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Solving Behavioral Health Service Delivery Challenges: Why You Need To Be Thinking About AI..

May 23, 2023

1pm EST

Agenda

Presenters Intro

Learning Objectives

Value of AI in Comprehensive Healthcare

AI and Medication Management

AI and Clinical Documentation

AI and Clinical Decision Making

AI Chatbots and Mood Trackers

The Future of AI and Healthcare

Questions and Answers

Presenter

Dr. Colin Banas, Chief Medical Officer, DrFirst

Colin is an Internal Medicine Hospitalist and former Chief Medical Information Officer for VCU Health System in Richmond, Virginia. He has testified before the U.S. Senate and the Office of the National Coordinator (ONC) on health IT and the Meaningful Use program and is a former Health IT Fellow for the ONC. His interests center on the role of big data and analytics on patient outcomes and on novel forms of clinical decision support that are outside the realm of traditional rules and alerts, including real-time dashboarding and intuitive usability designs. He also helped spearhead the VCU effort to participate in the Open Notes initiative, where patients have access to their clinical documentation in real time. In 2017, Colin received the HIMSS-AMDIS award for Physician Executive of the Year from his peers. He earned a bachelor's degree from University of Virginia, his M.D. from Eastern Virginia Medical School, and a master's in Healthcare Administration from Virginia Commonwealth University.

Presenter

Kevin Schmidt, VP of Technology, Qualifacts

Kevin has 3 decades of health care experience. He's been in EMS for 9 years, IT Director for a TPA with 5 high risk state pools, created the interoperability capabilities and business for a very large EMR vendor as well as helped define and manage all data for the population health platform for that same vendor; he was also the executive over a control substance repository. He has served on committees in the federal space with ONC and CMS, as well as helped states plan and define their data, analysis, and state reporting. Currently Kevin has responsibility over Data Innovations for Qualifacts. He has executive responsibilities over the strategies for big data.

Presenter

Mary Givens/ CCBHC Program Manager, Qualifacts

Mary has over 26 years experience working in the field serving people with SPMI, I/DD and dual diagnoses. In addition, Mary has been at Qualifacts for 16+ years working primarily in compliance until most recentl2022 when she moved to the newly created role of CCBHC Program Manager. Mary's knowledge of the CCBHC treatment model comes with years of research on the model as well as providing one on one consultation and close guidance to Qualifacts many CCBHC customers since the CCBHC launch in 2017. Mary facilitates the CCBHC cohorts which are platform specific groups of CCBHC customers that meet monthly for peer sharing and CCBHC specific training. Mary's education and experience includes practicing as an LPN, a behavior specialist, a supported employment specialist, a program director, and CEO of a nonprofit. Mary has a Masters in Rehabilitation Administration from the University of San Francisco.

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LEARNING OBJECTIVES

- Identify the ways in which AI technology may improve automation in healthcare documentation and explain how it can enhance efficiency for providers.

- Analyze how data patterns can be utilized to fill gaps in medication information and identify other areas where incomplete data can be addressed using AI methods.

- Assess the ways in which liberated data can be harnessed to enable clinicians to make more informed and effective decisions in real-time at the point of care.

- Assess the current state of AI technology in healthcare, including available tools and methods, and predict potential advancements and developments for the future.

Artificial Intelligence Defined

The term AI is typically used to describe both the "technology designed to perform activities that normally require human intelligence" and the multidisciplinary field of science concerned with understanding and developing that technology (Luxton, 2014). Luxton, D. D. (2014). Artificial intelligence in psychological practice: Current and future applications and implications. *Professional Psychology: Research and Practice*, 45(5), 332–339.

AI, at its core, is pattern recognition and making connections between facts. (Russell Kohl, MD, FAAFP ,2023)

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Value of Artificial Intelligence in Comprehensive Healthcare

Value of AI in Comprehensive Healthcare

✓ Free up valuable time for the human professional

- ✓ Through device integration, more automation in recording data (vitals, pain scales, assessments, screenings, etc.)

- ✓ Improve staff workflows with less manual effort for record keeping (progress notes, discharge summaries, etc.)

- ✓ Triggering automatic follow-up actions (treatment plan updates, external referrals "closing the loop", etc.)

- ✓ Help with staff retention and productivity (greater efficiency>less burnout)

✓ Improve clinical decision making

- ✓ Diagnostics: Using patient history and symptoms, assist provider in refining possible diagnosis (provisional diagnosis, etc.) and assigning to the right therapist

- ✓ Treatment: Quick access to Evidence Based Practice options and research relevant to their patient's condition, medical history, and other factors (trauma informed care, DBH, etc.)

- ✓ Patient monitoring: display change over time to monitor progress and identify when a treatment change may be in order

Value of AI in Comprehensive Healthcare

- ✓ Reduce Costs
  - ✓ Preventive care to reduce emergent care (crisis services, ED visits, IP stays)
  - ✓ Resource allocation: data to clearly show utilization of services and productivity of providers which can impact decision made about resource allocation
- ✓ Personalize Medical Treatment
  - ✓ Genetic information, Medical history, and Lifestyle factors all should be considered when customizing an individualized plan of care
- ✓ Population health management
  - ✓ AI could help identify gaps in population health and thereby facilitating the closing of those gaps
- ✓ Risk prediction and intervention
  - ✓ Using data from the EHR, AI-driven predictive modeling can outperform traditional predictive models in forecasting 30-day unplanned readmission and length of episode of care
- ✓ Helping with quality control and the training of therapists
  - ✓ NLP can listen to therapy and provide feedback on EBP used versus idle chat

Value of AI in Comprehensive Healthcare

✓ Enhance Practice Management workflows

   ✓ Make the workflows more efficient for end users

✓ AI can also automate repetitive clerical tasks:

   ✓ Eligibility checks,

   ✓ insurance claims,

   ✓ prior authorizations,

   ✓ appointment reminders,

   ✓ billing,

   ✓ data reporting and analytics

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AI and Medication Management

One of the Root Problems

Free text still plagues healthcare despite decades of progress in digitization and standardization.

