

**ELSEVIER**  
Clinical Decision Support



## **Driving ACO Success with Macro and Micro Clinical Analytics**

Arie van den Akker, Director of Business Development, Elsevier / MEDai

# Elsevier / MEDai



Elsevier, the Science, Technology & Medical (STM) division, is the leading provider of high quality scientific, technical and medical information to the academic, research and healthcare communities.



Elsevier Clinical Decision Support is a division of Health and Science dedicated to providing quality electronic health care solutions and services. Whether improving healthcare workflow, building competency through our eLearning solutions or providing intelligence through data mining and predictive analytics, our aim is to improve the quality, safety and cost effectiveness of patient care.



A recognized leader in healthcare analytics and data transformation offering award-winning solutions for the improvement of healthcare delivery. Utilizing cutting-edge predictive technology, payers and providers can predict patients at risk, identify cost drivers for their high-risk population, forecast future health plan costs, evaluate patient patterns over time and improve outcomes.

# Why Accountable Care?



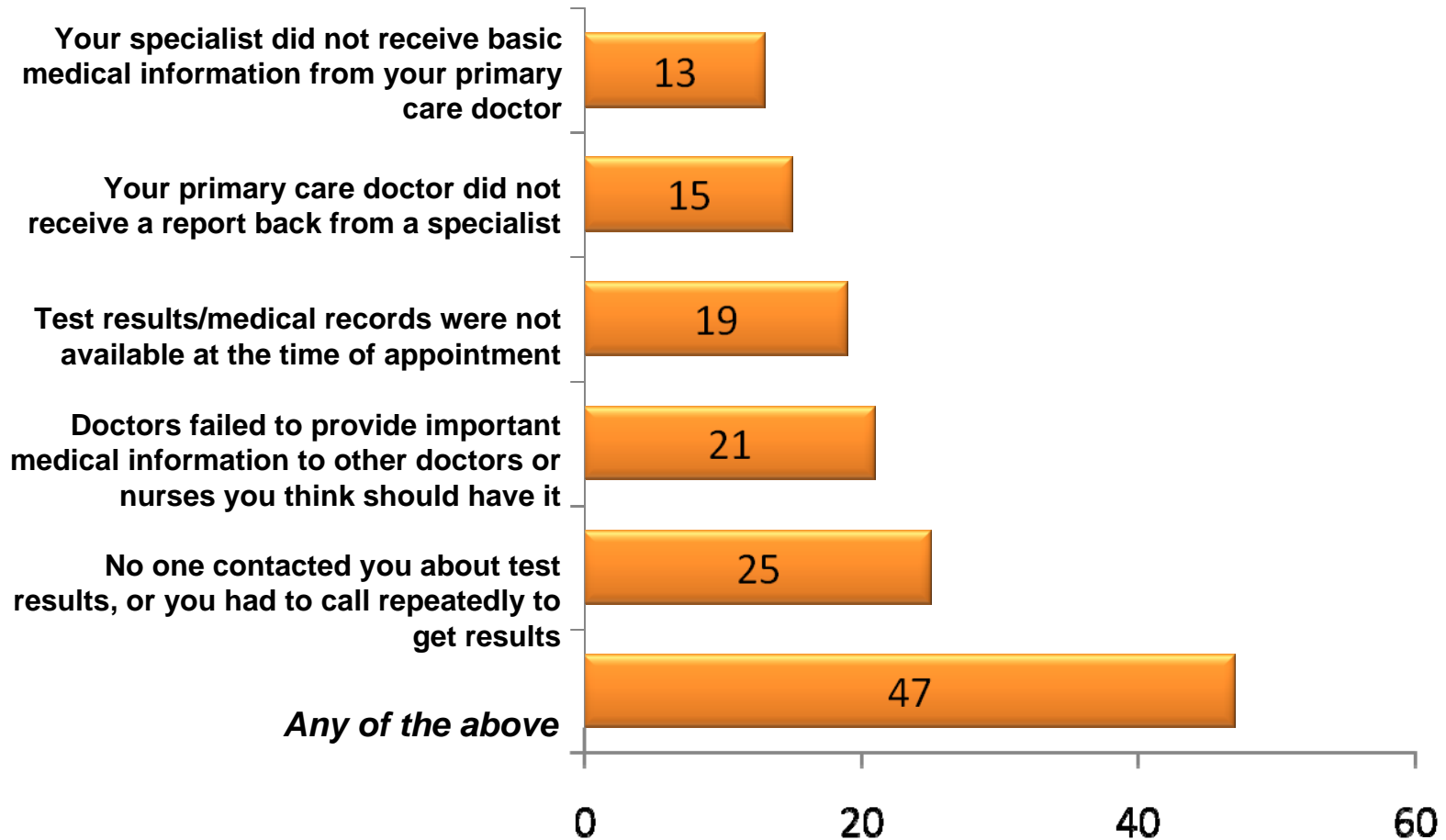
# Waste in Healthcare Spending estimated at 700B to 1.2 T

