

Cover

1. Title:
Driving Improvement of Diabetes Care in Upper West Side and Harlem neighborhoods of New York City through Clinical Decision Support and Analytics
2. Organization:
University Medical Practice Associates (UMPA), St. Luke's - Roosevelt Hospital Center, part of Continuum Health Partners, Inc.
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4. Goals:

**National Priorities Partnership:
 1. Improve health of the Population
 2. Engage Patients and Families in Managing Health and Making Decisions about Care
 3. Ensure Patients Received Well-Coordinated Care across all Providers, Settings, and Levels of Care
5. The technology utilized in this case study:
 1. eClinicalWorks Clinical Decision Support System (CDSS)
 2. eClinicalWorks Electronic medical record (EMR)
 3. eClinicalWorks MAQ Dashboard for Meaningful Use
 4. Cognos EBO Analytics Tool
6. The Meaningful Use Goal(s):
 1. Improve Population and Public Health
 2. Engage Patients and Families
 3. Improve Care Coordination

7. Cover letter, case study executive summary:

Our story began in November 2009, when we transitioned from a paper based general medicine practice to one using an electronic medical record (EMR). Our hope was to leverage the registry components of this new system to improve care in our chronically ill patient populations. Based on our experience in 2004 through 2006 participating in the Academic Chronic Care Collaborative (an initiative of the AAMC's [Institute for Improving Clinical Care](#)), we knew that utilizing diabetic registries, and implementing small tests of change using a team approach could have a profound effect on quality of care. Lab values, vital signs, problem lists, medication lists, and quality indicators such as ophthalmology visits, podiatry visits, and immunizations are critical for managing populations. But without an integrated EMR, the work of manually transcribing these to a registry was unsustainable. So we looked forward with anticipation to our new system.

Building on our experience with the Chronic Care Model as a means to organize health care, we decided to extend our efforts. Not only could we improve the quality of our own practice, but we could also take this opportunity to work alongside other providers in our neighborhood to co-ordinate care and identify best practices for improvement. We identified a group of like-minded physicians and began work.

To support the coordinated care management approach and clinical standards workflow, we began the technology implementation of our initiative. We put eClinicalWorks' electronic medical record system into operation two years ago, and plan to attest to meeting meaningful use stage one goals in the first quarter of next year. Meaningfully using the EMR was a critical first step in gathering the appropriate data for our diabetic population. The next step was setting up our clinical decision support structure to assist our providers at the point of care. The third step - creating reports - was the key to producing the **visibility into the care management** of this population.

Our efforts were focused on achievement of three National Priorities Partnership goals which also match both meaningful use goals and several of the hospital national patient safety goals. For each of these goals, we identified several aspects of our electronic medical record and associated tools to help capture, track, and report key data for this patient population. Specifically, for **Population Health**, our aim is to utilize our shared EMR, structured data collection and registry reports to identify areas for quality improvement. For **Patient and Family Engagement**, we are working with Certified Diabetes Educators, and have imbedded self-management goals into all of the structured data templates for chronic disease management, utilized patient Diabetes Report Cards to assist the communication between providers, patients and their families. For **Care Coordination**, we have developed a risk assessment tool to assist in identifying those diabetic patients who are at highest risk. These include patients with multiple ED and hospital admissions, with complications from their diabetes, or with multiple co-morbidities. We are developing a care management tool that will be incorporated into our Health Information Exchange as our next step.

After two years of utilizing the electronic medical record and four months of this initiative, we have been able to provide **visibility** across care providers in many neighborhoods to enable the improvement of care to this diabetic population. Our first chapter of capturing the appropriate data, creating tools at the point of care, and reporting across the point of care has laid the infrastructure for improvement of many neighborhoods, many providers, and many patients in NYC. We have come a long way, but it feels that our journey has just begun.