Patient Safety

Efficiency

Interoperability

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Hundreds of Variations on a Sig

Glipizide 5mg take 1 tablet by mouth daily

Glipizide 5mg tablet 1 po qd

Glipizide 5 mg tablet 1 orally per day

Glipizide 5mg tab 1 by mouth once daily

Glipizide 5mg PO daily

"Take 1 tablet by mouth once daily" had 832 permutations."

Quality and Variability of Patient Directions in Electronic Prescriptions in the Ambulatory Care Setting
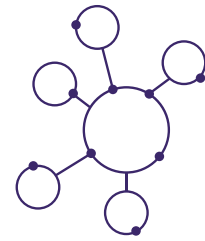
Yuze Yang, PharmD; Stacy Ward-Charlerie, PharmD; Ajit A. Dhavle, PharmD, MBA; Michael T. Rupp, PhD, FAPhA; and James Green, PharmD, MBA

Source: Quality and Variability of Patient Directions in Electronic Prescriptions in the Ambulatory Care Setting, National Library of Medicine 2018
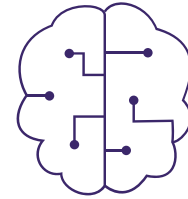
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What Could AI do for Medication Management?
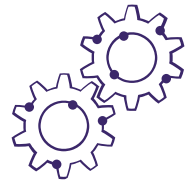
TRANSLATES	NORMALIZES	INFERS	PROCESSES	PREPOPULATES
NDCs Between Different Databases	Sig Information into Consistent Terms	Missing Pieces Of Information	Free Text into Discrete Fields	Drug and Sig information
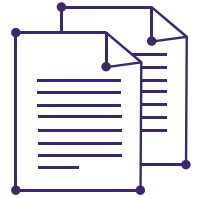
SmartSuite

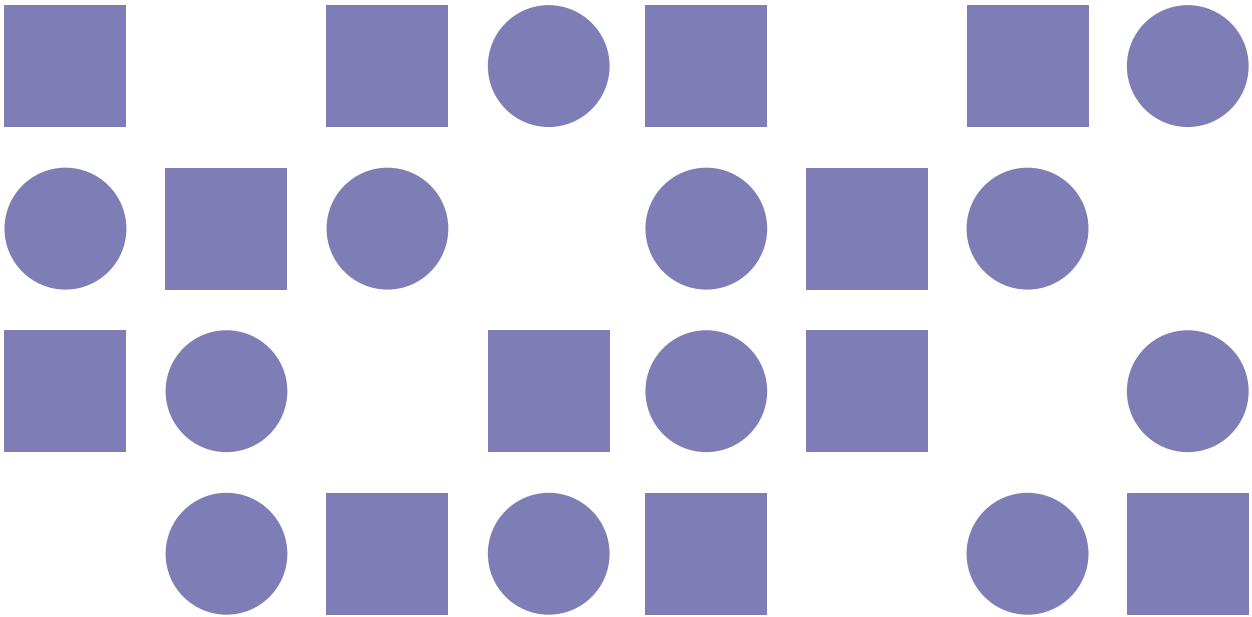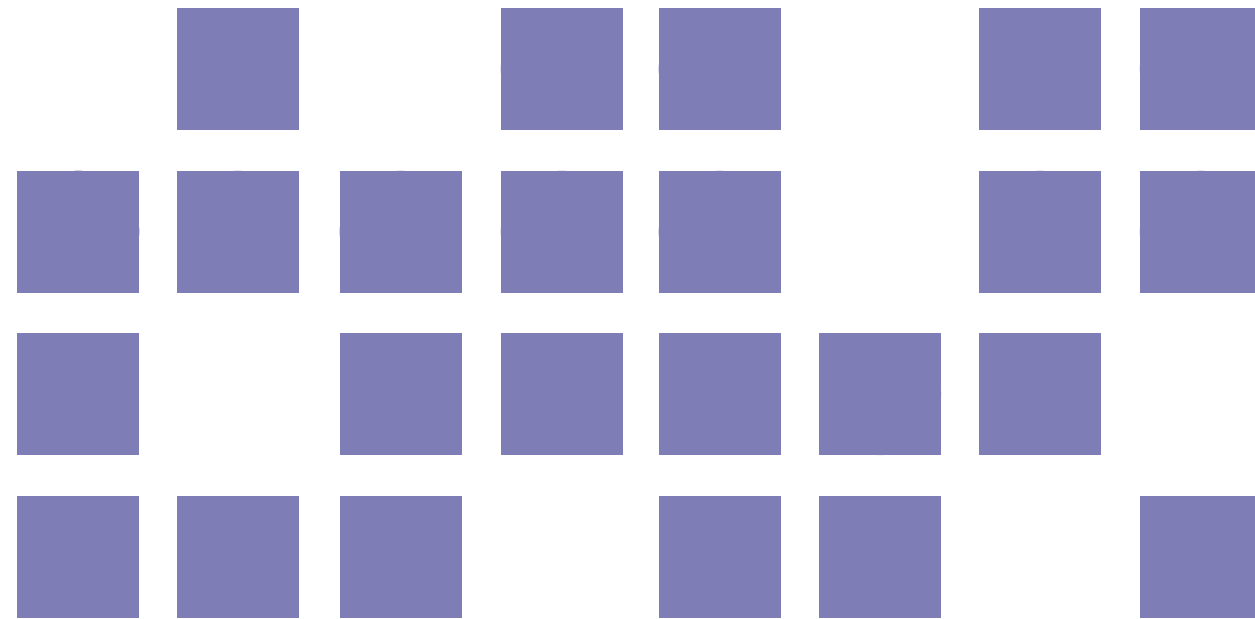| 15.5 M	93%		80%	:30
Transactions per Day in US/CA	Sigs Translated		Reduction in Clicks and Keystrokes	Saved for Each Medication
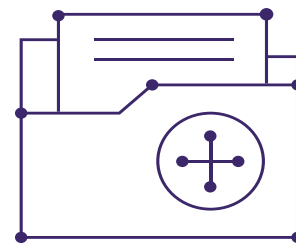
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Understand Clinical Meaning with Content