## ***Address the waste in our current healthcare delivery system:***

- Unnecessary Care = 40%
  - Overutilization
  - Inappropriate medication and diagnostic testing
- Fraud = 19%
  - Fraudulent claims and kickbacks
- Administrative Inefficiency = 17%
  - Redundant paperwork
- Provider Errors = 12%
  - Medical errors
- Preventable Conditions = 6%
  - Dollars spent on hospitalizations for controllable conditions (i.e., Diabetes)
- Lack of Care Coordination = 6%
  - Inefficient communication between providers
  - Lack of access to medical data
  - Duplication of efforts and inappropriate treatments

# Poor Coordination: Nearly Half Report Failure to Coordinate Care

**Percent U.S. adults reported in past two years:**



# Traditional Care Delivery Issues

- Physicians have very little time to actually deliver care (on average 10 – 15 min.) and address the following:
  - Acute, episodic care
  - Chronic disease management
  - Prevention and wellness strategies
- The traditional ambulatory care model is largely reactive in nature

# Non-Adherence to Evidence-Based Services: Clinical and Economic Impact

- Up to 60% of chronically ill patients have poor adherence to evidence-based treatment
- Responsible for up to one-quarter of all hospital and nursing-home admissions
- Costs from poor medication adherence estimated to exceed \$100 billion annually

Source : Dunbar-Jacob, *Journal of Clinical Epidemiology* 54 (2001) S57-S60

# Cost Containment Efforts Should NOT Produce Avoidable Reductions in Quality of Care

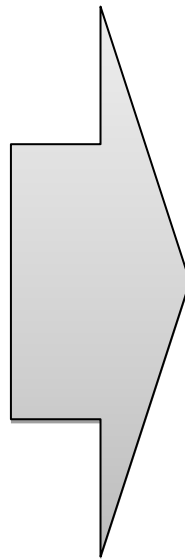
- The archaic “one-size-fits-all” approach fails to acknowledge the difference in clinical value among medical interventions and among patients
- Ideally, higher patient co-payments would discourage the use of low-value care
- A growing body of evidence demonstrates that cost shifting leads to decreases in essential and non-essential care



# Disruption Breeds Innovation

## Disruptive Drivers


- Meaningful Use
- Health Insurance Reform
- Medicare Shared Savings Programs
- Clinical Quality and Performance Improvement
- Risk and Accountability Shifts



## Emerging Models

- Accountable Care Organizations
- Bundled Payment Models
- Pay for Performance
- Patient-Centered Medical Home
- Coordinate Care Models

# The Case for Accountable Care Organizations



# Why an ACO?

Simply put, to reduce the cost of care and increase care quality by changing the delivery model

## Current Care Delivery System

- Volume-based payments
- Health plan directed
- Claim data reporting
- Disengaged patients

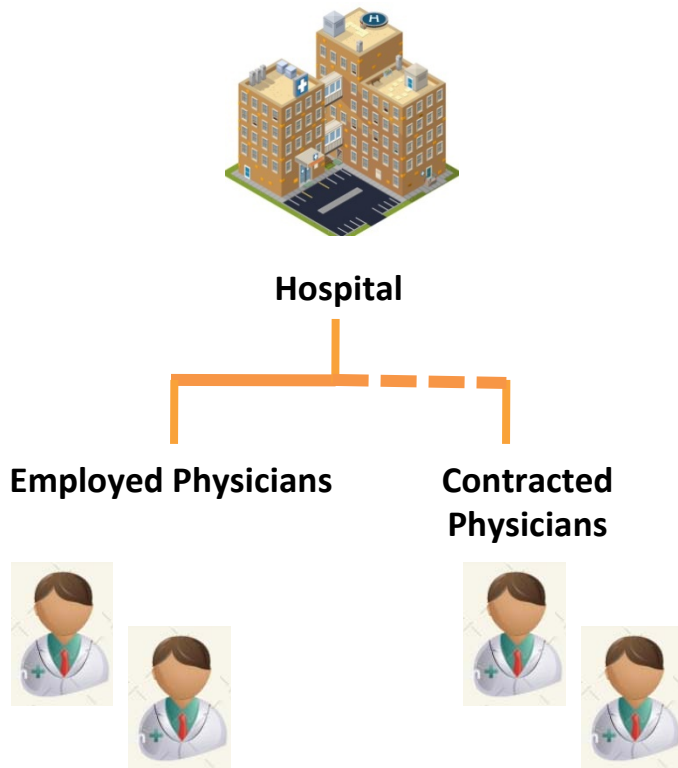
## Accountable Care Organizations

- Value-based payments
- Focus on waste reduction
- Clinical Quality reporting
- Connected patients

