Integration of Clinical Improvement and Activity-Based Costing Identifies Pathway to Healthier Moms and Babies

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Agenda

• Learning objectives.
• Impact of gestational diabetes mellitus (GDM) on women’s health.
• UPMC background.
• Using data and analytics to identify and support meaningful and effective interventions.
• Results.
• Lessons and next steps.
• Questions and answers.
Learning Objectives

Recognize the benefits of a service line organizational structure and interdisciplinary team approach to improvements across an episode of care.

Demonstrate how clinical information can be integrated with financial information for a specific population episode of care to identify opportunity.

Discuss barriers to optimal identification and management of Gestational Diabetes and use of innovative strategies to overcome those barriers.
Poll Question # 1

What proportion of women with Gestational Diabetes Mellitus develop Type II Diabetes in the 10 years following pregnancy?

a) 5%

b) 15%

c) 25%

d) 50%

e) 70%
Gestational Diabetes

- Hyperglycemia first noted in pregnancy.
- Affects ~5-10% of pregnant women (200,000-400,000 annually).
- Combination of metabolic changes that pre-date pregnancy and pregnancy-specific changes.
- Insulin secretion increases, but not enough to “normalize” glucose metabolism.
- Adverse pregnancy outcomes compared to women with normal glucose tolerance.

Ideal State:
- Timely testing.
- Proper diagnosis.
- Referral to Maternal Fetal Medicine (MFM) Management.
- Postpartum follow-up.
UPMC Snapshot

$16 billion world-renowned healthcare provider.

4,600+ employed physicians.

30+ academic, community, and specialty hospitals; 8,500+ licensed beds.

340,000 inpatient admissions and observation cases; 220,000 surgeries performed annually.

4.7 million outpatient visits 957,000 emergency visits.

60+ UPMC Hillman Cancer Center locations; 200+ affiliated medical, radiation and surgical oncologists.

UPMC Health Plan: 3.4 million total members; network of 125+ hospitals 11,500+ physicians.
National and UPMC Statistics

Cesarean Rate among women with GDM

- **UPMC**: 43%
- **National Average**: 40-50%

Macrosomia Rate

- **UPMC**: 9%
- **National Average**: 6%

Hyperbilirubinemia Rate

- **UPMC**: 13%
- **National Average**: 8%

Neonatal Hypoglycemia Rate

- **UPMC**: 6%
- **National Average**: 8%

Gestational Diabetes:

- **UPMC**: 3% of deliveries.
- **National Average**: 5% of deliveries.

UPMC: 25,000 Annual Births
GDM Initiative:

Project Planning and Implementation Framework

- Statistical design.
- Quality improvement methods and tools.
- Adaptive leadership strategies for leading transformation and managing change.
- Protocol development, implementation and testing.
- Clinical integration structure and governance models to sustain and spread improvement interventions.
Evidence-Based GDM Pathway

• This process map illustrates the recommended diagnostic pathway for management of GDM.

• Currently resides as a PDF document in outpatient EHR, but is underutilized.

• There is no IT support in best practice alerts and measurable metrics to encourage adherence.
Data Logic Map

Diagram illustrates the process used to determine the data logic behind the GDM pathway.

Delivered Pregnancy Episodes for the Period?

(Minus women who are currently diabetic or have history of bariatric surgery)

Eligible Cohort

A 23,229

No Glucose Tolerance Test

C 3,148

Glucose Tolerance Test

B 20,081

Screened Late > 28 Wks

D 2,527

Screened On-time <= 28 Wks

E 17,554

Late Score < 135

F 1,764

Late Score 135-199

G 369

On-time Score < 135

H 84

On-time Score 135-199

I 13,431

On-time Score >= 200

J 2,913

Late Score >= 200

L 323

On-time Score >=200

K 219

No Dx Screening 3Hr Test

M 46

Yes Dx Screening 3Hr Test

N 115

Dx Screen Late 3Hr Test

P 152

Dx Screen On-time 3Hr Test

Q 171

Dx Screen 3Hr Test

O 2,798

Definition of “on-time”

Pathway Adherence

CC 546

Non-Adherence to Pathway

DD 114

Delivery Post-partum

EE 179

Positive for Gestational DM

BB 660

Indicates Positive for Gestational Diabetes

Were not screened or tested properly

1. Glucose tolerance test
2. Diagnostic screening test

BB=H+K+U+W+Y+AA

Diagram illustrates the process used to determine the data logic behind the GDM pathway.

Data Logic Map
Education for glucola testing.

Education for 3 hr diagnostic testing.

Communicate news of GDM diagnosis to patient prior to MFM referral.

Test Order:
- Electronic.
- Paper.

Lab Location:
- Patient self-identifies convenient location.
- Office identifies closest lab based on patient’s preference.

Order glucometer (through script or HealthPlan).

