Innovation in Health Care Delivery Systems: Developing Ecosystems for Improving Health Care Delivery
A McCombs Healthcare Initiative Symposium
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Building Ecosystems for Ensuring the Safe and Effective Use of Medications

Unprecedented Opportunities
THE MEDICATION USE PROCESS

1. PRESCRIBING
   - Evaluate patient
   - Establish need for medicine
   - Select right medicine
   - Determine interactions and allergies
   - Prescribe medicine

2. TRANSCRIBING/DOCUMENTING
   - Transcribe prescription/order
   - Transmit to pharmacy

3. DISPENSING
   - Review prescription order
   - Confirm transcription
   - Contact prescriber for discrepancies
   - Prepare medicine
   - Distribute medicine

4. ADMINISTERING
   - Review prescription order
   - Confirm transcription
   - Review warnings, interactions, and allergies
   - Evaluate patient
   - Administer medicine

5. MONITORING
   - Assess patient’s response to medicine
   - Report and document results
The Need for Collaborative Care

- Lack of care coordination, variation in quality, fragmented delivery → poor quality care, increased health care utilization, increased cost.

- Chronic diseases, the leading cost driver in the U.S. health care system, affect a significant amount of the population.
  - More than half the nation's population expected to have at least one chronic condition by 2020.
  - More than half of the Medicare population have 5 or more chronic conditions.
  - Approximately $2 out of the $3 spent on health care in the US is directed toward care for the nearly 30% of Americans with multiple chronic conditions.


The Need for Collaborative Care

• Medications are involved in 80% of all treatments.

• Over $4 billion prescriptions written annually in U.S in 2011, with a cost of $320 billion.

• At least 1.5 million preventable adverse drug events in the U.S. every year, with costs exceeding $4 billion annually.

• Drug-related morbidity and mortality estimated to cost $177 billion per year (2000), with hospital admissions accounting for 70% of the cost.
Specialty pharmaceuticals are a key area of increased cost.
Ensuring the Safe, Effective, and Affordable Use of Medications

• Medication-related problems are prevalent at all points of care and lead to poor health outcomes.
  • Undertreatment
  • Suboptimal dosing
  • Suboptimal drug selection
  • Nonadherence and Misuse
  • Inadequate monitoring
  • Adverse effects
• Drug therapy provides tremendous benefit, yet is associated with serious harm and significantly impacts the cost of care.

The appropriate use and management of drug therapy has been acknowledged as a critical issue that must be addressed to improve national health care.
“As I approached the exam room, I looked at the clinic schedule, which noted the next patient’s reason for visiting as “DM”. Upon entering the room and speaking to Louise, I realized that the 58-year-old woman not only had diabetes, she also had high blood pressure, hypothyroidism, high cholesterol, asthma, and arthritis (not to mention a history of depression). She brought with her a plastic bag of medications – eight in all – for which she needed multiple refills. . . . She watched her diet (though too much salt was still a problem), tried to be physically active (though her knees always ached), and made sure she took her medications on time. Under the circumstances, Louise is in pretty good shape. But along with the 75 million other Americans who have multiple chronic conditions, she is at high risk for hospitalizations, adverse drug events, and poor quality of life, not to mention high health care costs.”

The Job To Be Done for Louise

- Discuss current health status and well-being with Louise. Ask questions, listen.
- Perform physical exam.
- Assess diabetes control and adjust treatment as needed.
- Assess control and status of other chronic diseases, including hypothyroidism, high cholesterol, asthma, arthritis, depression…and adjust treatment as needed.
- Assess medication use and adherence.
- Ensure that she is up to date on preventive screening and other needs.
- Educate Louise on lifestyle modifications, her conditions, her medications.
- Address unanticipated issues that may arise at the visit.
- Coordinate her care with other providers.
- Arrange follow-up, schedule appointments.
- And more…

Definition of a Clinical Care Team:

“A clinical care team for a given patient consists of the health professionals – physicians, advance practice registered nurses, other registered nurses, physician assistants, clinical pharmacists, and other health care professionals – with the training and skills needed to provide high-quality, coordinated care services specific to the patient’s clinical needs and circumstances.”
Supporting Data – Impact of Pharmacists on Care

- **Disease state management**: Significant reductions in HgbA1C levels, SBP, total and LDL cholesterol; improved care and reduced hospitalizations in patients with chronic heart failure as well as those requiring anticoagulation.

- **Efficiency**: A collaborative care team including pharmacists led to a decrease in the number of non-scheduled health services and specialty visits.