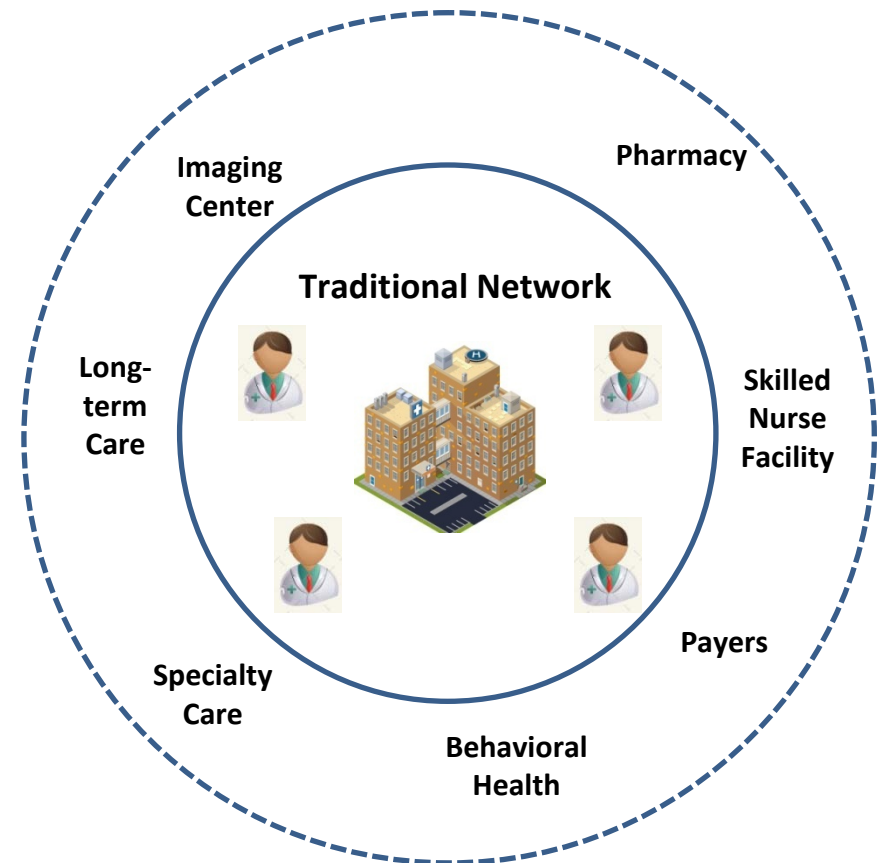
# Accountable Care Organizations

*Collaboration, interdisciplinary coordination, measurement, risk sharing*

**Traditional Hospital Network**



**Accountable Care Organization**



So... What Do We Need?



# Internal Analytics

Elsevier / MEDai Strength

## Cost

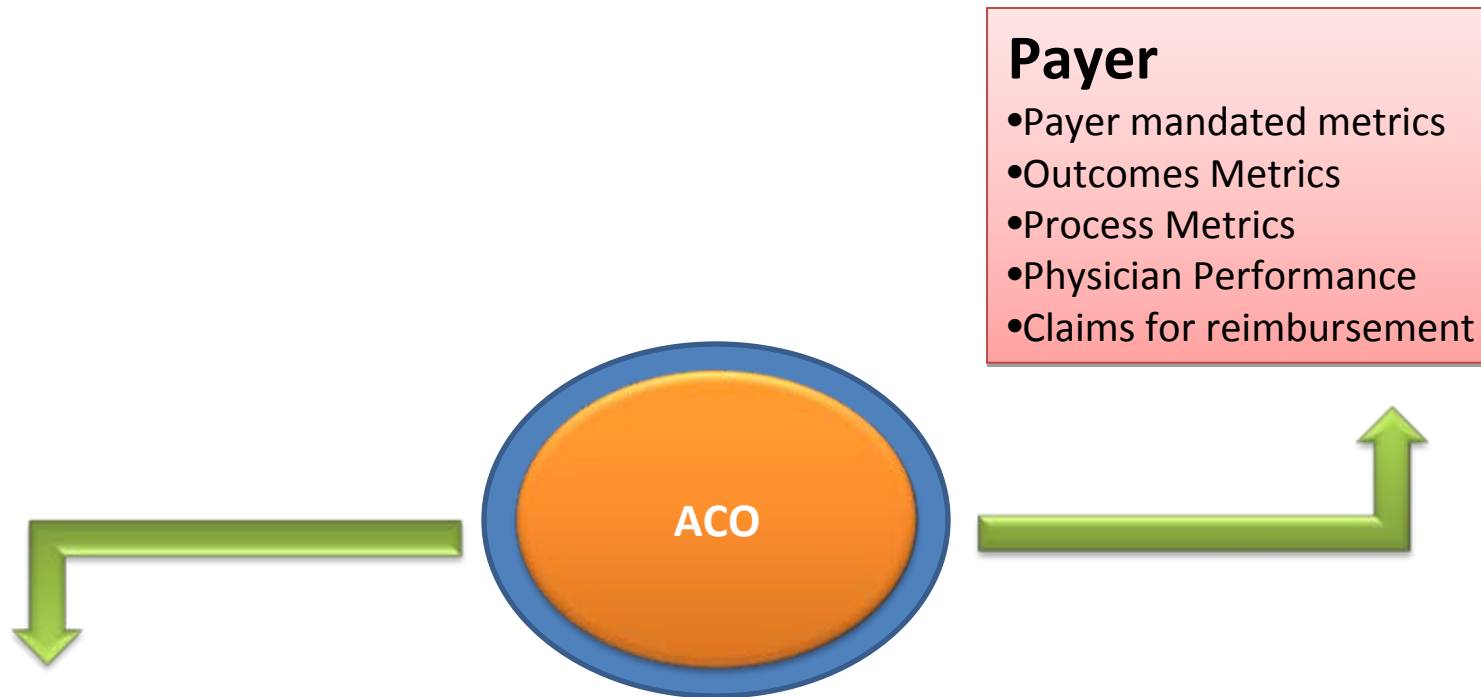
- Monitoring of risk adjusted claims
- relative to payer benchmarks
- Risk adjusted claims by service line and clinician
- Fine grain monitoring cost centers
- For at-risk ACOs: true patient-level cost accounting

