Healthcare Payer Medical Informatics and Analytics

Frank Wang, WW Healthcare and Life Sciences

THE FACES OF HEALTHCARE

Anatomy of a medical transaction

Emotional… Complex… Fragmented… Paper-based

Source: Life Magazine

Healthcare Client Needs are Changing to Address Drivers

Cost Reduction

- Pressure to reduce operating costs due to restrictions on Medial Loss Ratios
- Health Exchange-enabled Individual market requires a low cost structure
- Health plans will need to re-allocate capital to new product and growth initiatives
- Claims processing system modernization becomes increasingly important

Consumer Engagement

- Consumerism and Individual Markets are shifting the business model
- Increased number of Medicare and Medicaid membership
- Multi-channel customer engagement is needed
- Cloud CRM

Interoperability

- Accountable Care Organizations will require new partnerships with providers
- Greater alignment of incentives among pharma, health plans and health providers requires collaboration
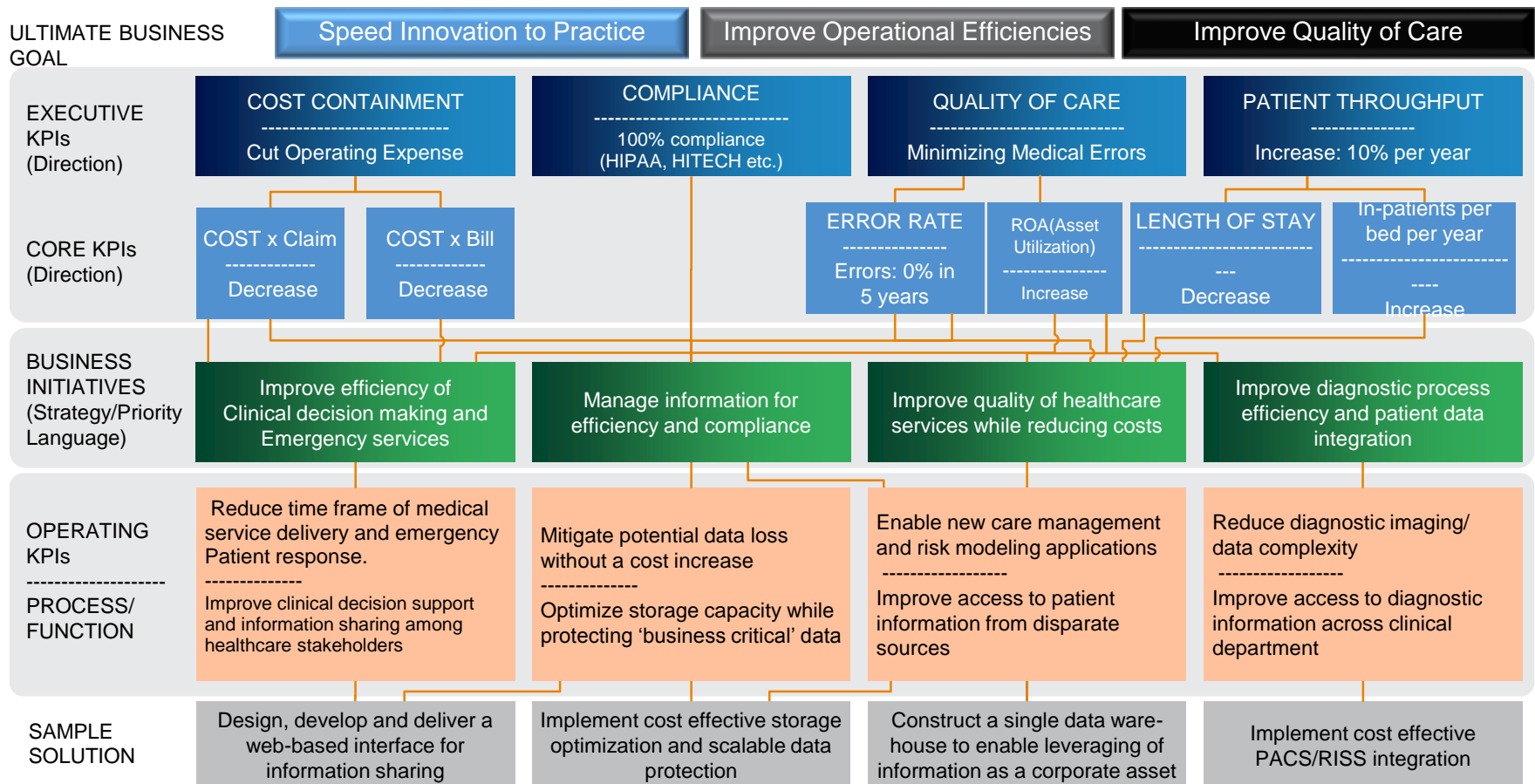- Global Network Infrastructure expansion to support growing business needs and industry interconnectivity

Business Intelligence Management

- Health plans and their partners will need to manage significantly more health data
- Dashboards and other insight tools can reduce operational costs
- Social network analytics is emerging
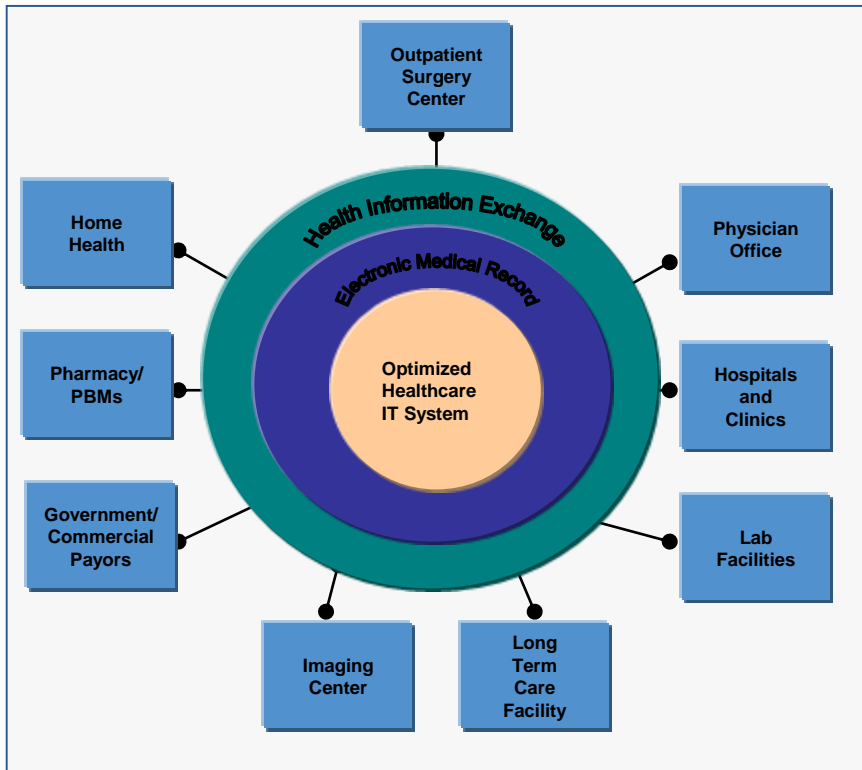- Real Time Data/Knowledge in support of Strategic Decision Making

Data Management

- ICD-10 is impacting critical applications and infrastructure
- Individuals moving between plans increase demand for data security and integrity
- Connectivity with individual end-point devices (tablets, smart phones) require increased data security
- New healthcare delivery models in support of evidence-based medicine and personalize medicine yield data types unfamiliar to most payers

