Advanced Analytics in Fighting Health Care Fraud – a Public and Private Perspective

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November 17, 2011

Making 2011 Headlines

Men sentenced in Medicare fraud case

Thursday April 7, 2011, Police News, Longview Texas

- 2 men pled guilty, sentenced to Federal Prison, $1.7M restitution.
- 500 Texas and Louisiana Medicare Beneficiaries Targeted, several other co-conspirators involved.
- Spanned August 2005 –April 2008, DME fraud.
- Marketing $5,000-$7,000 per “ortho kit” (braces, wraps, supports) not prescribed by physician, not ordered by Beneficiaries.
- Physician signatures forged, false claims submitted, identity theft, deceased beneficiaries.

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Largest Medicare Fraud Scheme Ever

February 2011, Department of Justice

- More Than **$225 Million in False Billing**
- Doctors, Nurses, Health Care Company Owners and Executives Among the **111 Defendants Charged**; Law Enforcement Agents Execute 16 Search Warrants
- Nine charged in Houston for $8 million in fraudulent Medicare claims for physical therapy, durable medical equipment, home health care, and chiropractor services.
- Five charged in Los Angeles for a scheme to defraud Medicare of more than $28 million by submitting false claims for durable medical equipment and home health care.
- Eleven charged in Chicago for conspiracies to defraud Medicare of $6 million related to false billing for home health care, diagnostic testing, and prescription drugs.
- DOJ Press release: “today’s operation is the largest-ever federal health care fraud takedown”.

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Marrero Woman Sentenced to Federal Prison for Health Care Fraud

THE UNITED STATES ATTORNEY'S OFFICE
EASTERN DISTRICT of LOUISIANA

June 2, 2011

- Louisiana woman sentenced to 1 year in prison , $65K restitution, 3 years supervised release.
- Personal care service (PCS) certified as provided to Medicaid recipients who never received benefits.
- Several other workers and the owner sentenced 2 years earlier.
- Total fraudulent losses: $3.98M paid to PCS provider and its employees.
- Solicited the mothers of Medicaid recipients, who were paid kickbacks for the use of their children's Medicaid ID numbers.

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THE FBI FEDERAL BUREAU OF INVESTIGATION

April 26, 2011

- Eight residents of greater New Orleans arrested – part of organized crime ring.
- $12M in fraudulent Medicare/Medicaid claims.
- 10 different clinics submitted diagnostic service claims for services not rendered or not medically necessary.
- Marketers and recruiters located, paid kickbacks to, and transported patients to and from clinics.
- Patients were given prescriptions for pain meds in return for undergoing unnecessary tests.

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What do they all have in common?

- Could have been spotted earlier with appropriate advanced analytics (each spanned years)
- Collusion (multiple parties)
- Crossing borders
- Outlier billing behavior

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The Financial Damage

- A Lucrative Endeavor:
  - As much as $800B lost to Fraud, Waste and Abuse annually in the U.S. alone
  - $78B (NHCAA) to $260B (GAO) is estimated to be true fraud.
  - Medicare and Medicaid alone lose over $70B annually to true fraud.
  - Losses are 100 times the credit card industry, but the spend to fight fraud is one tenth as much.
- Global Problem – losses due to health care fraud:
  - 3-10% in U.S.
  - 6% in European Union
  - 2-10% in Canada ($360M to $1.8B annually)
  - Other nations establishing anti-fraud agencies: Australia, South Africa
- "Professional" Fraud is on the rise:
  - Organized Crime
  - Collusion
  - Crossing Borders

