The Use of Business Intelligence in the Process of Designing Quality Improvement Initiatives

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About SETMA

Southeast Texas Medical Associates, LLP (SETMA) was founded August 1, 1995.

SETMA currently has 29 healthcare providers in the following specialties:

- Internal Medicine
- Family Practice
- Pediatrics
- Nurse Practitioners
- Cardiology
- Neurology
- Infectious Disease
- Ophthalmology

SETMA's Landmarks

- March 1998 – Acquired Electronic Health Records (EHR)
- January 1999 – All patients seen using EMR
- May 1999 – Began thinking in terms of "Electronic Patient *Management*" (EPM), rather than EHR
- October 2009 – Began "Business Intelligence Project"
- June 2010 – NCQA Tier 3 Patient-Centered Medical Home (PCMH)
- August 2010 – Affiliate of Joslin Diabetes Center, an Affiliate of Harvard Medical School
- August 2010 – NCQA Diabetes Recognition

Systems Thinking and Health

"Systems-thinking" (Senge, *The Fifth Discipline*) and the data display designed on those principles allow the provider to "see" the patient as a whole: as a "granular portrait", rather than as a faceless "silhouette."

Data Display

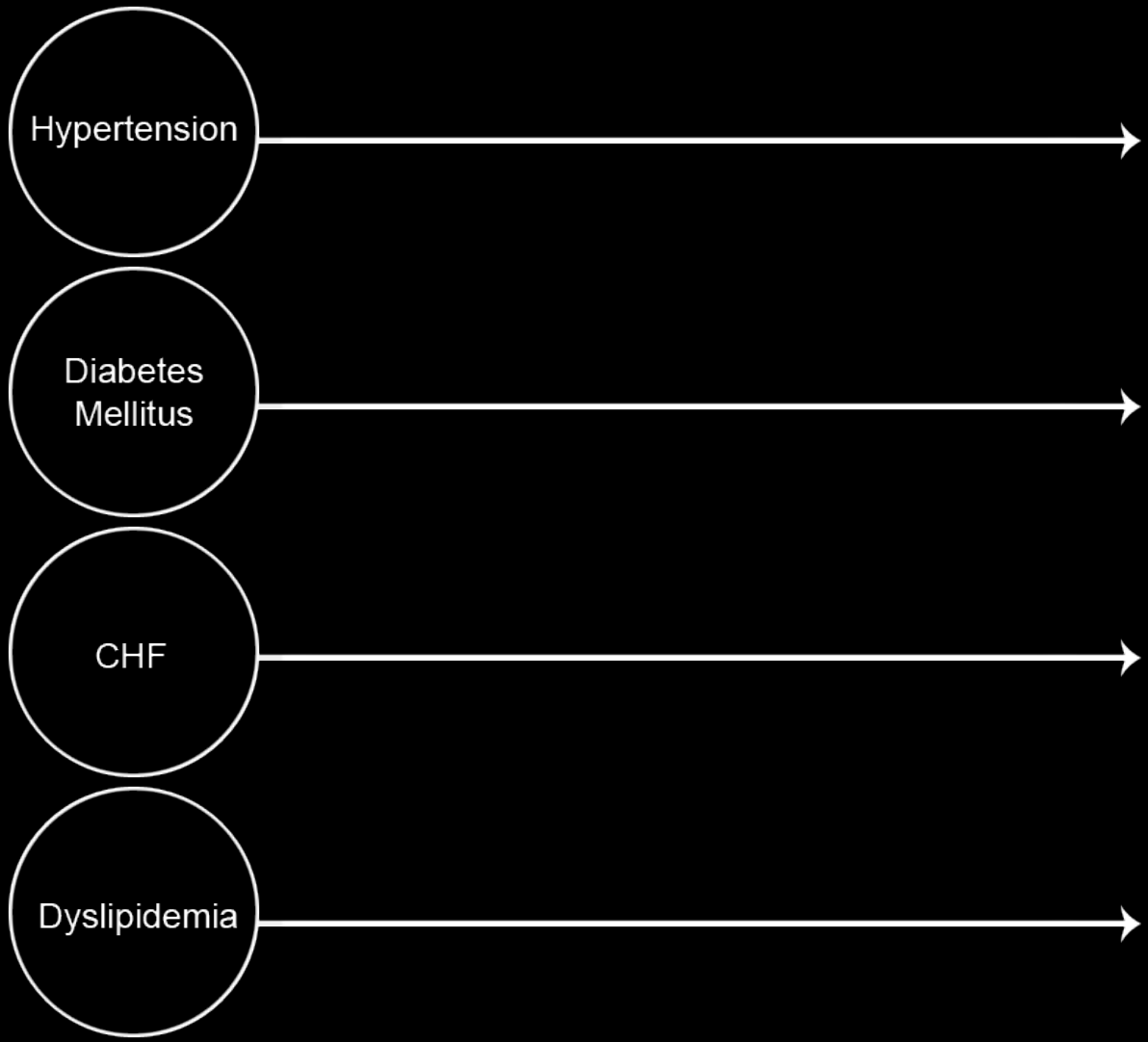
Data display can obscure effective management, if it simply presents more detail while ignoring or obscuring the dynamic interaction of one part of a biological system with another.

Seeing Circles of Causality

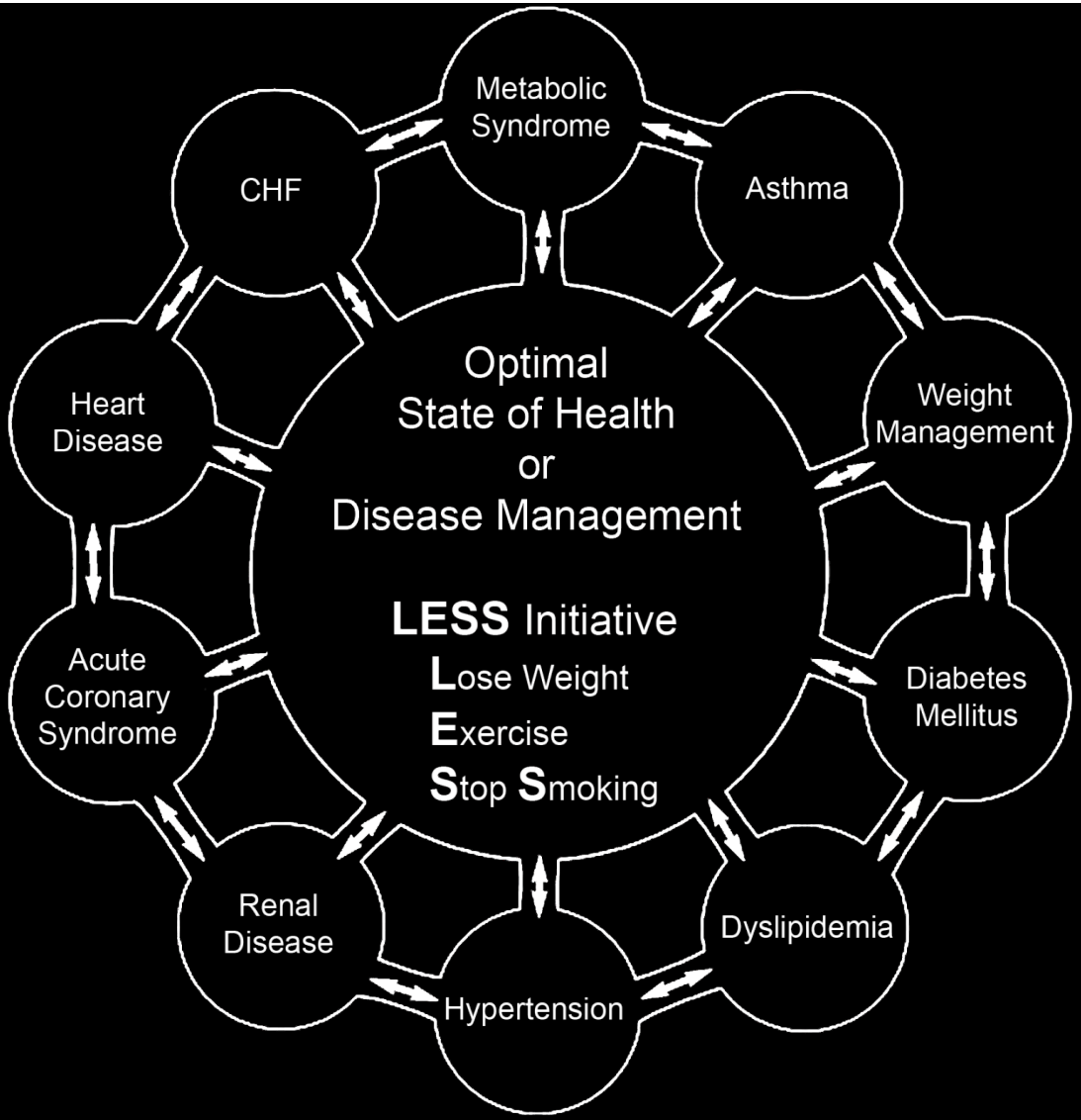
"Reality is made up of circles, but we see straight lines…Western languages…are biased toward a linear view. If we want to see system-wide interrelationships…we need a language of interrelationships, a language of circles."