Two methods:
- Fax referral.
- EHR referral.

Videos for patient education on GDM.

Order prescription for Wellness.

5X/day supply for glucometer.

EHR reports to track appropriate referral to MFM.

Order Prescription for Wellness.

Communicate news of GDM diagnosis to patient prior to MFM referral.

Establish timeline for test result reading & communication.

Streamline test order options.

Standardize scripting (timing & importance).

EHR Documentation build-out.

Process Map:
Testing & Diagnosis

Magee OP Clinic
Patients: Separate process for CDE referral.

Completion of IDEA Questionnaire.

1st Prenatal visit

Glucose tolerance test between 24 and 28 weeks

Education for glucometer testing.

3hr glucose tolerance test between 28 and 32 weeks

Education for 3 hr diagnostic testing.

GDM diagnosis

Communicate news of GDM diagnosis to patient prior to MFM referral.

Referral to MFM

Two methods:
- Fax referral.
- EHR referral.

Videos for patient education on GDM.

Order glucometer (through script or HealthPlan).

Appointment scheduling

Two methods:
- Office places call.
- Patient contacts MFM office.

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Completion of IDEA Questionnaire.
Process Map: GDM Management

Initial Appointment w/Clinical Diabetes Educator (CDE)

Appointment with MFM doc

GDM Management

Bluetooth glucometer.

Remote monitoring.

Prescription for Wellness Case Manager.

Post-partum type 2 diabetes mellitus (T2DM) testing and management

6 week post-partum check with PCP.

CDE Appointment
• Group:
  • Telemedicine.
  • In-person.
• One-on-One:
  • Telemedicine.
  • In-person.

Referral to dietician.

CDE appointment within 48 hours of result communication.

1 week after CDE consult.

Blood sugar data collection.
Stakeholders

- Multiple levels of frontline staff.
- Variation of practice by providers.
- Ability to pull data/manage metrics.
- Need for operational work team.
- Finding champions.
- Balance of ongoing project workload & team day to day operations.
Poll Question # 2

Does your organization provide Women’s Services in an organized service line approach that includes clinical, finance, quality, and IT team members?

a) Yes
b) No
c) Unsure or not applicable
Cost Accounting Used for Service Line Performance Improvement

Utilized activity-based costing (ABC) system

- Attributes costs to individual patients based on “activity drivers.”
- Identifies granular sources of variation.
- Captures cost of pregnancy episode.

\[ \text{Prenatal Care } $ + \text{ IP Stay } $ (\text{Mom & Baby}) + \text{ Post-Partum } $ = \text{ Episode } $ \]

Aligned Cost and Quality

- Utilizes standardized data warehouse platform for cost and quality.
- Provides structured means to access a variety of health system data.
- Converts large amount of data into usable information for reporting, analysis, and metrics.
Data Source Approach for GDM Project

SUBJECT AREA MART (SAM)

Total Bundle Cost of Care

Clinical and Quality data

Service Line Finance

EDW

Inpt EHR

Outpt EHR

Delivery

Prenatal

Postnatal

Inpatient

Physician Services

Outpatient

Labs, Procedures, etc.

UPMC Wolff Center (quality, safety and innovation team)
Baseline Metrics: Process and Outcome Measures

GDM Prevalence: 3%

Cesarean section rate in GDM patients: 43% vs. 30% in all deliveries
Aligning Cost and Quality: GDM Cost Overview

Data suggest there is potential opportunity to reduce costs by better managing GDM patients.

On average, GDM pregnancy episodes are more costly by approximately $4,000 per episode.

<table>
<thead>
<tr>
<th>Delivery Type</th>
<th>Non-GDM</th>
<th>GDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal</td>
<td>70%</td>
<td>57%</td>
</tr>
<tr>
<td>Cesarean</td>
<td>30%</td>
<td>43%</td>
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</table>

On average, Cesareans are more costly by approximately $12,000 per episode.

Potential opportunity:
Reducing the Cesarean rate for GDM patients from 43% to 37% is associated with a cost savings up to $240k annually.
Baseline Metrics: Process Measures

**Screening**
- 75% population ordered 1 hour glucose tolerance test.
- 67% completed by 28 weeks (Best Practice).
- **Opportunity:** 33% population of women not ordered by 28 weeks.

**Diagnosis**
- 87% eligible population ordered 3 hr glucose timely (≤32 weeks).
- 79% completed 3 hr glucose ≤32 weeks.
- **Opportunity:** 8% completed ≥32 weeks.
Aligning Cost With Quality: Diagnostic Screening Ordered Timely vs Not Timely

32% of GDM positive mothers did not have diagnostic tests ordered timely, and, on average, were more costly.

Other Considerations (Excluded):
- Preterm births, representing 6% of the patients with untimely testing (not likely modifiable).
- Outlier cases with significant costs for care unrelated to GDM, such as cardiac treatment.