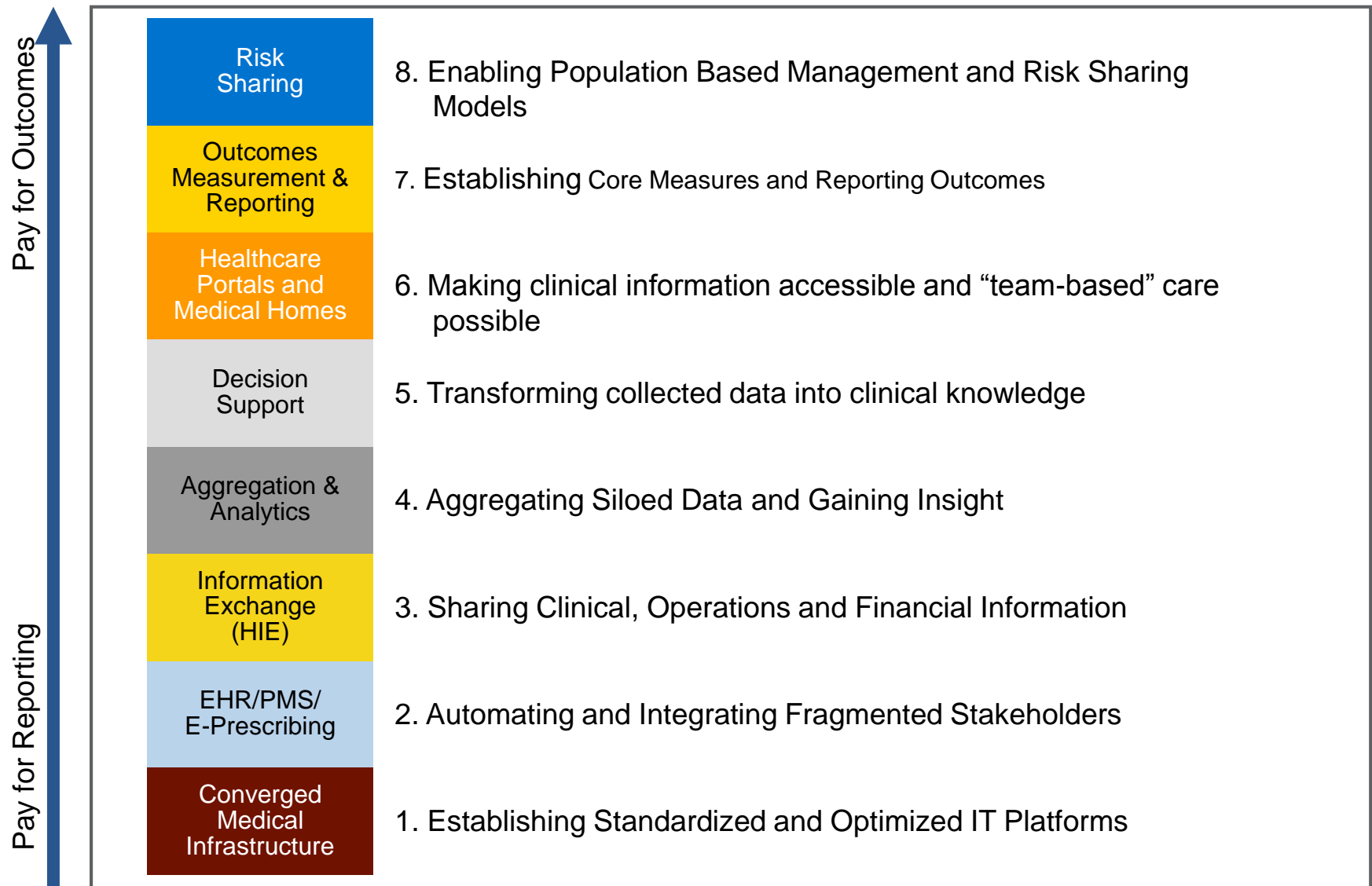# BUSINESS VALUE ANALYSIS OF INFORMATION MANAGEMENT IN HEALTHCARE

	Speed Innovation to Practice	Improve Operational Efficiencies	Improve Quality of Care
ULTIMATE BUSINESS GOAL			

EXECUTIVE KPIs (Direction)	COST CONTAINMENT --------------------------- Cut Operating Expense	COMPLIANCE --------------------------- 100% compliance (HIPAA, HITECH etc.)	QUALITY OF CARE --------------------------- Minimizing Medical Errors	PATIENT THROUGHPUT ---------------- Increase: 10% per year

CORE KPIs (Direction)	COST x Claim ------------- Decrease	COST x Bill -------------- Decrease	ERROR RATE --------------- Errors: 0% in 5 years	ROA(Asset Utilization) --------------- Increase	LENGTH OF STAY ------------------------- --- Decrease	In-patients per bed per year ------------------------- ---- Increase

BUSINESS INITIATIVES (Strategy/Priority Language)	Improve efficiency of Clinical decision making and Emergency services	Manage information for efficiency and compliance	Improve quality of healthcare services while reducing costs	Improve diagnostic process efficiency and patient data integration

OPERATING KPIs ------------------ PROCESS/ FUNCTION	Reduce time frame of medical service delivery and emergency Patient response. --------------- Improve clinical decision support and information sharing among healthcare stakeholders	Mitigate potential data loss without a cost increase -------------- Optimize storage capacity while protecting 'business critical' data	Enable new care management and risk modeling applications ------------------ Improve access to patient information from disparate sources	Reduce diagnostic imaging/ data complexity ------------------ Improve access to diagnostic information across clinical department

SAMPLE SOLUTION	Design, develop and deliver a web-based interface for information sharing	Implement cost effective storage optimization and scalable data protection	Construct a single data warehouse to enable leveraging of information as a corporate asset	Implement cost effective PACS/RISS integration

The journey to accountable care requires a Healthcare IT Transformation across the entire community of care
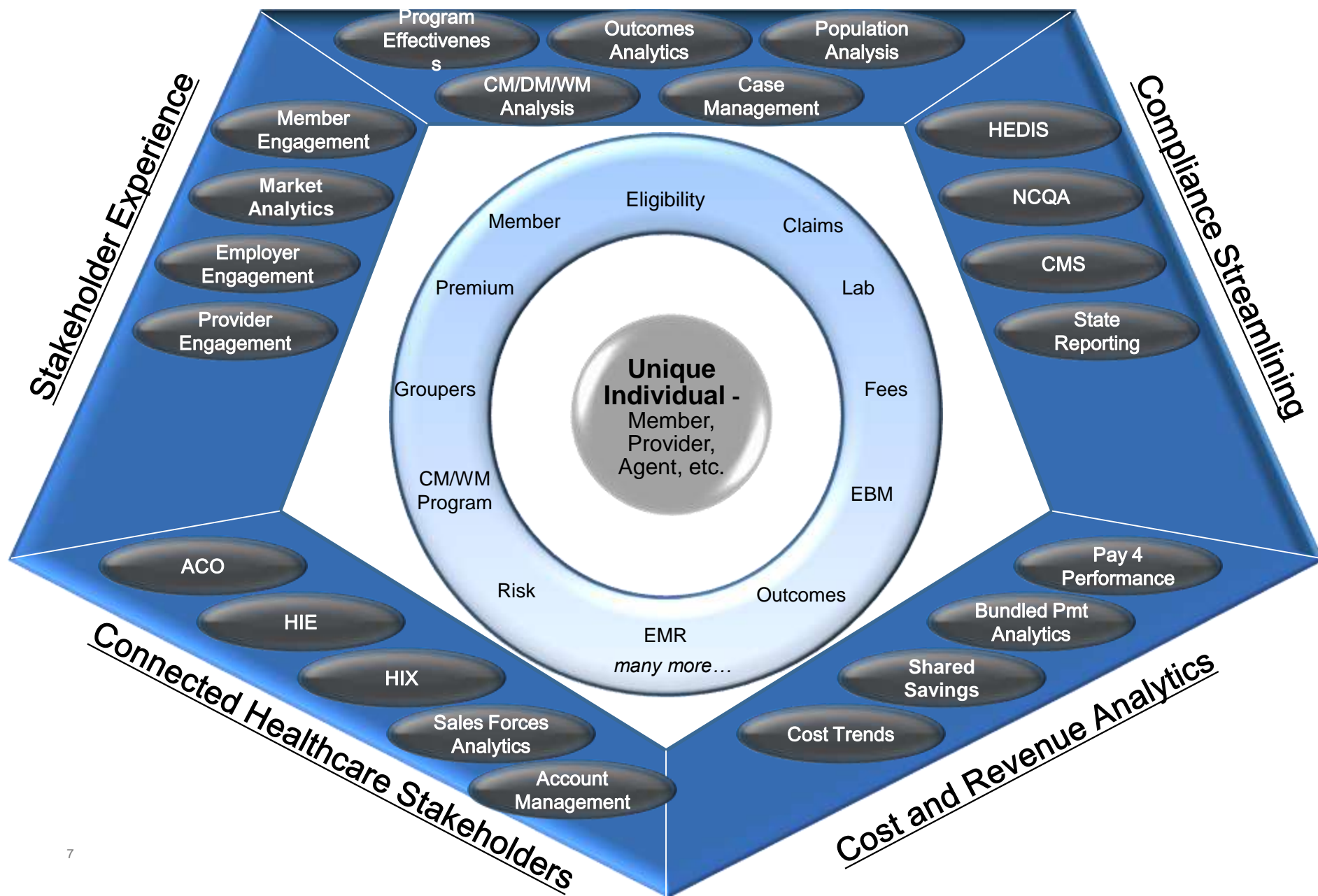

Health Information Exchange

Electronic Medical Record

Optimized Healthcare IT System

- Outpatient Surgery Center
- Home Health
- Physician Office
- Pharmacy/ PBMs
- Hospitals and Clinics
- Government/ Commercial Payors
- Lab Facilities
- Imaging Center
- Long Term Care Facility

Healthcare Transformation IT Requirements

- Upgrade, automate and connect healthcare IT systems across acute, ambulatory, clinic and home settings

- Deliver an integrated clinical and financial view of a patient on demand

- Deploy "collaborative" systems to enable "team" based community care

- Establish Business intelligence platforms for reporting, outcomes measurement and disease management

- Accelerate standardization and cost take out activities ahead of new system installs

The 8 Building Blocks of Successful Accountable Healthcare

Pay for Outcomes ↑

Pay for Reporting

Block	Description
Risk Sharing	8. Enabling Population Based Management and Risk Sharing Models
Outcomes Measurement & Reporting	7. Establishing Core Measures and Reporting Outcomes
Healthcare Portals and Medical Homes	6. Making clinical information accessible and "team-based" care possible
Decision Support	5. Transforming collected data into clinical knowledge
Aggregation & Analytics	4. Aggregating Siloed Data and Gaining Insight
Information Exchange (HIE)	3. Sharing Clinical, Operations and Financial Information
EHR/PMS/ E-Prescribing	2. Automating and Integrating Fragmented Stakeholders
Converged Medical Infrastructure	1. Establishing Standardized and Optimized IT Platforms

Healthcare Payer Solution Landscape

Care Management / Medical Management

Stakeholder Experience

Compliance Streamlining

Connected Healthcare Stakeholders

Cost and Revenue Analytics

Program Effectiveness

Outcomes Analytics

Population Analysis

CM/DM/WM Analysis

Case Management

Member Engagement

Market Analytics

Employer Engagement

Provider Engagement

HEDIS

NCQA

CMS

State Reporting

Eligibility

Member

Claims

Premium

Lab

Groupers

Fees

Unique Individual - Member, Provider, Agent, etc.