(*The Fifth Disciple, Dr. Peter Senge)*

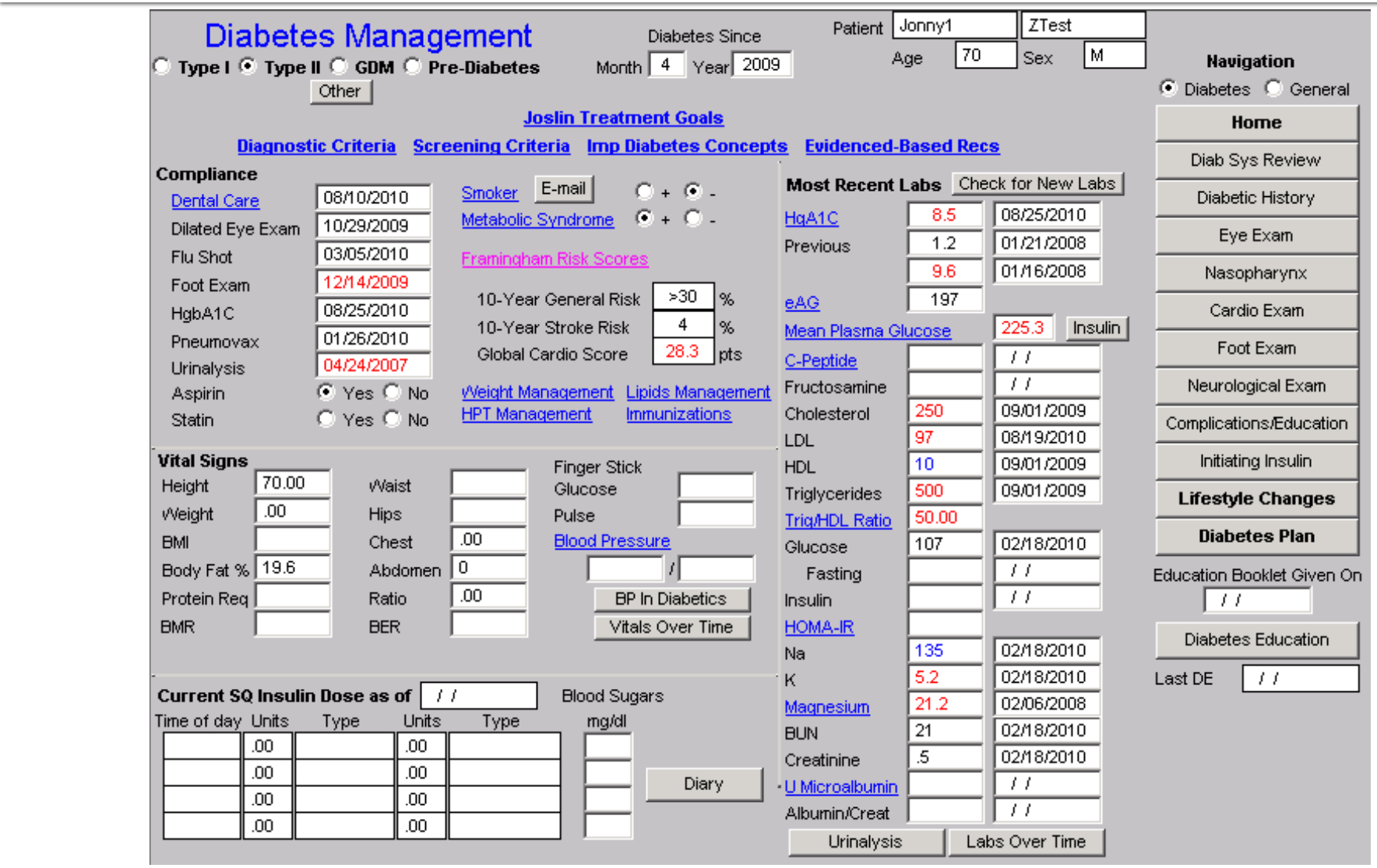
Linear Thinking



Circular Causality



SETMA's Diabetes Management



SETMA's Model of Care

1. Performance Tracking – one patient at a time
2. Performance Auditing – by panel or population
3. Analysis of Provider Performance Data
4. Public Reporting by Provider Name
5. Quality Assessment/Performance Improvement

Tracking Performance At The Point of Care

SETMA tracks multiple Physician Consortium for Performance Improvement (PCPI) measurement sets:

- Chronic Stable Angina
- Congestive Heart Failure
- Diabetes
- Hypertension
- Chronic Renal Disease
- Weight Management
- Care Transitions

Tracking Performance At The Point of Care

SETMA also tracks the following published quality performance measure sets:

- HEDIS
- NQF
- AQA
- PQRI
- BTE

Each is available to the provider, interactively at each patient encounter.

National Quality Forum (NQF)
National Voluntary Consensus Standards

Legend Measures in red are measures which apply to this patient that are not in compliance.
Measures in black are measures which apply to this patient that are in compliance.
Measures in gray are measures which do not apply to this patient.

General Health Measures
View Body Mass Index Measurement
View Smoking Cessation
View Proper Assessment for Chronic COPD
View Adult Immunization Status

Blood Pressure Measures
View Blood Pressure Measurement
View Blood Pressure Classfication/Control

Medication Measures
View Current Medciation List
View Documentation of Allergies/Reactions
View Therapeutic Monitoring of Long Term Medications
View Drugs to Avoid in the Elderly
View Appropriate Medications for Asthma
View Inappropriate Antibiotic Treatment for Adults with Acute Bronchitis
View LDL Drug Therapy for Patients with CAD
View Warfarin Therapy for Atrial Fibrilation

Care for Older Adults
View Counseling on Physical Activity
View Urinary Incontinence in Older Adults
View Colorectal Cancer Screening
View Fall Risk Management