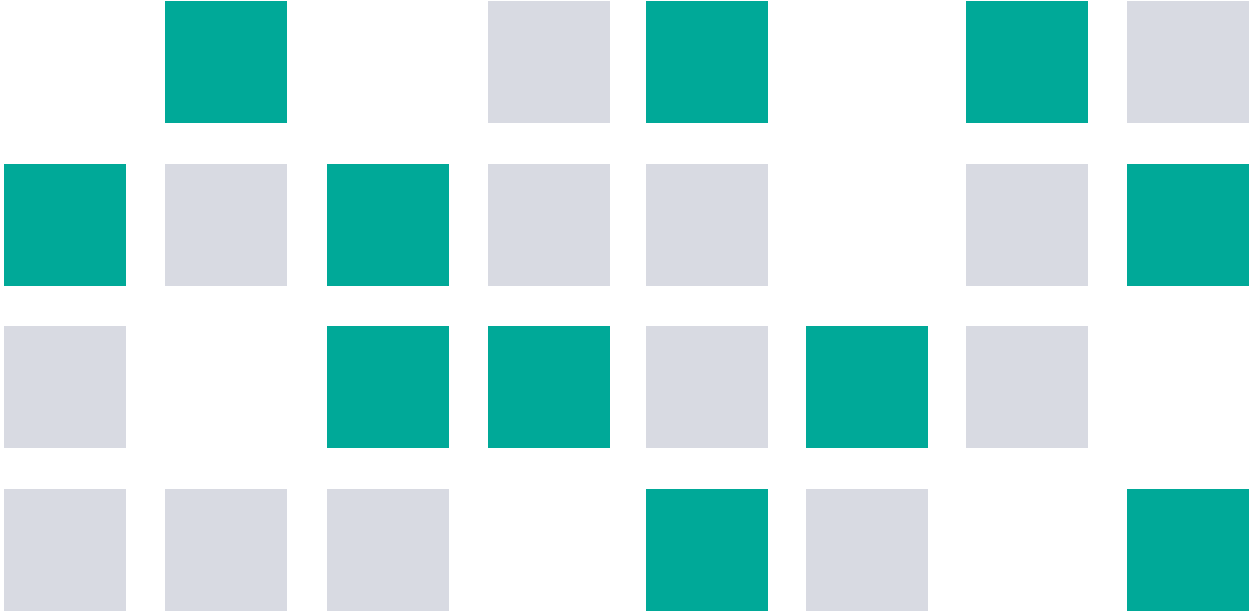# Identify drugs with mismatched or missing NDCs
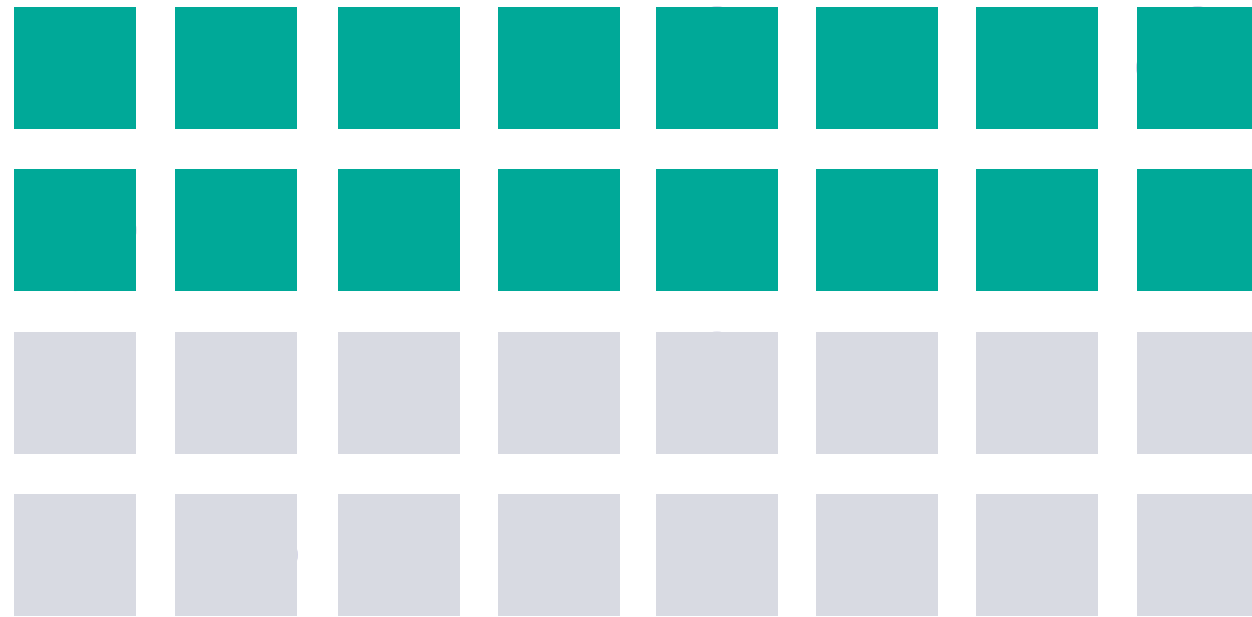
Identify