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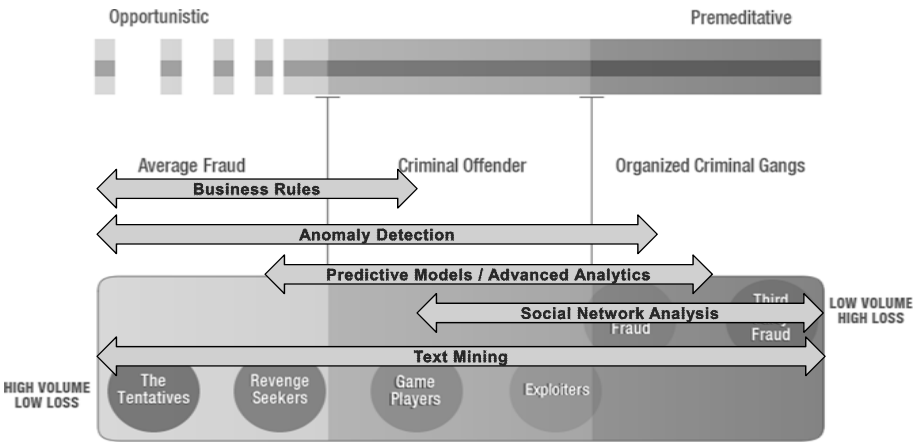
Solution: A Hybrid Approach



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Advanced Analytics are Required

Using hybrid analytics for fraud detection

Enterprise Data	For **known** patterns	For **unknown** patterns	For **complex** patterns	For **unstructured data**	For **associative linking**
Employer Data, Medical Procedure, Claims, Eligibility Data, Provider / Member, Referral, Known Bad Lists, 3rd Party Data	**Rules** Rules to surface known fraud behaviors Examples: • Inaccurate eligibility information • Unlicensed or Suspended Provider • Daily provider billing exceeds possible • CPT up-coding • Value of charges for procedure exceeds threshold	**Anomaly Detection** Algorithms to surface unusual (out-of-band) behaviors Examples: • Abnormal service volume compared to similar providers • Ratio of $ / procedure exceed norm • # patients from outside surrounding area exceeds norm	**Predictive Models** Identify attributes of known fraud behavior Examples: • Like patterns of claims as confirmed known fraud • Provider behavior similar to known fraud cases • Like provider/ network growth rate (velocity)	**Text Mining** Leverage unstructured data elements in analytics Examples: • Claim/call center notes high-lighting key fraud risks (e.g., policy questions) • Static data elements (e.g., address) used for linking suspicious activity • Integration of rich case file information	**Network Analysis** Associative discovery thru automated link analysis Examples: • Provider/claimant associated to known fraud • Linked members with like suspicious behaviors • Suspicious referrals to linked providers • Collusive network of providers & referrals

Hybrid Approach
Proactively applies combination of all approaches at entity and network levels

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Case Study - Public Sector

Gary Fuquay

How North Carolina Is Enhancing Their Program Integrity Efforts

Gary Fuquay- Fuquay Solutions

28 years in state government - Health and Human Services (HHS):

- State Auditor auditing HHS
- Assistant Controller for Mental Health, Developmental Disabilities & Substance Abuse Services
- Assistant Director for Division of Social Services, Budget and Management
- Controller for the Department of HHS
- Medicaid Director (Division of Medical Assistance) through 2005

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What Motivated NC Medicaid to Enhance Fraud Detection?

- Budget Pressures
- Growing Fraud Problem
- Health Care Reform Impact
- Innovative Thinking

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History in NC Program Integrity

- Historically – added staff in PI
- Patient Safety/Quality Concerns
- Iterative Evolution, Not final outcome
  - Strengthened controls
  - Use of advanced analytics
  - Better processes and use of data and systems
  - Specific areas:
    - » Provider enrollment
    - » Prepayment Fraud Detection

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Provider Enrollment Enhancement

- Ownership Disclosure
- Modifications to Credentialing Package
- Individual Disclosures
- MMIS enhancements
- Tighter controls on out of state providers
- Regulatory compliance
- Termination Rules
- Periodic Re-Credentialing

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Prepayment Enhancements

- Recognition that less than 10% of improper payments are recovered if done “pay and chase” – need for prepay review.
- Frequent Eligibility Verification Needed
- Enhanced State Legislation to support prepayment reviews
  - Credible allegation
  - Data outliers
  - Prepay review until he “cleans up his act”
- Edit and audit enhancements to MMIS by 2013

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Traditional Post Pay Fraud Detection Enhancements:

- Certification and Training of Staff
- Storage and Case Tracking Software
- Staff Additions
- MMIS enhancements
- Advanced Analytics (anomaly detection, predictive models, link analysis)

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Criminal Justice Law Enforcement Data Services (CJLEADS)

- Leveraging the power of ALL the data
- Clearer picture of an offender for Law Enforcement
- 2 objectives:
  - Comprehensive view
  - Watch list and alerting system
- Award winning

http://www.governor.state.nc.us/newsitems/PressReleaseDetail.aspx?newsItemID=1934

- CJLEADS website is https://cjleads.nc.gov

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Case Studies - Private Sector

Ted Doyle

"The right way to play the fraud-control game is to rely on people and to equip them with the very best technical tools available. If our major health insurers make the mistake of trusting systems to play the fraud-control game for them, we all lose. Fraud perpetrators run rings around such defenses."