ACO

## Quality

- Monitoring performance metrics
- Gaps in care identification
- Point of Care Real Time Clinical Surveillance
- Development of internal metrics & benchmarks
- Physician Performance
- Care team/facility performance

# Reporting



## Regulatory

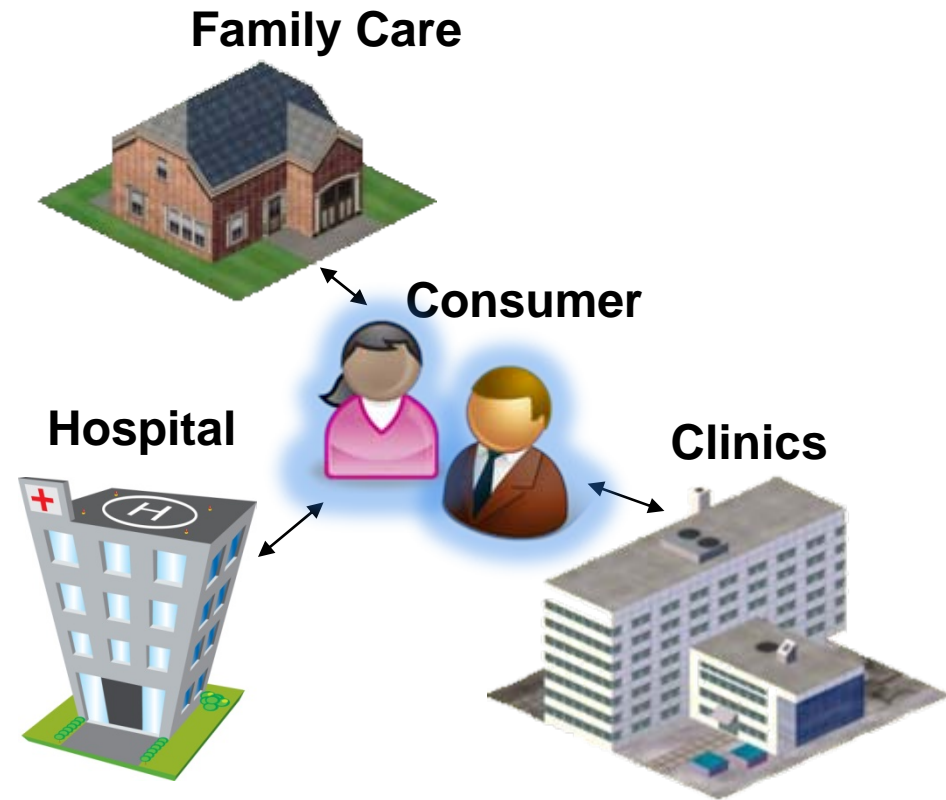
- Outcomes Metrics
- Guidelines Metrics
- Efficiency Metrics
- Clinical Process Metrics

## Payer

- Payer mandated metrics
- Outcomes Metrics
- Process Metrics
- Physician Performance
- Claims for reimbursement

# Need to Bring the Information Together

- Successful strategies link all providers delivering care to the patient
- Patients create information at multiple care settings in the community
- Cross-enterprise information exchange new to HIT industry
- Standards-based approaches emerging