CM/WM Program

EBM

Risk

Outcomes

EMR

many more…

ACO

HIE

HIX

Sales Forces Analytics

Account Management

Pay 4 Performance

Bundled Pmt Analytics

Shared Savings

Cost Trends

Cost and Revenue Analytics

Understand your financial metrics and trend analysis
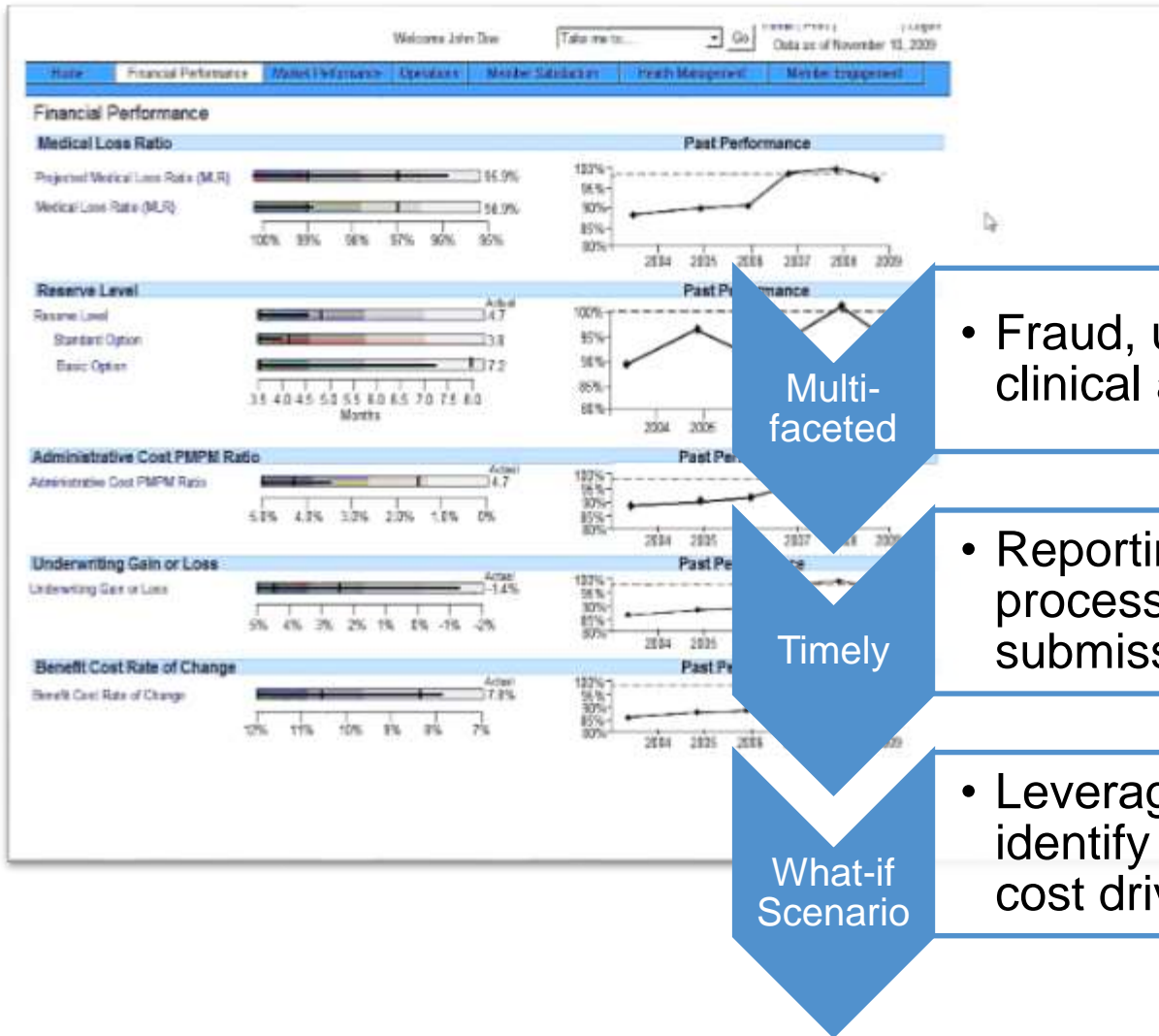
- Fraud, underwriting, MLR, clinical and coding guideline

Multi-faceted

- Reporting at the time of processing claims or claim submission

Timely

- Leverage "what-if" analysis to identify effective responses to cost drivers

What-if Scenario

Care Management Model

Supporting the BI needs of Healthcare Payers as they engage members in ongoing care management along the health continuum

Identify & Target
Right member; right program

1 Identify / Target

2 Enroll
Incentivize and engage members to participate

3 Intervene
Targeted, evidence based methods to impact the member's condition and health

4 Evaluate
Measure outcomes and adjust performance

Community
Health Plan
Employers
Providers
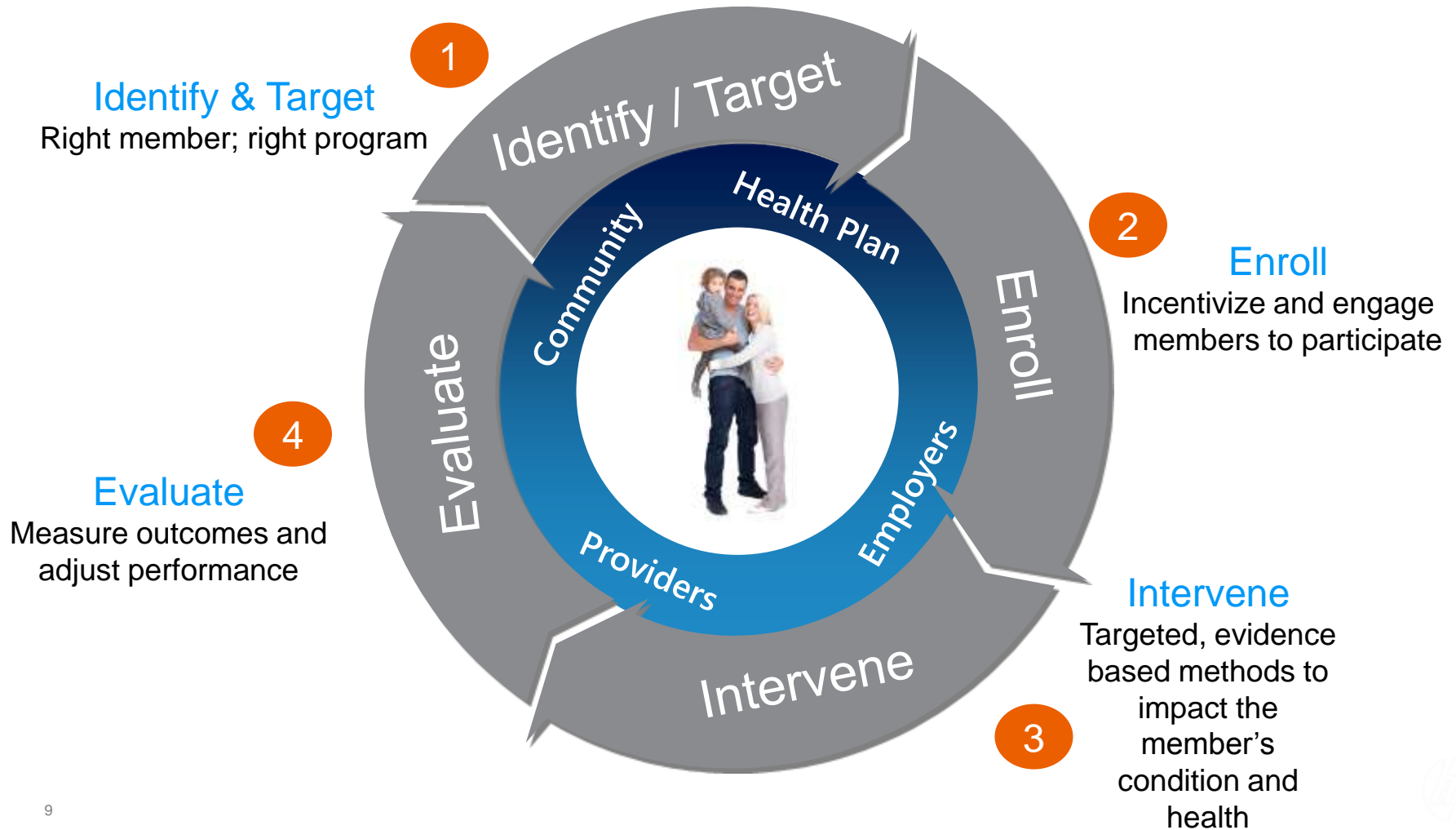
Care Management Portal

Member-centric
- Member-centric view tracking and reporting members' health conditions, goals, recommended interventions and outcomes so that care managers can assess overall program effectiveness

Integration
- Integrates with claims data to identify members with existing or developing chronic diseases, calculates treatment plan cost savings, and track results

Easy to use
- An easy to use care management portal

Demographics Selector

Member Gender	Male	Female
Claim Type	Inpatient - Institutional Services	Outpatient - Institu...
Member Age Range	18-25	26-40	41-65	Over 65	U...