Process data into discrete fields

Process

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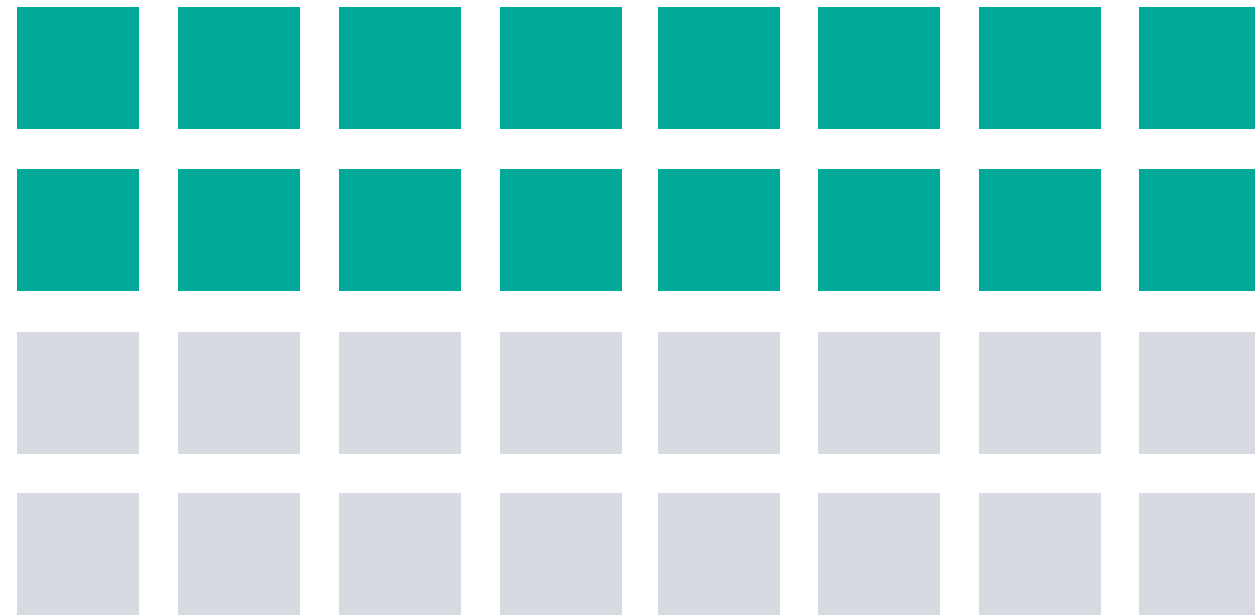
Infer missing pieces of data

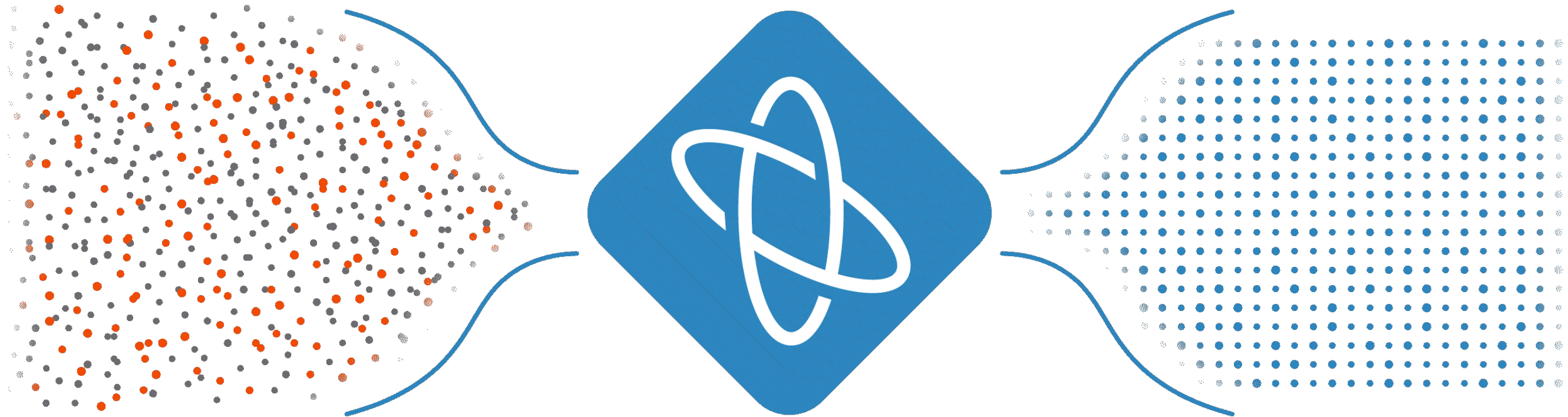# **Convert** legacy data into nomenclature of receiving system

Convert

Complete, Clean,
Consumable Data

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SmartSuite AI Data Services

Dirty, Unstructured Data

Clean, Structured Data

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AI and Clinical Documentation

AI and Clinical Documentation

Data Extraction
From free text

AI can pull out the pertinent and relevant words from free text to draft a progress note and identify types of intervention used
.

Data Entry
Streamline data entry

With consent, AI technology can listen in on patient and provider conversation and draft a progress note automatically including being able to identify types of intervention used

Improve Quality
Quality of therapy

With consent, AI can listen to a therapy session and idenitfy where and what interventions are being used compared to idle "chat" and provide feedback to therapist so they can make adjustmanets as they deem appropriate. .

Examples of AI and Clinical Documentation

Data extraction from free text Flatiron Health's human "abstractors" review provider notes and pull-out structured data, using AI to help them recognize key terms and uncover insights, increasing their productivity.

Diagnostic and/or predictive algorithms Google, Enlitic, and a variety of other startups are developing AI-derived image interpretation algorithms. Jvion offers a "clinical success machine" that identifies patients most at risk as well as those most likely to respond to treatment protocols. Each of these could be integrated into EHRs to provide decision support.

Clinical documentation and data entry Capturing clinical notes with natural language processing allows clinicians to focus on their patients rather than keyboards and screens. Nuance offers AI-supported tools that integrate with commercial EHRs to support data collection and clinical note composition.

