paid medical expenses over seven years. The plan involved over 60,000 patients and 200,000 providers and millions of data records. FTI Consulting was able to create dynamic visualizations and provide statistical analyses of the complex web of patient, doctor and provider relationships. These analyses allowed the client and outside counsel to focus on the entities perpetrating the fraud, waste and abuse and to take the necessary actions for recovery.

Fraud – false claims act

We have assisted clients and their outside counsel on numerous False Claims Act (FCA) cases involving suspicious claims being submitted to the U.S. Government. These FCA actions involved Medicare, Medicaid, Tricare and off -label marketing of drugs. Issues ranged from false certifications, inadequate documentation, and claim maximization to unqualified providers and unsupervised assistants. Our analyses involved complex statistical sampling and damage extrapolations including use of advanced network analysis.

Statistical sampling and damages experts

We worked with independent coding experts to provide a rebuttal damages claim regarding alleged overpayments from Medicare/ Medicaid. Statistical work is closely aligned with the guidelines of the U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, and the Medicare Program Integrity Manual to ensure all sampling procedures and extrapolation methodologies were appropriate. Econometric analyses have included survivor models that test whether temporary admission programs have led to inappropriate hospice care patient admissions.

Statistical sampling experts in healthcare claims audits

We served as statistical experts to assist a third party administrator in evaluating potential exposure from overpaid claims. Statistical sampling was used to determine overpayment exposure in three different strata: medical, surgical and VA services. In addition, statistical sampling guidelines from the U.S. Department of Health and Human Services were used to ensure consistency with industry standards.

Statistical sampling experts for a healthcare facility in defense of a ZPIC audit

Our role was to address potential deficiencies in the ZPIC's sampling plan and extrapolation methodology.

Statistical sampling experts in a large medicare/medicaid reimbursement healthcare litigation matter

We helped a healthcare provider extrapolate sample "underpayments" to the entire population of claims for a total "underpayment" amount. Statistical role was to examine plaintiff's damage analysis and the extrapolation methodology.

Expert witness

Results of our statistical work have been presented to the Securities and Exchange Commission and Department of Justice. We have successfully presented testimony in federal court in a qui tam false claims act matter, have been deposed by the U.S. Department of Justice, and have been cross examined by the New York State Office of the Medicaid Inspector General.

HOW WE WORK

— We communicate with the client to understand the problem.

— We communicate with the client to understand their data.

— We perform standard statistical analyses to identify the data of interest.

— We create preliminary network visualizations and analytics to see how the data assembles itself.

— We provide additional structure to the network(s) to observe more detailed relationships.

— We identify suspicious activity for further investigation and fraud, waste and abuse propensity metrics.

Example of our work

Detection of fraud, waste & abuse: large insurance plan

Case synopsis:

FTI Consulting was hired by a client to assist with the detection and quantification of fraud, waste and abuse related to a large self-insured health plan. Our review focused on the Insurance Plan's medical claims associated with over 60,000 employees, 200,000 medical providers, $2.5 billion in expenditures, over a seven year evaluation window. We were able to assist the client in detecting individual patients and medical providers that were likely perpetrators of fraud, waste and abuse. This was done by integrating the Plan's traditional fraud detection and internal audit procedures with advanced statistical and network analysis.

Insights:

FTI Consulting was able to identify for the client the patients and providers that were likely involved with waste, fraud and abuse. This allowed client and counsel to focus their limited budgets on high value recovery efforts. Also, we were able to assist the client in flagging suspected doctors, patients and providers to limit future exposure to illicit behavior.

RESULTS:

We provided the insights, evidence and visualization that assisted the client and outside counsel in recovering millions of dollars. Findings included:

— Discovery of fraud, waste and abuse in over 100+ medical providers

— Collusion of between patients and doctors for purposes of defrauding the Insurance Plan

— Failure of health plan's administrators to implement basic medical data, coding and medical necessity review procedures