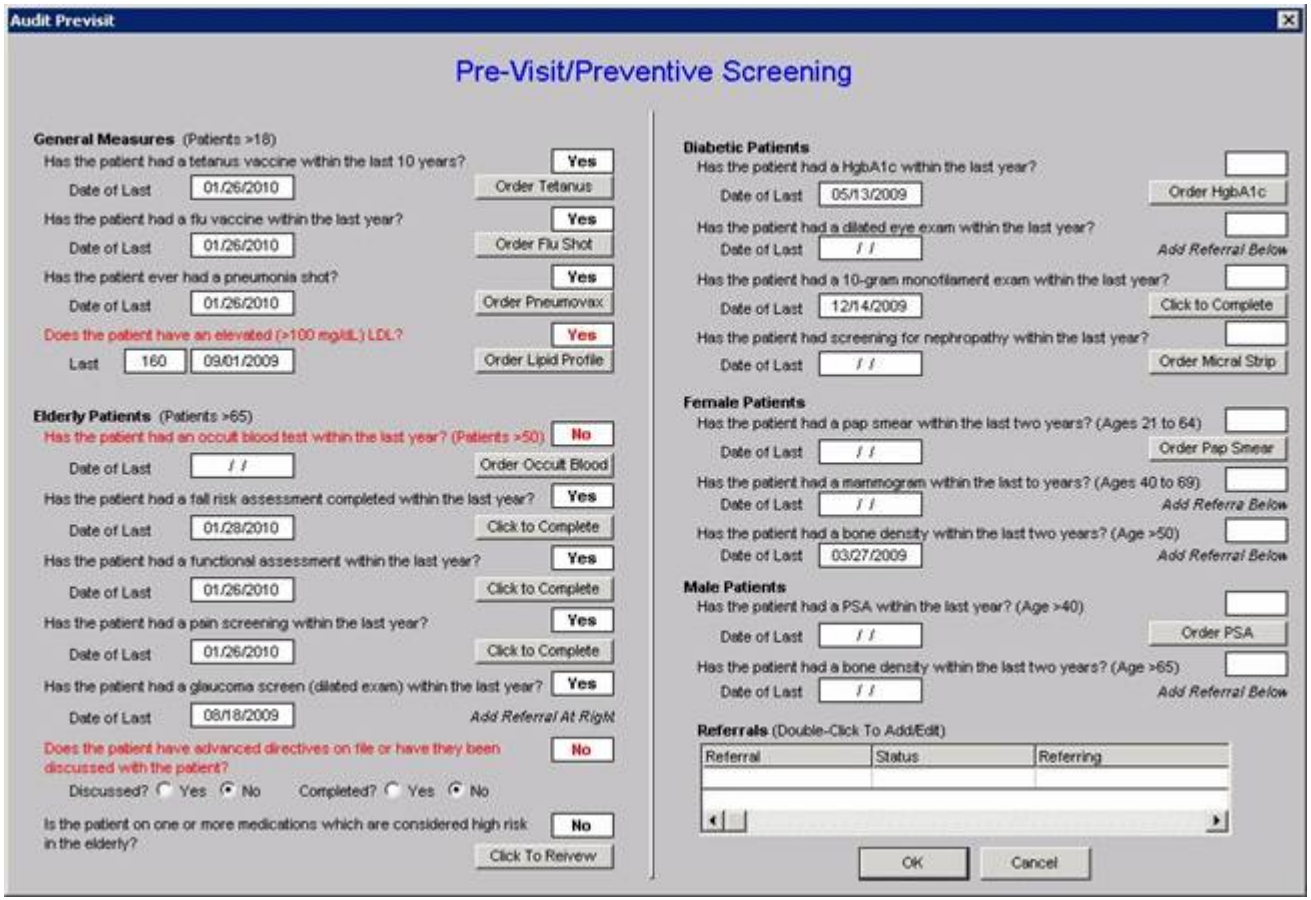
Diabetes Measures
View Dilated Eye Exam
View Foot Exam
View Hemoglobin A1c Testing/Control
View Blood Pressure
View Urine Protein Screening
View Lipid Screening

Female Specific Measures
View Breast Cancer Screening
View Cervical Cancer Screening
View Chlamydia Screening
View Osteoporosis Management

Pediatric Measures
View Appropriate Screening for Children with Pharyngitis
View Childhood Immunization Status

Tracking Performance At The Point of Care

This tool allows the provider to assess comprehensive quality measures for "screening" and "prevention" of each patient.



Tracking Performance At The Point of Care

2009 HEDIS Technical Specifications for Physician Measurement

Legend
Measures in red are measures which apply to this patient that are not in compliance
Measures in black are measures which apply to this patient that are in compliance.
Measures in gray are measures which do not apply to this patient.

Return
Tutorial

Information
NCQA
CAHPS
HEDIS

Effectiveness of Preventive Care

View Adult BMI Assessment
Weight Assessment and Counseling for Nutrition and Physical Activity for Children/Adolescents
Childhood Immunization Status
Immunizations for Adolescents
Lead Screening in Children
View Colorectal Cancer Screening
Breast Cancer Screening
Cervical Cancer Screening
Chlamydia Screening in Women
View Glaucoma Screening in Older Adults
View Use of High-Risk Medications in the Elderly
View Care for Older Adults

Effectiveness of Acute Care

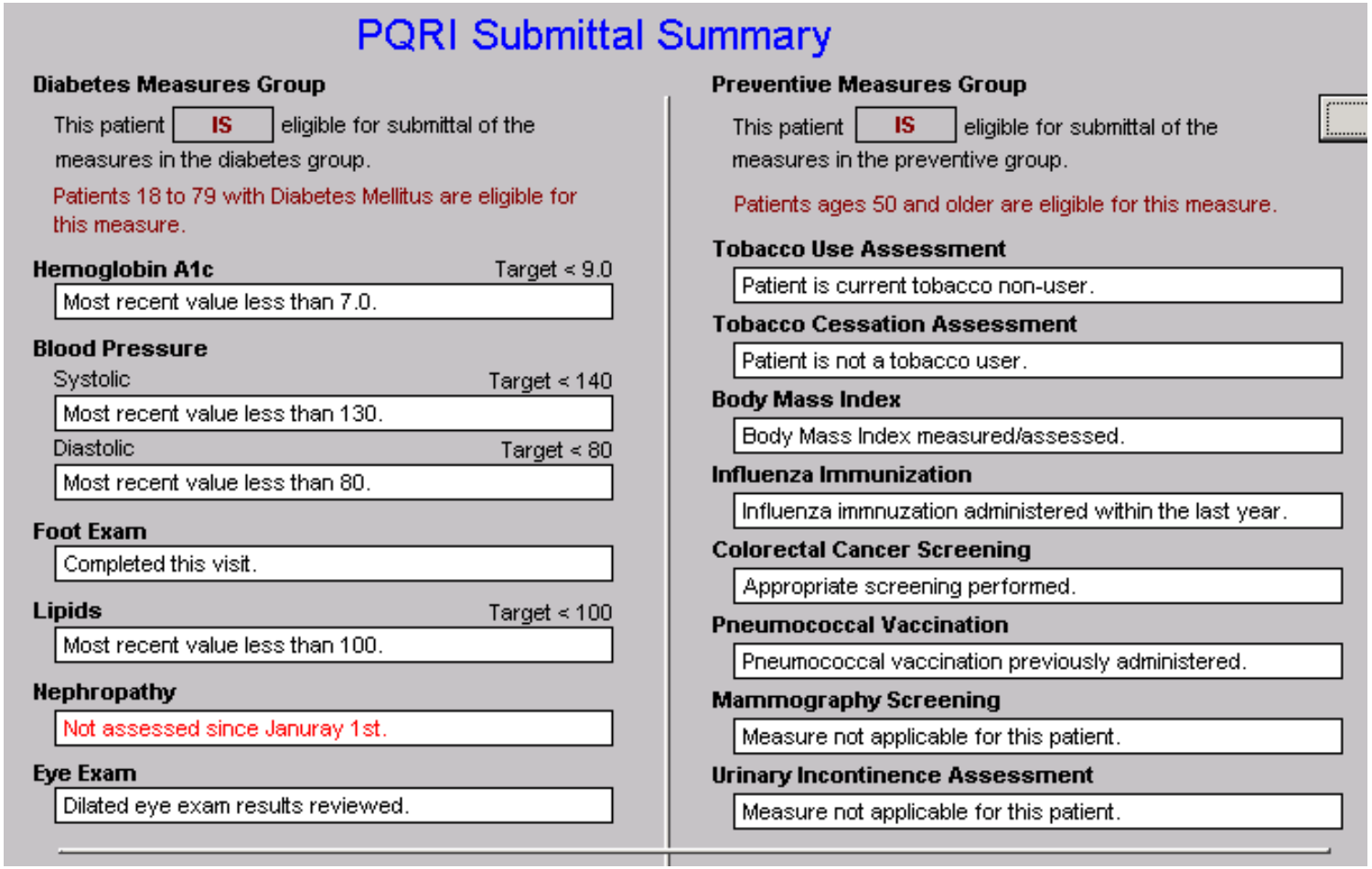
View Appropriate Treatment for Children with Upper Respiratory Infection
View Appropriate Testing for Children with Pharyngitis
Avoidance of Antibiotic Treatment in Adults with Acute Bronchitis

Effectiveness of Chronic Care

View Persistence of Beta-Blocker Therapy After a Heart Attack
View Controlling High Blood Pressure
View Cholesterol Managment for Patients with Cardiovascular Disease
View Comprehensive Adult Diabetes Care
Use of Appropriate Medications for People with Asthma
View Use of Spirometry Testing in the Assessment and Diagnosis of COPD
View Pharmacotherapy Management of COPD Exacerbation
View Follow-Up After Hospitalization for Mental Illness
View Antidepressant Medciation Management
Follow-Up Care for Children Prescribed Attention-Deficit/Hyperactivity Disorder Medication
Osteoporsis Management in Women
Disease Modifying Anti-Rheumatic Drug Therapy for Rheumatoid Arthritis
View Annual Monitoring for Patients on Persistent Medications
View Medication Reconciliation Post-Discharge

Tracking Performance At The Point of Care

PQRI



PQRI Submittal Summary

Diabetes Measures Group

This patient **IS** eligible for submittal of the measures in the diabetes group.