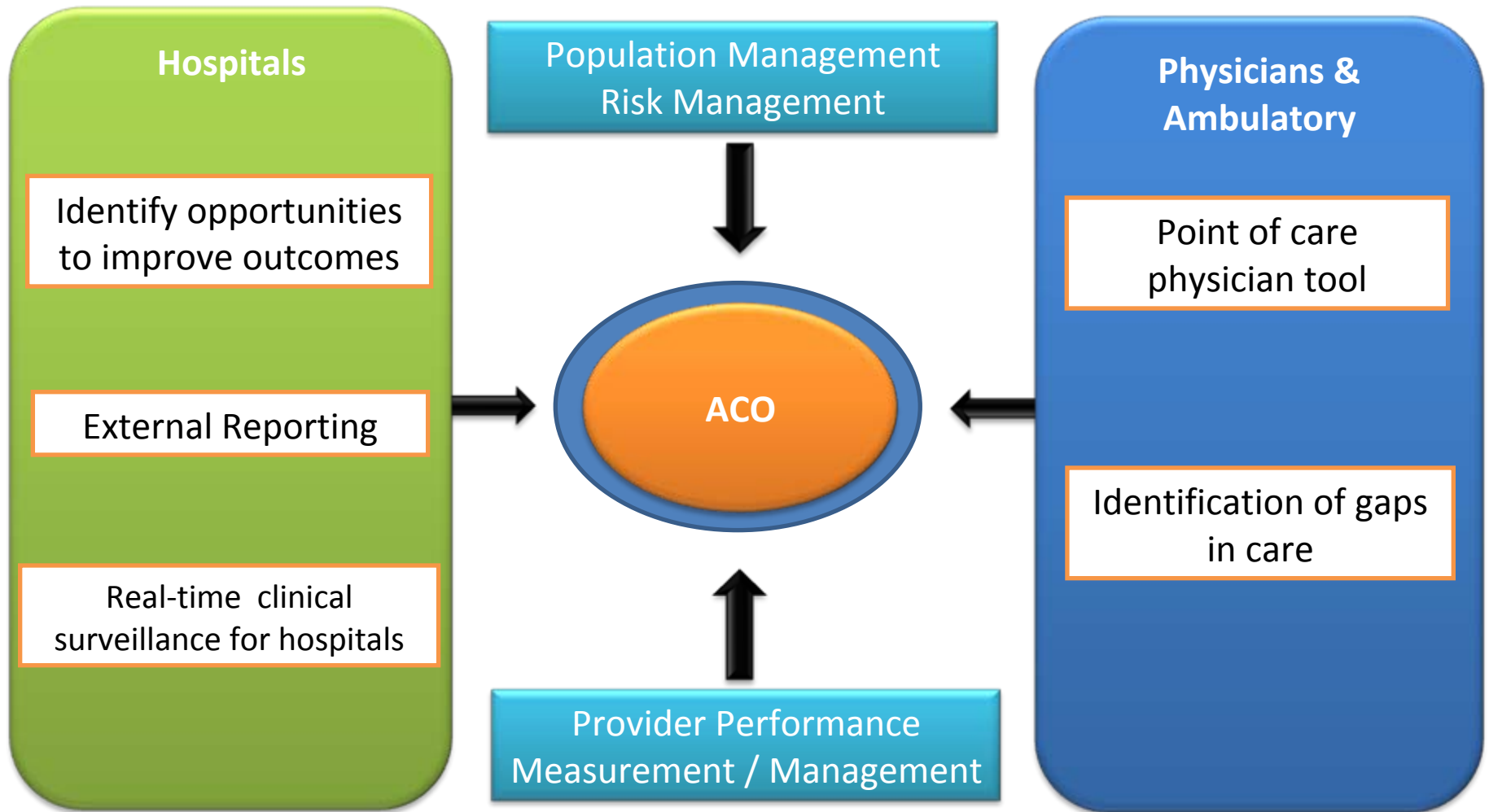




# Two Levels of Clinical Decision Support

- Macro - Organizational
  - Quality is considered on a system, disease, more global basis
  - Focuses on processes and organizational level data
  - Utilizes HIT including order sets, CPOE, portals for regulatory reporting
- Micro – Patient Specific
  - Quality is considered on an individual / case by case basis
  - Focuses on the application of analytics to patient specific data for patient specific improvement
  - Utilizes HIT including near real-time surveillance, predictive analytics, real-time alerting

# Analytic Solutions



# ACO: Population Management

- Identify Risk for all patients
- Actionable Predictions
  - Critical cost and risk drivers
  - Utilization predictions: Inpatient days, ER visits
  - Patient Motivation prediction
- EBM Compliance for Chronic Care Management
  - Based on key industry initiatives: NCQA, PCPI, NQF
  - Gaps in care
  - Chronic impact

# What Physicians Need to Know

- Which patients need to be addressed?
  - Evidence-based Medicine Care Plan
  - Medication Compliance
  - Care History
  - Is the patient motivated to maintain their health status?
- Physicians need to know
  - At a practice level, how am I managing the risk of my patient population?
  - How well am I managing the outcomes of my patients

# Risk Management

**Risk Navigator Provider** Home | Help | Logout | Change Password

Demo - Commercial - DMO | 02/01/2007 - 01/31/2008

Home Physician List My Patient List Disease Registry Diagnosis Profile Utilization Profile Batch Filters Batch Reports

## My Patient List

[Disease Registry](#) | [Diagnosis Profile](#) | [Utilization Profile](#) | [Export Page](#) | [Export Report](#)

**Physician Demographics (based on all patients for the current physician)**

Physician Name	KHZGS, CHKKHTL H	# Patients	738
Physician ID	O461178	Avg Risk Index	1.99

[First](#) | [< Prev](#) | [Next >](#) | [Last](#) | Page  of 15 Pages [Go](#)

Patient List					Guideline Compliance Information										
Patient Name	DOB	Primary Disease	Risk Index	Motivation Index	Asth...	CAD	COPD	CVA	Depr...	Diabetes	Drug Man...	HIV	Heart Failu...	Hem...	Hep.. C
<a href="#">VNJXHMZ, JTS...</a>	02/0...	Gastrointestinal ...	48.46	1.99							100 %				
<a href="#">LVWTMHXK, IN...</a>	04/1...	ENT neoplasm	29.67	1.40							100 %				
<a href="#">RTDSNM, OGEK...</a>	08/0...	Breast neoplasm	17.09	1.50											
<a href="#">WXLORXE, ITL...</a>	10/2...	Metabolic Disord...	11.74	0.79											
<a href="#">LNRXKXE, RSX...</a>	12/0...	Breast neoplasm	10.57	1.35											
<a href="#">VTOOT, ONUXO...</a>	02/1...	Degenerative Or...	9.53	1.69		100 %	75 %			100 %	100 %		100 %		
<a href="#">KXTVG, OHVJXE L</a>	07/2...	Degenerative Or...	9.31	1.82						88 %	100 %				
<a href="#">CHKKHTLR, LTQ...</a>	03/0...	Gastrointestinal ...	9.07	0.87		100 %				63 %					
<a href="#">GTLHKSNM, MT...</a>	05/2...	Infectious Disease	8.98	1.22			50 %			50 %			100 %		