— Discovery of fraud, waste and abuse in the purchases of medical equipment

— Recommendations on new compliance and monitoring for fraud, waste and abuse

— Recommendations for new statistical sampling and audit procedures

Healthcare fraud detection: limiting the search

The MRI into fraud, waste & abuse
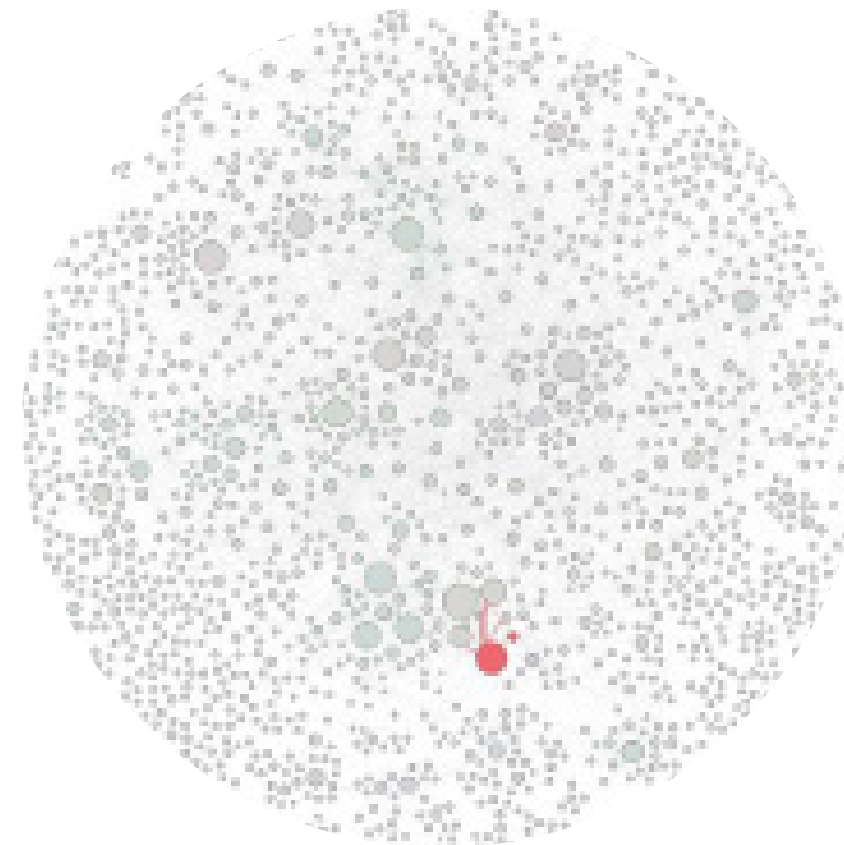
We used statistical "community" detection methods to identify those doctors and facilities that are working and collaborating together. These statistical communities allow for the network to be subdivided into visual communities or affiliations. Below is the same network of doctors/ providers where each "community" of doctors/providers are now of the same color. The zoomed in red community of doctors/providers is the one the two fraudulent doctors are members of. Of these 20+ doctors/providers in the red 'fraud' community, identified through FTI Consulting's analysis, 16 were found to have perpetrated fraud, waste and abuse for tens of millions of dollars. Something very difficult for traditional forms of analysis and fraud detection to identify.

Above is a network of doctors and providers linked through their medical billings and if they treated the same patient on the same day. The size of each of the doctor/provider node indicates the total dollars paid to the doctor/provider and the width of the link between the nodes indicates the total dollars paid to the doctors/provider on shared patients they both treated on the same day. We begin with visualizing these relationships and identifying a doctor and facility that were identified for fraud, waste and abuse.

This doctor and facility was also suspected of conducting business and other fraudulent operations through different names, facilities, ownership structures and other doctors. By mapping relationships in the medical billing data we start to identify other likely participants in the fraud we would likely not know about otherwise and allowed for prioritization and efficient use of client resources by focusing on other doctors closely associated with known fraudulent activities. Here are the doctors and providers directly associated with original two fraudulent doctor/facilities:
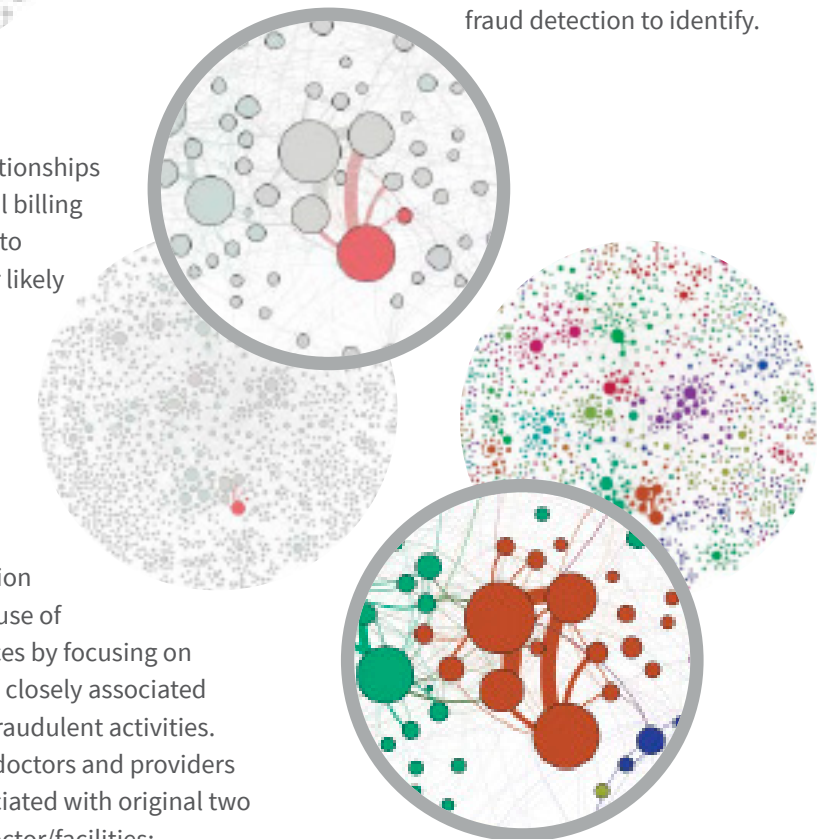
Network analysis team leaders