Source: Using AI to Improve Electronic Health Records (hbr.org)

AI and Clinical Decision Making

AI Facilitate Better Clinical Decision Making

Better Data
Timely and Accurate

AI can analyze large amounts of patient data, such as medical records and lab results, and provide relevant information to clinicians in real-time.

Reducing Errors
Quickly identifying risks

AI can help reduce errors in clinical decision making by identifying potential risks and providing recommendations based on evidence-based guidelines.
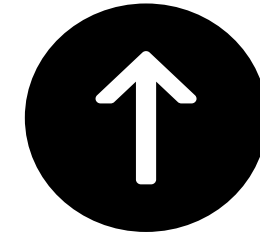
Improving Outcomes
Data based improvement

Using predictive analytics, AI can look at data across similar populations as well as client speciifc condition and history and suggest preventive steps to avoid worsening conditions.

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Simple Clinical Decision-Making Process Using AI

01

Data Collection

Provider enters clinical data on patient (ongoing)

02

Data Mining

System gathers all historical and current data

03

AI

AI analyzes data looking for patterns and trends

04

Recommendations

System delivers Insight as a result of synthesized data

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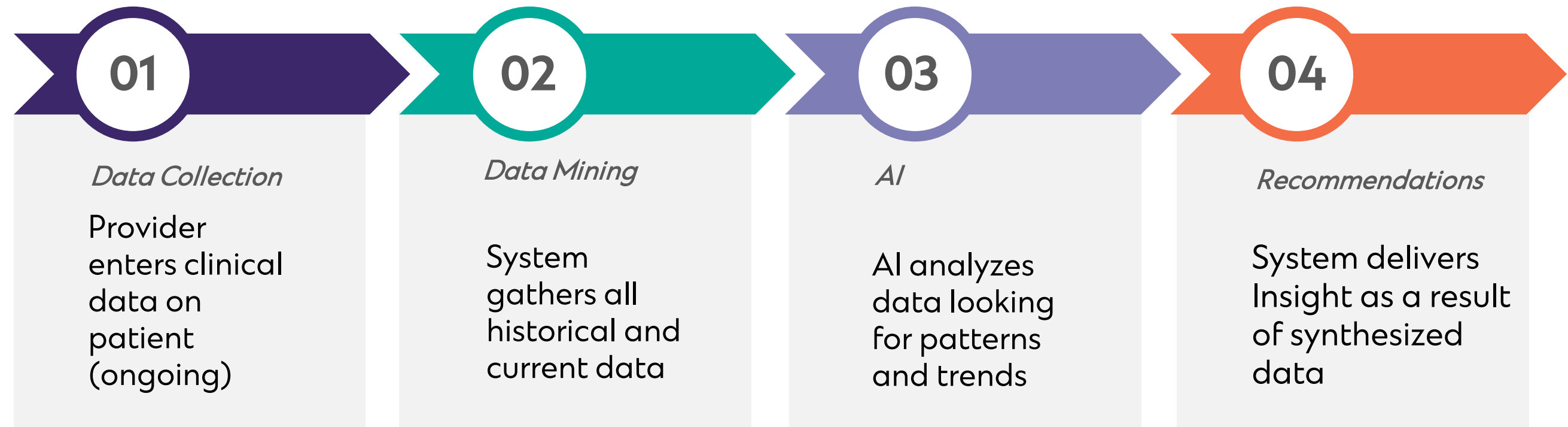
AI and Chatbots and Mood Trackers

Use of Chatbots and Mood Tracker Apps

- Chatbots now available for Cognitive behavioral therapy and mindfulness therapy
    - Although not intended for crisis or emergent therapy, can be used as day-to-day interventions for positive behavior change
    - Also, may function as companions for those struggling with mental health conditions
    - Can bridge the gap between therapy sessions
    - Chatbots now available for triage and pre-diagnosis for patients to help them select the best provider type
- Mood Tracker apps may be a replacement for journaling to track ones moods.
    - Benefit of mood trackers is greater consciousness of triggers.
    - Also gives you the opportunity to create a strategy to address negative moods to keep your mental, physical, and emotional health in check.

A word of caution when using phone apps

One should be cautious of apps available on the phone for therapy sessions, meditation, and mood trackers as not all are covered by the HIPAA privacy laws.

Justin Sherman of Duke's University Sanford School of Public Policy said, "The reality is that most Americans assume that their health data is protected anywhere, everywhere all the time. But unfortunately, that`s just not true. There are a range of companies who are not covered by the narrow health privacy regulations we have."

To read from this PBS NEWS interview with Justin Sherman, go to this link.

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Current Research and Future Possibilities

Natural Language Processing

- **Natural Language Processing** (NLP) is a subdivision of computer science that focuses on the learning, comprehension and production of everyday human languages. (source)

- How we speak, the words we use, and the acoustic feature of how we express ourselves regarding how we feel can all be indicators of a person's physical and psychological state.

- Natural language processing of these characteristics can give a provider great insights into a person's health including possible diagnoses and preferred treatment.

  - The NLP can pick up nuances and subtleties from the patient that can not be heard by the human ear alone.

Predicting Schizophrenia

Example: North American Prodome Longitudinal Study. Funded by the National Institute of Mental Health (NIMH)

The North American Prodrome Longitudinal Study (NAPLS) is a consortium of nine programs focusing on youth at clinical high risk (CHR) for psychosis.

- Cohort consisted of people, mainly adolescents, who have first degree relatives with schizophrenia.

- Cohort did not have schizophrenia yet but were at clinical high-risk.

- Researchers captured language from the cohort and then followed them for two years.

- Word2Vec was used as NLP to analyze the patient's choice of words, use of words, and pattern of words.

  - As a corpus, the NLP was fed 25 years of the New York Times (43 M sentences)

Predicting Schizophrenia

- Words that are closer to each other, tend to appear together with more probability. Blue words are nouns, red words are verbs, orange words are adjectives, green words are adverbs

- Each word is given a coordinate and the sentences of the cohort participants are turned into vectors.

    - Semantic density predicted conversion to psychosis with 80% accuracy.

