Clinical Safety & Effectiveness
Session # 1

Improving Diabetic Testing in the UT Medicine Primary Care Clinic

August 28, 2009
Educating for Quality Improvement & Patient Safety
Background
Testing HbA\textsubscript{1C} and microalbumin

- Standard of care
- Quality indicators
Glycosylated Hemoglobin (HbA\textsubscript{1c})

- **Strongly predicts** diabetes complications
- HbA\textsubscript{1c} ≤ 7% **reduces** microvascular and neuropathic complications
  
- Glucose status **within 90 days prior** to the test.
- Measurement **every 3 months** determines whether a patient's glycemic targets have been reached.
HbA$_{1C}$: ADA Recommendations

- Perform the HbA$_{1C}$ test at least two times a year in patients who are meeting treatment goals (and who have stable glycemic control).

- Perform the HbA$_{1C}$ test quarterly in patients whose therapy has changed or who are not meeting glycemic goals.

Diabetes Care 2009; 32:S13-S61
Diabetic Kidney Disease

- Occurs in 20–40% of patients with diabetes
- The single leading cause of end-stage kidney disease in US and Europe (>40% of all new cases in US)
- Care for patients with kidney failure in US ~ $32 billion
- Microalbuminuria is the earliest sign of diabetic kidney disease.
- Early detection and treatment of microalbuminuria may prevent or slow its progression to overt proteinuria, hence progression of kidney disease.

Perform an annual test to assess urine albumin excretion (UAE) in type 1 diabetic patients with diabetes duration of ≥5 years and in all type 2 diabetic patients, starting at diagnosis.

(Diabetes Care 2009 32:S13-S61)
Problem Identification

- Total diabetic patients seen in the UT Medicine Primary Care clinic in 2008 = 1,130

- Measurement rate

<table>
<thead>
<tr>
<th></th>
<th>Ordered in</th>
<th>Resulted in</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA$_{1c}$</td>
<td>39% of eligible pts</td>
<td>26% of eligible pts</td>
</tr>
<tr>
<td>Urine microalbumin</td>
<td>40% of eligible pts</td>
<td>30% of eligible pts</td>
</tr>
</tbody>
</table>
AIM STATEMENT

To improve the glycosylated hemoglobin (HbA₁c) and urine microalbumin testing rates by 10% in all diabetic patients in the UT Medicine Primary Care Clinic during June – August 2009 using a computerized reminder system within our electronic medical record (EMR).
Objectives

To assess the benefit of a computerized reminder system on

1. Provider adherence with ordering glycosylated hemoglobin and urine microalbumin testing according to the standard care for diabetic patients; and

2. the actual completion rate of interventions, following provider orders.
The Team

- **Dept of Medicine**
  Thwe Htay, M.D.

- **Dept of Family and Community Medicine**
  Marijan D. Gillard, M.D.

- **Electronic Medical Records**
  - Christopher Joseph, B.S.
  - Rosetta Barrera, B.A.
  Chief Transformation Officer
  EMR Project Team Member

- **Ctr for Pt Safety and Health Policy**
  Amruta D. Parekh, M.D, M.S.P.H

- **Tech/Statistical Support**
  Wayne Fischer, MS, PhD (MDACC)
Cause and Effect Diagram
Non Compliance of A1C & Microalbumin testing

Physician
- Knowledge base
  - Reason for visit not DM related
  - Non use of tools available for DM flowsheet
  - Not enough time to order during visit time
  - Lack of protocol in clinic
  - MD not ordering POC testing
- Lack of information of previous test results
  - Confusion about required tests
  - Lack of POC testing in Medicine Clinic
  - Invalid Specimen
  - Lost Specimen
  - No staff at the lab after 5 PM for Care Link

Patient
- Financial issues (loss of insurance)
  - Non-compliant
- No transportation for labs
- Patient education/comprehension
- Bypass Lab on way out
- Unable to provide urine/blood sample
- Knowledge Base
  - Lack of Diabetic educators
  - Nursing staff failing to follow up overdue lab results
- Lack of chart prep

Laboratory
- No reminder flag that patient due
- Lack of DM patient database
- Underuse of Standing orders
- No electronic patient access to MY CHART not allowing patients to record own values on MY CHART
- No proactive/reminder letter sent to patients