GDM Episode Cost Comparison

Other Considerations (Excluded):

- Preterm births, representing 6% of the patients with untimely testing (not likely modifiable).
- Outlier cases with significant costs for care unrelated to GDM, such as cardiac treatment.
## Baseline Metrics: Neonatal Outcomes

<table>
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<tr>
<th>Outcome</th>
<th>GDM</th>
<th>No GDM</th>
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<tbody>
<tr>
<td>Neonatal Hypoglycemia</td>
<td>38%</td>
<td>6%</td>
</tr>
<tr>
<td>Macrosomia</td>
<td>13%</td>
<td>9%</td>
</tr>
<tr>
<td>Neonatal Jaundice</td>
<td>17%</td>
<td>13%</td>
</tr>
</tbody>
</table>

*Excludes preterm births*
Aligning Cost with Quality: GDM Neonatal Outcomes

Babies born to GDM positive mothers with one or more neonatal outcomes are more costly.

Jaundice & Hypoglycemia cases are ~$5k more costly per episode, with longer LOS.

Among these babies, those born to GDM mothers with untimely testing, had a slightly higher LOS.
Aligning Cost with Quality: Improved Analytics

Complexity

Simplicity
Appeal to Leadership for Ongoing Support

- Executive buy-in for roll-out plan.
- Executive direction to providers to adopt new practices.
- Potential tie to dollars to increase pathway adherence.
- Identify champions for process change.
Interventions and Results
Technology Supported Questionnaire and Preliminary Findings

• Source of referral:
  o 24% fax.
  o 16% OB office phone call.
  o 58% patient phone call.
  o 0% electronic referral.

• 96% seen within 7 days of referral by CDE.

• Scheduling conflicts cause patient to decline 1st available.

• 78% enrolled and active in MyUPMC.
Technology Supported Questionnaire and Preliminary Findings

Preliminary Results of Screening:

• Distribution of CDE visits:
  o 4% group telemed.
  o 5% 1:1 telemed.
  o 49% group FTF.
  o 38% 1:1 FTF.

• Only 20% had glucometer & supplies at 1st education appointment.

• One out of 164 patients screened saw an educational video prior to visit.
# Remote Monitoring Portal

## Program Trend

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<tr>
<th>Date</th>
<th>BS (mg/dL)</th>
<th>Pulse (bpm)</th>
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<tbody>
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**Health Index**

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**Biometrics**

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**Pathways**

- Gestational Diabetes - Test Pathway
- Simple Post-Lunch Glucose Reporting
- Simple Fasting Glucose Reporting
- Simple Post-Dinner Glucose Reporting
- Simple Post-Breakfast Glucose Reporting

**Alerts**

- Blood sugar 176 mg/dL (Exceeding or equal to Random Hyperglycemia Alert Limit of 150 mg/dL).
- Did you have any dietary indiscretions since your last reading that would cause a high blood sugar? Yes.
- Blood sugar 70 mg/dL (Lower than or equal to Hypoglycemia Alert Limit of 70 mg/dL).
- Did you have any dietary indiscretions since your last reading that would cause a high blood sugar? Yes.
- Blood sugar 69 mg/dL (Lower than or equal to Hypoglycemia Alert Limit of 70 mg/dL).
- Did you have any dietary indiscretions since your last reading that would cause a high blood sugar? Yes.
- Blood sugar 130 mg/dL (Exceeding or equal to Random Hyperglycemia Alert Limit of 120 mg/dL).
- Did you have any dietary indiscretions since your last reading that would cause a high blood sugar? Yes.
- Patient skipped Glucose meter with reason: Not relevant.
Early Results

• Identified best practice for lab ordering.

• Reaffirmed that appointments with CDE are timely within one week.

• Identified areas of opportunity to improve patient engagement with education materials prior to MFM consult.

• Developed best practice alert in the EHR, combining glucometer ordering, MFM referral, and patient education.

• Identified remote monitoring as a means to collect patient data in a standardized method, (e.g. patient behaviors), track patterns, and provide appropriate interventions.

• Improved insights by integrating quality and cost data.
Additional Interventions

- Create standardized education rollout plan to all providers and hospitals serving OB population within UPMC.
- Recommend referral to MFM as best practice for all GDM patients.
- Patient Supply ordering prior to CDE appointment.
- Collect and monitor data via OB Dashboard to measure progress.
- Case management team engagement for transition of care team post pregnancy.
Key Takeaways

- The importance of bringing cost and finance to a clinical improvement project.
- Initial project identifies future opportunities.
- Engage stakeholders early for assistance with multiple levels of interventions.
- The importance of disease management during pregnancy in relation to population health.
- The approach taken can be applied to other projects.

#HASUMMIT18
Questions and Answers

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