1. Title

Driving Improvement of Diabetes Care in Upper West Side and Harlem neighborhoods of New York City through Clinical Decision Support and Analytics

2. Background knowledge

University Medical Practice Associates (UMPA): began in 1991 and has grown into a multi-specialty faculty group practice under the Department of Medicine. UMPA offers the experience of over 100 physicians in 10 unified divisions. Patients benefit from the personalized and integrated treatment provided by this group of physicians who function as a comprehensive internal medicine group practice. Each physician serves on the faculty of Columbia University College of Physicians and Surgeons, and is a member of St. Luke's – Roosevelt Hospital Center's Department of Medicine. UMPA has three primary care office sites, the two largest being at 1090 Amsterdam Avenue and at 425 West 59th Street, NYC. A new primary care UMPA site was recently opened on 147th Street (2771 Frederick Douglass Boulevard) in NYC.

3. Local problem being addressed

We have a unique opportunity to address disparities in diabetes care. In New York City (NYC), diabetes was the fifth most common cause of death in 2004. According to the 2007 NYCDOH Community Health Survey, 9.7% of reported patients having been told by a health care professional that they had diabetes (NYCDOH Epiquery: NYC Interactive Health Data System - Community Health Survey 2008; April 19, 2010; <http://nyc.gov/health/epiquery>). In Central and Eastern Harlem, the rates are 12.6% and 14.1%, respectively. The 2004 NYC community-level Health and Nutrition Examination Survey (NYC HANES) determined the prevalence of diabetes among NYC adults to be 12.5% - 8.7% diagnosed and 3.8% undiagnosed. 35.5% of New Yorkers reported being overweight, while 22.6% of this group reported being obese; both are risk factors for developing diabetes.

Further studies, such as from The National Healthcare Quality & Disparities, reports that Blacks are 18% less likely than the general population to receive recommended services for diabetes (hemoglobin A1C measurement, dilated eye examination, and foot examination); Hispanics are 30% less likely to receive recommended services for diabetics. The New York City DOH estimates that NYC's population is 23.3% Black and 32.5% Hispanic overall. In Central Harlem, the population is 76.6% Black and 16.9% Hispanic. In addition, adults with an annual household income less than \$15,000 are almost three times as likely to report having diabetes as adults with an annual household income of more than \$50,000 (15.2% versus 5.2%). Four of the clinics in our project are in Health Provider Shortage Areas (ZIP codes: 10030, 10031, 10037 and 10039).

A robust EMR with population management tools will enable the practices in our project to capture, track, and provide visibility for patients at highest risk; producing exception reports for missed services; building referral and test tracking for ophthalmology and podiatry visits, diabetes lab testing, EKGs and several other measurements were identified as the key tools to drive quality improvements.

4 Intended improvements

St. Luke's-Roosevelt and Continuum Health Partners have a long standing mission to providing full access to quality care for all patients, including high-risk and underserved patient groups. Working with the Academic Chronic Care Collaborative, the NYC Department of Health PCIP project, and most

recently our CHP Medical Home Initiative motivated our three recent innovations that align with National Priorities Partnership, patient-centered medical home, and meaningful use goals:

a. NPP Goal 1: **Population Health.** Our aim is to utilize our shared EMR, structured data collection and registry reports to identify areas for quality improvement. We have hired full time staff to assist in implementing these tools, and training staff in the use of PDSA cycles for improving practice processes. We will have monthly web conferences to share best practices identified at each site; and quarterly meetings to discuss next steps.

b. NPP Goal 2: **Patient and Family Engagement.** Working with Certified Diabetes Educators, we have imbedded self-management goals into all of the structured data templates for chronic disease management, and trained our staff in the basics of motivational interviewing. We utilize patient Diabetes Report Cards and self-management goal sheets to assist the communication between providers, patients and their families.

c. NPP Goal 3: **Care Coordination.** We have developed a risk assessment tool to assist in identifying those diabetic patients who are at highest risk. These include patients with multiple ED and hospital admissions, with complications from their diabetes, or with multiple co-morbidities. We are hiring a full time care coordinator to follow these highest risk patients and intervene to prevent hospital re-admissions. We are developing a care management tool that will be incorporated into our Health Information Exchange.