QUALIFACTS™ Natural Language Processing in Mental Health - Bing video
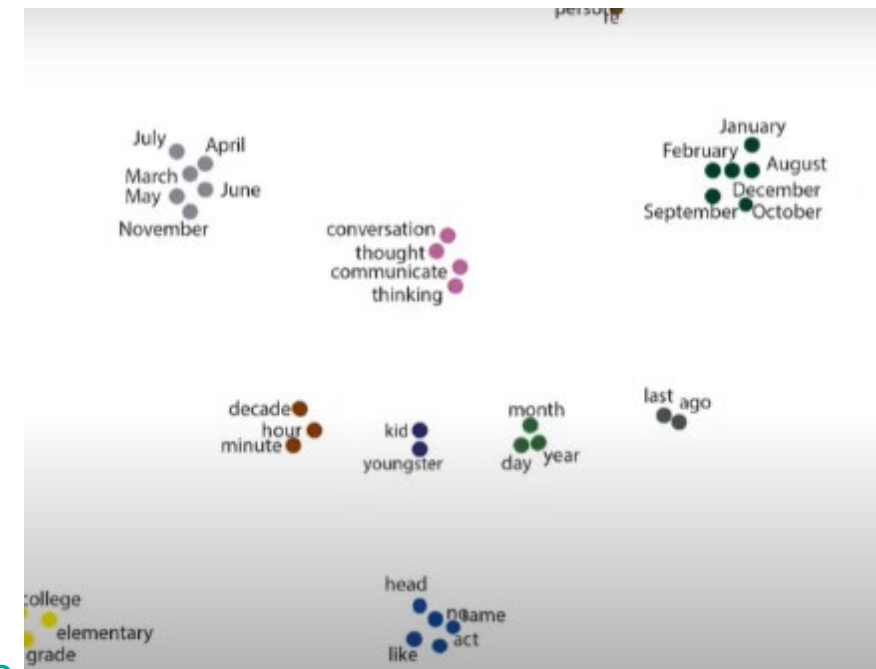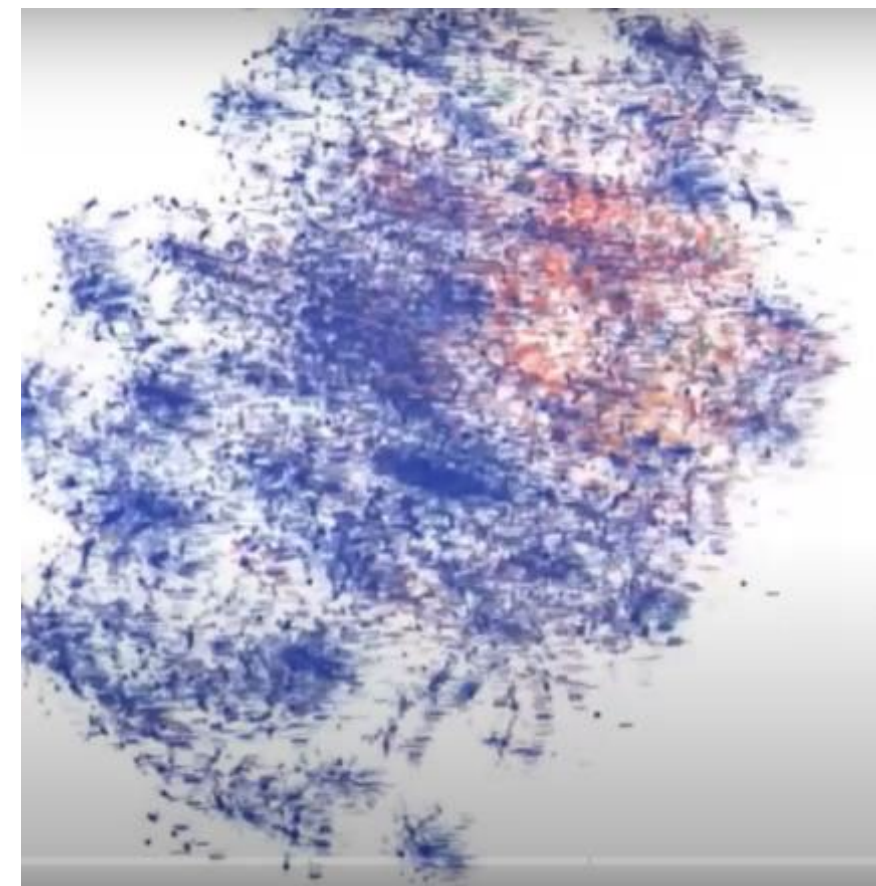
What do we do with this ability to predict?

Ability to target the most effective treatment(s) including best practice medications