License to Steal: Why Fraud Plagues America's Health Care System, Malcolm Sparrow, Westview Press 1996, p. 140

Perspective – What are the numbers?

- **$2.5T** – Amount the U.S. spent on health care in 2009[1]
- **$200B** – Estimated amount lost to fraud[2]
- **$124M** – Estimated amount paid for fraudulent claims submitted by Top 10 Most Wanted fraudsters[3]
- **903** – Number of new health care fraud prosecutions initiated in the first 8 months of 2011 (85% increase over FY 2010)[4]
- **$17.3M** – ROI for every $2M spent on fraud recovery[5]
- **50x >street value** – Medical identity vs. financial identity[6]

[1]NHE Fact. Sheet https://www.cms.gov/NationalHealthExpendData/25_NHE_Fact_Sheet.asp#TopOfPage
[2]October 2009 Thompson Reuters Report. http://www.reuters.com/article/2009/10/26/us-usa-healthcare-waste-idUS TRE59POL320091026.
[3]NHCAA. http://www.nhcaa.org/eweb/StartPage.aspx
[4]Coalition Against Insurance Fraud. http://www.insurancefraud.org/healthinsurance.htm
[5]Ibid
[6] McKay, Jim. "Identity Theft Steals Millions from Government Health Programs." *Government Technology*. Feb. 13, 2008. Available online at www.govtech.com.

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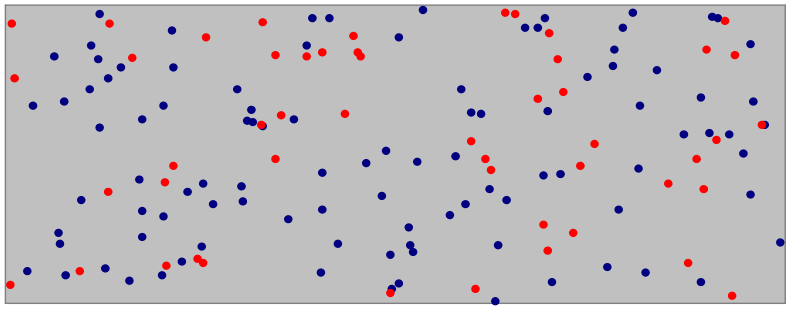
The Challenge of Improper Claim Detection



- This space represents the universe of claims
- Manual clinical review is impossible for entire space
- Goal: Stop as many reds (improper) for review as possible while keeping the number of blues (proper) identified to a minimum

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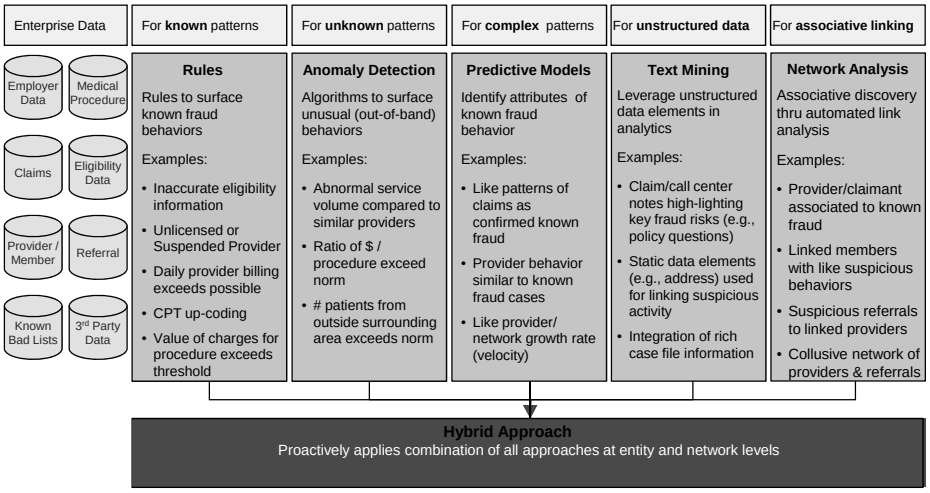
Refresh - Advanced Analytics are Required