Medical records/EMR
- No reminder flag that patient due
- Lack of DM patient database
- Underuse of Standing orders
- No electronic patient access to MY CHART not allowing patients to record own values on MY CHART
- No proactive/reminder letter sent to patients

Clinical Support Staff
- Lack of Diabetic educators
- Nursing staff failing to follow up overdue lab results
- Lack of chart prep

Dual Medical Records
- Diabetic Flow sheet
DM patient comes to clinic
Registration by Front Desk Clerk
Intake by LVN or MA (H/O DM asked)
Seen by Physician/PA/NP
Is visit about DM?
Yes
- Check home Glucose reading
- Review previous labs
- Check DM testing due
- Order new labs

Is A1C & Microalbumin due?
Yes
MD/PA/NP Orders it

POC lab done during visit
- Call patient
- Call Lab
- Look for other labs
Are results available?
No

Same day Lab order
- Clinical Support staff get overdue message
- Call patient to reschedule lab appt

Does patient go to lab for testing?
No
Pre-Clinic/Fasting Lab on different day
- Lab request evaluated by lab personnel

If fasting lab required?
No
Results in EMR
A1C and Microalbumin testing done
End of visit for patient

Yes

Results available in Physician’s basket to review

End of visit for patient
Interventions

- Team meeting for planning and brainstorming
- Education to providers and nurses
  - Weekly IM/FM Meeting
  - E-mail to providers
- EMR alert
Dear Colleagues,

As you all may know, Dr. Htay and I have been attending the Clinical Safety & Effectiveness training course. A requirement for CSE graduation is that we complete a project. Our goal is to improve diabetic testing rates including HgbA1c and microalbumin in all our diabetic patients. We have reviewed some initial data regarding the current rates for testing among Family Medicine and Internal Medicine and there is some need for improvement to meet current guidelines for screening.

The EPIC team has been an important part of our project. In the next few days, the team will implement the "EPIC alert" system for ordering these tests. EPIC team leads will be sending their own e-mail with screen shots to help you through the process. Generally speaking, you will see the "Best Practice" tab and EPIC red flag alert when you see any diabetic patient older than 10 years. Diabetes needs to be an active problem in order for the alert to become active. Guidelines currently recommend microalbumin testing once yearly and HgbA1c varies dependent on how well controlled the problem may be but on average is every 3 months. You will always have the option to decline the orders as needed.

We also plan to mail letters to all of our diabetic patients in need of testing. With your permission, the patients will receive notice to call our clinic and ask for the MAs helping us with our project. An encounter will be generated with the test orders needed and will be routed to the provider designated as PCP or whomever sees the patient the most in clinic. This will simply be FYI and you have no need to do anything else. We have not sent letters to any patients yet so if you have strong objection regarding this idea, please let us know.

Dr. Htay and I will be reporting back to you in late August how this all works out! Our goal is to increase diabetic testing rates by at least 10% with the time we have left until graduation.

Attached is a document outlining current guidelines for diabetic testing which are recommendations generally accepted by the U.S. Preventative Task Force, ADA, and Endocrinology experts.

Thanks in advance for your cooperation,

Marijan Gillard
Thwe Htay
Epic Project Background
EpicCare Alert
8/18/2009 visit with DR. EDWARD LEBEGER JR for FOLLOW UP - lab work

Allergies: No Known Allergies Reviewed on 10/7/2008
Last Vitals: BP: 138/90 P: 68 T: 98.6°F (37.6°C) T Sr: Tympanic Resp: 18 W: 182 lbs (82.555 kg) H: 5' (1.524 m)
SpO2: 100% PF: BMI: 35.54 kg/m² BSA: 1.87 m² Tobacco: Never

Office Visit
BestPractice
Chief Complaint
Vital Signs
Allergies
Med. Document
Problem List

BestPractice Alerts

⚠️ A Microalbumin Urine Test may be indicated for diabetic patients annually.
Last MICROALBUMIN: Not on file
Acknowledge Reason: 
Open SmartSet: MICROALBUMIN URINE ORDERS