Ability to more accurately diagnose

Ability to develop a more precise and effective plan of care or treatment plan

Ability to develop a more custom safety plan

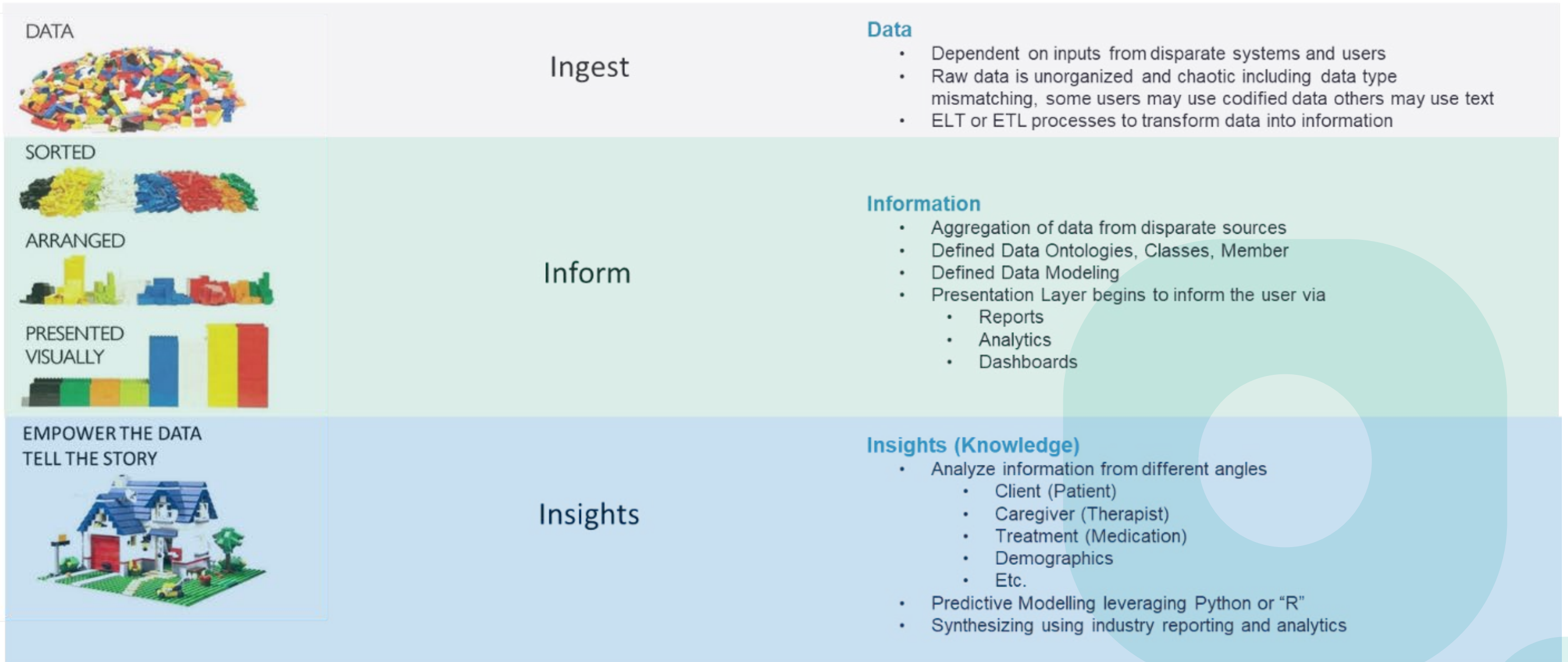Ability to put protective and preventive measures in place
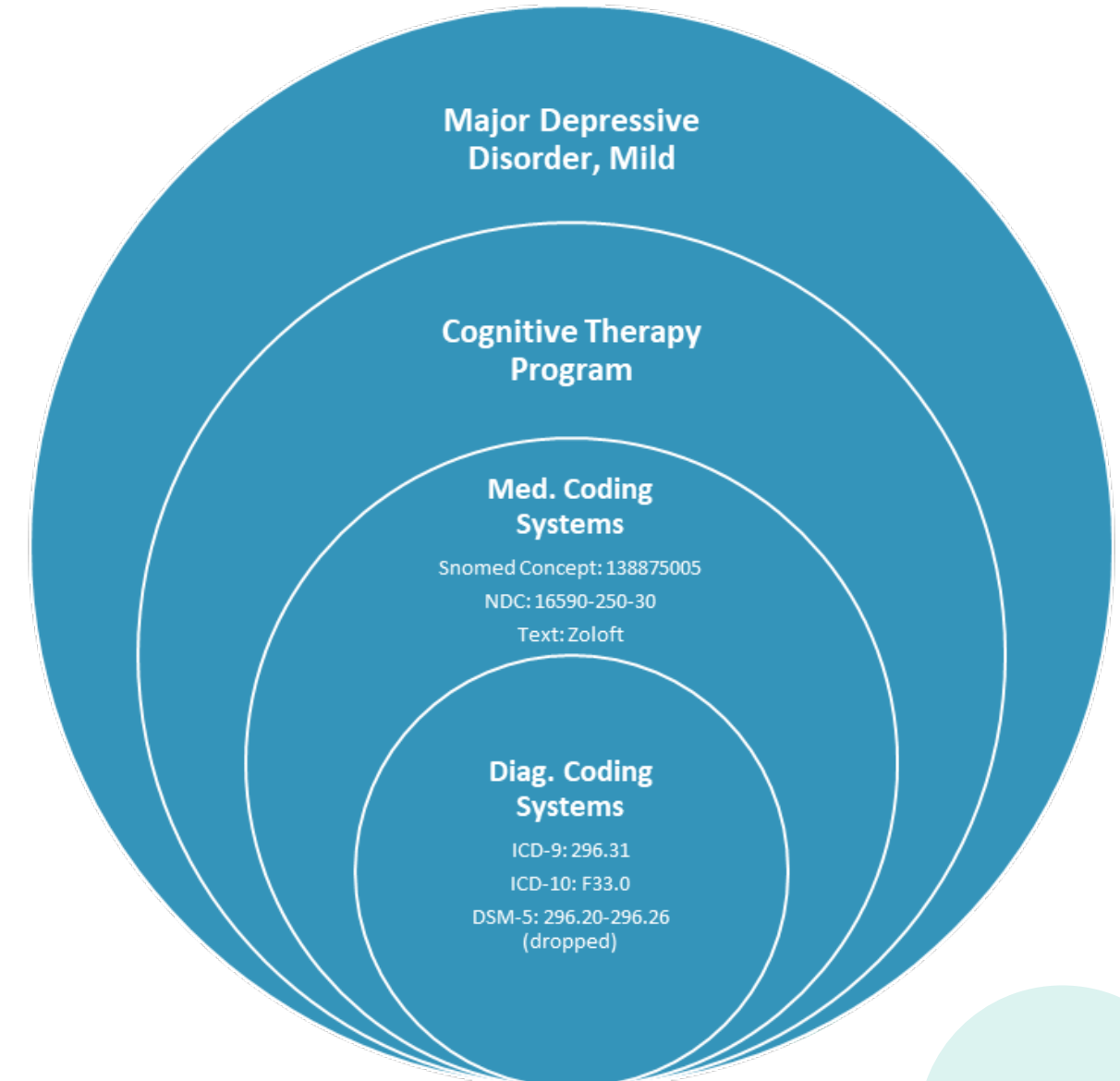
Ability to identify EBP to reduce risks

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Looking to the Future
& Analytics

Vision – Improve the health outcomes through data innovations

DATA	Ingest	**Data** • Dependent on inputs from disparate systems and users • Raw data is unorganized and chaotic including data type mismatching, some users may use codified data others may use text • ELT or ETL processes to transform data into information

SORTED
 	
ARRANGED
 	
PRESENTED VISUALLY
	Inform	**Information**
		• Aggregation of data from disparate sources
		• Defined Data Ontologies, Classes, Member
		• Defined Data Modeling
		• Presentation Layer begins to inform the user via
		   • Reports
		   • Analytics
		   • Dashboards