Patients 18 to 79 with Diabetes Mellitus are eligible for this measure.

Hemoglobin A1c Target < 9.0

Most recent value less than 7.0.

Blood Pressure

Systolic Target < 140

Most recent value less than 130.

Diastolic Target < 80

Most recent value less than 80.

Foot Exam

Completed this visit.

Lipids Target < 100

Most recent value less than 100.

Nephropathy

Not assessed since Januray 1st.

Eye Exam

Dilated eye exam results reviewed.

Preventive Measures Group

This patient **IS** eligible for submittal of the measures in the preventive group.

Patients ages 50 and older are eligible for this measure.

Tobacco Use Assessment

Patient is current tobacco non-user.

Tobacco Cessation Assessment

Patient is not a tobacco user.

Body Mass Index

Body Mass Index measured/assessed.

Influenza Immunization

Influenza immnuzation administered within the last year.

Colorectal Cancer Screening

Appropriate screening performed.

Pneumococcal Vaccination

Pneumococcal vaccination previously administered.

Mammography Screening

Measure not applicable for this patient.

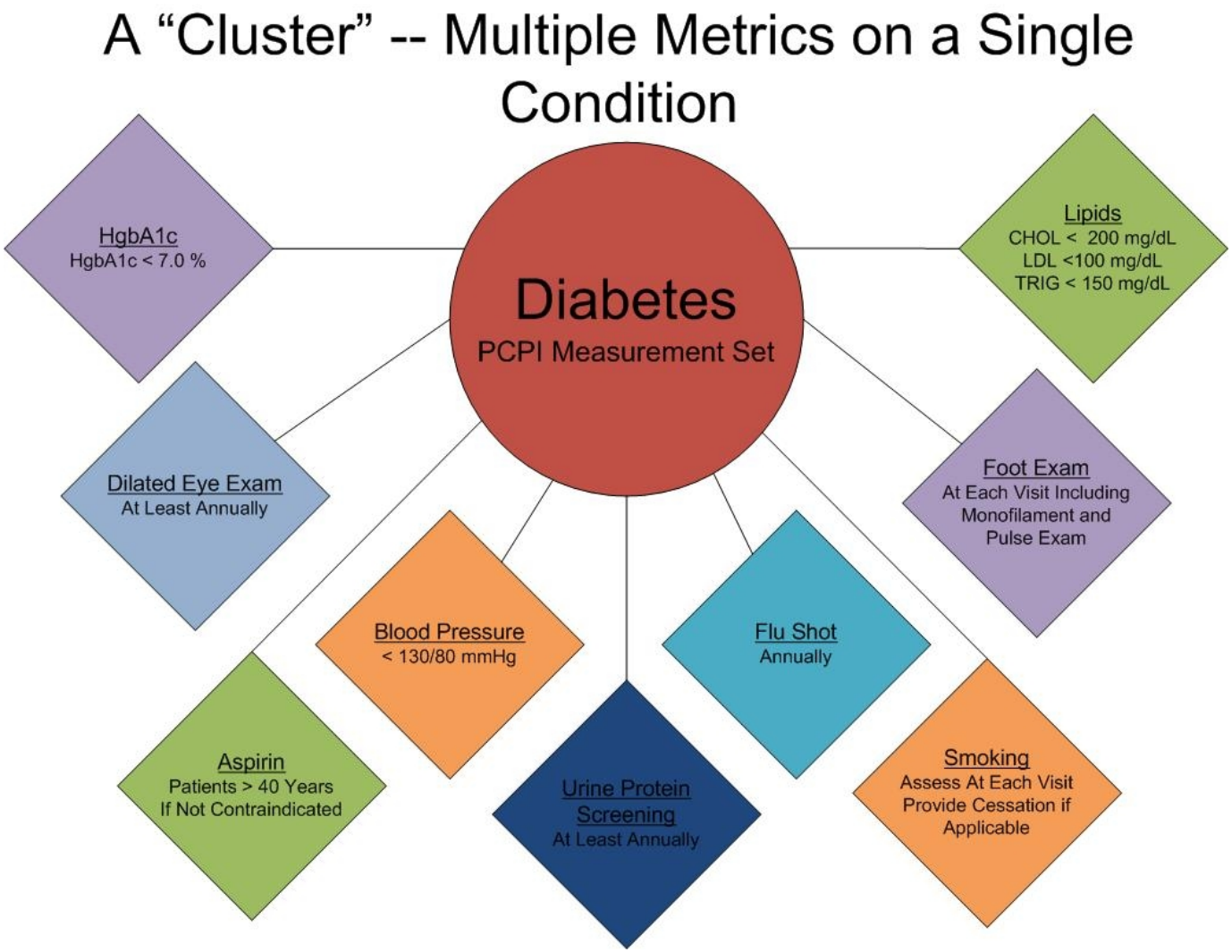
Urinary Incontinence Assessment

Measure not applicable for this patient.

Clusters and Galaxies

- A "*cluster*" is seven or more quality metrics for a single condition, i.e., diabetes, hypertension, etc.
- A "*galaxy*" is multiple clusters for the same patient, i.e., diabetes, hypertension, lipids, CHF, etc.
- Fulfilling a single or a few quality metrics does not change outcomes, but fulfilling "clusters" and "galaxies" of metrics at the point-of-care can and *will* change outcomes.

Auditing Performance After the Visit



Auditing Performance After the Visit

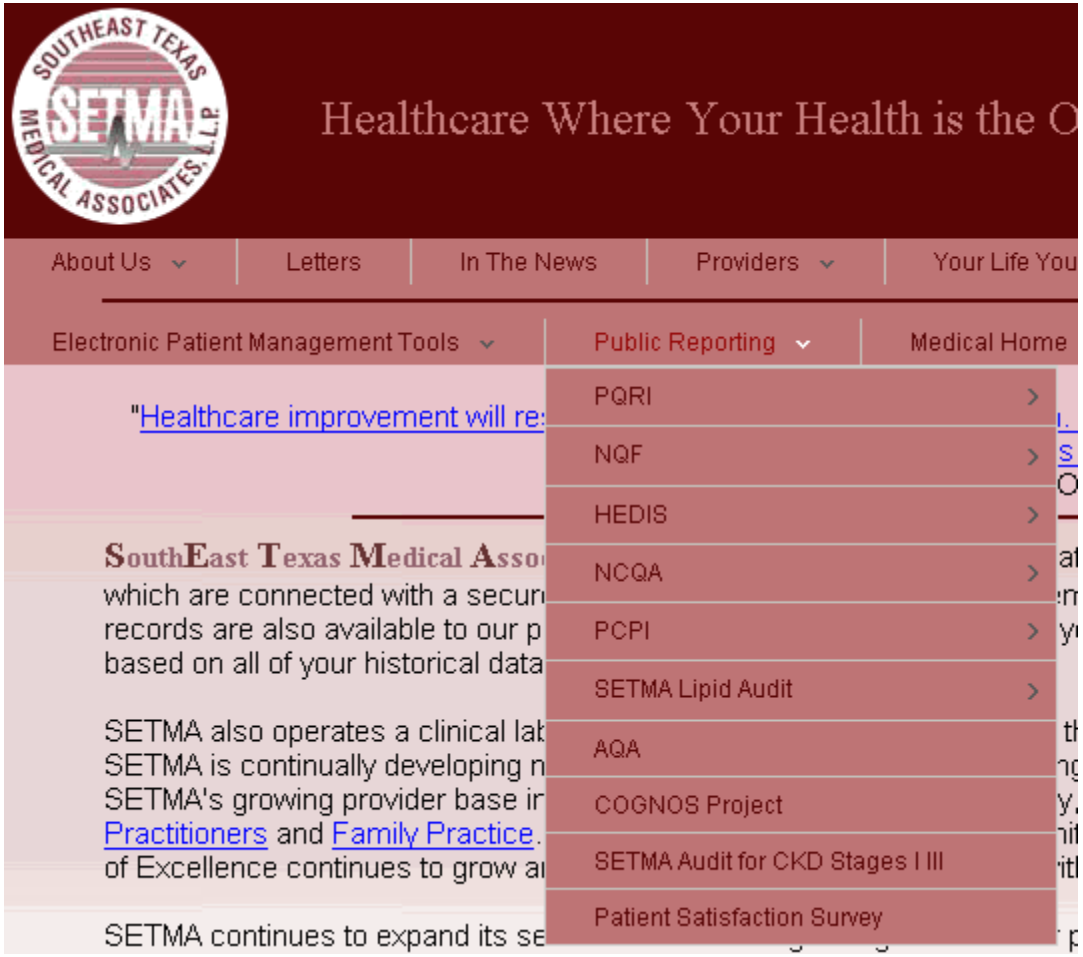
A "Galaxy" -- Multiple "Clusters" Tracked on a Single Patient at a Single Visit

Auditing Performance After the Visit

Unlike a single metric, such as "was the blood pressure taken," which will not improve care, fulfilling and then auditing a "cluster" or a "galaxy of clusters" in the care of a patient ***will*** improve treatment outcomes and ***will*** result in quality care.