# Care History

## Patient Profile

Lab Profile

Chronological Care History

Export Page

### Patient Demographics

Patient Name	OHXQVX, KEMM	Age	62
Address	123 MAIN STREET ANYTOWN, ST 12345- 6789	Gender	F
		Risk Index	3.89
		RX Detail?	Yes

[Top Patient Diagnosis](#) [Care History](#) [Maintenance Drugs](#) [Lab Opportunities](#) [Guideline Compliance](#)

### Patient Diagnosis

Primary Condition	Diabetes, Type 2, with comorbidity
Co-Morbidities	Conditions associated with menstruation, w/o surgery Benign hypertension with comorbidity Hyperlipidemia, other Screen & immunizations incidental - Cholesterol Ongoing Rx therapy wo Prov intervention - Irritable Bowel Disease Therapy

[Top Patient Diagnosis](#) [Care History](#) [Maintenance Drugs](#) [Lab Opportunities](#) [Guideline Compliance](#)

### Care History

Visit Type	Date of Service	Primary Diagnosis	Procedure Description	Provider Name
Outpatient	04/27/2007	OTH SCR N MAMMO MALIG NEOP BREAST	COMPUTER-AIDED DETECTION (COMPUTER ...	LXSGNWHRS GNROHSTK VXMSQTK...
Outpatient	04/27/2007	OTH SCR N MAMMO MALIG NEOP BREAST	SCREENING MAMMOGRAPHY, PRODUCING DI...	LXSGNWHRS GNROHSTK VXMSQTK...
Professional	12/18/2007	BENIGN HYPERTENSION	OFFICE/OUTPATIENT VISIT, ESTABLISHED ...	KHZGS, CHKKHTL

[Top Patient Diagnosis](#) [Care History](#) [Maintenance Drugs](#) [Lab Opportunities](#) [Guideline Compliance](#)


### Maintenance Drug Compliance

Drug Name	Last Fill Date	% Compliance	Next Fill Date
SERTRALINE HCL	12/18/2007	92.5%	03/18/2008
ATORVASTATIN CALCIUM	09/14/2007	100%	12/14/2007
SITAGLIPTIN PHOSPHATE	12/26/2007	98.2%	03/26/2008
GLIPIZIDE	10/17/2007	78.7%	11/17/2007
METFORMIN HCL	12/26/2007	97.8%	03/26/2008
LISINAPRIL	11/23/2007	93.4%	02/22/2008
PIOGLITAZONE HCL	09/10/2007	99.6%	12/10/2007

# Gaps in Care

Guideline Compliance					
Disease	Description	Current Compliance	Future Compliance	Permanent	
Diabetes	Eye exam (retinal) performed	NO			<a href="#">Edit</a>
	Hemoglobin A1c (HbA1c) testing	Yes			
	Influenza immunization	NO			<a href="#">Edit</a>
	LDL-C screening performed	Yes			
	Lipid profile or all component testing (total cholesterol, LDL-C, HDL-C, triglycerides)	Yes			
	Medical attention for nephropathy: screening or evidence of nephropathy	Yes			
	Microalbuminuria	Yes			
	With Hypertension: attention to blood pressure	Yes			
Drug Management	ACE or ARB: annual monitoring for persistent medication use	Yes			
	Statin: annual monitoring for persistent medication use	Yes			
Hyperlipidemia	Lipid-lowering medication, including niacin	Yes			
Hypertension	Multiple risk factors & receiving at least two agents from different classes	NO			<a href="#">Edit</a>
	Thiazide diuretic	NO			<a href="#">Edit</a>
Preventive Care	Colon cancer screening: Age 50 and older	Yes			
	Influenza immunization: Individuals age 5-64 with chronic conditions	NO			<a href="#">Edit</a>
	Influenza immunization: Individuals age 50 to 64	NO			<a href="#">Edit</a>
	Pneumonia immunization: Age >=65 or 2-64 with chronic condition	NO			<a href="#">Edit</a>
Preventive Care - Women	Breast cancer screening: Women 40-69 years	Yes			
	Cervical cancer screening: Pap test within the previous 2 years	Yes			

# Physician Performance Management



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 Demo - Commercial -     DMO ▾     02/01/2007 - 01/31/2008 ▾

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## Disease Registry

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Physician Demographics (based on all patients for the current physician)			
Physician Name	KHZGS, CHKKHTL H	# Patients	738
Physician ID	O461178	Avg Risk Index	1.99

Disease Registry					
Guideline Condition	# Members w/Condition	# Members w/any Gap	Average % Compliance	% Members w/Chronic Impact >= 95	% Members w/Acute Impact >= 95
<a href="#">Asthma</a>	12	5	79.2%	<a href="#">75%</a>	<a href="#">0%</a>
<a href="#">CAD</a>	22	7	83.1%	<a href="#">68.2%</a>	<a href="#">18.2%</a>
<a href="#">COPD</a>	11	4	65%	<a href="#">54.6%</a>	<a href="#">36.4%</a>
<a href="#">CVA</a>	8	6	64.7%	<a href="#">87.5%</a>	<a href="#">0%</a>
<a href="#">Depression</a>	1	0	100%	<a href="#">100%</a>	<a href="#">100%</a>
<a href="#">Diabetes</a>	74	70	66.4%	<a href="#">58.1%</a>	<a href="#">9.5%</a>
<a href="#">Drug Management</a>	206	12	96%	<a href="#">35.4%</a>	<a href="#">4.9%</a>
<a href="#">Heart Failure</a>	4	0	100%	<a href="#">75%</a>	<a href="#">100%</a>