- **Quality care and patient safety**: systematic review of 298 studies demonstrated favorable therapeutic and safety outcomes.


Supporting Data – Impact of Pharmacists on Care

• **Cost containment**: Serving in advanced clinical roles, pharmacists have contained or reduced health care costs through reduced acute health services utilization, reduced outpatient visits, direct cost savings to the patient, or less missed/non-productive workdays.

• **ROI**: As high as 12:1 and an average of 3:1 to 5:1. Based on the ability of medication management services to reduce hospital admissions, reduce the use of unnecessary or inappropriate medications, and reduce emergency room admissions and overall physician visits.


The Role of the Pharmacist

- One of the most evidence-based decisions to improve the health system is to maximize the expertise and scope of pharmacists.

- “We do not need more studies demonstrating the value of the pharmacist in optimizing medication use and improving patient care…we must figure out how to integrate pharmacists into workflow to maximize their benefit as integral members of the team.”

- “The most underutilized member of the health care team.”

George Halvorson, chairman and CEO of Kaiser Foundation Health Plan, Inc. and author of *Health Care Reform Now!: A Prescription for Change.*

Challenges

• Perception of what pharmacists do and are capable of doing.
• Varying roles, experience, and training of pharmacists.
• Inconsistencies in practice models.
• Absence of sustainable payment models for cognitive and clinical services.
• Must better prepare health professions students to work collaboratively – in new models of care delivery - toward improvement of patient care.
Opportunities

• Unprecedented opportunity to engage and integrate now amidst changes in health care delivery.
• Assume more responsibility for the safe, effective, and affordable use of medications.
• Build direct patient care clinical pharmacy services into workflow and then scale them.
• Establish and implement consistent approaches to care delivery by pharmacists.
• Target unmet medication needs in high-risk patients and populations at major points of care and across care transitions (admissions, discharge-home, primary care, community pharmacy setting).
• Implement and evaluate new value-based payment models.
• Work together to re-engineer health professions education to build workforce capacity for providing team-based, patient-centered care.
• Implement, evaluate, and scale best practices.
A Case Study in Workflow Integration

Primary Care-Based Multidisciplinary Readmission Prevention Program

• 20% Medicare beneficiaries discharged from the hospital readmitted within 30 days – costing nearly $17.4 billion annually.

• Development and evaluation of a multidisciplinary follow-up program for individuals at risk for hospital readmission in an academic medical center.

Setting and Participants

- Large academic medical center practice serving nearly 14,000 patients.
- No standardized hospital follow-up process (left to discretion of discharging team).
- Follow-up appointments advised, but often not scheduled.
- When scheduled, visits were not standardized.
Program Description

• Project team: physicians, nurses, pharmacists, care managers, support staff.

• Adopted the Institute for Healthcare Improvement’s State Action on Avoidable Rehospitalizations guide as a framework for the intervention.

• Involved other hospital staff already engaged in institutional readmission QI efforts as part of team.
Program Description

• Environmental scan:
  • Measured number of internal medicine patients hospitalized and rehospitalized within 30 days each month.
  • Designed process to identify internal medicine patients discharged daily.
  • Reviewed sampling of records to conduct root-cause analysis.
• Identified opportunities for streamlining flow of information and scheduling of patients.
  • Care management
  • Timely follow-up
  • Standardizing visits (protocols)
Care Management and Timely Follow-up

• Care manager responsible for:
  • Identifying discharged patients
  • Risk-based triage using readmission risk classification
  • Scheduling appointments within 5 calendar days of discharge
  • Coordinating patient transportation, if needed
  • Reminder calls (also addressed transportation and importance of bringing medications to visit)
Visit Standardization
Clinical Pharmacist/Resident, Physician

<table>
<thead>
<tr>
<th>Prior to Visit</th>
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<tbody>
<tr>
<td>• Review discharge summary</td>
</tr>
<tr>
<td>• Contact primary care provider</td>
</tr>
<tr>
<td>• Contact home health (as appropriate)</td>
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<tr>
<td>• Review pending tests from discharge</td>
</tr>
<tr>
<td>• Start medication reconciliation</td>
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</tbody>
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<table>
<thead>
<tr>
<th>During the Visit</th>
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</thead>
<tbody>
<tr>
<td>• Identify patient goals for the visit</td>
</tr>
<tr>
<td>• Gather patient reported factors contributing to admission or ED visit</td>
</tr>
<tr>
<td>• Complete thorough medication review and education</td>
</tr>
<tr>
<td>• Identify barriers to care</td>
</tr>
<tr>
<td>• Complete medical interventions (appropriate to discharge conditions and chronic conditions)</td>
</tr>
<tr>
<td>• Discuss goals of care</td>
</tr>
<tr>
<td>• Update demographic information</td>
</tr>
<tr>
<td>• Obtain social history</td>
</tr>
<tr>
<td>• Order labs</td>
</tr>
<tr>
<td>• Complete home health referral (as appropriate)</td>
</tr>
<tr>
<td>• Review medication changes</td>
</tr>
<tr>
<td>• Review self-management instructions using Teach Back</td>
</tr>
<tr>
<td>• Provide Visit Summary</td>
</tr>
<tr>
<td>• Arrange follow-up</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Following the Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete referrals (as appropriate)</td>
</tr>
<tr>
<td>• Complete documentation</td>
</tr>
</tbody>
</table>
Program Evaluation and Outcomes