Auditing Performance After the Visit

What is most often missing in quality improvement initiative is real-time, auditing with comparative display of results, and public reporting.



Auditing Performance After the Visit

SETMA employed Business Intelligence (BI) software to audit provider performance and compliance.

SETMA's BI Project allows all providers to:

1. Display their performance for their entire patient base
2. Compare their performance to all practice providers
3. See outcome trends to identify areas for improvement
4. See this at the point-of-care

Auditing Performance After the Visit

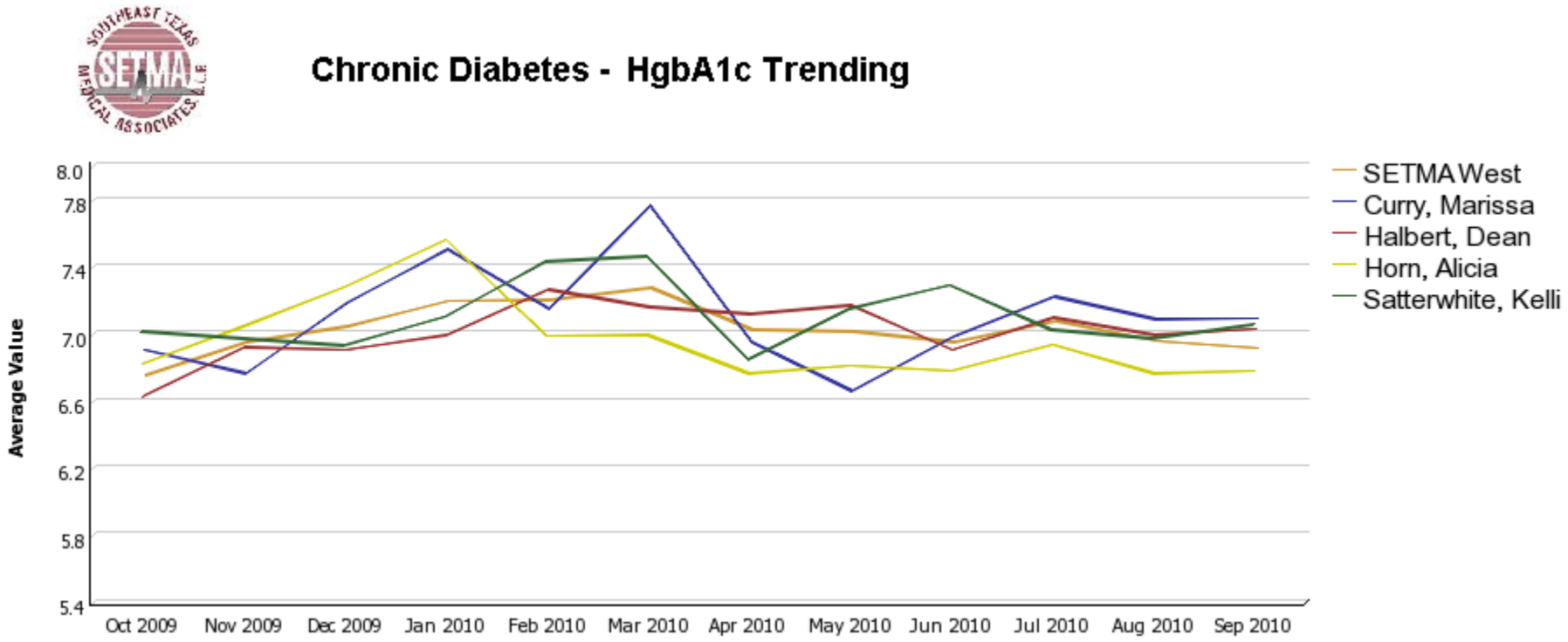
- SETMA contracted with a Business Intelligence consulting firm to build our auditing tools.
- The consultants designed a data warehouse to minimize the impact on our production servers.

Analyzing Provider Performance

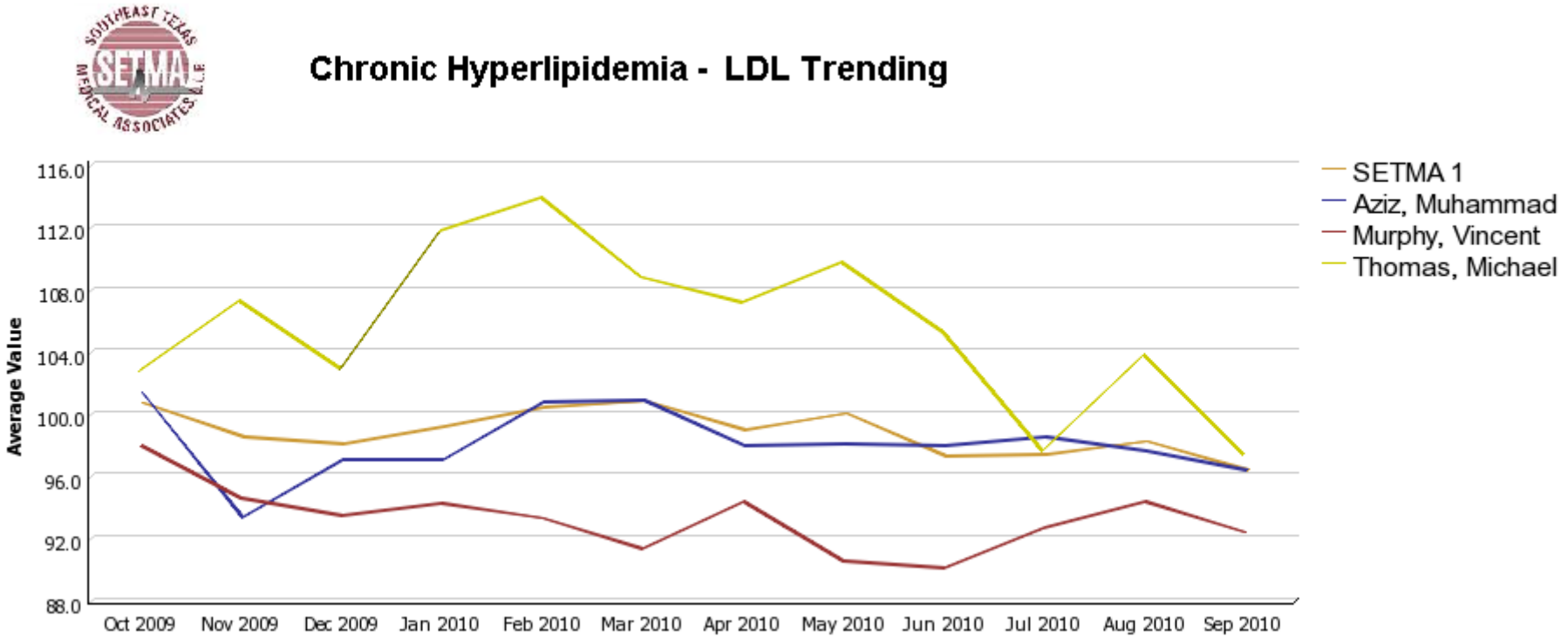
- The consultant used SQL Server Integration Services (SSIS) to clean and scrub the hundreds of data points we needed for our audit rather than having to process the millions of data points contained in our EHR.

- SSIS scrubs and preloads our EHR data into the warehouse, which gives us both speed in reporting and confidence in the results in our Business Intelligence reports.