Refresh ✅ Accept
**MICROALBUMIN, RANDOM URINE**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATININE, RANDOM URINE</td>
<td>17/8</td>
<td>20 - 370 mg/dL</td>
</tr>
<tr>
<td>MICROALBUMIN</td>
<td>1.9</td>
<td>mg/dL</td>
</tr>
<tr>
<td>REFERENCE RANGE NOT ESTABLISHED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MICROALBUMIN/CREATININE RATIO, RANDOM URINE</td>
<td>11</td>
<td>&lt;30 mcg/mg creat</td>
</tr>
</tbody>
</table>

The ADA (Diabetes Care 26:S94-S98, 2003) defines abnormalities in albumin excretion as follows:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>RESULT (MCG/MG CREATININE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL</td>
<td>&lt;30</td>
</tr>
<tr>
<td>MICROALBUMINURIA</td>
<td>30-299</td>
</tr>
<tr>
<td>CLINICAL ALBUMINURIA</td>
<td>&gt; OR = 300</td>
</tr>
</tbody>
</table>

The ADA recommends that at least two of three specimens collected within a 3-6 month period be abnormal before considering a patient to be within a diagnostic category.
8/18/2009 visit with DR. EDWARD LEFEBER JR for FOLLOW UP - Medication Refill/ R Shoulder Pain

Allergies: No Known Allergies  Reviewed on 2/24/2009
Last Vitals: BP: 140/68  P: 55  T: 98°F (36.7°C)  T Src: Tympanic  Resp: 16  W: 186 lbs (84.369 kg)  H: 5'9" (1.753 m)
SpO2: 99%  PP: BMI: 27.47 kg/m²  BS: 2.03 m²  LMP: Tobacco: Yes

Office Visit
BestPractice
Chief Complaint
Vital Signs
Allergies

BestPractice Alerts
-

A Hemoglobin A1C may be indicated for diabetic patients every 3 months.
Last A1C=7.1 on 3/13/2008

Acknowledge Reason:

Open SmartSet: HEMOGLOBIN A1C
<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMOGLOBIN A1C</td>
<td>11.0 (H)</td>
<td>% of total Hgb</td>
</tr>
</tbody>
</table>

**Abnormal**

**Status:** Final result 8/12/2009

**MyChart:** Not Released

NON-DIABETIC: <6.0%
Post-Intervention Flow Chart
DM patient comes to clinic

Registratio n by Front Desk Clerk

Intake by LVN or MA (H/O DM asked)

EMR Alert if TESTING due

Seen by Physician/PA/NP

Is A1C & Microalb due?

No

Physician/NP/PA/MA/LVN Orders it

• Med reconciliation
  • Consults for DM education & Podiatry

Yes

POC lab done during visit

• Call patient
• Call Lab
• Look for other labs

Are results available?

No

Clinical Support staff get overdue message

Call patient to reschedule lab apt

Results transmitted in EMR

A1C and Microalbumin testing done

Same day Lab order

Lab request evaluated by lab personnel

If fasting lab required?

No

Results available in Physician’s basket to review

End of visit for patient

Yes

Does patient go to lab for testing?

Yes

Pre-Clinic/Fasting Lab on different day

No

Call Lab

Look for other labs

Yes

Lab request evaluated by lab personnel

If fasting lab required?

No

Results transmitted in EMR

A1C and Microalbumin testing done

End of visit for patient

DM patient calls clinic/pharmacy

EMR Alert if TESTING due
Identified Diabetic patient population using Problem List, Medical History, and Encounters by visit type.

Identified patients seen during each week (1-20).

Identified patients seen and due for Hemoglobin A1C by checking to see if the patient had resulted lab within 90 days of the visit.

If the patient has not had lab done within 90 days, patient is identified as lab due.

If patient is identified as lab due, patients are identified if the provider placed the lab order.

If the provider placed the lab order, patients are identified if the lab has been resulted (patient had the lab done).

For Microalbumin, same steps with lab expected once yearly.

Values were collected electronically and verified manually.