EMPOWER THE DATA TELL THE STORY	Insights	**Insights (Knowledge)**
		• Analyze information from different angles
		   • Client (Patient)
		   • Caregiver (Therapist)
		   • Treatment (Medication)
		   • Demographics
		   • Etc.
		• Predictive Modelling leveraging Python or "R"
		• Synthesizing using industry reporting and analytics

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Data Ontology - Organizing

Example: Major Depressive Disorder, Mild

- One data source may report a person's diagnosis:
  - PCP
  - Therapist
- One data source may report a person's medications:
  - Prescription
  - Claims
  - Controlled substance repository
- One data source may report a person is in a Cognitive Therapy Program
  - Therapist
  - Family Counselling
  - Court appointed Counseling service

Major Depressive Disorder, Mild

Cognitive Therapy Program

Med. Coding Systems

Snomed Concept: 138875005
NDC: 16590-250-30
Text: Zoloft

Diag. Coding Systems

ICD-9: 296.31
ICD-10: F33.0
DSM-5: 296.20-296.26 (dropped)

Data Ontology - Informing

Example: Major Depressive Disorder, Mild

- Analytics is run on the concept "Major Depressive Disorder, Mild", not on each attribute

- Report or analytics, a query for clients (pt.) with Major Depressive Disorder, Mild.

  - If the client (pt) meets one or more, or 2 or more of these conditions across all data sets, their information will pull forward

  - How effective has the treatment been?

- Report or analytics, a query for caregivers who are diagnosing Major Depressive Disorder, Mild

  - A report including all diagnoses by a caregiver, including prescriptions without diagnosis may pull forward information

  - How often or likely is it this person will diagnose *and* prescribe medications *without* psychotherapy session?

ANALYTICS

Final Thoughts

- The use of AI and NLP will always just be more tools for the provider and clinician, never a replacement.

- AI improves safety and making provider workflows more efficient

- AI has the potential to allow providers to work at top of training instead of relegating them to being scribes

- "Augmented Intelligence" is connecting the dots"
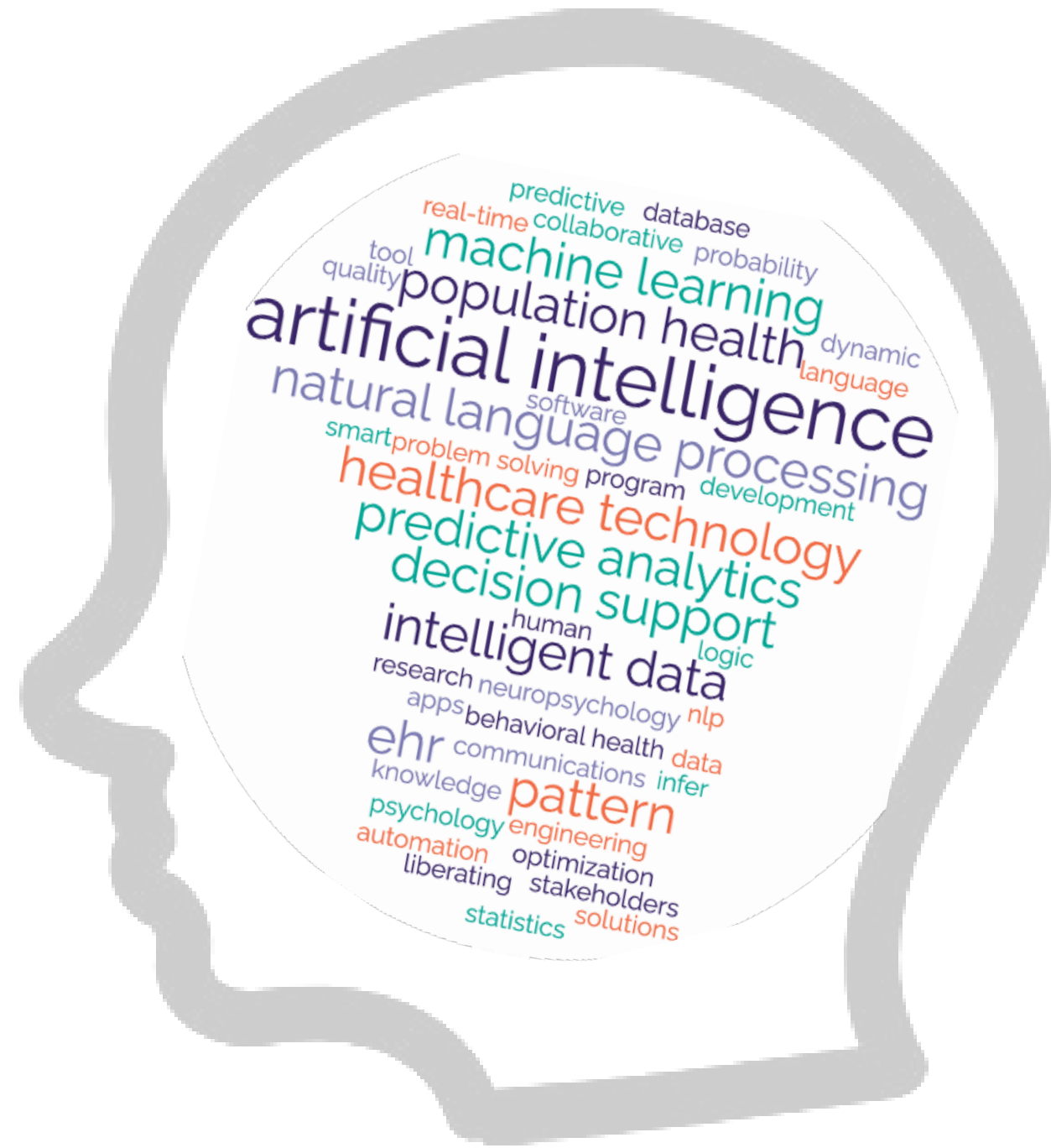
- AI is not coming-AI is here

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Contact Information

If you have any questions about what we have presented today or want to talk more about what Qualifacts has to offer, please email mary.givens@qualifacts.com or visit our website at www.qualifacts.com.

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Thank You