MICHAEL SALVE, PH.D.
Senior Managing Director
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Michael Salve is a Senior Managing Director in the Economic Consulting practice based in New York.

Dr. Salve is an applied economist with experience in advanced quantitative methods, statistical studies, healthcare claims sampling, False Claims Act matters, econometric modeling, ZPIC audits, network analysis and commercial disputes.

He holds a doctorate in economics, with concentrations in both applied econometric and statistical techniques and industrial organization. He has served as an adjunct faculty member at Hunter College in New York City where he teaches Econometrics, and Law and Economics in the graduate economics program.

Dr. Salve has extensive experience in designing statistical samples, developing complex extrapolation and benchmarking models, and evaluating achieved precision levels for clients in the healthcare industry. He also uses network analysis to reveal unexpected, yet systematic, relationships among admitting physicians, tending physicians and other providers with respect to their common billing and claim submission patterns.

ROBERT D. FUITE, CFA, MA
Managing Director
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Robert Fuite is a Senior Managing Director in the Economic Consulting practice based in Seattle. He is an applied economist and data scientist with extensive experience in litigation consulting, providing economic, financial, econometric, infographic and valuation analysis to clients involved in litigation, arbitration, and mediation. Mr. Fuite investigates complex legal problems through his expertise in the fields of economics, mathematics, statistics, and computer science.

He has a wide range of life sciences litigation experience including complex and big data analytics, false claims act litigation, designing statistical samples and extrapolations in healthcare litigation and constructing the appropriate database architecture for medical claim line/record review and analysis.

Mr. Fuite holds a Master's degree in economics, with a concentration in econometrics. He is a CFA charter holder and a member of the New York Society of Security Analysts.

Mr. Fuite uses his broad experience to designing statistical samples for extrapolation purposes in life sciences litigation and regulatory proceedings. He has also consulted with healthcare providers and a third party administrator to benchmark their statistical models and assisting with evaluating their sampling and audit programs.

About FTI Consulting

FTI Consulting is an independent global business advisory firm dedicated to helping organizations manage change, mitigate risk and resolve disputes. Due to our unique mix of **expertise**, **culture**, **breadth of services** and **industry experience**, we have a tangible impact on our clients' most complex opportunities and challenges.

OUR COMPANY

● FTI Consulting offices

With over **5,700** employees and offices in **27 countries** on six continents, our breadth and depth extends across every major social, political, and economic hub **around the globe**

Founded in **1982** and **$4.7BLN** equity market capitalization*

Advisor to **96** of the **world's top 100** law firms

53 of the **Global 100 corporations** are clients

Advisor to **8** of the **world's top 10** bank holding companies

OUR EXPERTISE

Trusted advisers serving clients globally with **diverse expertise** and **exceptional credentials** including accountants, economists, engineers, former CFOs, and strategists

We are a **global advisory firm** that provides multi-disciplinary solutions to **complex challenges** and **opportunities**

Expertise across a range of industries:

Construction	Healthcare & Life Science	Real Estate
Energy Power & Products (EPP)	Insurance	Retail & Consumer Products
Financial Institutions	Mining	Telecoms, Media & Technology (TMT)

We combine unparalleled **expertise** and **industry knowledge** to address critical challenges for clients

*Number of total shares outstanding as of April 23, 2020, times the closing share price as of April 30, 2020.

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EXPERTS WITH IMPACT™

FTI Consulting is an independent global business advisory firm dedicated to helping organizations manage change, mitigate risk and resolve disputes: financial, legal, operational, political & regulatory, reputational and transactional. FTI Consulting professionals, located in all major business centers throughout the world, work closely with clients to anticipate, illuminate and overcome complex business challenges and opportunities.

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