Using hybrid analytics for fraud detection



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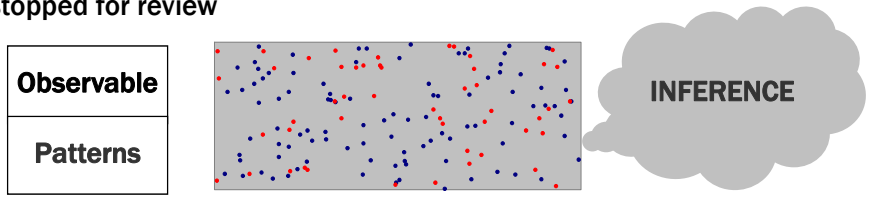
Pre-Pay Fraud and Abuse Detection Methods

Provider Flags – a list of known providers with issues is compiled and all or a subset of claims are stopped for review

Challenger Analytics – outlier analysis & soft rules create dynamic provider flagging



Aberrant Billing Pattern (ABP) Algorithms – clinical expertise crystallized into coding logic, patterns are identified at the claim level

Predictive Model – detecting more advanced improper billing patterns using interactions among many variables

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Healthcare Fraud by Dead MD's

- Dead Doctors Used to Scam Government Money
  - http://hsgac.senate.gov/public/_files/OPENINGSTMTCarlLevin7908.pdf
  - Senate Hearing Viewable at: http://hsgac.senate.gov/public/index.cfm?FuseAction=Hearings.Hearing&Hearing_id=eb856347-01f1-4b55-826e-a9bf5247072c
  - Fraudulent providers submitted claims based on "orders" from some doctors who were **dead for 10 years or more**
  - From 2000 to 2007, Medicare **paid between $60M & $93M for** claims where the "ordering" or prescribing doctor had been **dead** for **at least 12-months**

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Billing for Members not Seen or Deceased

- Aug. 2011 - Physician indicted on charges that he committed more than $100,000 in health care fraud by billing for patients not seen — or who were dead
  - 27 counts of health care fraud, punishable by up to 10 years in prison
  - three counts of mail fraud, punishable by a maximum of 20 years
  - one count of aggravated identity theft, punishable by a mandatory two years
- Allegedly billed for "office visits during times when patients were not present, out of town and hospitalized, at times when defendant was outside the US States, and at times when office was closed
- Court records allege that more than $100,000 was fraudulently billed
- http://www.mysanantonio.com/news/local_news/article/S-A-doctor-indicted-in-healthcare-fraud-case-1697720.php#ixzz1UTzJOPdH

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Billing for the Deceased

Healthcare Fraud by Dead MD's

- Detection Method
  - Matching: member and provider info to deathmaster file
  - Anomaly Detection: address aberrant behavior for suspect providers in relation to peers provider profile and member profile
  - Rules then to address established behavior of billing for "deceased scenario"

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Fraudulent Billing for "Ordered Services"

- Independent Diagnostic Testing Facilities (Labs)
- Clinical Testing Laboratories; Durable Medical Equipment
- Home Health Services; Hospice Services

EQUALS

- Tests & Equipment Not Really Ordered and Likely NOT Performed
- Tests For Which A Clinical Relationship Does NOT Exist

DETECTION

- Anomaly Detection: Algorithms to surface unusual behaviors
  - Abnormal service volume compared to similar providers
  - Ratio of dollars to procedure exceed norm
- Network Analysis: Associative discovery thru automated link analysis
  - Provider/claimant associated to known fraud
  - Linked members with like suspicious behaviors
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  - Collusive network of providers & referrals