Top Five Procedures

- TOTAL PANCREATECTOMY
- DESTRUCT PERITONEAL TISS
- AMPUTATION THROUGH FOOT
- RAD PANCREATICODUODENECT
- EXC LES SOFT TISSUE NEC

Top Cancer Diagnosis Groups

Average Drug Claim Paid Amount

Average Medical Claim Paid Amount

Average Drug Co-Pay Amount

Average Medical Claim Submitted Amount

Care Management

Care management to reduce hospital readmission rates

Comprehensive
- From prevention to long-term chronic disease maintenance

Predictable
- Predictive modeling at patient and population levels to reduce hospital readmission rates

Multiple data sources
- Leverage many different data sources

Use Case: Stratification for Care Intervention

The challenge is to correctly assess who is at risk, quantify the risk, then match the individual

Mr. HP1 – 20 years,

Mr. HP2 – overweight, borderli

Mr. HP3 – overweight, repeate

Is healthy and thus has a very low risk score. Based on this, he is directed to the Wellness program.

Is at risk of developing a chronic condition that can be minimized through better understanding and improved self care. He has a medium risk score. He is placed into a Disease Management program to optimize blood pressure control, achieve moderate weight reduction, and incorporate

Has a chronic condition that puts him at high risk for getting progressively worse. In this case, preventing or slowing progression is the goal. He is placed in a Case Management (CM) program.

Use Case – Case Management

– Identifying High Risk High Cost (HRHC) Members

- Identify members who are at high risk for experiencing decreased health or likely to incur high dollar cost for treatments.
- Separate long-term HRHC members (advanced chronic disease suffers) from one time high cost members (trauma)
- Stratify long-term HRHC members in order to assign appropriate intervention by Case Management (CM)

– Benefit

- Lower immediate costs
- Much lower long term cost (bend the trend)
- Target intervention by Case Mangement to improve member health, keep the member healthier for longer period of time, delay the worsening of health.

Insurance Performance – Case Management

	Member ID	First name	Last Name	Age	Total Cost	Expected Amount Year 2
	1	De-ID	De-ID	60	$10,565	$109,051.00
	2	De-ID	De-ID	61	$27,013	$78,934.00
	3	De-ID	De-ID	50	$28,805	$51,971.00
	4	De-ID	De-ID	59	$8,372	$66,154.00
	5	De-ID	De-ID	86	$17,674	$65,604.00
	6	De-ID	De-ID	61	$420,318	$14,575.00
	7	De-ID	De-ID	55	$29,925	$48,609.00
	8	De-ID	De-ID	54	$4,828	$55,133.00
	9	De-ID	De-ID	87	$5,161	$55,062.00
	10	De-ID	De-ID	5	$620,887	$5,570.00

One time event (Blue)
- Little impact for future
- Goal: encourage healthy behavior

Continued progression (Yellow)
- Slow progression, moderate affect long term costs
- Goal: Extend time the member feels healthy

Sudden change for the worse (Red)
- Rapid progression into disease, large affect on long-term costs
- Goal: Stop or moderate descent into disease

Utilization Management (UM)

- Appropriateness
  - Reviews prior authorization, eligibility, benefits limits and services limits

- Necessity
  - Provides concurrent and retrospective reviews based on evidence-based guidelines, clinical criteria (InterQual, Milliman, Solucient)

- Efficiency
  - Proactively manages therapeutic duplication, level of care and length of services
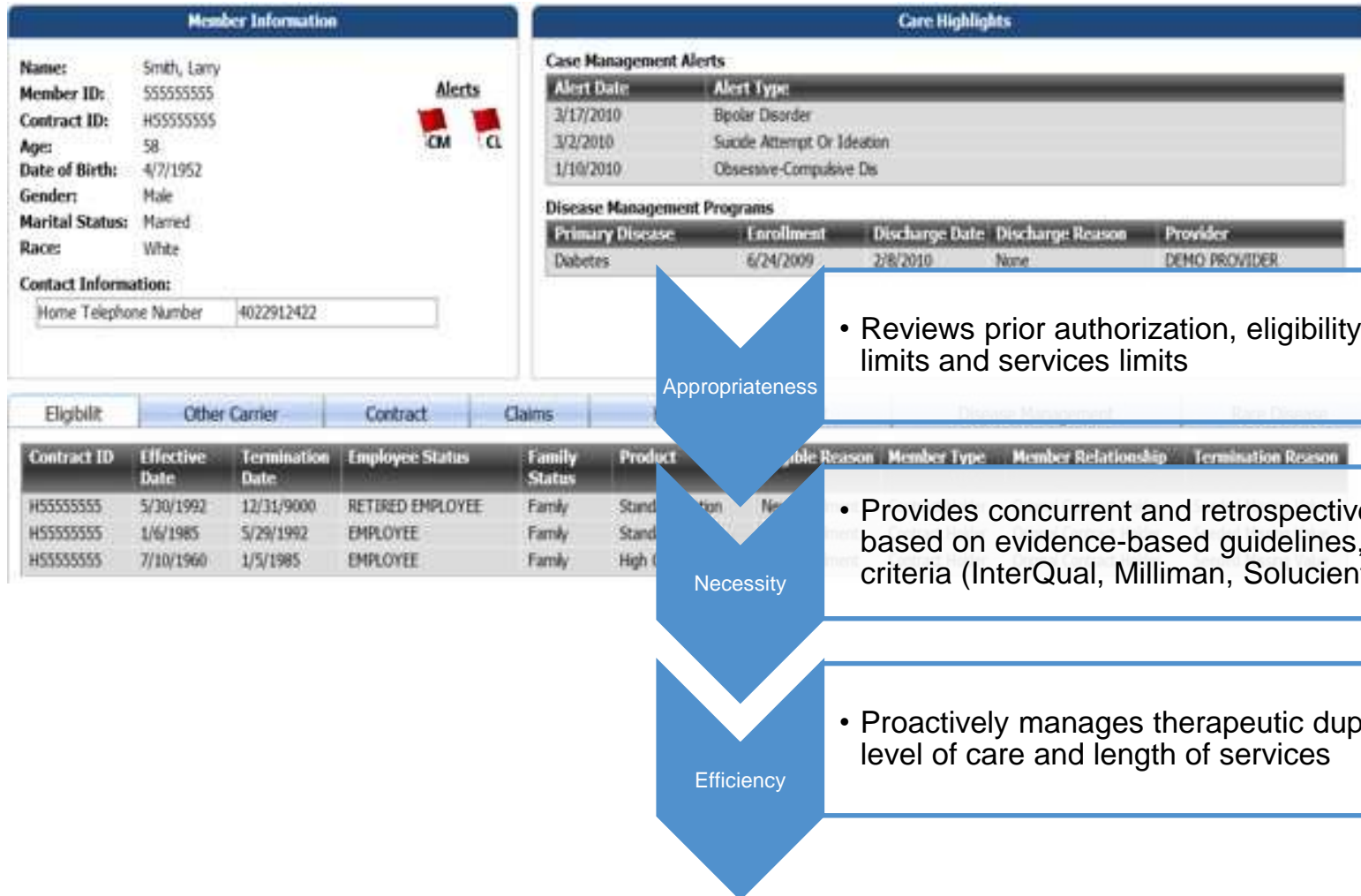
Disease Management and Wellness Management