5. Planning and Implementing the Intervention

The model used consistently across the selected patient population included: 1) identified greatest at risk patient population based on health condition and demographics; 2) established a central team, comprised of EMR informatics, IT, Clinical expertise; 3) set goals and patient report cards measures; 4) identified integration and tools needed at each site; 5) created diabetic templates, patient dashboards; 6) test and implement; and 7) established monthly meetings to report on progress and assess.

To assess health condition and high risk patients, the following were implemented:

1. Technology infrastructure at each site and centrally was implemented to integrate the disparate eClinicalWorks EMR implementations, installation of the reporting tools, new workflows, and templates for data capture.
2. Clinical Decision Support functionality, part of eClinicalWorks was utilized to create alerts for those patients who were outside the targeted measures for Hemoglobin A1c, LDL cholesterol, BP, foot and eye care, and immunization rates for pneumonia and influenza.
3. Analytic Tools were created utilizing eClinicalWorks eBO to help providers and patients drive quality through risk assessment tools, patient dashboards, report cards, and trend reports.

6. HIT Dimensions Utilized

The NYC practices involved in this initiative utilize eClinicalWorks' CCHIT certified Electronic Medical Record which contains Clinical Decision Support Features (CDSS). Also utilized was eClinicalWorks Cognos for reporting through its Enterprise Business Optimizer (eBO). eBO is also in use to provide more dynamic reporting with drill-down and custom report writing based on meta-data; Another feature in use is eClinicalWorks MAQ (Meaningful Use Adoption Quality) Dashboards to showcase real time reports regarding core measures, menu measures, quality measures, and user adoption. The data displays the

aggregate denominator and numerator for each objective measure and clinical quality measure by provider.

The flexibility of our EMR precipitated the innovations described here, but in all cases Continuum invested in a significant amount of custom development to ensure that new features would be useful and relevant to our patients, providers, and health care partners. Each of the applications described above has been integrated into the Continuum's EMR system and practice workflows.

We utilized these key technology tools and applied them to meet our diabetic care improvement goals: development of diabetic templates, inclusive of key quality measures for data capture, supported by decision support reminders at the point of care, and reporting – from patient report cards to assessment tools.

The initial task was to develop a set of templates within eCW to collect standardized data. Next, we built reports that pulled from laboratory data, vital signs, immunization records, and the templates we had developed to produce patient report cards, provider dashboards, risk assessment tools, and exceptions lists for follow-up. Then we started weekly team meetings to decide how best to use these tools to drive quality improvement. We have set up systems to track and increase ophthalmology and podiatry visits for diabetics, to reach out to patients for pre-visit planning, and to open up access for flu shots. The part that is new, and most exciting, though, is collaborating with other practices. The diabetic templates have been installed in all of the offices using eCW, the reporting tool is installed in four of our practices, and we are currently working with eCW to have it available everywhere. We have monthly web conferences where we share ideas, challenges, and encouragement. Next month we have our second group meeting to talk about what we have accomplished so far, and what the next steps will be. In January, 2012, we will expand our collaborative to a second group of practices using the same model.

7. Value Derived/Outcomes

For this initial phase of the project, through the implementation of the EMR and analytic reporting tools, we were able to **gain visibility into missing care management** components for high risk (HbA1C >9), diabetic patients and begin deriving improvements for better diabetes management.

The total diabetic population in this initiative is estimated at **8000 patients**. A snapshot of the value derived or the visibility into missing care management components for this targeted diabetic population proved to be significant in a very short time. The patient population for one of the larger sites was 3565; 569 were diabetic with 3200 encounters for those patients identified.

From a **population health** perspective, 2 outcomes were measured and derived: 1. improvement in identifying high risk diabetic patients and 2. improvement in clinical outcomes. Gaining improved visibility into high risk patients resulted in identifying: 108 (19%) of the diabetic patients were missing LDL's; on average only 156 (27.4%) of the diabetics had foot exams; 88(15.5%) patients were missing A1C results; on average only 174 (30.6%) of diabetics had eye exams. There were 11 indicators including some of the above which were reviewed regularly to help manage this patient population.