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Anorectal Manometry

- **March 2010: California Medical Clinic Owner Convicted in $3.4M Fraud Scheme**
- Clinic owner found guilty of 22 counts of health care fraud and six counts of money laundering for a scheme that billed more than $3.2 million in only one month for medical services that were not provided
- Charges related to approximately 6,000 health insurance claims for more than 800 patients supposedly treated at clinic, USA Independent Medical Corp
- No patients received medical services, and no doctors provided any medical services
- USA Independent billed for services such as echocardiography, office evaluations, ultrasounds, electromyography studies of the anal or urethral sphincter, and **Anorectal Manometry.**
- **Recently sentenced to 5-years in state prison and financial restitution**
- **Medicare paid over $30 Million for suspected fraud related to ARM (CPT: 90911, 91010, 91122, 43236)**

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Anorectal Manometry
Detection Method & Lessons Learned

- **How does fraud or "over-utilization" like the ARM Occur?**
- **How can it be prevented?**
- **How can it be detected?**

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Anorectal Manometry – Detection Advanced Analytics are Required

For **unknown** patterns	For **complex** patterns	For **associative linking**
Anomaly Detection Algorithms to surface unusual (out-of-band) behaviors Examples: • Abnormal service volume compared to similar providers • Ratio of $ / procedure exceed norm • # patients from outside surrounding area exceeds norm	**Predictive Models** Identify attributes of known fraud behavior Examples: • Like patterns of claims as confirmed known fraud • Provider behavior similar to known fraud cases • Like provider/ network growth rate (velocity)	**Network Analysis** Associative discovery thru automated link analysis Examples: • Provider/claimant associated to known fraud • Linked members with like suspicious behaviors • Suspicious referrals to linked providers • Collusive network of providers & referrals

Hybrid Approach
Applies combination of multiple approaches at entity and network levels

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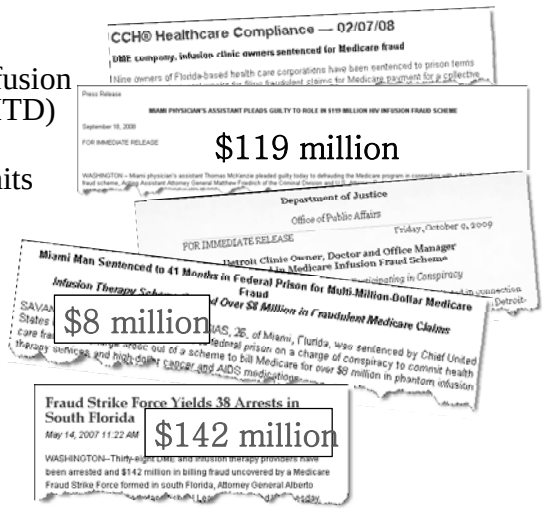
Infusion Therapy

- Scheme: Over-utilization of Infusion Therapy Drug (ITD) codes
  - Excessive units
  - Excessive frequency of service
- Costly services
- Small # of patients



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Infusion Therapy

- Scheme targets vulnerable populations
  - Lower income/high unemployment
  - HIV diagnoses
  - Fraudsters buy member IDs
    - o From other fraudulent providers (list sharing)
    - o From patients themselves – offer kickbacks
      - ✓Cash
      - ✓Prescriptions, drugs, appliances, food
- Providers enlist physician complicity or bill using their provider number without doctor knowing
  - Often older physicians
  - Pay kickbacks for referrals
- Providers enroll with Plan to get new provider number

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Infusion Therapy Detection Approaches

- Scheme involved billing excessive units and frequency of costly drugs and billing for a small # of patients with only a few E&M codes being billed (patients not really being seen by the treating docs
- Indications that fraudulent providers were buying member IDs
- Retrospective detection involved looking for paid claims with a pattern of utilization of infusion therapy codes with a high number of units (high dosage), variety of Infusion Therapy Drug (ITD) codes billed, small number of patients, and high reimbursement rate due to high frequency of service delivery for these codes
- Patterns of the same diagnosis codes were detected
- Patterns of drugs billed daily that should not be administer daily from a clinical perspective or medically appropriate perspective

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Infusion Therapy Detection Approaches

Detection

- Predictive Scoring Model (PSM)
- Peer Grouping
- Provider Profiling
- Link Analysis
- Static Code Analysis
- Prospective Rules

