

Redefining
value
& success in
healthcare

IBM



Delivering Insights at the Point of Impact – Population Health

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HIMSS

CENTRAL & SOUTHERN OHIO Chapter

Thrive In The Time of Change

IBM's Involvement in healthcare

Buyer/Consumer of Healthcare

- 600,000 lives; \$2B in investment
- Partner to promote innovation and value

Change agent transforming healthcare

- Influencer to national level reform and eHealth
- IBM Research -- 600+ healthcare patents, systems thinking
- IBM 's numerous partnerships for accelerating change

Solution provider across the continuum

- Intersection of business and technology for Payers / Providers / Life Sciences / Devices
- Business services, process and workflow integration
- Big Data, information management and analytics
- Secure, optimized transaction processing
- Infrastructure build and optimization

2

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Healthcare undergoing seismic paradigm shifts

Traditional View

Patients Who Arrive



New View

Entire Patient Population

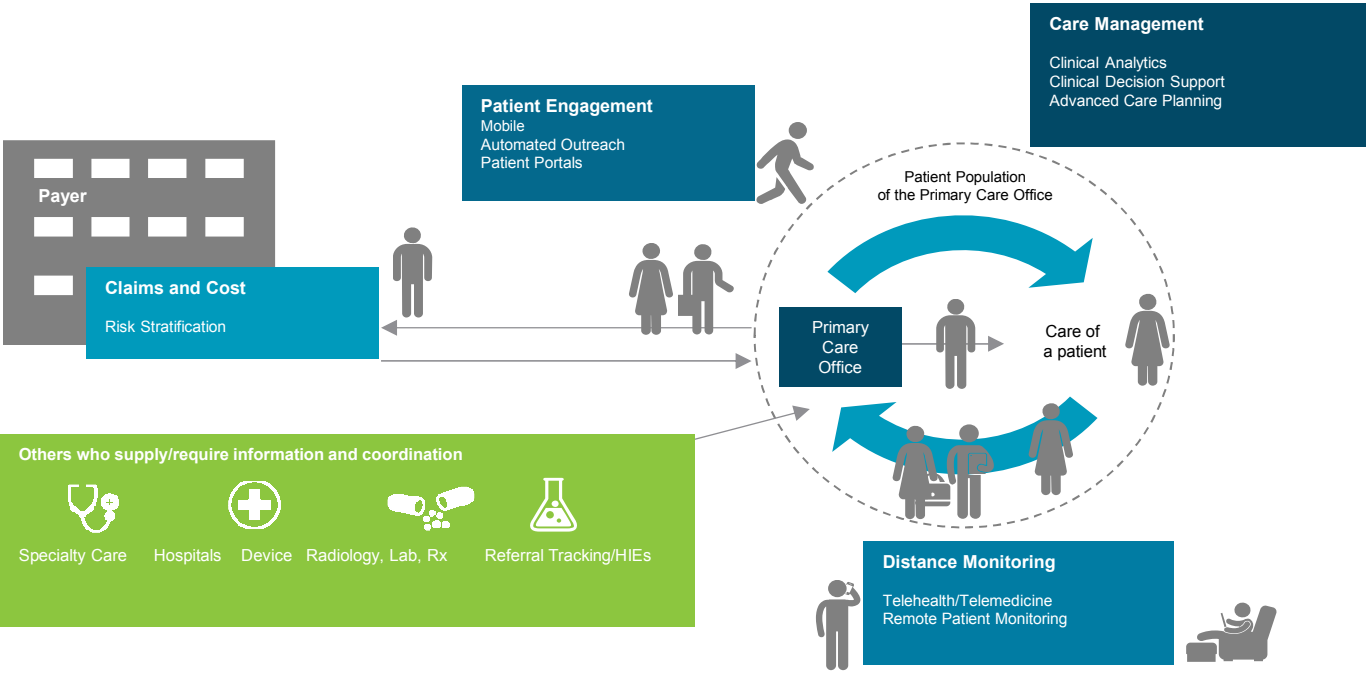


Fee for Service

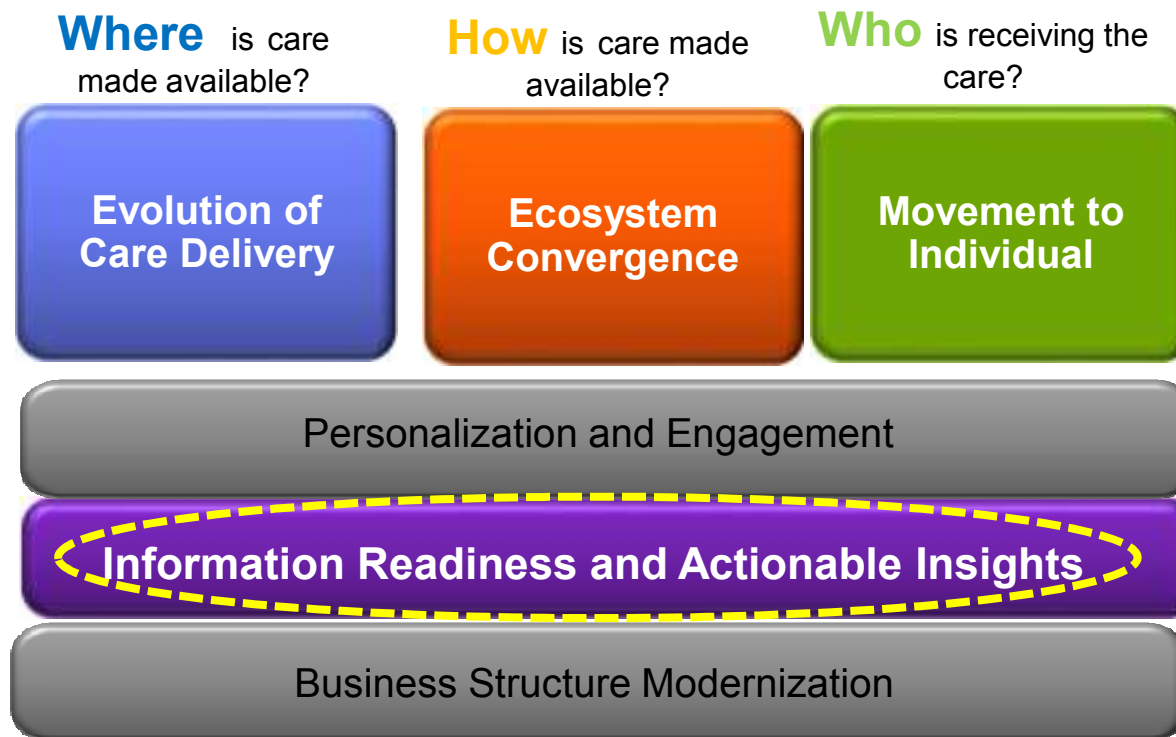
Value-Based Care



Demanding holistic and deeper understanding of their population




Leaders are turning to “information” for answers



Finding data rich, information poor systems

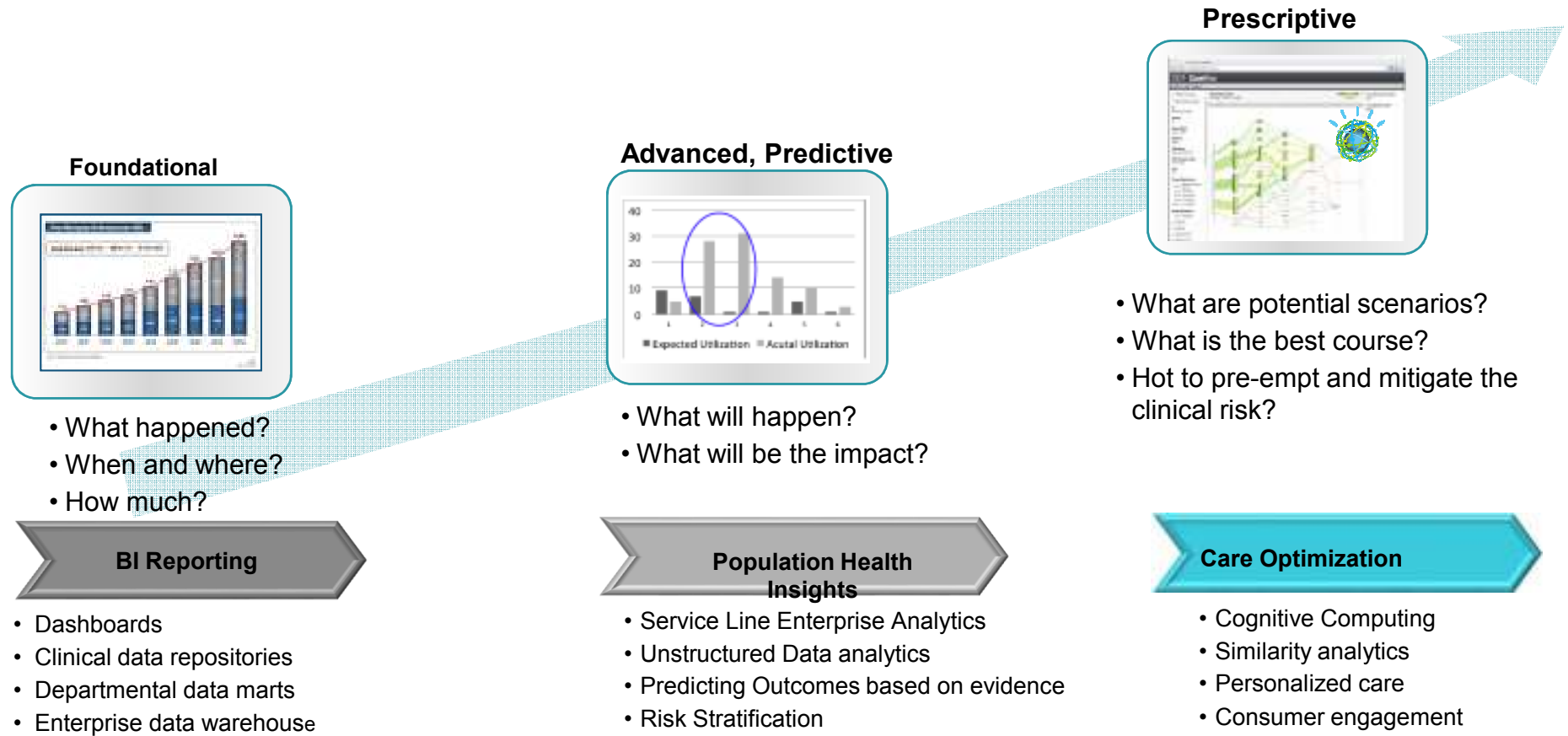
- *Unable to answer several brilliant basic questions*



What is **risk profile** of my population?
How do I **compare** to others on quality & costs?
Who are my **high-cost, high-risk** patients?