Secondly, significant clinical improvements in this diabetic population occurred in 5 short months as indicated by the following values:

Criteria	July,	November,
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	2011	2011
1. % of patients who had HbA1c<8.0	76%	77%
2. % of patients who had HbA1c>9.0	15%	12%
3. % of patients who had LDL < 100	56%	61%
4. % of patients who had Dilated Eye Exam	17%	46%
5. % of patients who had BP < 140/90	61%	72%

From a patient/ family engagement perspective, several improvements were derived. For the highest risk (HbA1c>9, BP>140/90, LDL>100, recent hospitalization) diabetic patients (28 or 5% of the diabetic patients), the following was performed monthly: medication / equipment needs (refills, understanding), social work needs (insurance, transportation, home environment). The population with DM, HTN or hyperlipidemia received educational materials once a year, set goals, and were able to speak to a Clinical pharmacologist available on-site for medication education.

From a care coordination improvement perspective, a new team structure and workflows were implemented: a case manager and patient care teams were created (MD, MA, and front desk); the MA began previsit planning 2 weeks prior to an appointment; care teams met to discuss; and created monthly outreach to high risk patients. The care team members said that this improvement significantly helped them in management of this patient population - understanding more closely who was not in control. In all of the high risk patients, a yearly ophthalmology exam was performed; relationships with ophthalmologists were established to also complete the care coordination team. The end result showed an overall 15% improvement in this high risk patient population.

Meaningful Use – using the MAQ dashboards, the providers in this study were able to see the data capture for the corresponding quality measures for diabetics but also to achieve meaningful use stage one.

8. Barriers/Challenges Faced/Lessons Learned

Understanding the nature and complexities of enterprise decisions needed to be recognized by stakeholders very early in the process. This was considered essential due to anticipated challenges that the team expected to receive at each of the unique practices having their own very specific requirements and priorities. Creating the right governance structure, infrastructure needed, and hands on support were both the challenges and lesson learned with this initiative.

As an example, the team recognized the overlapping priorities for the practices, as well as the office disruption of work and large commitment to implementation goals, while still caring for patients. Risk plans were identified as key in assisting the practices to mitigate as many of their issues as possible without impacting the roll-out schedule once established.

Besides the challenges of time commitment to the initiative, decision making, and unique issues by site, there were several, key lessons learned that will be applied to future phases of this initiative. With so many practice sites, providers, and EMR implementations, we underestimated the complexity of putting in the entire necessary infrastructure for this implementation.

The different patient identifiers that we eventually resolved, the different versions of the software installed, etc. created more time initially and now has become part of our implementation process, allowing more time upfront to deal with these infrastructure issues.

The second key lesson learned was the importance of having hands on staff at the practice. We designed the project initially to be more centrally driven. We have now deployed more staff at the sites to help with the initial set up, training, creating additional reports, and practice specific issues.

The third key lesson learned was an immediate and obvious one. In a very short period of time, given the EMR and analytic tools in place, the ability to positively impact care for an underserved population was significant. In four short months, we were able to gain visibility into the uncontrolled diabetics and were able to respond quickly.

9. Financial Considerations

It is important to note that grant funding does not cover the costs of these initiatives, and Continuum devotes significant resources in-kind. For this reason, we prioritize investing our resources in projects that may lead to increased efficiencies and reimbursement incentives in the future. The projects described above clearly align with federal "meaningful use" standards, and Patient Centered Medical Home recognition, for which we will be receiving enhanced reimbursement. While we have not tracked cost savings associated with the introduction of these applications, feedback from providers across our care network indicate that streamlined processes, such as asynchronous patient communication (i.e., reduced phone "tag"), uploaded consult reports, and outreach systems for high-risk patients have improved both communication and efficiency.

