Pre-NLP Payor-Based Clinical Decision Support and the Potential of NLP

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CDS Enables Actionable Population Care

**Precision Alerts**
Timely Action On Patient-Specific Gaps in Care & Events

**Real-Time Analytics**
Quality Measures, Registries & Predictive Risk Models

**Care Coordination**
Team Workflow & Coordination Tool Suite

**Patient Engagement**
PHR, Mobile, eVisits, Portal for Education + Navigation + More
CDS Finds Individualized Opportunities for Health Care Improvement & Risk Reduction

Collect Patient Data

Compare to Evidence-Based Medicine

Identify Risks & Communicate Gaps in Care
Basic Clinical Decision Support Helps at Some Steps

Diagnose & Evaluate
- BMI >25 & Age >40, need diabetes test

Prevent & Monitor for Complications
- Need A1c blood test
- Need Eye Exam
- Need Routine Vaccine

Manage Disease & Complications

Medication Safety
- Drug interactions

Much of clinical decision support is fairly basic today.
Advanced CDS Helps at Every Step of Care

**Diagnose & Evaluate**

- BMI > 25 & Age > 40, need diabetes test
- High random blood sugar, need test
- Gestational diabetes, need diabetes test
- Metabolic syndrome, need treatment

**Prevent & Monitor for Complications**

- Need A1c blood test
- Need Eye Exam
- Need Foot Exam
- Need LDL cholesterol blood test
- Need Vaccines for Influenza, Pneumonia
- Need kidney damage urine protein test
- Need kidney function blood test
- Need Peripheral Artery Disease Test

**Manage Disease & Complications**

- High A1c, no meds, need metformin
- High A1c, on meds, need to intensify
- Very high A1c, need insulin
- LDL > 100, no meds, need statin therapy
- LDL still high, on meds, need intensify
- Kidney damage, need ACE inhibitor / ARB
- Hypertension, need ACE inhibitor/ARB
- Age > 40, need aspirin

**Medication Safety**

- Metformin danger conditions, need tests
- Glitazones, liver damage, tests needed
- Drugs that worsen blood sugar levels
- Statins – liver, muscle damage warning
- Pramlintide – danger with gastroparesis
- ACE inhibitor/ARB side effects (e.g. potassium)
- Oral contraceptives – danger with diabetes
- Aspirin & ulcer risk, need ulcer protection

These are real alerts that cover the spectrum for just one disease.

CareEngine CDS library covers 200+ conditions.
National-Scale Claims-based CDS Alerting

2011 Statistics

- 5000 rules
- 1453 gaps in care
- 200+ conditions
- 180+ measures
- 22 Million covered lives
- 4.8 Million provider alerts per year
- 7.4 Million patient wellness alerts
- 584k FDA-style patient alerts

Note: claims-based CDS = 91% concordance with EMR “validity” (AMIA Annu Symp Proc. 2008 Nov 6:1171); HIE data will improve true-positive rate
Lessons Learned from CDS Work and areas where NLP may help

Current ‘real world’ data is structured but noisy
- Diagnosis claims often inaccurate due to coding errors and ‘rule outs’
- Rule coding logic can mitigate this
- Claims lag is an issue especially for ICD & CPT data.

Sensitivity vs Specificity
- Patient-specific alerts need to be ↑specific and ↓sensitive: MDs hate false positive alerts! Also concern for potential alert fatigue.
- CDS rules address with ‘tight’ inclusionary & exclusionary logic
- Population-based quality measures need to be ↓specific and ↑sensitive particularly for measure numerators

“Absence of Evidence does not equal Evidence of Absence” (Carl Sagan)
- Current CE/CDS uses insurance and Rx eligibility as evidence of absence (i.e. ‘we would have seen it in the data’) for errors of omission
- This can lead to false positive alerts
Published Studies of CDS Demonstrate Real Quality Improvement & Cost Savings

**MEDICAL ERRORS:** 46/1000 potentially serious medical errors were identified

**HOSPITALIZATIONS:** 8.4% fewer hospitalizations

**PAID CLAIMS:** $8.07 PMPM lower across the study population

**CHARGES:** Average PMPM charges (vs. paid claims) in the treatment group were reduced by $21.92 (6.1%) vs. control group

**HOSPITALIZATION:** 95% of savings was due to decreases in inpatient charges and associated professional charges

**CAUSALITY:** After the study, both groups received CareEngine services, and differences between the groups disappeared
ACOs Shift Provider Focus to Population Health Management

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Accountable Care Solutions (ACS) Vision

- Clinical Data Integration
- Secure Data Exchange

- Leading consumer mobile app
- Symptom-to-Provider pathway
- Navigation, access, appointments, registration

- iTriage
- iNexxx

- Aetna
- ACTIVEHEALTH MANAGEMENT

- Intelligent provider interface
- Cloud-based application store
- Rapid/viral distribution

- Population-based clinical intelligence, decision support, disease registries and alerts
- Care Management, communication and workflow technology
- Personal Health Record
Aetna ACS Technology Overview

Goal: develop and deploy a technology solution dedicated to ACOs and integrated across multiple platforms

- Deploy integrated technology stack specifically designed to manage ACO clinical & financial operational needs
  - Integrate ActiveHealth, Medicity, CentriHealth, iTriage into turn-key, easily deployable solution that can be on-premise if required
  - Leverage ActiveHealth quality algorithm development process, add efficiency algorithms
  - Develop automated care management processes

- Create new integrated clinical and claims data warehouse for ACO performance management, population based reporting, and clinical quality and outcomes measurements

- Create 5 Pioneer labs which develop incremental intellectual property which reside on technology stack
Potential for NLP in Aetna & ACO World

Medicity HIE
ICD·CPT·NDC·LOINC
SNOMED·UMLSID

iNexx NLP app

Unstructured Data

Auto UM
Faster
Prior Auth
↓Manual Work

CDS
Alerts
Registries

iNexx is an app store & SDK that runs across EMRs, hospital & lab systems, on Medicity HIE technology.
Thank you.

(Paved with NLP)

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