Which individuals are **likely to develop** chronic conditions?
How do I most **effectively engage** my population?
How do I effectively **manage** them?
How do I get paid for **performance**?
How do I pay for performance?

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Impedes Maturity on Analytics Journey



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Challenge exacerbated with healthcare "Big Data"

Exogenous data
(Behavior, Socio-economic, Environmental, ...)

60% of determinants of health
Volume, Variety, Velocity, Veracity

Genomics data

30% of determinants of health
Volume

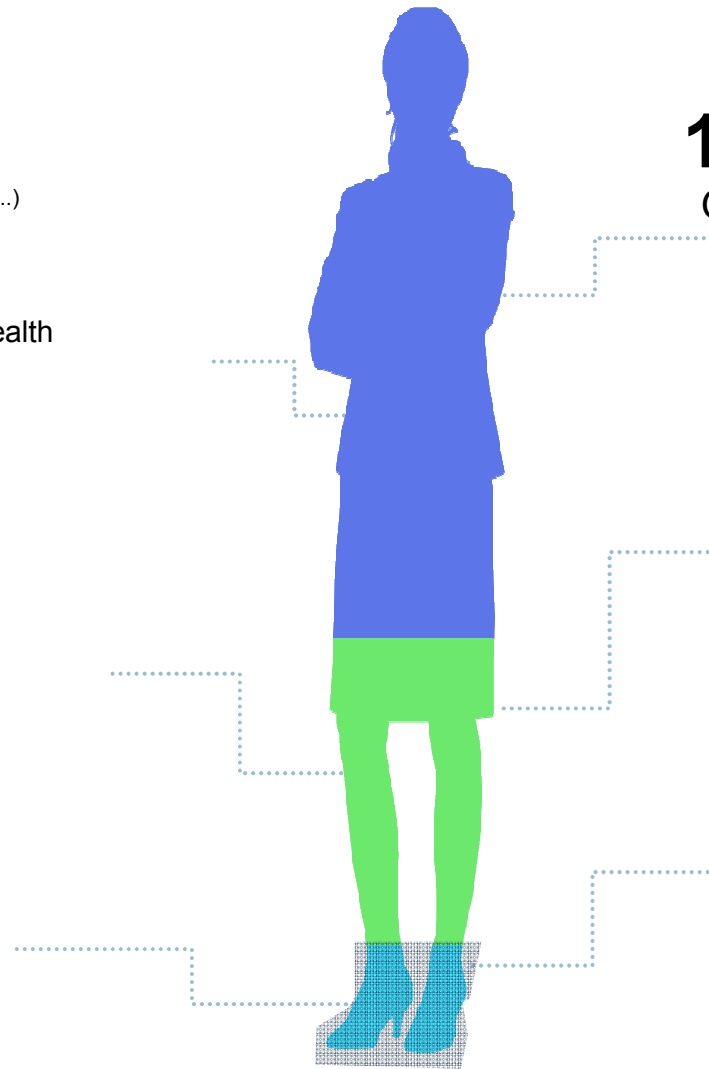
Clinical data

10% of determinants of health
Variety

1100 Terabytes
Generated per lifetime

6 TB
Per lifetime

0.4 TB
Per lifetime



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Source: "The Relative Contribution of Multiple Determinants to Health Outcomes", Lauren McGover et al., Health Affairs, 33, no.2 (2014)

IBM delivering analytic solutions to deliver value

Increase access to healthcare

Individual Insights & Engagement

- Enterprise Health Analytics - Consumer360 Insights
- Consumer Experience Analytics
- Patient /Member Risk Analytics
- Consumer Acquisition and Retention
- Watson Engagement Advisor

Collaborate to improve care and outcomes

Population Health Insights & Care Mgmt

- Population Health Insights - Risk Stratification
- Predicting Readmissions, Infection Onsets, LoS analytics
- Bundled Payments
- Care Gap Identification, Planning, Coordination
- Watson Cognitive Solutions - Oncology, R&D Discovery and Clinical Trial Matching
- Remote Health Monitoring