Although accurately assessing return on investment difficult, our goal is to generate cost-savings across the health care system by preventing disease and service over-use in those at highest risk. Reimbursement from meaningful use stage one will provide a great offset for this initiative. Savings are therefore not readily calculable, and may in fact accrue to tertiary care systems and payers rather than to our own organization.

The EMR was funded by Continuum through approved capital funding over the last 3 years. This funding was considered enterprise funding based on future revenue coming from meaningful use dollars.

10. Summary/Conclusions

In a very short period of less than 6 months, goals were set for population health, patient and family engagement and care coordination. An overall 15% improvement was achieved among many of the high patients. Their risk measures moved into an acceptable range, indicating a more controlled state among these high risks, diabetic patients in the Harlem and Upper West Side neighborhoods of New York.

Population Health. Our aim was to utilize our shared EMR, structured data collection and registry reports to identify areas for quality improvement. The outcome resulted in identifying the high risk patients, establishing a baseline of key quality indicators, such as missing tests, tests showing levels out of control, eye exams, etc. to begin care management. In 100% of these high risk patients, we were able to improve their status to a more controlled state, portrayed by these key indicators.

Patient and Family Engagement. Working with Certified Diabetes Educators, we have imbedded self-management goals into all of the structured data templates for chronic disease management, Diabetic Report Cards and trained our staff in the basics of motivational interviewing. 100% of the high risk patients were engaged in their care through new education, involvement in goal setting, and outreach which resulted in less appointment reschedules and missed appointments and better adherence to dietary and medication management.

Care Coordination. We developed a risk assessment tool to assist in identifying those diabetic patients who are at highest risk and established a new care team approach including specialty providers such as ophthalmologists to help improve these patients health status. The new care teams reported that the tools and the common workflow resulted in better management for these patients. From identifying the patients through the risk profiles to the patient report cards enabled them to monitor and manage these patients more effectively among each of the members in the group.

Through the usage of clinical decision support and analytical tools, this communication and coordination was made possible. The greatest difficulty was working through the technical challenges of disparate computer systems at different practices without a centralized administrative structure.

11. /12. Interpretation and Conclusions

St. Luke's -Roosevelt Hospital and Continuum Health Partners are building a collaboration among providers in Upper West Side and Harlem neighborhoods of New York focused on improving the quality of diabetes care. Improving care in disadvantaged, underserved communities challenges any health care system, so finding efficient, innovative means is critical for success.

In a very short period of time, we have accomplished both of our goals: quickly gaining visibility into high risk diabetic patients and helping those patients achieve better management of their diabetes. Through patient and family engagement, informative data tools, prescriptive care coordination among providers, we were able to see improvement in management of this population's health.

Specifically, patient and family engagement is essential to chronic disease management. Our work with self-management goal setting, motivational interviewing, educators, and patient outreach has been extremely successful in raising awareness, and collaboratively working with patients and their families.

We have seen that tools such as, structured data fields, registry reporting and Patient Report Cards, Provider and Practice Dashboards when used in a collaborative environment, can drive quality improvement. Finally, for those at highest risk, supplemental care management provides critical support to these especially vulnerable patients and decreases overall utilization. Sharing care management resources among a network of providers increases efficiency.

St. Luke's-Roosevelt, part of Continuum Health Partners continues to provide excellent, innovative care as it fulfills its mission as a community hospital to care for all. Our goal is to institutionalize these new processes, data tools, and care team approach to ensure continuing improvement.

Success Story - University Medical Practice Associates (UMPA), St. Luke's - Roosevelt Hospital Center, part of Continuum Health Partners, Inc.

