Experience of the Zato Health Team and the Zato Health Interoperability Platform Processing Electronic Clinical Records to Extract Clinical Quality Measures

Discussion with Connecticut HIT Council

Jan. 15, 2016

Zato Health Team Experience with Computer Assisted Coding and Extraction of Medical Knowledge from Clinical Data

- Dr. Daniel Heinze, Founder and CTO of Zato Health was previously Founder and CTO of A-Life Medical and inventor of LifeCode® software

- A-Life and LifeCode® were acquired by the largest US health insurer, UnitedHealth in 2010.

- LifeCode® is a product of OPTUM – the health services platform of UnitedHealth

LifeCode® - Invented by Dr. Daniel Heinze

- Patented Natural Language Processing (NLP) for computer assisted coding
- Assists medical coders and clinical abstractors by reading clinical documentation
- Deciphers the meaning and context of words within medical records
- Makes sense of doctor/patient interactions
- Correctly codes diagnoses and procedures of patient care for insurance purposes
- Recommends appropriate and compliant ICD-9 and CPT-4 codes
- Reduces the costs of manual claims coding and speeds the reimbursement process
- More accurate efficient coding; enhances productivity
- At the core of OPTUM 360^{0TM} clinical documentation improvement
- Has successfully processed hundreds of millions of medical records

Zato Health: A New Generation of Integrated Software Functionality for Healthcare Data Interoperability

➤ *Seamlessly integrated software to improve care quality and cost effectiveness*

1. *Next-Gen **extraction of medical concepts and ICD-10 coding** from diverse clinical data, leveraging a comprehensive medical ontology*

2. *Data normalization, indexing, **edge processing for de-centralized analysis** across different EHR vendor databases and other healthcare data silos*

➤ *Improved quality of clinical documentation, billing, performance measures*

➤ ***Fully verifiable** via links to highlighted evidence in the source clinical data*

➤ ***Standardized performance reports** to meet payment performance requirements of State, Federal, and private payers*

Zato Health Comprehensive Semantic Ontology

Leveraging relationships among:

- **Clinical anatomy**

- **Diseases**

- **Symptoms, Observations**

- **Medical tests**

- **Findings, Diagnoses**

- **Treatments, Procedures**

- **Morphological abnormalities**

Examples of Healthcare Applications Enabled by Zato Health

- Clinical Documentation Improvement

- Risk stratifying patients

- Automated coding & billing to ICD-10 standards

- DRG Dashboard for proactive monitoring of DRGs

- Patient quality measure reporting (GPRO-EZ)

- Reporting Meaningful Use measures

- Cross clinical and genomic variant data analysis simultaneously

- Effective and efficient search for patient clinical care and audits

- Real time monitoring and quality alerts for evidence based intervention

Extraction and Analysis of Clinical Data from a Cerner EHR Data Repository for a Multi-Hospital Provider

- NLP medical knowledge extraction, coding, indexing of 2.2 million clinical records and millions of lab records of 230,000 patients extracted from Cerner EHR

- Clinical data normalized and indexed for demonstration of DRG Dashboard application and Clinical Documentation Improvement

- HIPAA compliant live demonstrations of capabilities may be arranged upon approval by Baystate and execution of confidentiality agreement.

- Implications for cost savings by further automation of chart reviews

- Verifiability of reported data by automatic hyperlinking to evidence

- Low staff requirement and cost for a pilot and evaluation

Extraction of Medical Knowledge from Clinical Data for Correlation with Genomic Data

- Initiative of UCONN Medical School

- De-identification of EHR clinical records, while preserving full fidelity of the medical knowledge in the clinical data. Low site staff time.

- Enabling edge analysis in parallel across outpatient data, inpatient data, diagnoses, medications, imaging studies, test and procedure results, lab and pathology results, demographics, genomic variants

- Objective: to enable discovery of novel genetic variants that are associated with diseases or pharmacogenomics phenotypes

- Extending research data reach to accelerate research discoveries

Additional Zato Team Experience - Anita Karcz MD MBA

➢ Emergency medicine physician

➢ Co-founder of Institute for Health Metrics

➢ VP Product Development InterQual

➢ Over 20 years innovating with electronic clinical data

➢ Experience with different EHR vendor systems

➢ Worked with data from 100 providers to produce clinical quality measure reports, processing over 20 million clinical records in the past 5 years

Dr. Karcz' Use of Electronic Clinical Data for Quality Measures

➢ Quality initiative experience (MU, IQR, PQRI, etc) from both a clinical and informatics perspective