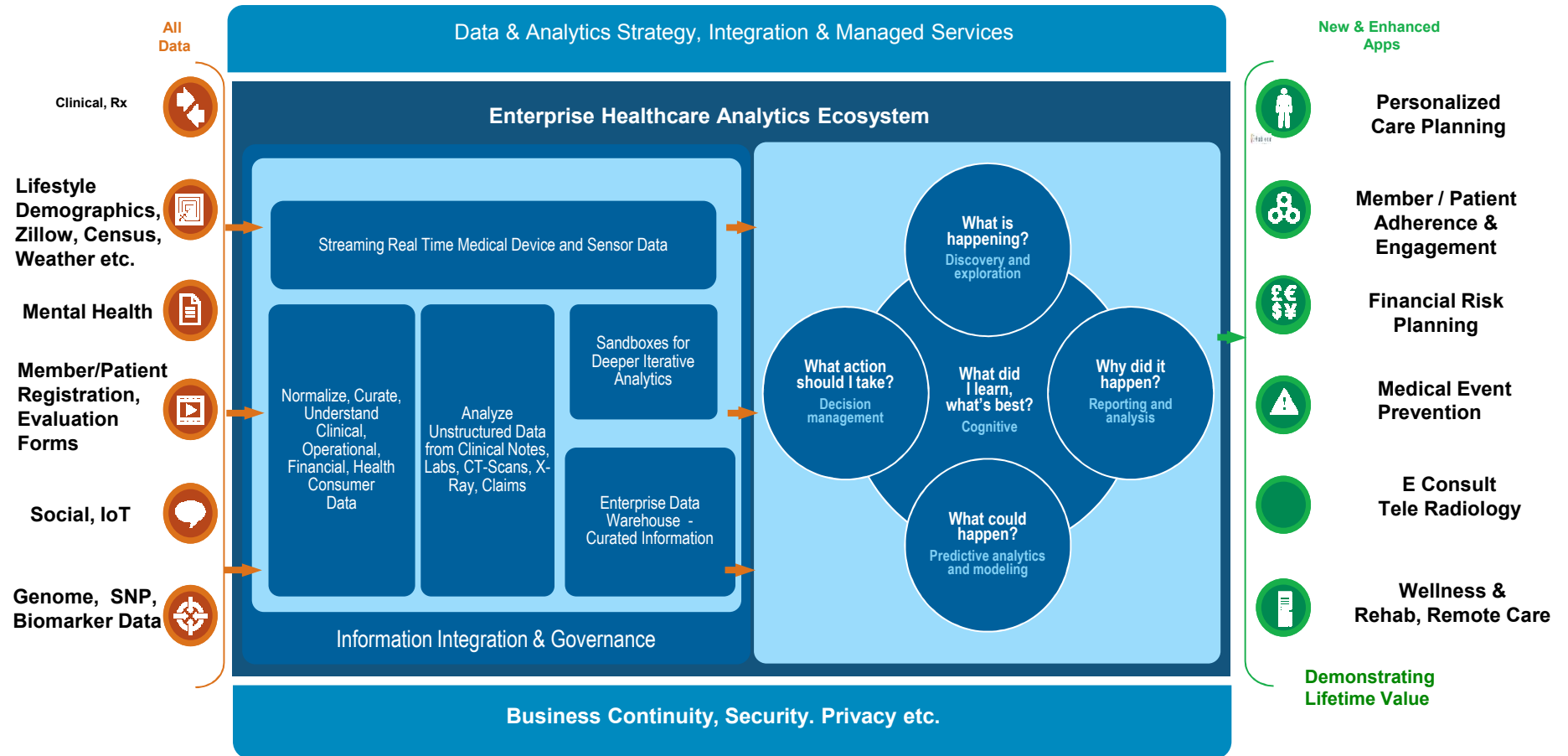
Build sustainable healthcare systems

Health System Performance & Optimization

- Digital Hospital
- Enterprise Health Analytics - Business Performance
- Predicting FWA through Counter Fraud Management
- Watson Cognitive Solutions -, EMR, Utilization etc.

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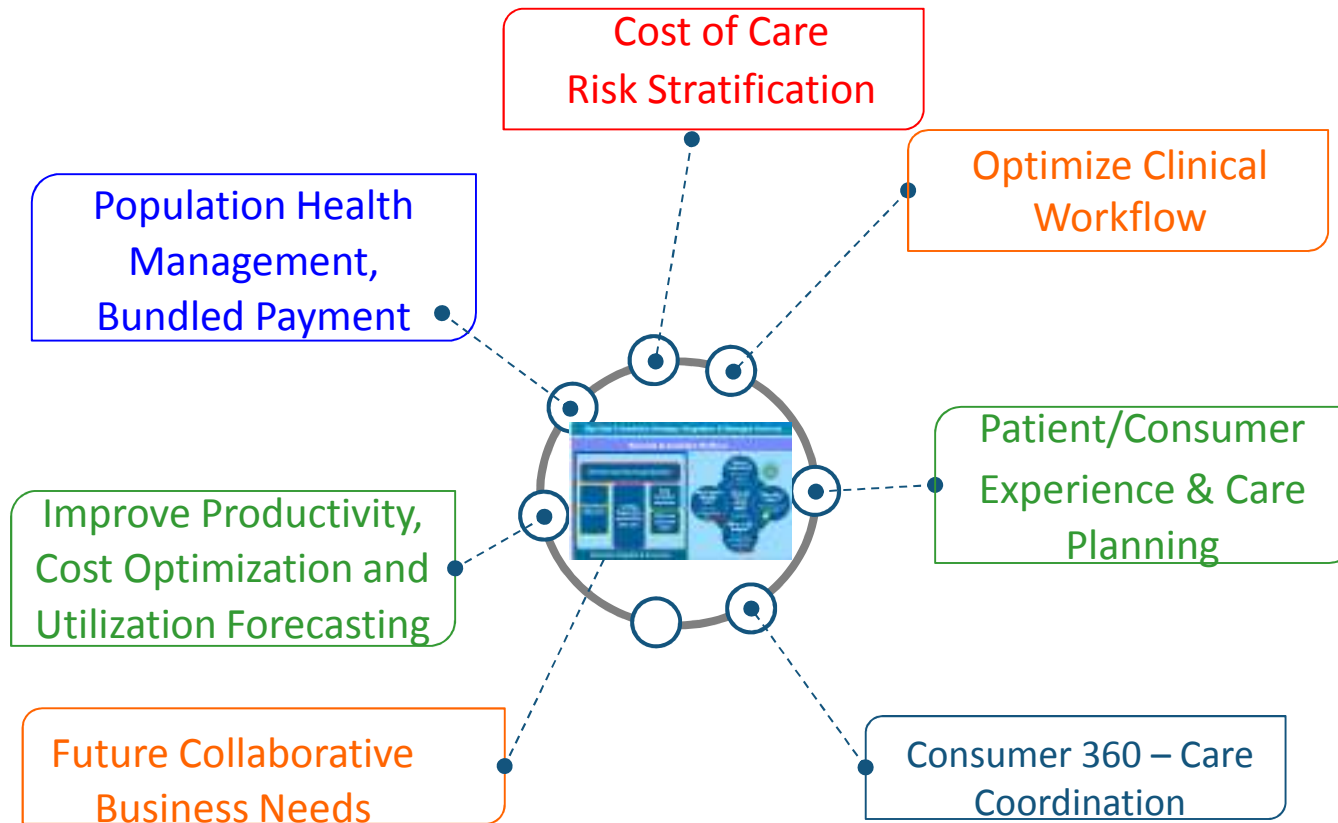
Solutions built on interconnected, pre-optimized set of capabilities



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Establish Enterprise-wide “Systems of Insights”

Goal is to Build Once, Deliver Many Use Cases



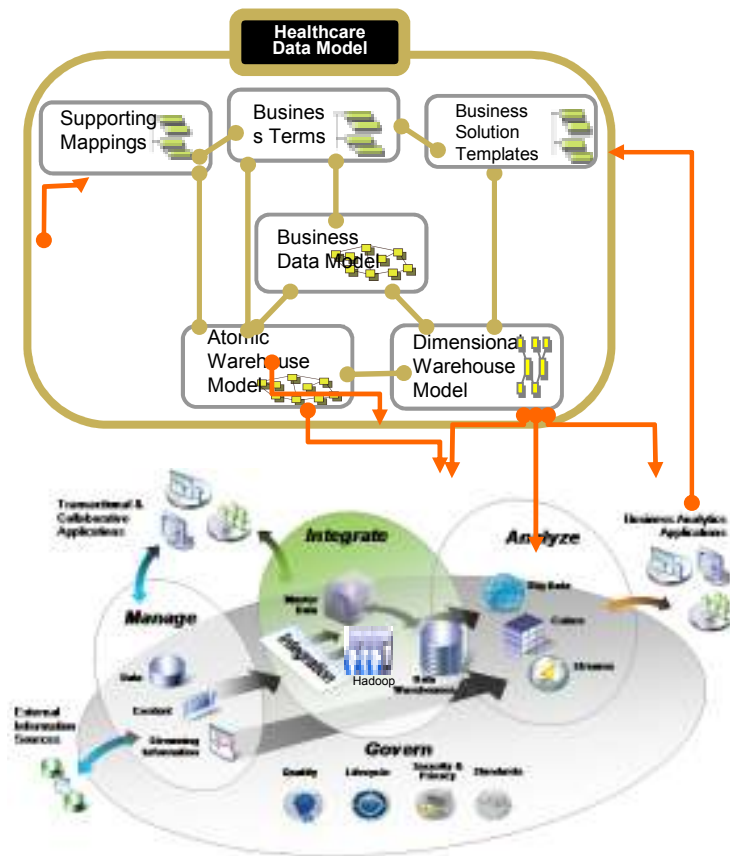
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Data Lake or Data Swamp – Know the difference