# Hospital Level Reporting & Analytics



# Executive Reporting – System Level Cost Savings Report

pinpoint: Clinical Decision Support System

File View Contents Help

Exploring: MEDai

- Executive Summary
  - Priority Diseases
  - Key Indicator E
  - Cost Savings C
- Physician Studies
- Disease Studies
- Code Summary F
- Other Reports

+ Unfavorable Sev. Adj. Variance at 95% Confidence Level  
+ Favorable Sev. Adj. Variance at 95% Confidence Level  
+ Neither Favorable nor Unfavorable Sev. Adj. Variance  
+ Not statistically different from Severity Adjusted Expected

Hospital ID	Disease	Patient Count	Avg. Severity	Avg. LOS	Avg. Readmit	Avg. Mortality	Avg. Complications	Cost Savings	Clinical Quality Indicator Unfavorable
System	Diabetes Type 2	9864	2.9	6.0	12.5%	4.0%	8.4%	\$19,750,201	112
	Delivery	12075	2.0	2.5	0.1%	0.0%	0.5%	\$7,518,378	071
	Vaginal Birth	8650	1.8	2.0	0.1%	0.0%	0.3%	\$4,961,905	213
	Newborn Sick Baby	1334	2.7	11.8	0.6%	1.4%	0.5%	\$4,362,572	231
	CHF	2187	2.7	5.5	16.3%	4.5%	2.5%	\$4,041,245	231
	Acute Myocardial Infarction	1621	2.9	6.3	9.2%	8.9%	9.8%	\$3,736,151	113
			2.2	3.9	2.3%	0.2%	9.4%	\$3,466,179	310
			3.2	11.3	10.9%	2.2%	27.3%	\$3,373,387	412
			1.8	4.0	0.3%	0.0%	1.2%	\$3,369,462	070
			1.4	3.0	0.1%	0.3%	0.1%	\$2,965,796	231
			3.2	15.0	7.6%	6.6%	42.0%	\$2,532,191	112
			2.4	2.4	6.5%	0.1%	2.9%	\$2,241,074	310
			2.2	4.5	3.2%	0.3%	7.6%	\$1,909,230	110
			3.2	6.0	9.6%	9.7%	1.3%	\$1,430,264	110
			2.9	10.3	4.9%	3.3%	25.4%	\$1,415,580	110
			2.9	12.5	0.0%	0.0%	0.0%	\$1,301,485	231
			2.5	7.0	19.4%	13.4%	8.5%	\$1,200,547	071
			2.7	5.8	15.9%	3.0%	6.1%	\$1,041,053	112
			2.2	4.2	8.7%	2.2%	11.8%	\$984,807	111
			2.9	5.4	13.5%	6.3%	2.2%	\$962,474	312
			2.8	4.8	10.2%	5.5%	4.2%	\$879,248	113
			2.1	3.1	0.7%	0.0%	9.0%	\$810,633	071
	Ischemic Stroke	830	3.0	5.1	7.7%	4.8%	1.1%	\$363,516	231
	Endarterectomy	193	2.8	4.3	7.8%	1.6%	9.3%	\$344,611	111
	Lumpectomy or Mastectomy	132	2.8	1.8	0.8%	0.0%	6.1%	\$303,196	070
	UGI Bleeding and Ulcers	510	2.5	4.2	6.1%	2.4%	2.4%	\$284,111	110
	Asthma/Status Asthmaticus	259	1.9	2.9	6.2%	1.2%	0.4%	\$224,650	111
	Hip Fractures	605	3.0	5.3	6.6%	2.0%	8.4%	\$186,840	212
	TIA	367	2.0	2.9	5.4%	0.3%	0.5%	\$159,725	111
	Bipolar	906	2.9	9.2	0.0%	0.1%	0.4%	\$133,661	311
	TURP	226	1.9	2.7	3.1%	0.0%	5.3%	\$55,965	111
	Hip Replacement	650	2.1	4.1	2.5%	0.0%	0.0%	\$33,019	212
	Lower Limb Vascular Surgery	183	3.3	8.9	14.2%	5.5%	20.2%	\$26,216	110
	Prostatectomy	86	2.6	3.5	1.2%	0.0%	9.3%	-\$81,724	071
	Depression	2003	2.8	7.3	0.0%	0.0%	0.2%	-\$489,527	310
	Knee Replacement	918	2.0	3.7	1.0%	0.0%	5.0%	-\$622,120	212

The Cost Savings is calculated by subtracting the Severity Adjusted Expected Cost

Zoom: 75%

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Acute MI Mortality 8.9%

How do we lower mortality rates?