➢ Managing/evaluating pilots/projects using electronic clinical data

➢ Institute for Health Metrics site PI for 4 federal grants:

➢ AHRQ-physician practice quality reporting from EMR

➢ NCI-comparative effectiveness of therapies for breast cancer,

➢ NHLBI-anticoagulation therapy and VTE post total joint replacement

➢ CDC-early diagnosis and clinical outcomes in sepsis

Remaining Slides are not part of the presentation.
They are available for reference during Q&A

1. Analysis of Clinical Data in the DRG Dashboard Application Progress Status and Implications

- Live demonstration for DRGs of Pneumonia and Congestive Heart Failure at

  https://www.youtube.com/watch?v=93IbgDbc5G0

- Rank ordered risks calculated for each DRG across patients

- Rank ordered risks calculated for each patient for each DRG

- Easy toggle from dashboard view to source medical record with highlighted evidence

- Easy to use, non-intrusive, highly productive tool for Clinical Decision Support, early intervention, improved outcomes

DRG Dashboard: Productivity for Bundled Payments and Intervention

2. Virtual Data Lake of Clinical and Genomic Variant Records Progress Status and Implications

- Live demonstration of next-gen NLP extraction and edge processing across multiple databases of multiple organizations with data centers in New York and Massachusetts at

  https://www.youtube.com/watch?v=omJfbNLUt90&feature=youtu.be

- Live demo of fusion of results over multiple private and public networks

- De-identified clinical data and genomic variant data – 8 billion records

- Unified global view from single pane of glass

- Scalability for nation-size virtual data lakes that are interoperable

Navigation of Clinical Records by Facets

Extraction of ICD-9-CM Codes from Medical Records

Extraction of Labs, Procedures, and Substances Taken

Zato Data Security, Tracking, and Accountability for Oversight, Compliance, Auditing, Comparison of Cost Effectiveness

➢ All Data and indexes remain where the data are created, stored, and protected

➢ All data access is subject to user role-based discretionary access control

➢ Optional download encryption and control under Digital Rights Management

➢ Security enforced and sharing permission controlled at each organization

➢ Server-to-server security; cross-network data encryption end-to-end

➢ All user activity is logged at the source for tracking, with global analysis of logs

➢ Successful financial fraud interdiction in the Intelligence Community processing Suspicious Activity Reports across all US banks under the Bank Secrecy Act

➢ Successful cross-domain implementation controlling security across multiple security domains and networks in parallel from a single unified interface

Differentiation of Combined Capabilities

➢ **Data transparency** normalizes, indexes, filters EHR data, HL-7 data, other data

➢ **Interactive query, analysis** from unified interface ('single pane of glass')

➢ **Batch analysis:** high productivity, flexible output to reports or other applications

➢ **Automatic recognition and extraction of medical concepts** 'on the fly' in context

➢ **Global navigation across data sources in parallel** by context, concepts, facets

➢ **Current awareness** from continuous monitoring, real-time filtering, alerting

➢ **Dynamic iterative knowledge discovery and visualization** across data sources

➢ **Seamless system integration and interoperability** with APIs and Web interfaces

➢ **Integrated medical ontology, automated medical coding, and medical NLP**

Differentiation of Performance

- **Massive Scalability** across decentralized application repositories, with capacity for scores of petabytes, trillions of records and documents

- **Consistent global relevance ranking accuracy as** data volumes increase and number of nodes increases across data centers

- **Consistent response time performance** as data volumes increase and number of nodes increases across data centers

- **Efficiency over existing networks** with heavy processing loads at the edge

- **Cross-Domain access control security** executed at the edge

- **Unobtrusive** to local production information systems during query and analysis across production data repositories

Zato Health Summary Slide

➢ Seamless integration of unique next generation capabilities for integrated NLP extraction, ICD-CM-10 coding, semantic medical ontology, edge-processing

➢ Team track record for new product innovation resulting in improved accuracy, user productivity, scalability, cost savings in massive production systems

➢ Unique capability to normalize data from multiple EHRs and other health application data silos and enable de-centralized analysis and quality reporting

➢ Risk stratification capabilities to impact cost effectiveness of healthcare

➢ Continuous monitoring and discriminating unobtrusive alerts to improve intervention at the point of care and reduce readmissions

➢ Revolutionary pricing model affordable to every provider with pilot offering and try-before-buy offer for IBM/Zato Power Linux appliance

Contact Information for Questions
or to Request a Technical Presentation

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