Appendix – Diabetic Template

Success Story - University Medical Practice Associates (UMPA), St. Luke's - Roosevelt Hospital Center, part of Continuum Health Partners, Inc.

eClinicalWorks (YOUNG, EDWIN, MD)

Practice: Progress Notes

Patient: Test, Diabetes, 61 Y, M

DOB: 09/01/1950

Address: 1111 Amsterdam, NEW YORK, NY 10025

Phone: 212-961-5500

Primary Insurance: AETNA PPO

Payer ID: 6005

PCP: EDWIN YOUNG, MD

Provider: JOHN GREELY, MD

Appointment Facility: UMPA GEN MED04 (B0932 UMPA04 General Med)

Encounter Date: 10/13/2011

Subjective:
Chief Complaint(s):
HPI:
Diabetes
 Chronic Condition Currently Controlled? * No, Signs and Symptoms: denies polyuria, polydipsia, Home Glucose Monitoring: AM Glucose 80-120, Post Prandial Glucose 140-200, Medication Compliance: Yes, Dietary Habits: Not at ideal body weight, Exercise: Does not exercise 150 minutes/week, Self Management Goals Yes, Healthy Eating: I will measure 1 cup of cooked starch per meal., Exercise/Getting Active: I will walk at least 10 minutes a day up to 30 minutes a day., Monitoring Blood Sugar Levels: I will test and record my blood sugar level at least once a day., Taking My Medications: I will learn how my medications help keep me healthy., Reducing Risks of Complications: I will check my feet daily., Problem Solving/Coping: I will learn to reduce my stress level., Barriers to Meeting My Goals: I have insurance issues., How Confident Am I? 8 Confident, Handouts Requested: Self Monitoring Tools, Referral Requests: Nutritionist, Date When Diabetes Diagnosed: 10/18/2010, Retinal Exam: 12/18/2010, Foot/Leap Exam: Yes, Date of Foot/Leap Exam: 10/18/2011, Assessment Risk: Low Risk.

Current Medication:

- Coumadin 5 MG Tablet 1 tablet Once a day
- ASA-APAP-Caff Buffered 81mg Tablet 1 tablet Once a day
- Sertraline HCl 25 MG Tablet 1 tablet Once a day
- Metformin HCl 500 MG (OSM) Tablet Extended Release 24 Hour 1 tablet with evening meal Once a day

Medical History:
Allergies/Intolerance:
Gyn History:
OB History:
Surgical History:
Hospitalization:
Family History:
Social History:
General
 Tobacco Use Are you a: current smoker, How often do you smoke cigarettes? every day, How many cigarettes a day do you smoke? 31 or more, How soon after you wake up do you smoke your first cigarette? within 5 min, Are you interested in quitting? Not ready to quit.

HPI Notes - Structured

Chronic Condition Currently Controlled?	Name	Value	Notes
	* No		
	Signs and Symptoms:	denies polyuria, polydipsia	
	Home Glucose Monitoring:	AM Glucose 80-120, Post Prandial	
	Medication Compliance:	Yes	
	Dietary Habits:	Not at ideal body weight	
	Exercise:	Does not exercise 150 minutes/wk	
	Self Management Goals	Yes	
	Healthy Eating:	I will measure 1 cup of cooked starch per meal.	
	Exercise/Getting Active:	I will walk at least 10 minutes a day	
	Monitoring Blood Sugar Levels:	I will test and record my blood sugar level at least once a day.	
	Taking My Medications:	I will learn how my medications help keep me healthy.	
	Reducing Risks of Complications:	I will check my feet daily.	
	Problem Solving/Coping:	I will learn to reduce my stress level.	
	A Goal I Can Reach:		
	Progress I Have Made:		
	Barriers to Meeting My Goals:	I have insurance issues.	
	How Confident Am I?	8 Confident	
	Handouts Requested:	Self Monitoring Tools	

Medication Summary

Medication	Action
Coumadin 5 MG Tablet	Taking
ASA-APAP-Caff Buffered 81mg Tablet	Taking
Sertraline HCl 25 MG Tablet	Taking
Metformin HCl 500 MG (OSM) Tablet Extended Release 24 Hour	Taking

Allergies

- Penicillin - rash
- Sulfacetamide Sodium - sob
- latex - sob, rash

Immunization

- DTaP
- DTaP 10/15/2010