Auditing Performance After the Visit

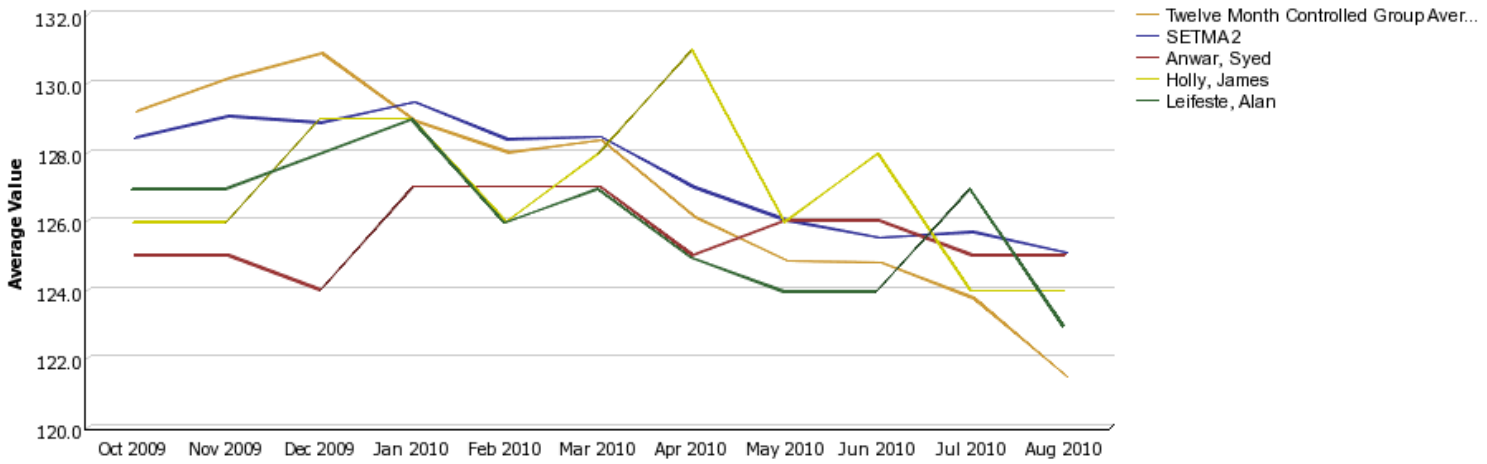


Auditing Performance After the Visit

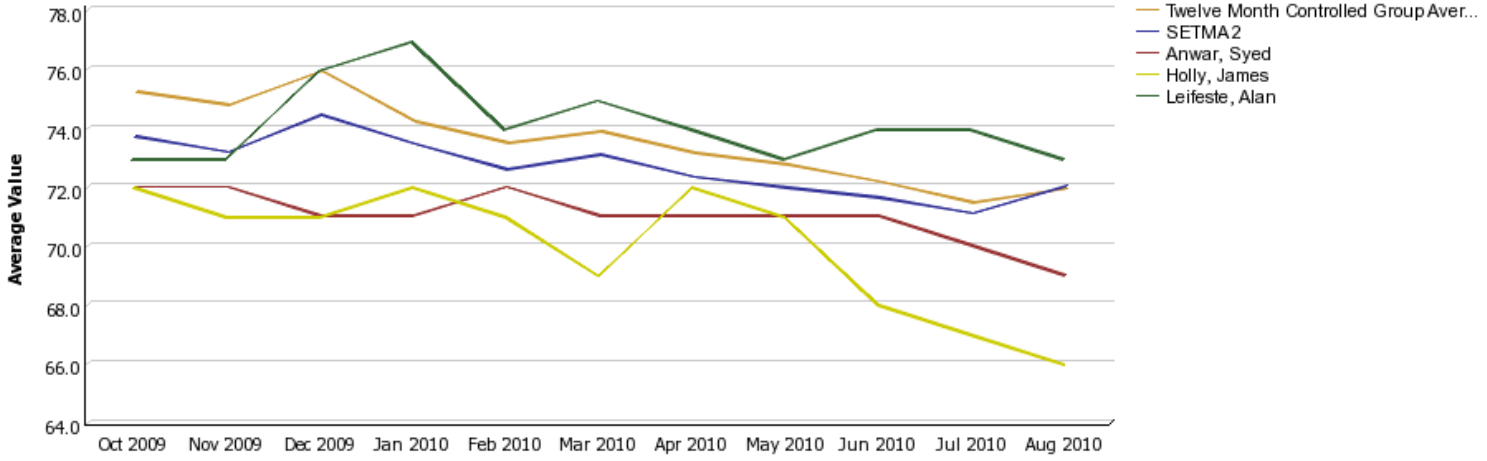


Auditing Performance After the Visit

Systolic Trending



Diastolic Trending



Auditing Performance After the Visit

Beyond how one provider performs (tracking and auditing), SETMA looks at data as a whole (analyzing) from which to develop new strategies for improving patient care.

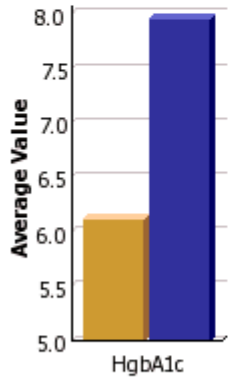
We analyze patterns which may explain why one population is not to goal while another is. Some of the parameters, we analyze are:

- Frequency of visits
- Frequency of key testing
- Number of medications prescribed
- Were changes in treatments made, if patient not to goal
- Referrals to educational programs
- Etc.

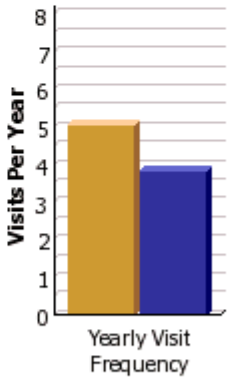
Analyzing Provider Performance

Chronic Diabetes - Measures Comparison (Most Recent 12 Months)

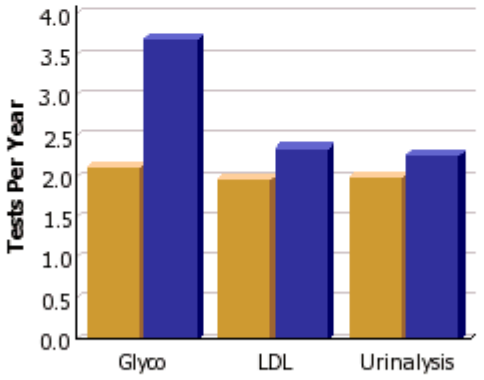
Controlled Group	Selected Group
Population: **All SETMA**	Practice: **SETMA 1, SETMA 2, SETMA West**
Time Basis: **Prior 12 Months**	Provider: **None**
	Controlled or Not Controlled: **Not Controlled**



	HgbA1c Avg	Standard Deviation
Controlled	6.1	0.7
Selected	8.0	1.7



	Visit Frequency
Controlled	5.1
Selected	3.8



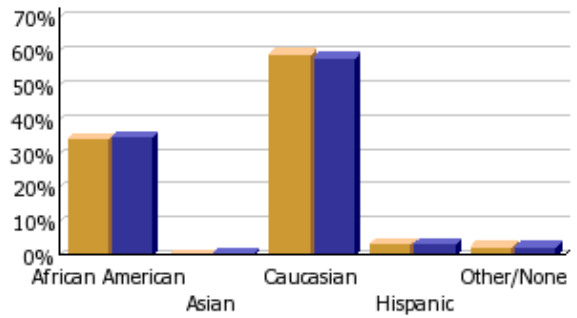
	Yearly Glyco Tests	Yearly LDL Tests	Yearly UA Tests
Controlled	2.1	2.0	2.0
Selected	3.7	2.4	2.3

Analyzing Provider Performance

Chronic Hypertension - Measures Comparison (Most Recent 12 Months)

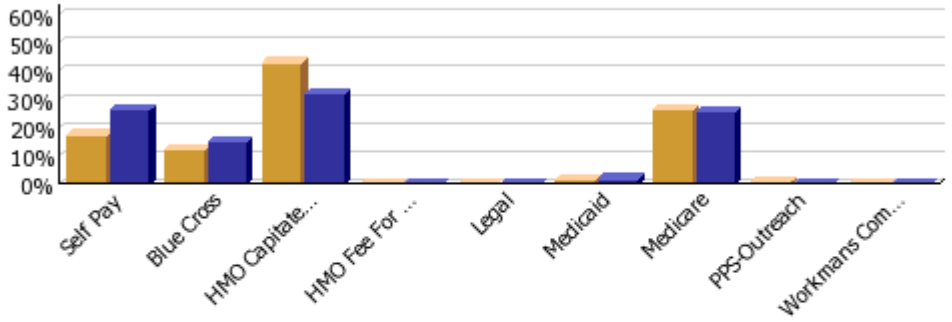
Controlled Group	Selected Group
Population: **All SETMA**	Practice: **SETMA 1, SETMA 2, SETMA West**
Time Basis: **Prior 12 Months**	Provider: **None**
	Controlled or Not Controlled: **Not Controlled**