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Industry Model for Healthcare



Integrated set of models providing:

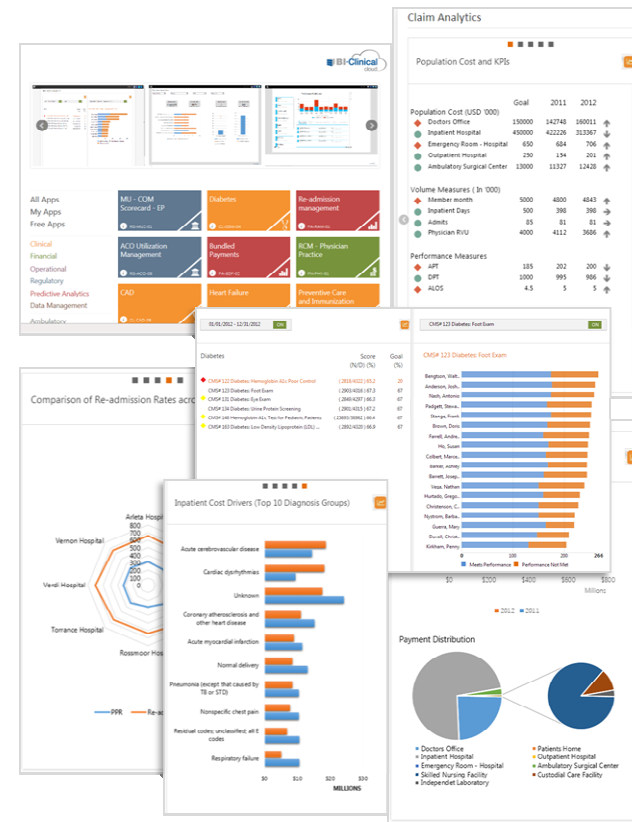
- **Business Model**
 - Business Glossary covering Defined Business Solution Template (BST's) and Atomic Level Models
- **Atomic Warehouse Model (AWM)**
 - Structured for Persistence
 - Temporally Enabled
 - Multi-Tenant Enabled
- **Dimensional Warehouse Model (DWM)**
 - Business Solution Templates (BSTs) based represent collections of related Indicators and other measures, used to define and validate business requirements and to create OLAP cubes/Data Marts for dashboard, scorecard, applications or ad hoc reporting, etc.
 - Utilizing Dimensional Modelling
 - Temporally Enabled
 - Supporting HL7 2.x, X12, Snomed, Loinc, RXNorm, ICD9/10, OASIS, CCD, CCR, CDA,
 - Multi-tenant enabled at physical tiers


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Delivering pre-built packaged analytic content

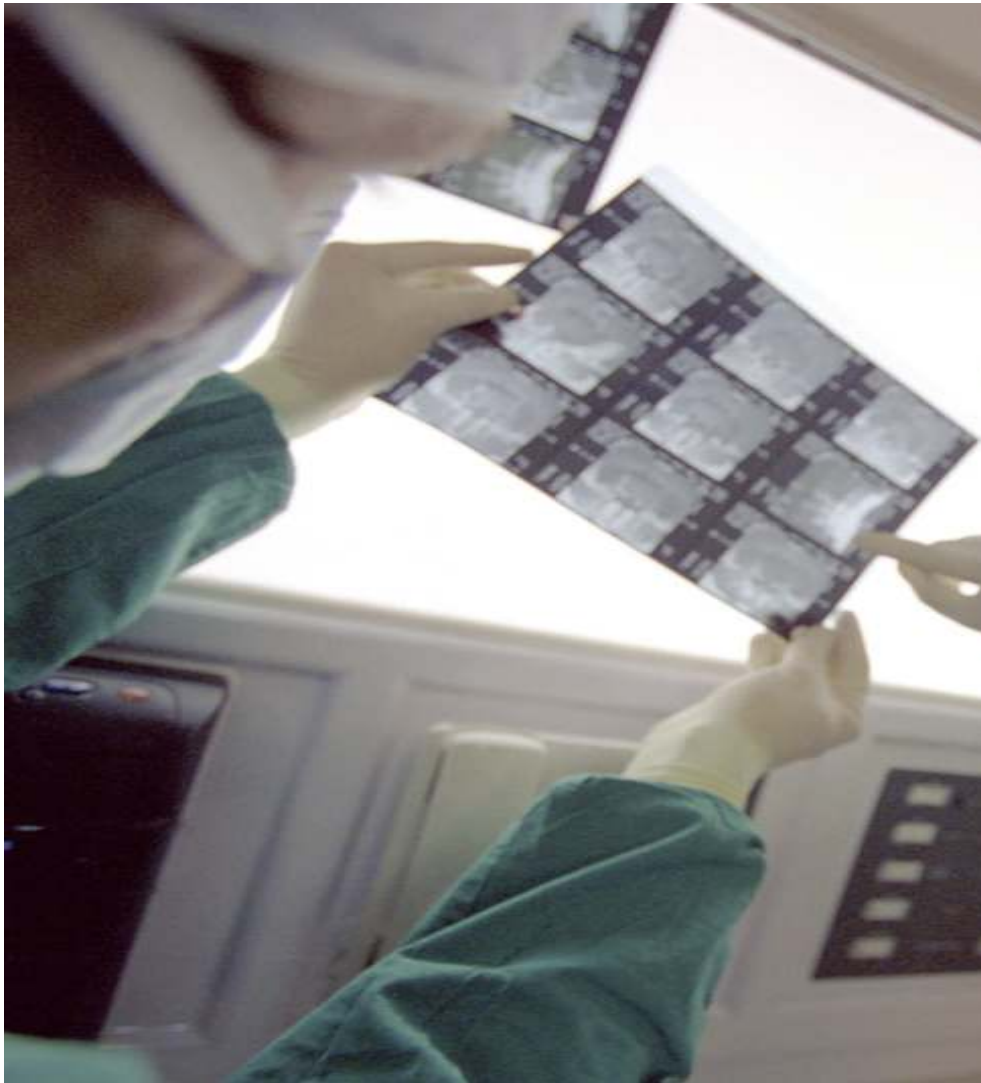
- BI-Clinical Pre-packaged content: Advanced Healthcare BI/Analytics Solution

- Embedded healthcare BI/Analytics – designed for healthcare organizations
- ONC certified for MU; NCQA certified for HEDIS; CMS vetted for PQRS
- BI-Clinical Rules Engine with cross-market support for measures and KPIs
- 600+ pre-built measures across regulatory/ P4P initiatives – ACO, MU, PQRS, IQR, HVBP, HEDIS
- Apps portfolio for integrated clinical and financial analytics – across hospitals, physicians, ACO, HIE
- Actionable intelligence – benchmarking, gaps in care alerts, point of care decision support
- Available with cross-platform device compatibility – on premise, cloud
- Serving over 1,200 provider sites – most widely deployed 3rd party ONC-certified BI/Analytics solution




 BI-Clinical: 3,800 + deployments – most widely deployed 3rd party ONC HIT 2014 certified BI / Analytics platform

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Carolinas Healthcare System gains data-driven insights with advanced analysis across patients and care settings