- Segments and predicts specific illness such as heart conditions, diabetes and depression
- Member centric wellness management including health risk assessment, patient education
- Develop short- and long-term cost control machnism
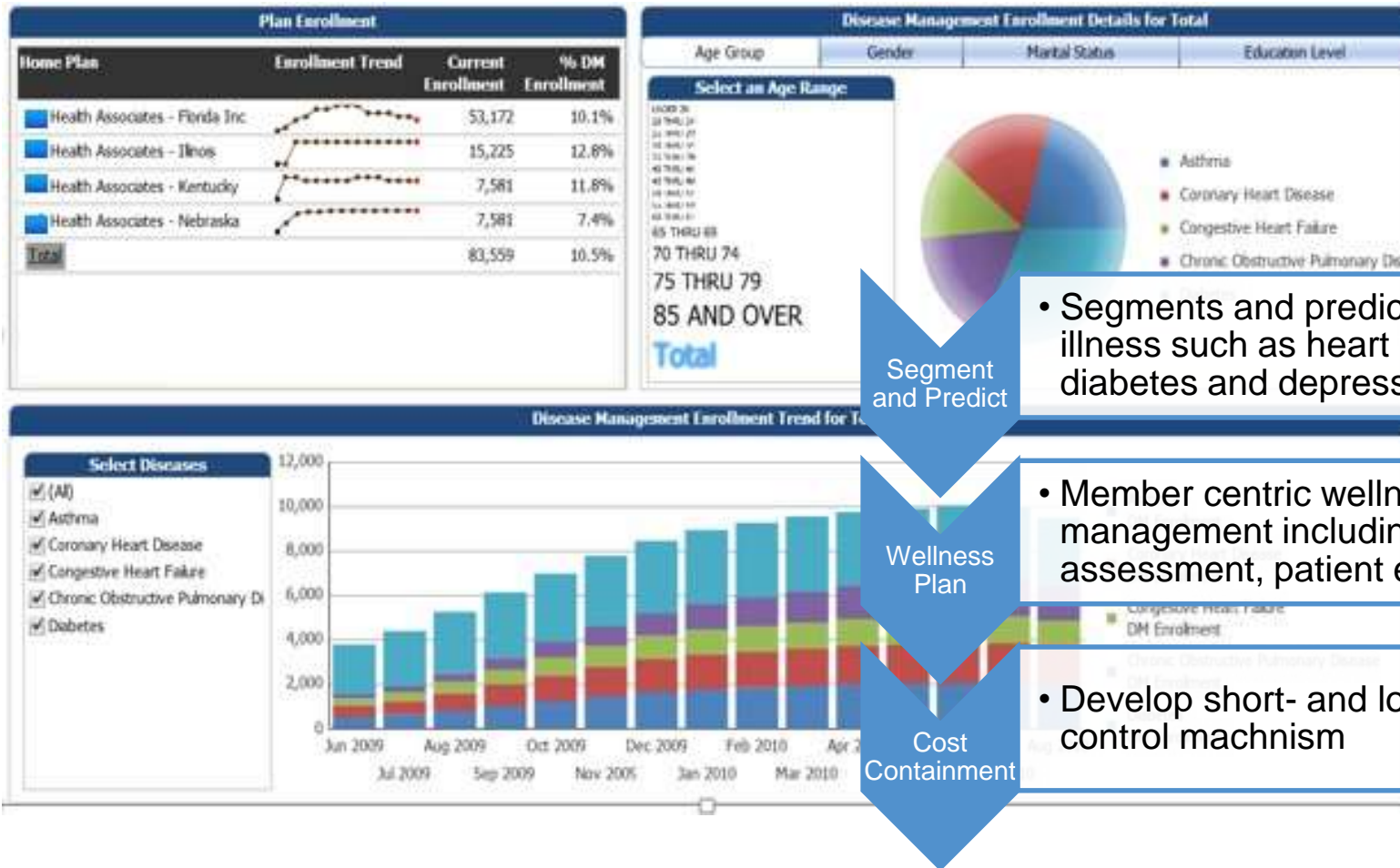
Cost Containment Findings

Reduce costs by identifying and eliminating un-necessary procedures

Necessity

- Is the procedure necessary

Savings

- How large is the potential saving and what is the estimated cost/benefit ratio?

Nail Debridement

- Nail debridement clinical guidelines. Only 2 of 5 are directly tied to a disease
- Relief of pain
- Treatment of infection (bacterial, fungal and viral)
- Temporary removal of an anatomic deformity …
- Exposure of subungal condition …
- Prophylactic measure to prevent further problems …

Provider #	Count	Provider Name	Specialty	Total $
		Ming, Mark	Family Practice	$160,833
2	4342	Yahoo, Charles	Psychiatry	$143,490
3	2732	East End Urgent Care URGENT	Family Practice	$90,479
4	2602	Place, First MD	General Practice	$63,892
		Swan, Edward MD	Anesthesiology	$56,696
6	4312	Smith, Gregory E DPM	Podiatry	$54,597
7	3836	Man, Super G DPM	Podiatry	$49,796
8	1615	Riley, James R MD	Plastic Surgery	$37,970
9	3243	Avian, Bird DPM	Podiatry	$37,327
10	2513	Copper, Metal H DPM	Podiatry	$32,668

Fraud and Abuse Detection

Additional investigation needed

Provider #	Count	Provider Name	Specialty	Total $
1	4836	**Bing, Mark**	Family Practice	**$160,833**
2	4342	**Yahoo, Charles**	**Psychiatry**	**$143,490**
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Provider1
- Charges significantly higher than his peers

Provider 2
- Specialized in psychiatry, and is not generally associated with nail debridement

Provider 5
- Practised in a specialty that is not generally associated with the nail debridement procedure

Fraud and Abuse (F&A) Detection by Profiling Providers

Outlier detection based on Provider profiles. Highlighted cells suggest further investigation.

Ranking Top 5 Codes by Quantity for Provider: GR0000000 – ABC Medical Group, Inc										
6 Months of Service xx/xx-yy/yy, Paid in Months xx/xx-yy/yy										
		GR0000000		Qty Rank and % Compared to OB/GYN Groups					6 Month Peer Averages	
Code	Code Desc	Total Dollars Paid	Total Qty Adj	Rank		% of Total Qty	Total # Provs		Peer Avg Dollars Paid	Peer Avg Qty
81025-TC	Urine pregnancy test	$12,560.60	2,710	#1	or	19%	65		$1,022.93	220
Z9752	Family planning counseling (15 minutes)	$33,086.45	1,735	#1	or	21%	55		$2,778.90	149
Z6410	Perinatal education, individual, each 15 minutes	$9,511.71	1,131	#9	or	3%	91		$3,657.38	435
Z6204	Follow-up antepartum nutrition assessment, treatment and/or intervention; individual, each 15 minutes	$7,569.00	900	#5	or	4%	96		$2,074.14	247
Z1034	Antepartum follow-up visit	$48,625.92	804	#16	or	2%	195		$11,996.08	203

Health Information Exchange

Singular
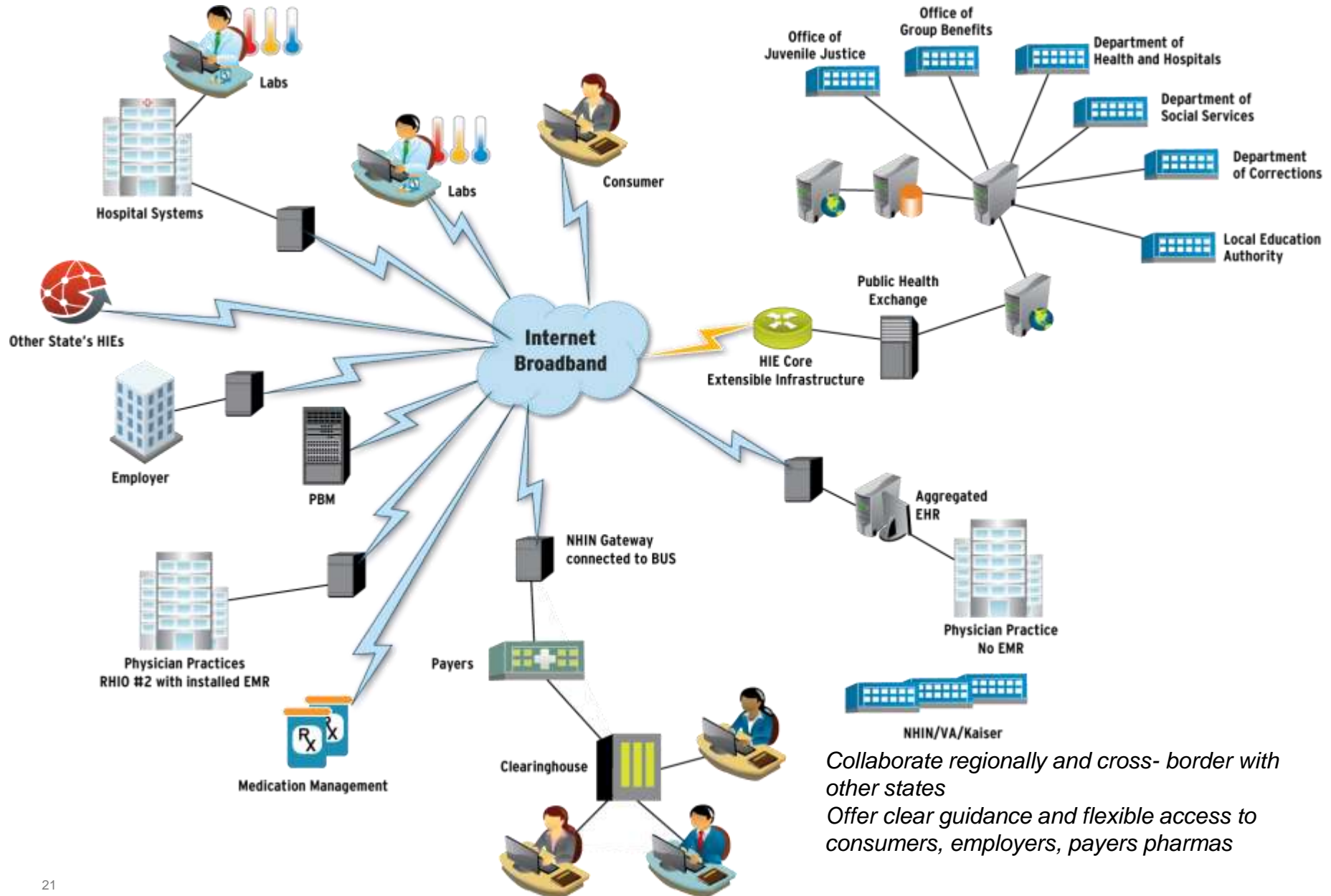- Houses data from many clinical data sources in a secure central structure