Verified EPIC alert “fired” when lab due.
Check

# lab ordered/ # lab due (Provider adherence)

# lab resulted/ # lab ordered (Patient compliance)

# lab resulted/ # lab due (both Provider and Patient behavior)
Hemoglobin A1C Lab Provider and Patient Compliance

### Pre-Intervention
- **CL**: 0.302
- **UCL**: 0.500
- **LCL**: 0.103

### Post-Intervention
- **CL**: 0.337
- **UCL**: 0.538
- **LCL**: 0.137

**Lab Resulted/Lab Due**

- **Hemoglobin A1C**
  - Post-Intervention
  - Pre-Intervention
Microalbumin Lab Provider Compliance

Pre-Implementation

Post-Implementation

Lab Ordered/Lab Due

Week
Microalbumin Lab Patient Compliance

Pre-Implementation

Post-Implementation
Microalbumin Lab Provider and Patient Compliance

Pre-Implementation

Post-Implementation

Week

Lab Resulted/Lab Due

UCL

LCL

0.223

0.091

0.432

0.226

0.020
Benefits of EMR

- Increased revenue from improved physician productivity resulting in new visit capacity
- Decreased costs associated with duplicate or redundant orders.
- Decreased costs due to increased productivity of nursing and support staff.
- Increased revenue from preventative care services due to the institution of health reminders.
- Future savings can be realized from the administration of preventative measures.

www.himss.org
Intangible Benefits

- Adherence to clinical practice guidelines is achieved through system alerts.
- Disease prevention achieved through system flags.
- Clinical reporting and the associated research and publishing opportunities are achieved through the system’s reporting tools.
- Improved patient satisfaction is achieved through multiple provider services given on same day of visit (treat cold and order DM testing), also visit less cumbersome.
- Improved retention and recruitment of clinicians is achieved by improving the quality of work life through storage of medical data in an electronic format.
Return on Investment (ROI)

Time spent by provider:

<table>
<thead>
<tr>
<th>Time spent</th>
<th>For 10 DM pts/wk</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mins</td>
<td>50 mins</td>
<td>100 mins</td>
</tr>
</tbody>
</table>

Total days worked/year:

<table>
<thead>
<tr>
<th></th>
<th>Per week</th>
<th>Per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 days</td>
<td>240 days</td>
<td></td>
</tr>
</tbody>
</table>

Total hours saved /year/provider = 18 hours
Which equals 270 hours/yr/Primary care group

= $13,500 Salary saved /year

OR

approx 1 hour/wk = 1 - 3 more patient visits/wk
If 50$ / visit return = $50-150/wk x 48 wks =$2,400 - 7,200/yr

= $36,000- 108,000 revenue dollars saved
Impact from adherence to DM guidelines is real:

**Implements morbidity and mortality:**

**A1c** Strongly predicts diabetes complications

HbA$_{1c}$ $\leq$ 7% reduces microvascular and neuropathic complications


On a population level, the greatest number of complications will be averted by taking patients from poor control to fair or good control, indicated by HbA$_{1c}$.


Renovascular complications reduced by avoiding microalbuminuria, overt proteinuria and progression to CKD or dialysis.

**Increased work productivity of patient, less missed days from work.**
Return on Investment (ROI)

“All forms of IT-enabled disease management improved the health of patients with DM and reduced health care expenditures. Over 10 years, diabetes registries saved $14.5 billion, computerized decision support saved $10.7 billion, payer-centered technologies saved $7.10 billion, remote monitoring saved $326 million, self-management saved $285 million, and integrated provider-patient systems saved $16.9 billion.”

Barriers

- Competing demands during office visit (what the provider wants to do vs. what the patient wants that day)
- Providers and staff already have too much to do.
- EPIC alert—too many steps to order tests
- EPIC alert not “on” for a few patients when due.
- Multiple EMR systems.
- Time to train staff.
What’s next?

- Modify EPIC alert—needs to be more user friendly
- Expand to other aspects of DM care (screening lipids, eye exam, foot exam, ACE-I/ARB, ASA)
- Expand to other aspects of Primary care (pap smear, mammogram, colonoscopy, immunizations)
- Empowering the support staff (fear of making an error)
- Empowering the patients (patient education, unnecessary testing/ duplicate tests)
Questions?

Contacts
Marijan D. Gillard, M.D.
Thwe Htay, M.D.