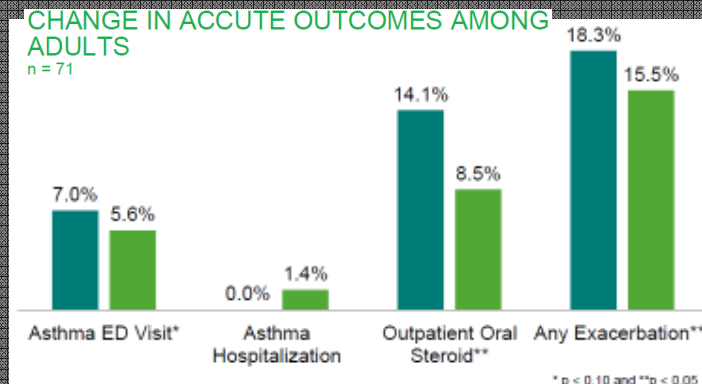
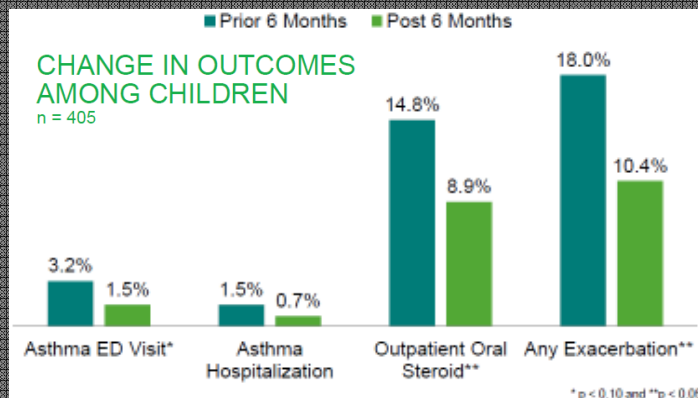
Need

- Create an enterprise analytics platform with a 360° view of patients to provide insights for clinical, administrative and research constituents
- Manage the increasing volume of data being created in the EMR

Benefits

- Integrate and analyze EHR/clinical, claims, care plans for population health and community interventions to mitigate over use of the ED
- Correlate insights across patients and providers by creating a holistic view of patient data
- Perform advanced analysis and trending of patient and physician clinical data

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Asthma Use Case

- Asthma is a high impact chronic lung disease
- Carolinas Health System cares for 60,000+ patients with asthma
- Its complexity makes it difficult to manage, prompting the need for new approaches to care delivery
 - Build electronic Asthma Action Tool
 - Provide evidence-based guidance for providers
 - Promote Asthma action plan

Approach

- Plan, Do, Study, Act (PDSA) cycles used for provider feedback to make modifications
- Reviewed and tested, with positive feedback confirming success
- Piloted at 5 outpatient facilities, with continual enhancements
- Widespread implementation at 100+ primary care practices in August 2013

Benefit

- In combination with other initiatives to improve outcomes, continued use of the eAAP has the potential to **save the healthcare system \$96M** through reduced exacerbations.

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Texas Health Resources transforms Heart & Vascular care on IBM Enterprise Health Analytics

Need

- Silo'ed view of patient(s) & care provided across health system; Existing operating model and inefficiencies prevent optimizing care, attracting top talent and achieving higher value care at lower cost
- Focusing on 8 months old retrospective analysis versus predicting “what will happen” and steering change
- Assists physicians and their care team in managing their patients' care with comprehensive evidenced based guidelines

Benefits – Established an EHA Foundation

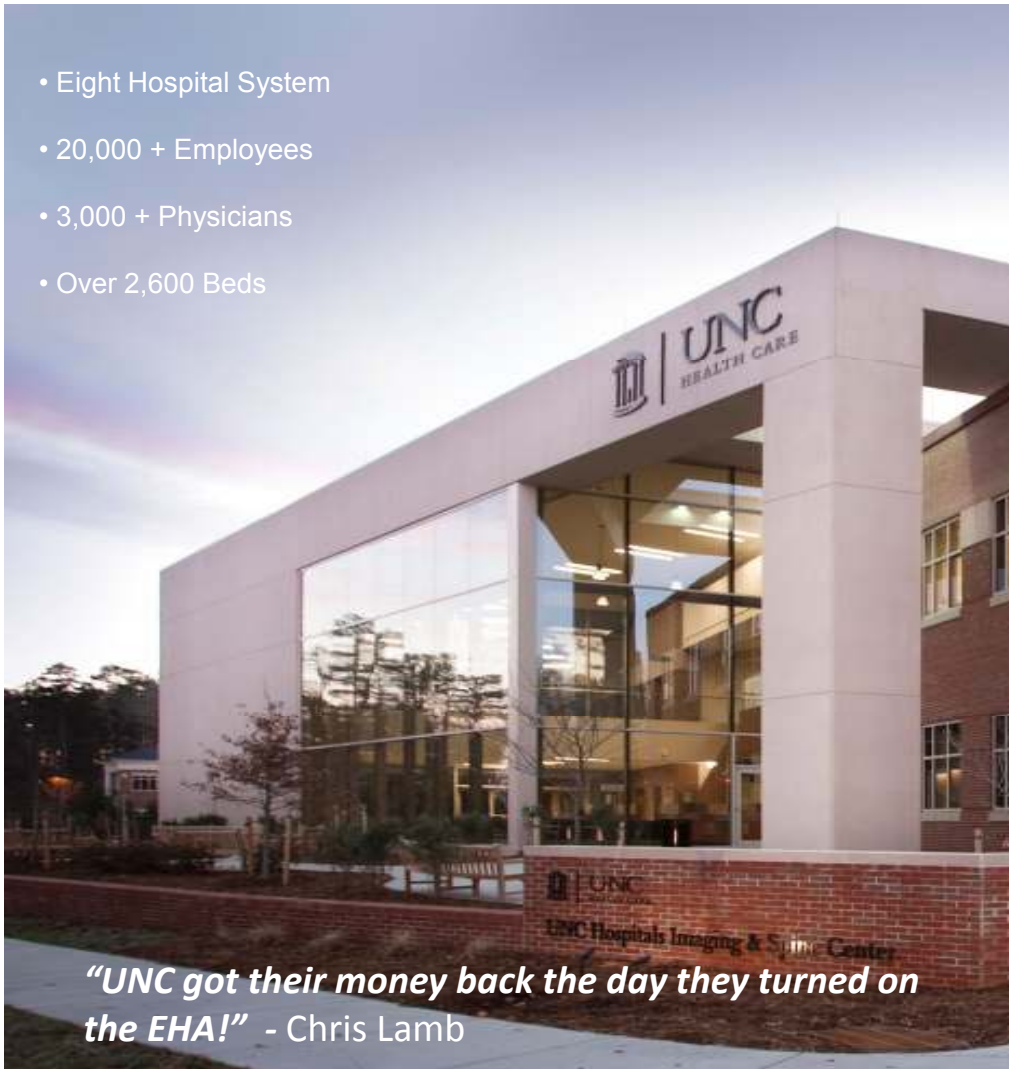
- Improved Referral Management by identifying referral patterns influencers inside and outside THR. Estimated revenue loss is \$175M over 5 years ; **Increase \$3.4M per year – Recovered 10%**
- H&V Procedural Analytics - Evaluate outcome, process and cost/efficiency measures within the H&V service line. **\$5-8M per year savings**
- H&V Care Redesign - Identify opportunities in achieving improvements to quality, patient safety, patient satisfaction, efficiency and cost across the care continuum. **Savings of \$6.2M per year**

✓THR - Won 2013 HIMSS Davies Award



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- Eight Hospital System
- 20,000 + Employees
- 3,000 + Physicians
- Over 2,600 Beds



“UNC got their money back the day they turned on the EHA!” - Chris Lamb

Incorporating unstructured text analytics into analytics strategy projected to save USD 1.1M in penalty avoidance, in addition to saving/improving the lives of thousands

Need

- Identify patients at risk for readmission and take proactive action to improve outcomes
- Improve identification of high risk patients, better reflect required screenings and enhance required reporting

Benefits

- Extract abnormal results from text-based reports on breast and other cancer screenings
- Feed data back into data warehouse to fuel enterprise health analytics and HIE
- Improved PQRS measures and follow up on cancer screenings, readmissions and abnormal tests by 10-20%

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NLP enhancing Risk Adjusted Scoring for Medicare Advantage

The screenshot displays the IBM Content Analytics Studio interface with a medical document open. The document text is annotated with various ICD-9 and HCC codes, which are highlighted in yellow callout boxes. The codes are as follows:

- Icd9: 244.9, Hcc: HCC022
- Icd9: 272.4, Hcc: HCC024
- Icd9: 414.00, Hcc: HCC084
- Icd9: 780.79, Hcc: HCC166
- Icd9: 780.79, Hcc: HCC166
- Icd9: 780.79, Hcc: HCC166
- Icd9: 401.9, Hcc: HCC091
- Icd9: 562.10, Hcc: HCC036
- Icd9: 455.3, Hcc: HCC105
- Icd9: 232.9, Hcc: HCC013
- Icd9: 780.79, Hcc: HCC166
- Icd9: 441.4, Hcc: HCC105
- Icd9: 780.79, Hcc: HCC166
- Icd9: 780.79, Hcc: HCC166
- Icd9: 300.00, Hcc: HCC059
- Icd9: 784.0, Hcc: HCC166

At the bottom of the interface, a table displays the properties of the selected rule:

Property	Value
icd9	@ 414.00
modifiers	@
normalized	@
origin	@ coronary arteriosclerosis
Rule identifier	@ D9B45C50D4FC6220B88AE6A842DEB502

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Emory University Center for Critical Care gains early insight into heart failure in critical care patients

Need

- Provide clinic-wide situational awareness to allow prioritization of treatment based on real-time analysis of physiologic data streams

Benefits

- Early warning system detects subtle signs of Atrial Fibrillation in patients in the Intensive Care Unit
- Enables early detection and intervention to mitigate deterioration in the patient's condition

IBM Watson

New Business Unit Dedicated to Healthcare

- 2,000 employees
- 100+ million patients clinical data set
- 92 of the top 100 healthcare organizations
- \$4B data/cloud/engagement investment 2015
- \$5B foundation HCLS business
- IBM Watson Health Ecosystem
- Partnerships with Apple, J&J, Medtronic

*“We will do our part to change the face of
healthcare”*

*•Ginni Rometty
Chief Executive Officer, IBM*

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IBM Watson Health



IBM Watson Health Cloud

HIPAA compliant, standard based, massively scalable



Insights
Cognitive & Advanced Analytics



Data
Structured & unstructured



Solutions
IBM & Ecosystem Solutions

Insights as a Service - providing knowledge and actionable information through advanced analytics and cognitive capabilities

Data - HIPAA-enabled, standards-based, massively scalable, open repository of data on all dimensions of health

Solutions - From IBM and ecosystem partners improves the overall experience and increases the quality of outcomes -- where it matters and when it matters

Individuals Researchers Physicians Providers Pharma






Health | Smarter Care | Social Programs

IBM Watson Health

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Watson Health

- Enables largest commercial clinical datasets in healthcare

	UNIQUE LIVES 50 MILLION	U.S. POPULATION 15%	HEALTHCARE NETWORKS 26
	UNIQUE LIVES 42 MILLION	U.S. POPULATION 12.5%	HEALTHCARE NETWORKS 50
	UNIQUE LIVES 100 MILLION +	U.S. POPULATION 30%	HEALTHCARE NETWORKS 39



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Population Assessment

Know their past and future utilization, their risks, and which are can be mitigated given your network's capabilities.

• Population Assessment

- Demographics & health status
- Geographic coverage
- Share of chart

• Historical Utilization

- By service line
- By health status

• Risk and Projected Utilization

- PMPM by condition and type

• Identify the Best Opportunities

- To eliminate waste
- To reduce variation
- To close care gaps
- To improve outcomes

Population Management

Provide targeted information and directives for care coordinators, providers, and patients to drive performance.

• Registries & Work Lists to...

- Mitigate time-sensitive risks of unnecessary utilization and poor outcomes
- Proactively manage diseases
- Meet performance goals and objectives of programs

• Workflow

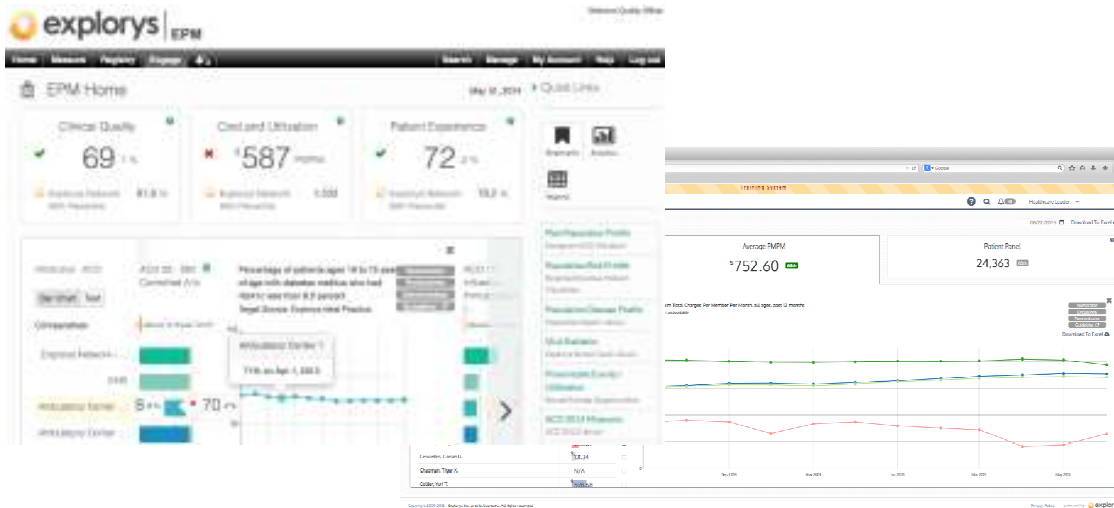
- Integrated into the daily process of care coordinators and providers
- Automated assignment, alerts, notes, and reminders

• Engagement

- Communicate via integrated 3rd party portal, telephone, and letters.

The screenshot displays the Explorys EPM interface, which is a comprehensive data analytics and patient engagement platform. Key components include:

- Geographic Information - Tyndall Health - DHS:** A section with a pie chart titled "Distance to the Nearest Hospital" showing data for three categories: >20 Miles (25%), >15 Miles (35%), and >10 Miles (40%). Below the chart is a map of the region.
- Diagnosis Registry:** A map showing the geographic distribution of various medical conditions.
- PMPM Predicted Cost and Risk Score - Tyndall Health - DHS vs. Comparison:** A bar chart comparing predicted costs and risk scores against a comparison group.
- Top Largest Drivers of Predicted Cost - Tyndall Health - DHS:** A bubble chart showing the impact of various conditions on predicted costs.
- Engage Action:** A patient profile view for a patient with a birth date of 04/07/2014, language of English, and insurance of Medicare. It includes a "Scheduled Appointment" dropdown menu with options like "Send Letter", "Log Note", "Log Call", and "Log Reminder".
- Engage History:** A table showing a log of engagement actions, such as a "Call: Scheduled Appointment" on 04/07/2014 at 03:00 PM, with details like "Referred patient to: Nutrition Educator".



Performance Measurement

Up-to-date network-wide reporting and measures relative to performance targets, program return-on-investment, and pinpointed opportunities for continued improvement.

• Role Specific Dashboards for...

- Leadership
- Care coordinators
- Providers

• Program Specific Measure Libraries

- ACO (commercial and Medicare)
- Medicare Advantage
- Direct-to-Employer
- Provider-based HEDIS
- Inpatient quality and efficiency
- Optimized utilization

• Pre-built Reports & Data Marts

- Payer/plan submission
- Provider scorecards and performance plans
- HCC and proper coding opportunities
- Contract performance

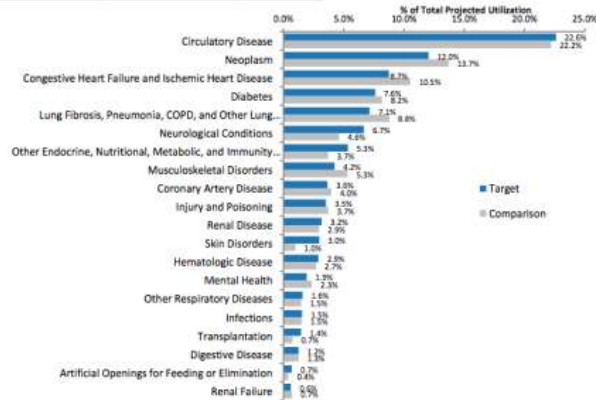
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Insights to better understand Risk, Utilization

