NLP: Value Based Care

Dr. Hon Pak, MD FAAD
Chief Medical Officer

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3M Health Information Systems (3M HIS) delivers performance measurement and management solutions to optimize the revenue cycle, lower costs, and improve quality outcomes.
A Shift to Value-Based Care Requires More Sophisticated Instruments... and a Broader Data Set to Drive Performance
We use methodologies and classification systems to achieve Value Based Care.

We look at whole person, not a specific disease.

We “get it” - years of experience with populations, provider performance, and payment design.

We use a specific well-accepted process to attribute a person to a provider.

We understand the characteristics of an attributed population:
- Sociodemographic Factors
- Risk & Burden of Illness
- Utilization, Access to Care, Total Cost of Care

We apply a categorical model:
- Classifying persons to a risk group based on clinical condition and severity of illness
- Linking this to expected resource consumption and payment

We calculate preventable events and conditions and identify opportunities to improve care and reduce unnecessary costs.
Value-Based Care: It’s More than Clinical Data
Determinants of Health Outcomes – Clinical Care

Clinical Care is estimated to represent only 20% of overall outcomes (measured by length and quality of life).

Market needs a greater amount of actionable data, validated measurement and tools.
Most clinical data is in an unstructured form and not readily available for use.

- **20%**: Structured content that is currently mined for bill dropping.
- **80%**: Unstructured data in free-text fields, dictated content, disparate systems.
Natural Language Processing in Use

- Researchers at MIT in 2012 were able to attain a **75 percent accuracy rate** for deciphering the semantic meaning of specific clinical terms contained in free-text clinical notes, using a statistical probability model to assess surrounding terms and put ambiguous terms into context.

- Natural language processing was able to take the **speech patterns of schizophrenic patients** and identify which were likely to experience an onset of psychosis with 100 percent accuracy.

- Researchers from the University of Alabama **found** that NLP identification of reportable cancer cases was 22.6 percent more accurate and precise than manual review of medical records. The system helped to separate cancer patients whose conditions should be reported to the Cancer Registry Control Panel from cases that did not have to be included in the registry.

- In 2013, the Department of Veterans Affairs **used** NLP techniques to review more than 2 billion EHR documents for indications of PTSD, depression, and potential self-harm in veteran patients. The pilot was 80 percent accurate at identifying the difference between records of screenings for suicide and mentions of actual past suicide attempts.
Suicide is the 4th leading cause of death for Americans aged 15–65
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• Patients at risk for suicide often come into contact with primary care providers, many of whom use electronic health records (EHRs) for charting.

• Among the patients with NLP-processed HPI data (n=15,761), 1,025 had an indication of suicidal ideation recorded in their HPI note(s) by their clinician

• Of these, a mere 3% (n=30) had a corresponding ICD-9 code indicating suicidal ideation recorded in their EHR
Natural Language Processing (NLP): Surfacing concepts that improve performance of any healthcare organization

Unstructured, unusable clinical data, manually extracted.

Data Information Extraction

UDM NLPaaS

- E&M Coding
- HCC Identification
- CDI Edits
- Quality Reporting
- Clinical Decision Spt
- Claims/Coding Audit
- Other Uses
- Registry

Optimized Revenue

Improved Quality Outcomes

Operational Efficiencies
WHAT ARE THE CHALLENGES OF INTEGRATING NLP TOOLS INTO CLINICAL CARE?

• Natural language processing technology is already embedded in products from some electronic health record vendors, including Cerner Systems, but unstructured clinical notes and narrative text still present a major problem for computer scientists.

• Reliability and accuracy are still evolving: Limitations of our language and how we use it. Reliability and accuracy requirements vary depending on the use case

• Using NLP to fill in the gaps of structured data on the back end is also a challenge. Poor standardization of data elements, insufficient data governance policies, and infinite variation in the design and programming of electronic health records have left NLP experts with a big job to do.
Natural Language Processing

Today’s Use Cases
1. Conversational documentation.
2. Computer-assisted coding (CAC).
3. Clinical documentation improvement (CDI).
4. Clinical alerts (HCCs)

Tomorrow’s Use Cases
1. Clinical Decision Support (CDS)
2. Precision Medicine
   - Genomics
   - DOH
   - PRO

Tomorrow’s Technology =
NLP + Machine Learning +
Categorical Data Model (Methodologies) + Knowledge Domain (Ontologies)
Questions

• Hon S. Pak, MD FAAD
• hspak@mmm.com
• 304-906-9463