Enabling
- Enables key functions that reduces costs (reduced repeated testing, reduced risk of adverse events) and improves coordination of care
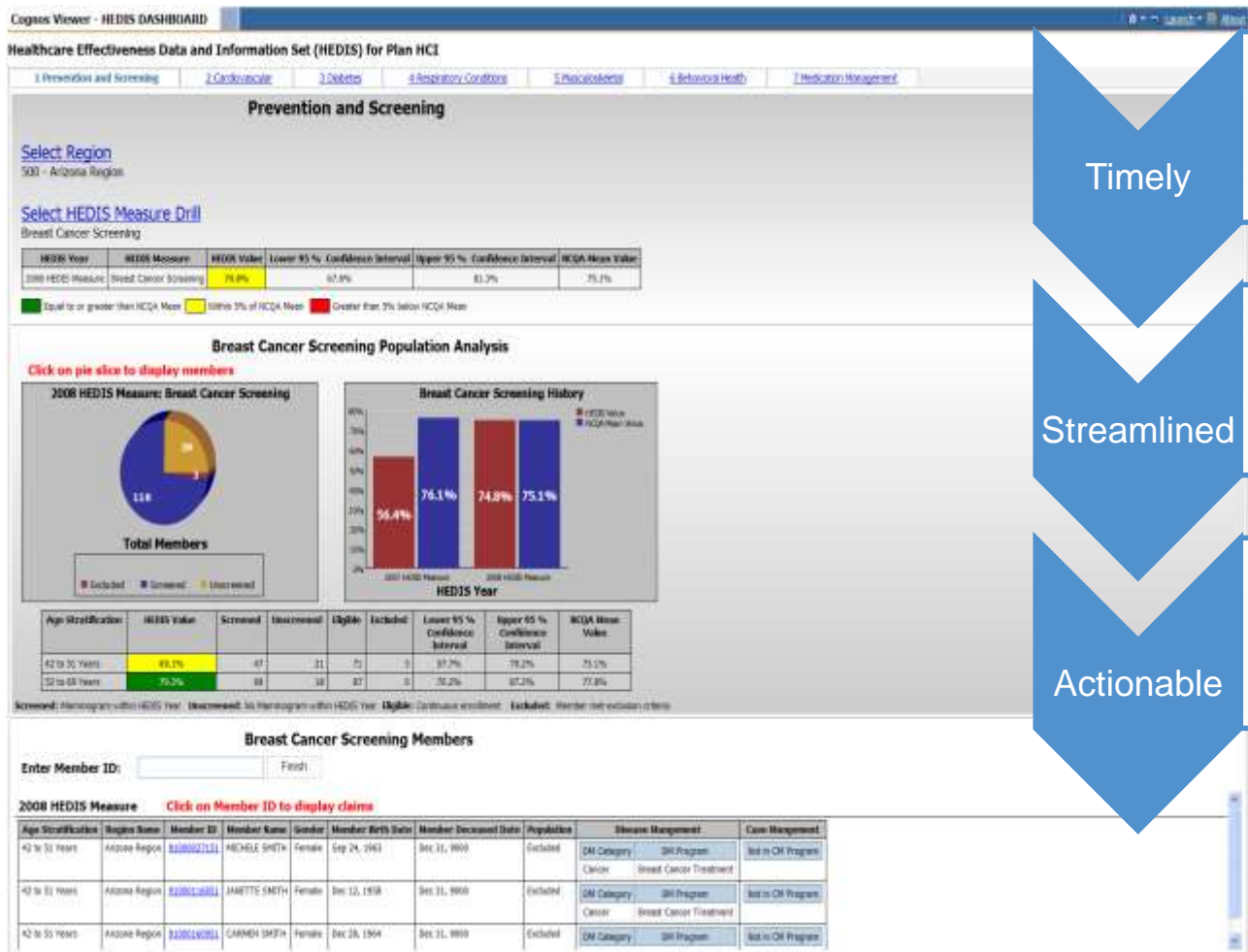
Payer
- Some HIE use cases have focus on sending ADTs (admissions, discharges, transfers) and discharge summaries to the health plans in lieu of manual processing

HIE DISTRIBUTION LAYER BUILT FOR GROWTH

Collaborate regionally and cross- border with other states
Offer clear guidance and flexible access to consumers, employers, payers pharmas

Compliance Streamlining

- **Timely**: Analyze compliance data ahead of time to highlight problems before submission

- **Streamlined**: Easier to locate, access and report; new reports can be added quickly to increase regulatory adherence

- **Actionable**: Provide further drilldowns to identify root-causes in order to take actions to rectify the issues

Healthcare Payer Medical Informatics

Transform readily available, everyday data into actionable knowledge

Data Sources (Structured and Unstructured)

- Eligibility
- Demographics
- Medical Inpatient & Outpatient
- Pharmacy
- Labs
- Medical Records
- Surveys
- Health Risk Assessments

Medical Informatics

– Clinical expertise
– Statistical tools
– Data mining
– Predictive analytics
– Research methods
– Database technologies
– Published papers

Possible Actions to Take

- Optimize Quality
- Seamless Information Exchange
- Enhance Health Outcomes
- Population Health Analysis
- Prevent Fraud
- Enhance Collaborative Care
- Cost Containment

Turning Data into Knowledge – Example

Predictive Modeling

1	2	3	4	5
Primary Data –counts –sums	**Secondary Data** –averages –rates	**Information** –benchmarks –trends	**Knowledge** –goals –targets	**Wisdom** –actionable info
We have 35,000 individuals in our population with diabetes.	The patients cost us $7,000 this year, a 15% increase over last year.	The national prevalence rate for diabetes is 8.3%; ours is 12%. Hypertension is a major co-morbidity for diabetes.	Assign patient-level risk scores using a statistical model to predict which diabetics will be hospitalized next year.	Efficiently allocate care management resources to help reduce avoidable hospitalizations for at-risk patients.

Turning Data into Knowledge – Examples

	1 Primary Data (counts, sums)	2 Secondary Data (averages, rates)	3 Information (benchmarks, trends)	4 Knowledge (goals, targets)	5 Wisdom (actionable info)
Program Integrity	A total of 10,000 Medicaid enrollees received mental health services in SFY 2010.	Mental health services expenditures averaged $400 pmpm in 2009.	Payments for mental health services to provider X have risen 20% YOY whereas the Statewide average is 5%.	Applying data mining to large data sets, we can automatically detect more fraudulent providers and increase our ROI.	We will proactively ward off complex sets of fraudulent claims using predictive analytics.
Predictive Modeling	We have 35,000 individuals in our population with diabetes.	The patients cost us $7,000 this year, a 15% increase over last year.	The national prevalence rate for diabetes is 8.3%; ours is 12%. Hypertension is a major co-morbidity for diabetes.	Assign patient-level risk scores using a statistical model to predict which diabetics will be hospitalized next year.	Efficiently allocate care management resources to help reduce avoidable hospitalizations for at-risk patients.
Ad hoc Analytics	Medicare patients cared for by our physicians have an average cost of $8800 per year.	The No. 1 DRG for our hospitalized Medicare patients is chronic heart failure. This amount has increased by 2% in each of the past three years.	The number of heart failure patients compared to benchmark data is high.	Medicare patients with Class 4 heart failure without a cardiac specialist cost over $50,000.	Early referral to a "Heart Failure Specialty Clinic" may lower the Medicare cost profile.
Cost Containment	The procedure for internal fetal monitoring was billed multiple times for the same pregnancy.		This is not medically justified as the procedure is only performed during active labor to monitor fetal heart rate and uterine activity.	This procedure was controlled solely by diagnosis, which did not prevent misuse and coding errors.	Update medical policy to reimburse fetal internal monitoring in an inpatient setting and establish limits for reimbursement consistency.