Ethnicity



	African American	Ethnicity Asian	Caucasian	Hispanic	Other/None
Controlled	34.6%	0.1%	59.3%	3.4%	2.6%
Selected	34.9%	0.8%	58.3%	3.4%	2.7%

Financial Class



	Self Pay	Blue Cross	HMO Capitated	HMO Fee For Service	Legal	Medicaid	Medicare	PPS-Outreach	Workmans Comp
Controlled	17.3%	11.8%	43.0%	0.0%	0.0%	1.2%	26.2%	0.5%	0.0%
Selected	26.0%	14.7%	32.0%	0.0%	0.0%	1.6%	25.4%	0.1%	0.0%

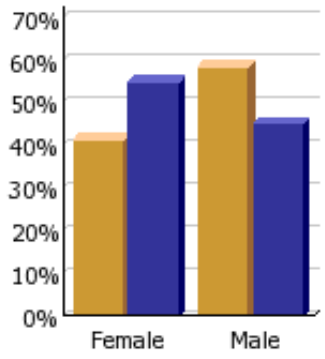
Analyzing Provider Performance

Chronic Hyperlipidemia - Measures Comparison (Most Recent 12 Months)

Controlled Group Time Basis: **Prior 12 Months**
Controlled Group Constrained to: **All SETMA**
Practice: **SETMA 1, SETMA 2, SETMA West**
Provider: **None**

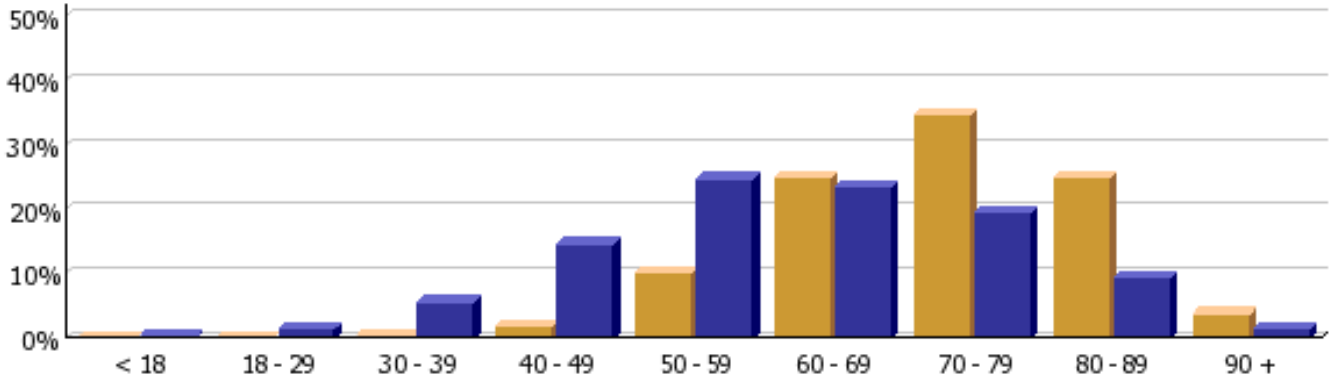
Controlled Group
Selected Group

Gender



	Female	Male
Controlled	41.4%	58.5%
Selected	55.0%	45.0%

Age



	< 18	18 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89	90 +
Controlled	0.0%	0.0%	0.2%	1.8%	10.0%	24.8%	34.7%	24.9%	3.7%
Selected	0.2%	1.4%	5.5%	14.5%	24.7%	23.4%	19.5%	9.3%	1.4%

Analyzing Provider Performance

Raw data can be misleading. For example, with diabetes care, a provider may have many patients with very high HgbA1cs and the same number with equally low HgbA1cs which would produce a misleadingly good average. As a result, SETMA also measures the:

- Mean
- Median
- Mode
- Standard Deviation

Analyzing Provider Performance

SETMA's average HgbA1c as been steadily improving for the last 10 years. Yet, our standard deviation calculations revealed that a subset of our patients were not being treated successfully and were being left behind.

By analyzing the standard deviation of our HgbA1c we have been able to address the patients whose values fall far from the average of the rest of the clinic.

Public Reporting of Performance

One of the most insidious problems in healthcare delivery is reported in the medical literature as "treatment inertia." This is caused by the natural inclination of human beings to resist change. As a result, when a patient's care is not to goal, often no change in treatment is made.

To help overcome this "treatment inertia," SETMA publishes all of our provider auditing (both the good and the bad) as a means to increase the level of discomfort in the healthcare provider and encourage performance improvement.

Public Reporting of Performance

NQF Diabetes Measures

NQF - Diabetes Measures

E & M Codes: Clinic Only
Encounter Date(s): Jan 1, 2010 through Jul 16, 2010

Location	Provider	Dilated Eye within 12 Months	Micral Strip within 12 Months	Foot Exam within 12 Months
SETMA 1	Aziz	48.9%	64.3%	61.5%
	Duncan	55.9%	44.9%	79.1%
	Groff	56.2%	53.5%	81.9%
	Henderson	58.3%	65.4%	83.8%
	Murphy	35.5%	67.9%	86.1%
	Sims	46.5%	50.7%	79.9%
	Thomas	41.3%	49.6%	69.3%
	SETMA 1 Totals:	46.9%	58.9%	77.2%
SETMA 2	Ahmed	68.3%	38.1%	98.2%
	Anthony	67.4%	88.3%	97.5%
	Anwar	76.7%	84.2%	90.4%
	Cricchio	66.3%	81.9%	75.5%
	Holly	77.6%	89.1%	90.5%
	Leifeste	72.7%	84.5%	78.6%
	Wheeler	55.6%	76.3%	84.6%
	SETMA 2 Totals:	69.2%	64.8%	91.1%
SETMA West	Curry	50.7%	62.2%	85.1%
	Deiparine	52.9%	46.6%	89.9%
	Halbert	47.9%	29.3%	59.6%
	Horn	42.9%	63.6%	96.4%
	Satterwhite	67.0%	81.2%	72.1%
	Vardiman	43.1%	35.4%	72.3%
	Young	48.7%	44.0%	84.1%
	SETMA West Totals:	49.9%	50.3%	78.9%
	SETMA Totals:	58.8%	59.8%	84.6%

Public Reporting of Performance

NQF Diabetes Measures

NQF - Diabetes Measures - Blood Pressure Control

E & M Codes: Clinic Only
Encounter Date(s): Jan 1, 2010 through Jul 16, 2010

		Blood Pressure on Last Visit			
Location	Provider	< 120 / 70	< 130 / 80	< 140 / 90	> 140 / 90
SETMA 1	Aziz	16.6%	41.6%	64.9%	35.1%
	Duncan	32.3%	77.2%	92.4%	7.6%
	Groff	13.2%	41.0%	64.6%	35.4%
	Henderson	32.9%	67.9%	89.2%	10.8%
	Murphy	27.2%	53.8%	78.8%	21.2%
	Sims	29.9%	52.8%	77.8%	22.2%
	Thomas	11.0%	57.5%	83.1%	16.9%
SETMA 1 Totals:		23.6%	56.0%	78.8%	21.2%
SETMA 2	Ahmed	29.3%	62.9%	90.3%	9.7%
	Anthony	20.6%	56.0%	78.6%	21.4%
	Anwar	16.8%	76.3%	91.9%	8.1%
	Cricchio	31.8%	72.7%	92.5%	7.5%
	Holly	23.8%	68.0%	93.2%	6.8%
	Leifeste	24.1%	61.0%	85.9%	14.1%
	Wheeler	22.6%	58.3%	85.0%	15.0%
SETMA 2 Totals:		25.5%	64.7%	88.7%	11.3%
SETMA West	Curry	22.9%	54.2%	79.6%	20.4%
	Deiparine	21.6%	55.8%	76.4%	23.6%
	Halbert	16.9%	43.7%	69.0%	31.0%
	Horn	18.8%	65.3%	92.2%	7.8%
	Satterwhite	8.6%	37.1%	61.4%	38.6%
	Vardiman	12.3%	26.2%	55.4%	44.6%
	Young	7.3%	33.6%	70.3%	29.7%
SETMA West Totals:		16.2%	48.0%	74.7%	25.3%
SETMA Totals:		22.8%	58.4%	82.8%	17.2%