# Executive Reporting - Key Indicator Summary System Level

**pinpoint: Clinical Decision Support System**

File View Contents Help

Exploring: MEDai

**Review Cardiac Diseases**  
**Select additional indicators**

**Key Indicator Summary - MEDai Healthcare**

- Unfavorable Sev. Adj. Variance at 95% Confidence Level
- Favorable Sev. Adj. Variance at 95% Confidence Level
- Neither Favorable nor Unfavorable Sev. Adj. Variance
- Not statistically different from Severity Adjusted Expected

**Outcomes** →

Hospital ID	Disease	Avg. Severity	No. of Pat	ADR	ChargeTtl	CostTtl	Iatrogenic	LOS	Mortality	Readmit31
System	Acute Coronary Syndrome	2.6	784	4.2%	\$49,099	\$9,506	4.3%	4.6	5.5%	10.2%
	CABG	3.2	744	4.3%	\$148,056	\$31,419	27.3%	11.3	2.2%	10.9%
	Valve Surgery	3.2	288	3.8%	\$213,478	\$48,207	42.0%	15.0	6.6%	7.6%
	Chest Pain/CAD	2.4	2866	3.9%	\$28,375	\$5,135	2.9%	2.4	0.1%	6.5%
	CHF	2.7	2197	6.6%	\$41,320	\$8,949	2.5%	5.5	4.5%	16.3%
	Acute Myocardial Infarction	2.9	1523	4.6%	\$77,199	\$15,372	9.8%	6.3	8.9%	9.2%
	PTCA	2.2	1392	4.5%	\$75,906	\$13,951	11.8%	4.2	2.2%	8.7%

**Drugs** →

Hospital ID	Disease	Acelnhib	Angio2Blkr	AntiLipids	Aspirin	BetaBlkr	CChanBlkr	NitroIV
System	Acute	54.0%	9.7%	53.8%	90.1%	81.1%	36.7%	25.6%
	CABG	53.5%	10.1%	58.7%	91.1%	91.8%	60.8%	76.3%
	Valve	50.7%	8.0%	67.7%	80.9%	67.7%	49.7%	61.1%
	Chest	34.1%	9.1%	43.8%	87.0%	59.7%	29.1%	10.3%
	CHF	57.7%	15.1%	27.2%	56.5%	58.3%	29.2%	4.9%
	Acute	58.1%	7.6%	56.1%	90.1%	84.0%	40.8%	42.0%
	PTCA	55.1%	11.0%	68.9%	97.8%	82.2%	53.5%	74.6%

**Pt Safety** →

Hospital ID	Disease	Avg. Severity	No. of Pat	ADR	Hemorrhage	HemtomComp	Iatrogenic	InfePostOp	InfectComp	Readmit31	UTI
System	Acute Coronary Syndrome	2.8	784	4.2%	0.9%	1.8%	4.3%	0.1%	0.6%	10.2%	25.6%
	CABG	3.2	744	4.3%	5.5%	0.5%	27.3%	15%	0.4%	10.9%	4.3%
	Valve Surgery	3.2	288	3.8%	10.8%	2.4%	42.0%	14%	2.4%	7.6%	5.6%
	Chest Pain/CAD	2.4	2866	3.9%	3.4%	2.9%	2.9%	6.5%	0.2%	6.5%	10.3%
	CHF	2.7	2197	6.6%	0.4%	2.2%	2.5%	16.3%	0.3%	16.3%	9.1%
	Acute Myocardial Infarction	2.9	1523	4.6%	1.6%	2.3%	9.8%	9.2%	1.2%	9.2%	8.1%
	PTCA	2.2	1392	4.5%	14%	4.0%	11.8%	8.7%	0.6%	8.7%	4.1%

**Acute MI Beta-blockers 84.0%**

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# Real-time Clinical Surveillance and Forecasting

- Identify Patients at Risk for Preventable Re-admit and Decubitus Ulcer
  - *High Risk*: Stratify all patients at risk using probability scores
  - *Movers*: Identify patients with a change in risk
  - *Why?*: View risk drivers to identify prevention strategy
- Provide Near Real-time Clinical Surveillance
  - Intelligent Alert feature with customized alert delivery options
  - Powerful data filtering features
  - Reporting by Hospital, Admitting Physician, Unit/Nursing Station, Diagnosis
- Use EHR data
  - Vital Signs
  - Lab Results
  - Pharmacy
  - Procedures
  - Central Supply

# Clinical Surveillance at the System or Facility Level

## What if a patient in your hospital...

- Was found to have a bedside glucose range check below 50 or above 180 (mg/dl)?
- Has a Creatinine that increased by more than 0.5 (mg/dl) since last reading?
- Has had 2 blood sugars out of range in 24 rolling hours?
- Had surgery but has not received Venous Thromboembolism prophylaxis?
- Initial Antibiotic Received within 6 hours of arrival for patient with Diagnosis of Pneumonia
- Blood Cultures Performed Within 24 Hours Prior to or 24 Hours After Hospital Arrival for Patients Who Were Transferred or Admitted to the ICU Within 24 Hours of Hospital Arrival
- Magnesium Range Check : MG below 1.8 or above 2.4 (mg/dl)
- Potassium Range Check: K below 3.0 or above 6 (mEq/l)

# Questions?



# Contact Us

For more information or questions,  
please contact us at:

1.800.446.3324

Or

[Sales@MEDai.com](mailto:Sales@MEDai.com)