Use Cases

Client A

– Client concern
  - Children receiving dangerous and costly anti-psychotic drugs with no evidence of approved diagnosis

– Our study reveals
  - Similar disturbing patterns

– We recommends
  - Physician education,
  - Care management for patients
  - Consideration for a prior authorization program

Client B

– Client concern
  - Is mental health utilization below norms?
  - If so, what financial penalty risk

– We examines
  - HEDIS methods
  - Reviews medical literature for benchmarks

– We executes study
  - co-morbidities
  - utilization trends
  - confidence intervals

– Our study reveals
  - Client in full compliance
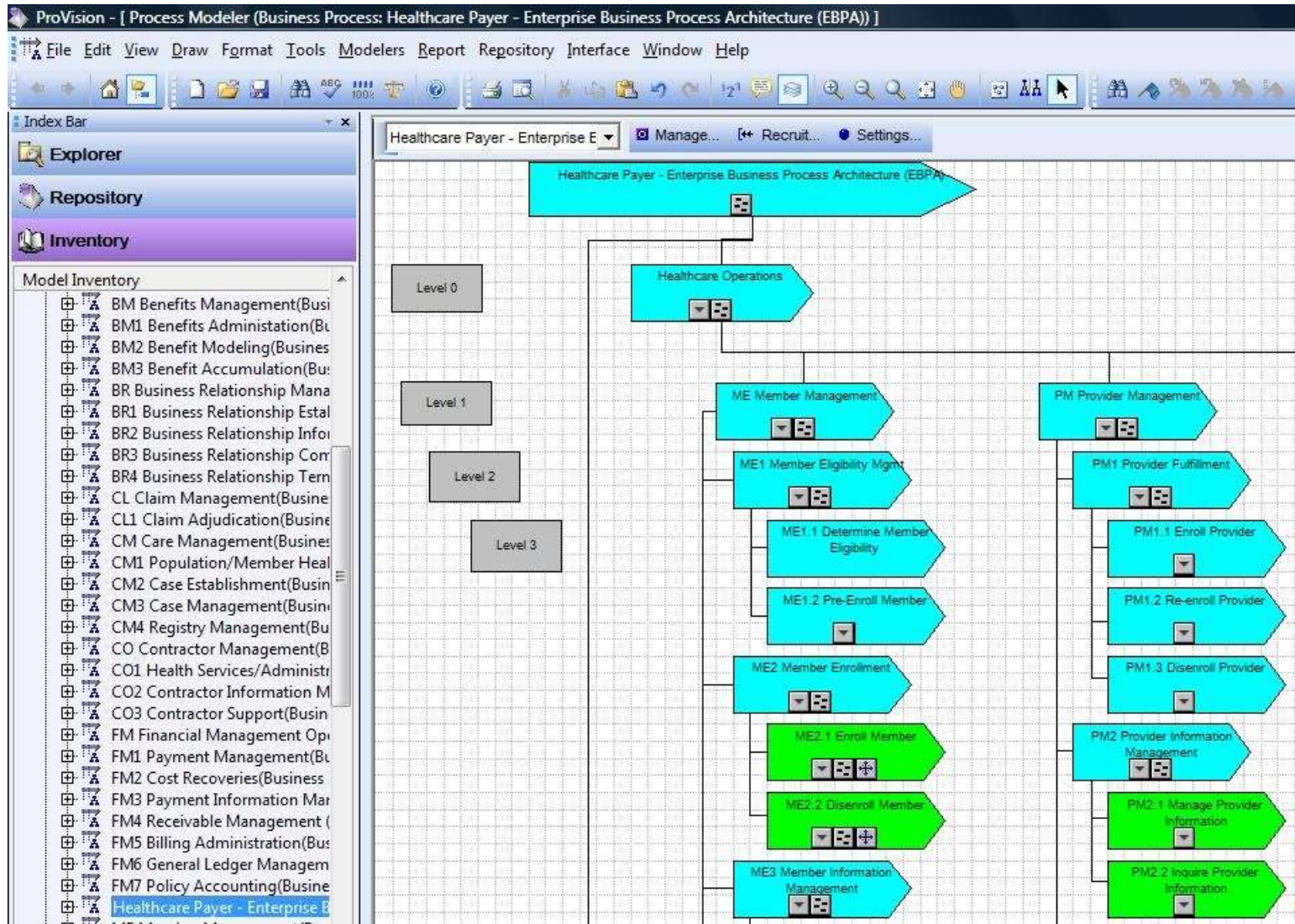 - At national norms
  - No penalties incurred

Client C

– Client concern
  - Vendor proposes device for chronic wound care claiming substantial cost effectiveness
  - Need to due diligence

– We researches
  - Device
  - Medical literature for wound care
  - Develops assessment study

– Our study reveals
  - potential for significant savings based on prevalence of wounds
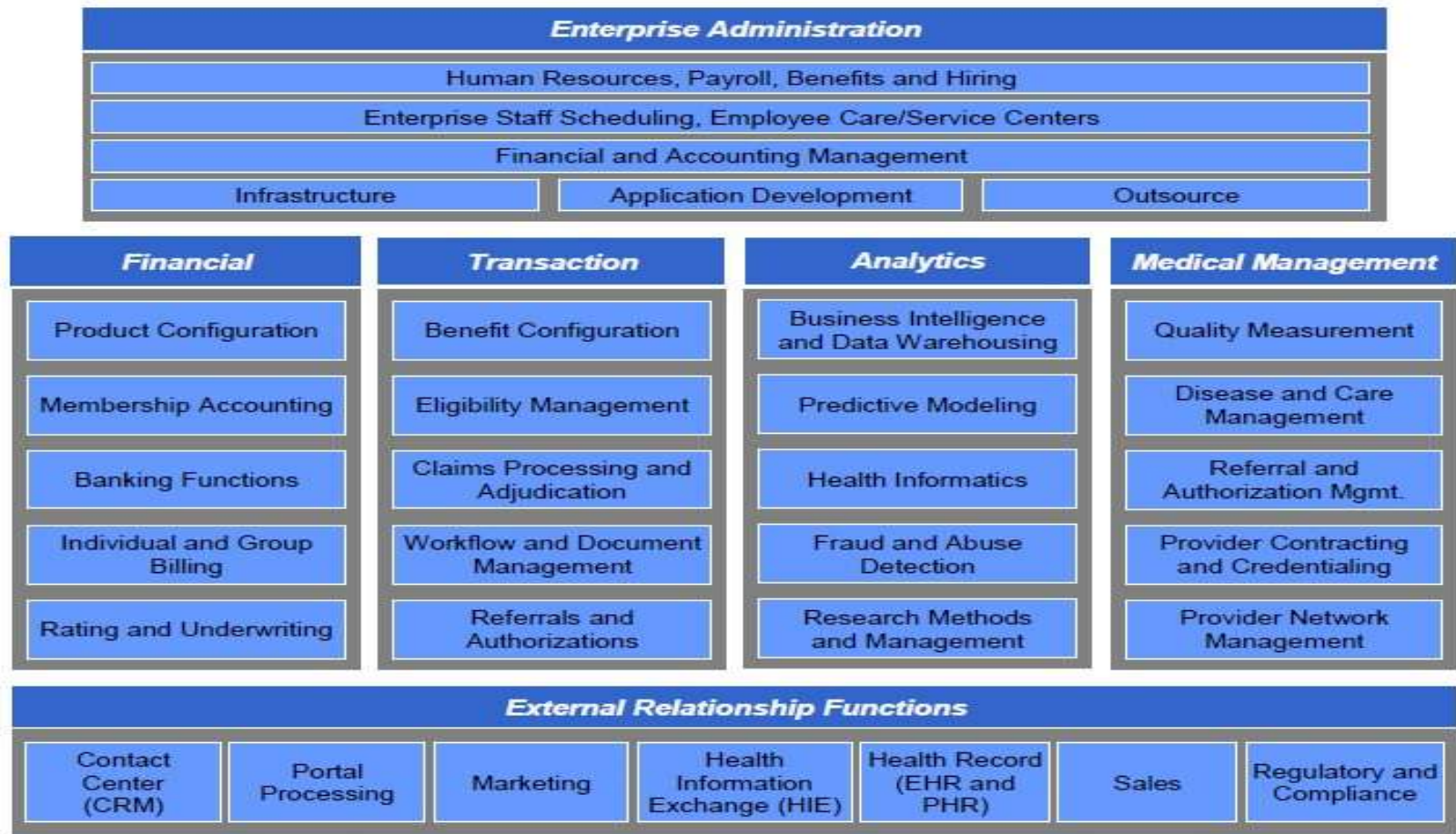
– We recommends
  - Pilot of new treatment
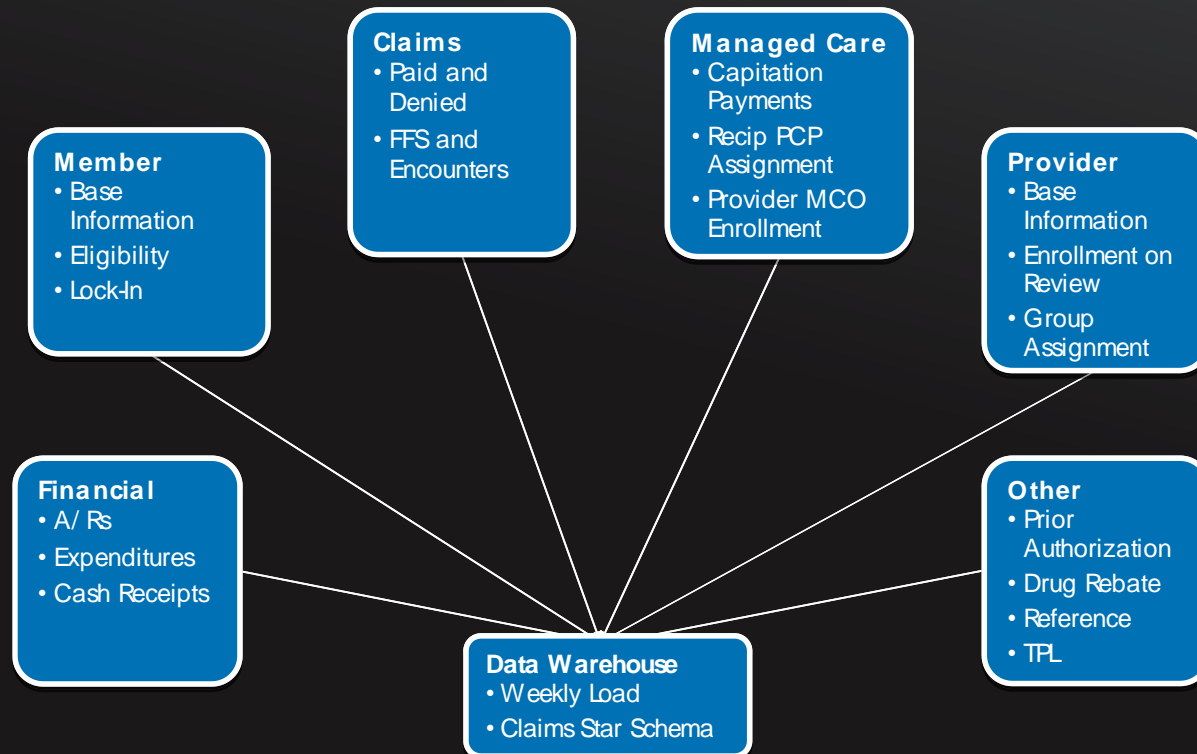
Q&A