Source	Target Population			Comparison Population [†]
	Claims & EMR	Claims only	EMR only	EMR only
Average 2014 CMS-HCC Risk Score	1.23	1.16	0.91	0.78
Projected \$ PMPM	\$1,045.50	\$986.00	\$773.50	\$663.00
Projected \$ PMPY	\$12,546.00	\$11,832.00	\$9,282.00	\$7,956.00
Projected Total Annual Utilization	\$186,797,394	\$176,166,648	\$138,199,698	\$118,456,884

Distribution of Projected Utilization by Condition



Risk Category	Risk Score Range ²	No. of Members	Average 2014 CMS-HCC Risk Score ³	Projected \$ PMPM ⁴	Projected Utilization (Annual)	Percent of Total Utilization
Critical	≥ 4.16	298	5.26	\$4,471.00	\$15,988,296	9%
High	2.14 – 4.15	1,776	2.83	\$2,405.50	\$51,266,016	27%
Medium	0.92 – 2.13	5,478	1.40	\$1,190.00	\$78,225,840	42%
Low	≤ 0.92	7,337	0.55	\$467.50	\$41,160,570	22%
Overall	-	14,889	1.23	\$1,045.50	\$186,797,394	100%

Clinical Indicators



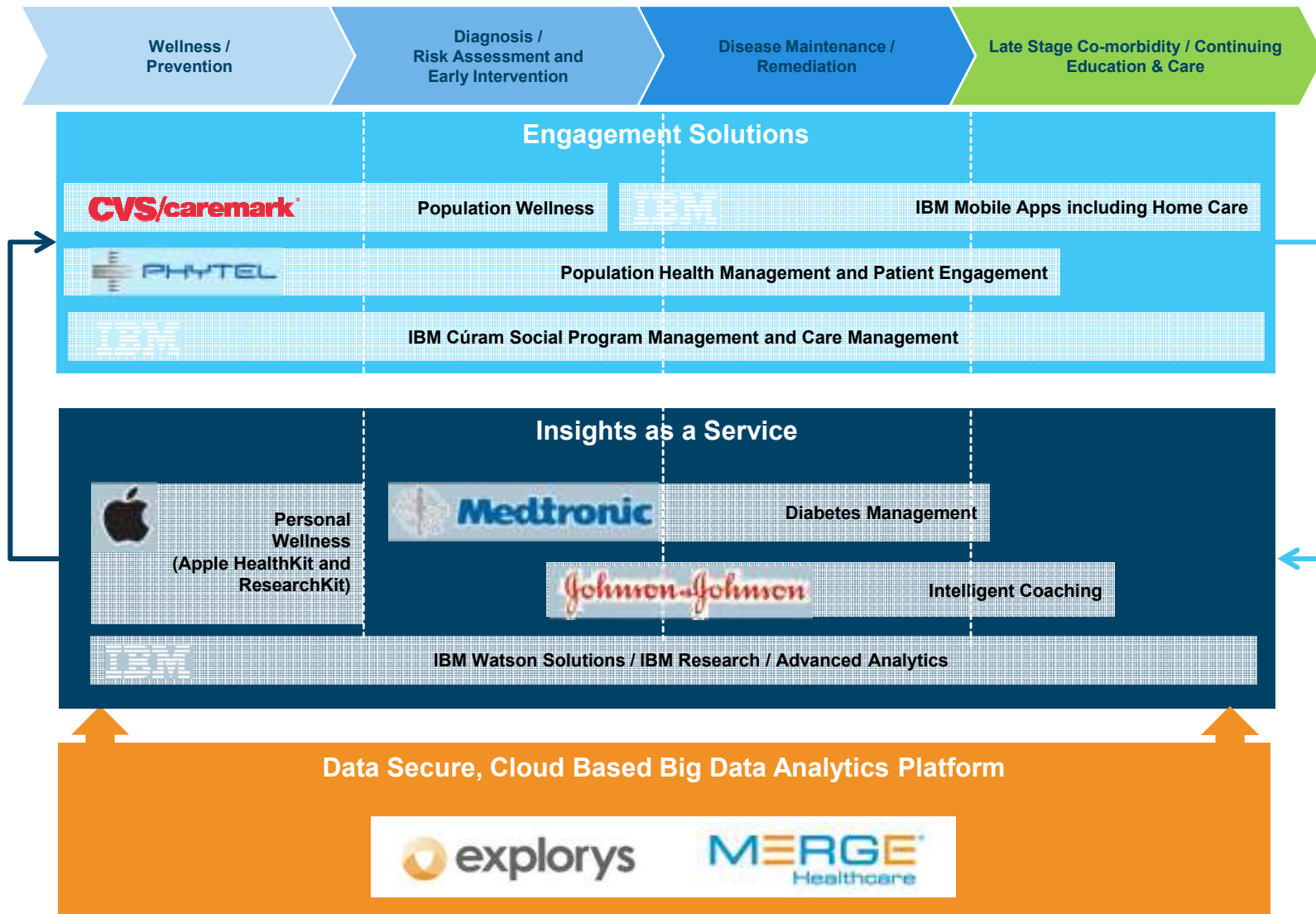
Prevention and Screening

Measure	Benchmark Rate	Target Population Adherence Rate	Comparison Population [†] Adherence Rate
NQF 0055 - CMS131v3 - Diabetes: Eye Exam	69.0% ²	16.3%	16.7%
NQF 0056 - CMS123v3 - Diabetes: Foot Exam	51.0%	n/a	n/a
NQF 0057 - Diabetes: HbA1c Testing	91.0% ²	91.4%	89.8%
NQF 0062 - CMS134v3 - Diabetes: Urine Protein Screening	51.7%	88.2%	86.8%
NQF 0063 - Diabetes: LDL-C Screening	88.0% ²	86.0%	81.9%

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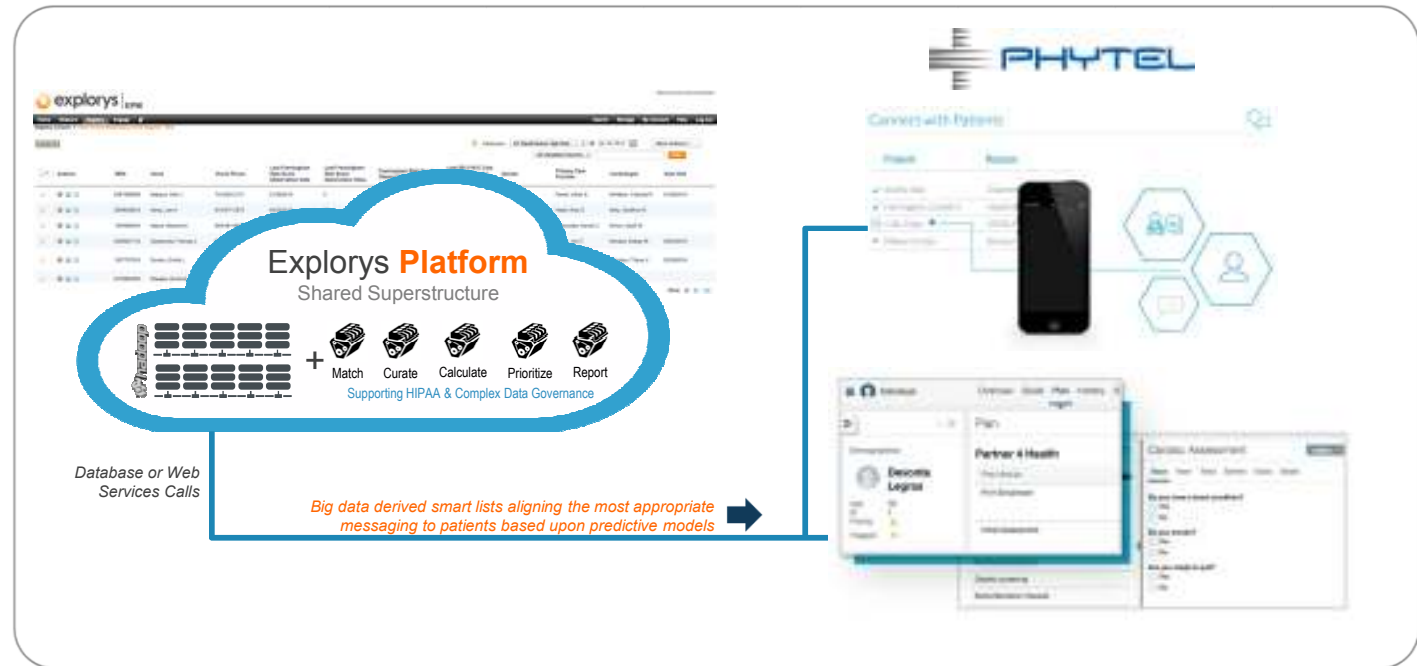
To Address Entire Care Continuum and Improve Outcomes

IBM Watson Health



Extending business value

- Leveraging with Hybrid Health Cloud Insights



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Client Success Story

- Improved Population Insight and Engagement

About the Organization

- Community based, not-for-profit system
- 7 Acute care facilities, 1800 beds
- 500 Employed physician network
- 2000+ Affiliated physicians.
- MSSP ACO and CIN

The Challenge

- Needed to create a Patient-First clinically integrated new model of care in collaboration with our medical staff to pursue seamless, quality outcome-driven extraordinary care.