Public Reporting of Performance

NCQA Diabetes Recognition

NCQA Diabetes Measures

Encounter Date(s): January 1, 2010 to July 16, 2010

Location	Provider	Encounters	HgbA1c > 9.0	HgbA1c < 8.0	HgbA1c < 7.0	BP > 140/90	BP < 130/80	Eye Exam	Smoking Cessation	LDL >= 130	LDL < 100	Nephropathy	Foot Exam
SETMA 1	Aziz	505	10.3%	82.2%	65.1%	37.4%	38.8%	47.5%	57.5%	11.5%	67.7%	67.3%	60.4%
	Duncan	366	8.7%	79.5%	63.4%	9.8%	77.0%	58.2%	66.1%	13.1%	66.1%	51.6%	80.6%
	Henderson	330	13.0%	78.8%	58.5%	11.5%	69.7%	57.6%	77.6%	16.4%	67.9%	70.0%	87.3%
	Murphy	749	7.5%	80.9%	65.6%	20.3%	56.6%	37.5%	41.7%	9.6%	72.2%	72.0%	85.0%
	Sims	223	12.1%	74.9%	58.3%	23.8%	49.8%	46.2%	73.1%	15.7%	62.3%	53.8%	76.7%
	Thomas	353	12.5%	67.4%	49.9%	15.9%	57.8%	43.9%	64.0%	15.6%	50.7%	51.6%	70.8%
SETMA 2	Ahmed	1,937	19.1%	62.4%	38.9%	10.1%	61.8%	67.3%	36.5%	11.4%	66.6%	40.7%	98.1%
	Anthony	549	11.8%	80.0%	63.0%	22.0%	55.2%	65.2%	51.6%	14.6%	62.8%	88.3%	97.4%
	Anwar	811	6.4%	82.0%	57.8%	7.5%	77.4%	77.8%	52.9%	12.6%	61.9%	82.4%	90.0%
	Cricchio	468	10.5%	79.9%	63.2%	8.3%	72.9%	66.7%	50.6%	16.5%	61.5%	83.5%	75.4%
	Holly	232	11.2%	77.6%	62.9%	7.8%	68.1%	75.0%	59.1%	11.6%	60.3%	89.7%	90.5%
	Leifeste	554	10.5%	76.7%	61.6%	15.2%	61.0%	71.8%	60.6%	11.6%	62.5%	85.0%	79.1%
	Wheeler	333	9.6%	80.8%	60.1%	18.0%	54.1%	56.2%	66.7%	16.8%	58.9%	74.2%	86.2%
SETMA West	Curry	271	10.7%	67.9%	50.9%	19.9%	55.7%	56.5%	54.2%	10.0%	63.5%	67.5%	86.7%
	Deiparine	256	8.2%	50.0%	37.9%	24.2%	55.1%	54.3%	80.0%	8.2%	42.6%	47.3%	87.9%
	Halbert	633	10.9%	72.7%	56.4%	31.1%	44.4%	49.0%	28.6%	16.6%	54.0%	34.1%	61.9%
	Horn	456	6.6%	76.1%	58.1%	7.2%	63.6%	44.3%	72.2%	14.7%	51.5%	64.5%	95.4%
	Satterwhite	229	12.7%	66.8%	47.2%	37.6%	38.9%	65.1%	75.0%	13.1%	48.9%	77.3%	70.3%

Quality Assessment & Performance Improvement

Quality Assessment and Performance Improvement (QAPI) is SETMA's roadmap for the future. With data in hand, we can begin to use the outcomes to design quality initiatives for our future.

We can analyze our data to identify disparities in care between

- Ethnicities
- Socio-Economic Groups
- Age Groups
- Genders

Quality Assessment & Performance Improvement

SETMA's Model of Care along with Business Intelligence Software -- this pairing of medicine and technology -- can transform the delivery of healthcare and is worthy of being adopted by others.

Quality Assessment & Performance Improvement

By expanding SETMA's *Business Intelligence Project*, we are also designing a quality improvement initiative for the elimination of preventable readmissions to the hospital.

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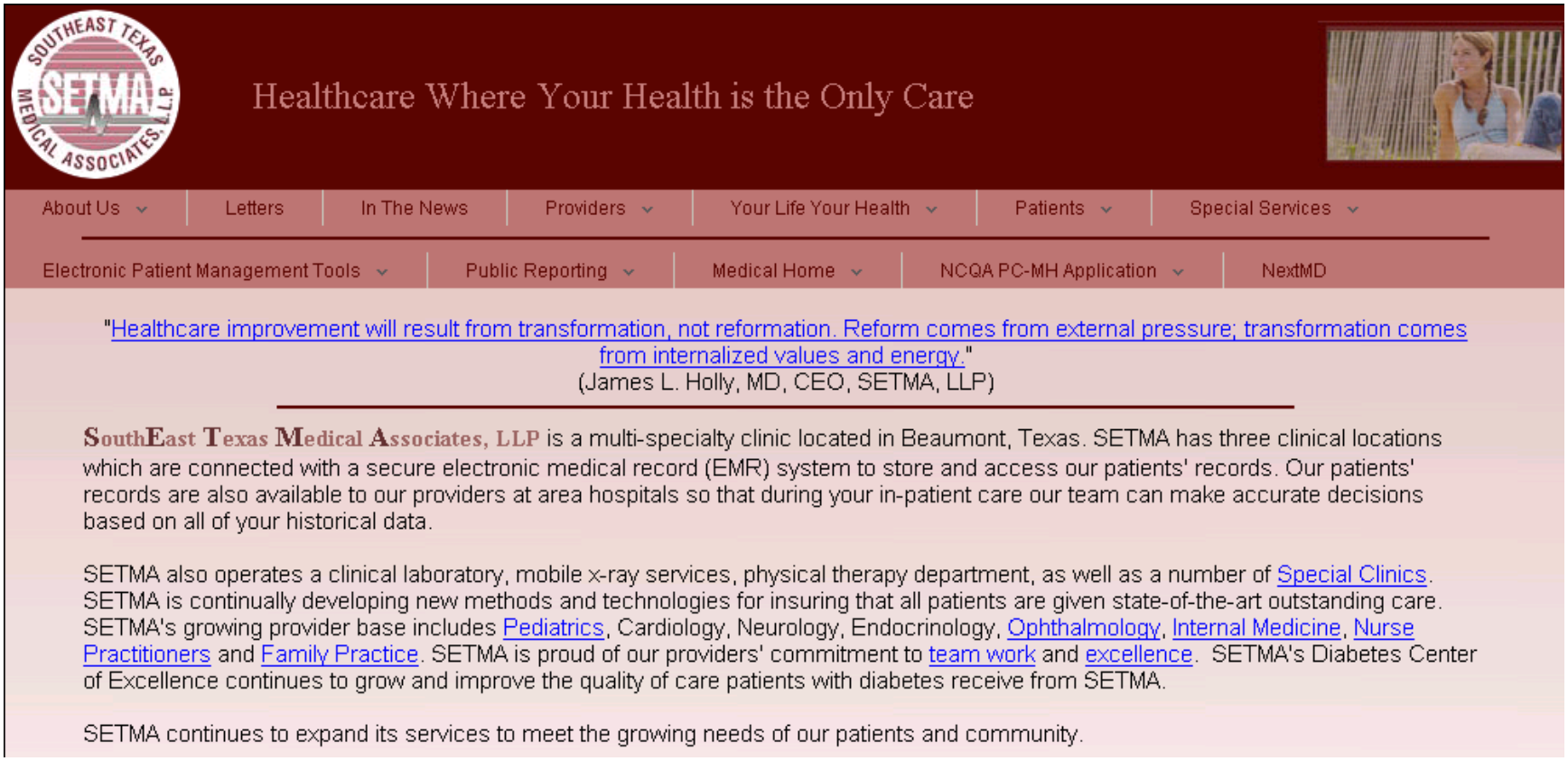

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The Future

The future of quality metrics and the auditing of provider performance are constantly evolving. SETMA's BI Project allows us to both participate in the future and to define it; and, ultimately to pay attention to the things that matter and the things that will result in improved health for all of our patients.