Healthcare Payer Business Architecture

Gartner Healthcare Payer Solution Map

Enterprise Administration			
Human Resources, Payroll, Benefits and Hiring			
Enterprise Staff Scheduling, Employee Care/Service Centers			
Financial and Accounting Management			
Infrastructure		Application Development	Outsource

Financial	Transaction	Analytics	Medical Management
Product Configuration	Benefit Configuration	Business Intelligence and Data Warehousing	Quality Measurement
Membership Accounting	Eligibility Management	Predictive Modeling	Disease and Care Management
Banking Functions	Claims Processing and Adjudication	Health Informatics	Referral and Authorization Mgmt.
Individual and Group Billing	Workflow and Document Management	Fraud and Abuse Detection	Provider Contracting and Credentialing
Rating and Underwriting	Referrals and Authorizations	Research Methods and Management	Provider Network Management

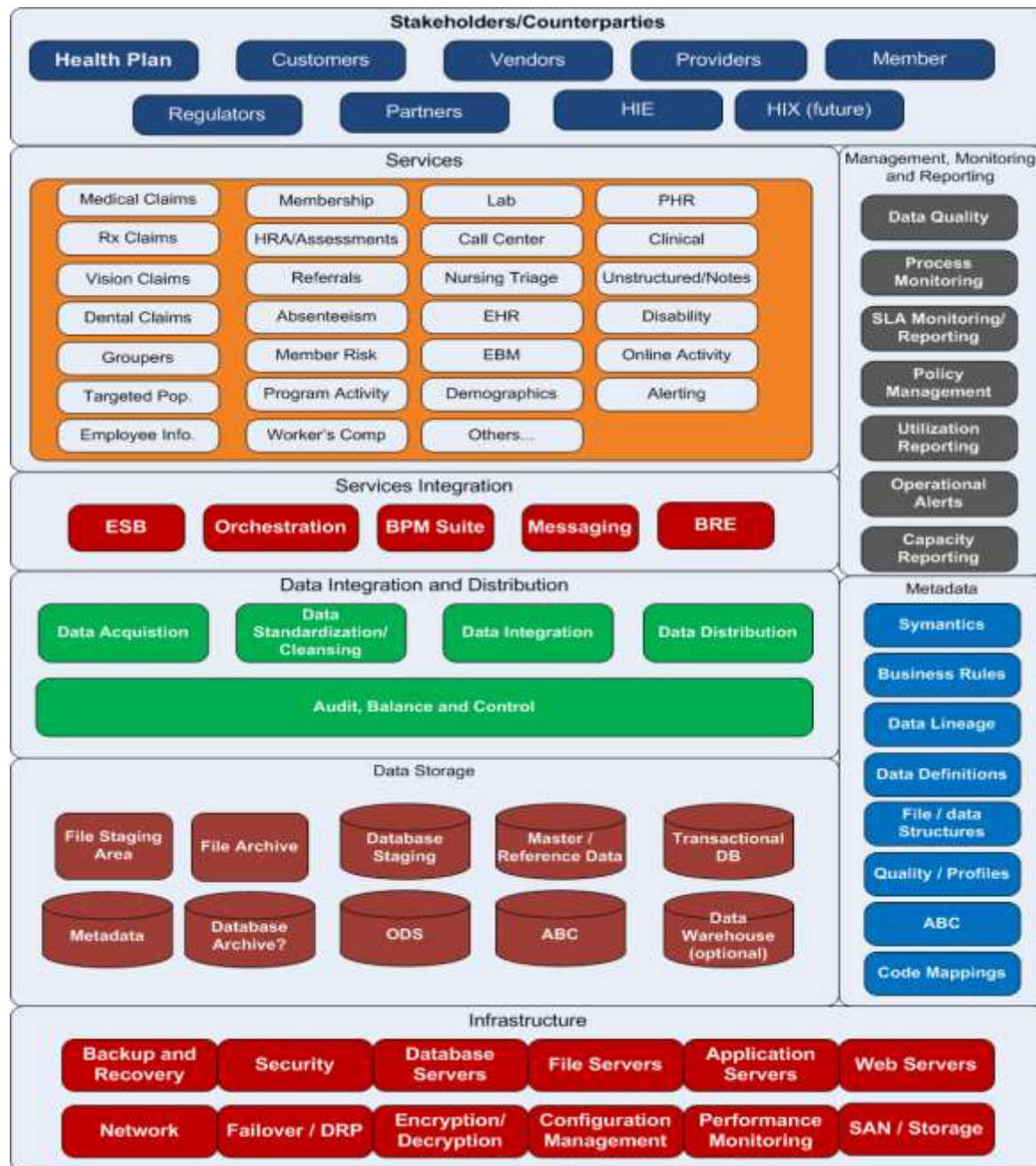| External Relationship Functions						
Contact Center (CRM)	Portal Processing	Marketing	Health Information Exchange (HIE)	Health Record (EHR and PHR)	Sales	Regulatory and Compliance

Source: Gartner (March 2008)

ADVANCED ANALYTICS
Decision Support Services Data Inputs

Healthcare Payer Reference Architecture

Reporting Findings

Testing and Analyzing

Collecting and Examining the Evidence (aka the Data)

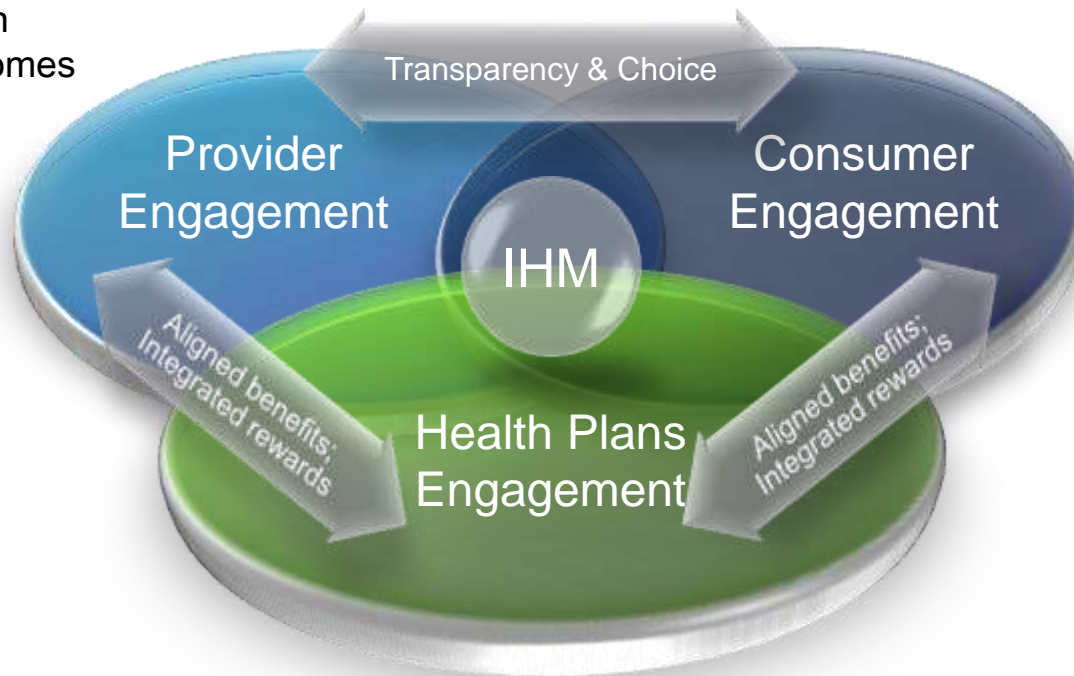Preserving Data and Information

Alternative Computing Models – e.g. Cloud

Converging and Transforming…

From Healthcare ("Sickcare") to Integrated Health Management

- Wellness & prevention
- Diagnosis & treatment
- Care coordination
- Quality and outcomes

- Empowered consumers and expert patients
- Coaching and advocacy
- Integrated budget, benefits and health management
- Aligned incentives/rewards

Transparency & Choice

Provider Engagement

Consumer Engagement

IHM

Aligned benefits; Integrated rewards

Aligned benefits; Integrated rewards

Health Plans Engagement

- Pay 4 Performance
- Bundled Payment
- Analytics for improved decision making
- Accountable Care Organization