The Solution

- Formed regional Clinically Integrated Network with University of Florida = 1300 employed physicians
- Pursuing PCMH status in 28 locations
- Managing 80 – 120k lives in shared savings contracts

52 days

to implement forty feeds across six inpatient and ambulatory systems

“I have never seen an IT project go so smoothly. Most companies sell a product and then you are on your own. This was a great team to work with throughout the project.”



Rick Schooler
Clinical Information Officer
Orlando Health

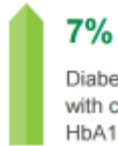
- Total of **101,592 unique patients attempted to contact with Gaps in Care** for 132 Outreach providers
- **Successfully contacted 89,513 unique patients** who were informed of an identified gap in care through Outreach
- Care gaps that were closed based on these successful Outreach attempts **generated over \$6,694,319 in billable revenue**

* Note – data is for June 1, 2014 – May 31, 2015



A CLOSER LOOK: ORLANDO HEALTH

Year one clinical outcomes



Diabetic patients with current HbA1c test



Adult female patients receiving preventive mammogram screening



All patients age 50+ receiving colonoscopy screening



Elderly patients receiving falls-risk screening



Patients receiving depression screening and a follow-up plan

IBM Watson Health

A CLOSER LOOK: ORLANDO HEALTH

Strong financial returns



INSTALLATION



Implementation begins for 100 physicians

6 MONTHS



Closed ~7,000 chronic and preventative care gaps; 83.6% successful contacts

9 MONTHS



Phytel NCOA auto-credit, enables PCMH Level 3 certification

12 MONTHS



\$6.6MM in shared savings

24 MONTHS



Additional \$10MM in shared savings

IBM Watson Health



IBM Bridging Data Driven and Knowledge Driven Analysis

- *Delivering value to derive individualized and applied insight*

From published knowledge

Medical Literature
~700 K new scientific articles year



Guidelines



Institutional Knowledge



To insights for the individual

Exogenous data



Genomics data



Clinical data



Cognitive Solutions – IBM Watson

Improve Engagement (ASK)

Engagement Advisor

to transform interactions and experiences with health consumers:

- Digital Virtual Agent - Increase success rate of online transactions
- Digital Health Advisor - Engage health consumers to improve health and wellness

Utilization Management

Streamline and automate authorizations and ensure adherence to guidelines

R&D Productivity (DISCOVER)

Discovery Advisor

Uncover new insights into diseases and innovative therapies

Genomics Advisor

Applying latest Research to understand biochemical considerations of tissue

Clinical Trial Matching solution that optimizes patient selection against clinical trial requirements

Improve Outcomes (DECIDE)

Oncology (& beyond)

to assist in identifying individualized treatment plans and clinical trials.

EMR Advisor

Identify critical attributes of a patient case and provide easy-to-consume summaries

Clinical Reasoning / Paths

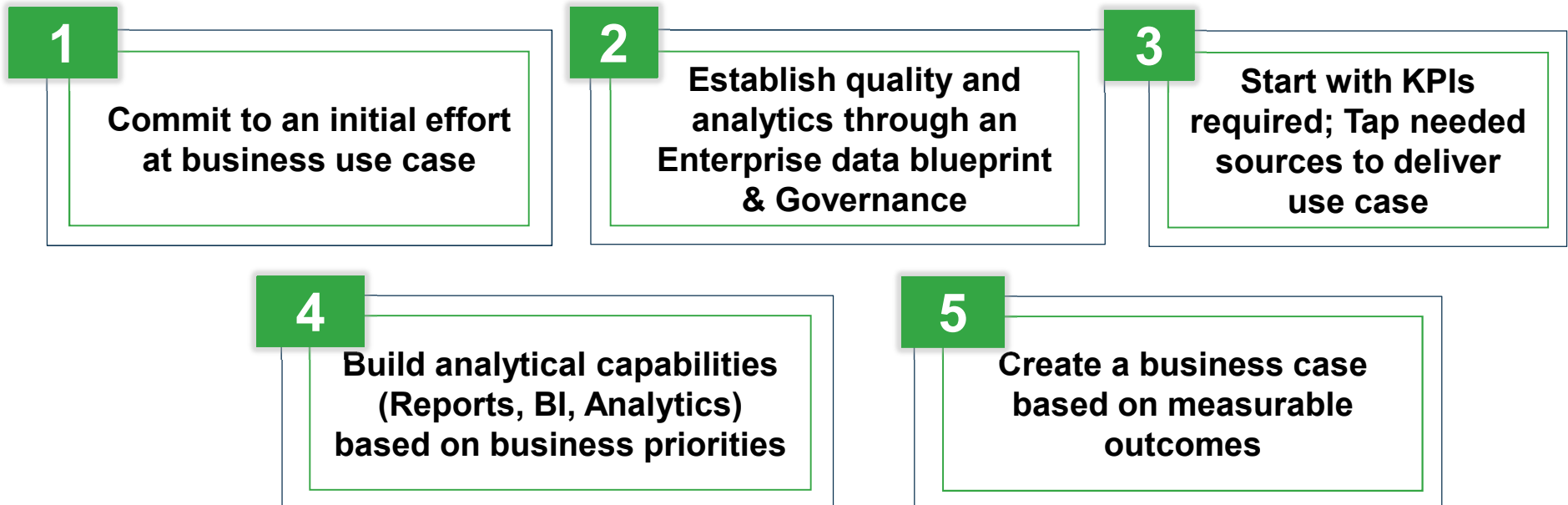
Clinical reasoning for Medical Education & top of license care delivery

Leading Healthcare institutions using Cognition

<p>Ongoing Training Partner</p>  <p>Memorial Sloan Kettering Cancer Center Watson for Oncology, trained by Memorial Sloan Kettering <i>available in clinical use in lung, breast, colon and rectal cancer</i></p>	 <p>Bumrungrad International HOSPITAL Bumrungrad International Hospital <i>5 year agreement for <u>Watson for Oncology</u></i></p>	<p>THE UNIVERSITY OF TEXAS MD Anderson Cancer Center Making Cancer History® MD Anderson <i>Introduced <u>proprietary solution with Watson</u> for clinical use for Leukemia and Molecular Targeted Therapies</i></p>	<p>MAYO CLINIC  mayo clinic <i>Completed testing with <u>Clinical Trial Matching</u> for lung, breast, colon and rectal cancer</i></p>
 <p>Baylor College of Medicine <i>Published results of use with <u>Watson Discovery Advisor</u> – identified 7 targets for P53 activation within weeks</i></p>	 <p>Watson Genomics Advisor <i>Secured 13 Cancer and Academic medical centers for beta testing</i></p>	 <p>Department of Veterans Affairs <i>Selected <u>Watson to analyze EMRs</u> in a demo project</i></p>	<p>MAYO CLINIC  Mayo Clinic <i>Selected <u>Watson to analyze EMRs</u> for Clinical Efficiency and Effectiveness Program</i></p>

Where do I start?

– Practical Approach to addressing quality and analytics in sizeable business sprints / sub-projects



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THANK YOU