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Mirzoyan-Terdjanian "Family"– Organized Crime

- **73 Members and Associates of Organized Crime Enterprise, Others Indicted for Health Care Fraud Crimes Involving More Than $163 Million**
- The international organized crime enterprise known as the Mirzoyan-Terdjanian, fleeced the health care system through a wide-range of money making criminal fraud schemes. The members and associates located throughout the United States and in Armenia, perpetrated a large-scale, nationwide Medicare scam that fraudulently billed Medicare for more than $100 million of unnecessary medical treatments using a series of phantom clinics
- Seventy-three defendants, including a number of alleged members and associates of an Armenian-American organized crime enterprise, were charged in indictments across five states with various health care fraud-related crimes involving more than $163 million in fraudulent billing
  - Defendants operated at least 118 different phony clinics in 25 states

Source: Dept. of Justice. http://www.justice.gov/opa/pr/2010/October/10-dag-1140.html
http://en.wikipedia.org/wiki/2010_Medicaid_fraud

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Social Network Analysis Makes Collusion Visible

- Optimal Social Network Analysis (SNA) identifies relationship clusters leveraging “big data” and advanced linking to reveal the relationships that organized criminal networks try so hard to keep hidden, enabling the effective investigation and termination of insidious and costly fraud rings
- SNA which leverages the right data and analytics can reveal
  - Patient relationships with known perpetrators of health care fraud
  - Links between recipients, businesses, and assets, as well as relatives and associates
  - Links between licensed and non-licensed providers
  - Suspect relationships of employees, suppliers, and partners with patients and providers

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Identification of “Unlikely” Claims Multiple Methods

Predictive Models & Analytical Targets

Codes that can be used to bypass conventional claims edits

Provider’s historical prevalence of up-coding

Hours of work

Changes in provider behavior particularly involving increasing of claims filed such as:

Likelihood that certain claims should have been grouped

Scores based on multiple factors

Dimensional Modeling Anomalies Flag Claim as High Risk for “Overpayment”

- Unlikely or infrequent relationships
  - Between diagnosis and procedures within a claim
  - Between procedures from different claims for the same patient

Peer Comparison Approach

- Outlier within specialty/region for performing high cost procedures based on synthetic (data-driven) specialty groupings
- Outlier for ordering certain tests or treatment

These are some examples of the issues identified in pre-pay analytics

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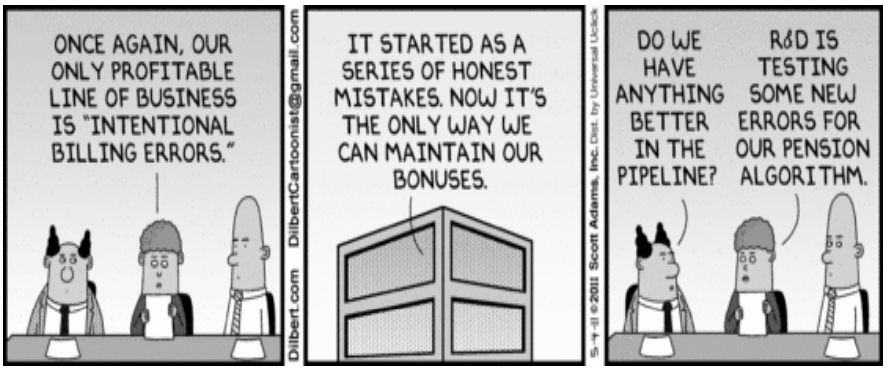
Fraudsters Use Advanced Techniques
Advanced Analytics are an Absolute



Dilbert Cartoon May2011

http://dilbert.com/strips/comic/2011-05-04/

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In Summary

- ***Hybrid Analytical Approach*** could have found all "headline makers" sooner, and captured multiple parties involved.
- Public Sector has the ***same challenges*** as the private sector.
- As ***identity theft and collusion*** become more prevalent in health care, the analytical methods necessary to spot them need to become more advanced.
- Time is money – let your investigators work on the highest probability, highest ROI cases first – ***efficiency*** gains.
- It is important to use ALL the data available in a singular view.

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