• Retrospective cohort study comparing intervention patients with those who received usual care during same period (n=54 patients in each group).

• Primary outcomes hospital readmission at 30 and 90 days. (Significantly fewer readmissions at 30 and 90 days, p<0.05).

• Assessed time to follow-up as a process measure. (Significantly different, p<0.05; 5 days earlier for intervention group).

• Future work – will need to evaluate attendance rates, effort expended in care management, cost effectiveness.
Conclusion

• Attention to structure and process in transition from inpatient to outpatient settings can reduce the rate of readmissions.

• Real-world implementation science and QI
  • Real-time care management
  • Improved access to care
  • Standardization of visits
  • Multidisciplinary in focus
Community Care of North Carolina

A True Ecosystem for Healthcare Delivery
Community Care: “How it works”

- Primary care medical home available to 1.1 million individuals in all 100 counties
- Provides 4,500 local primary care physicians with resources to better manage Medicaid population
- Links local community providers (health systems, hospitals, health departments and other community providers) to primary care physicians
- Every network provides local care managers (600), pharmacists (76), psychiatrists (14) and medical directors (20) to improve local health care delivery
Primary Goals of Community Care

- Improve the care of Medicaid population while controlling costs
- A “medical home” for patients, emphasizing primary care
- Community networks capable of managing recipient care
- Local systems that improve management of chronic illness in both rural and urban settings
Community Care Networks

- Are non-profit organizations that receive a per-member, per-month (PMPM) payment from the state
- Primary care providers also receive a PMPM payment
- Provides resources needed to manage enrolled population, reducing costs
- Central office of CCNC is also a nonprofit 501(c)(3)
- Seek to incorporate all providers
- Have Medical Management Committee oversight
- Hire care management and pharmacist staff
- Robust and extensive informatics center
CCNC Pharmacy Programs Infrastructure

Network Pharmacist Director

- Mental Health Director
- Care Management Director
- Clinical Directors Director
- Quality Improvement Director

Network Pharmacist
Clinical Pharmacist (Practice Based)
Clinical Pharmacist (Hospital Based)
Care Manager
Medication Management
Spectrum of Activities

**Medication Oriented** - Single Problem
- Formulary & Eligibility
- REMS Programs
- MTMS-Part D

**Patient Oriented** - Multiple Problem
- Medication Reconciliation
- Adherence Counseling
- Pharmacy Home

**Medication Oriented** - Single Problem
- Electronic Prescribing
- Drug Interactions
- Drug Duplications
- Adherence Assessment

**Patient Oriented** - Multiple Problem
- Anti-Coag. Clinic
- Pharmacotherapy Clinic
“Create a Pharmacy Home, virtual or otherwise, where drug use information from multiple sources* is gathered to better inform prescribing and intervention strategies”
FTE Allocation by Activity

% of CCNC Pharmacist Time Allocation by Activity

- Medication Review (Comprehensive) 56.9%
- Medication Review (Focused) 13.5%
- Medication Reconciliation 8.9%
- Administrative 20.7%
## Most Frequent Drugs with Problems

<table>
<thead>
<tr>
<th>Drug</th>
<th>Occurrence</th>
<th>Top Discrepancy</th>
<th>Drug</th>
<th>Number Urgent</th>
<th>Percent Urgent</th>
</tr>
</thead>
<tbody>
<tr>
<td>LISINOPRIL</td>
<td>479</td>
<td>Poor adherence</td>
<td>WARFARIN</td>
<td>26</td>
<td>30.59%</td>
</tr>
<tr>
<td>OMEPRAZOLE</td>
<td>440</td>
<td>Unconfirmed Disc.</td>
<td>NOVOLOG</td>
<td>39</td>
<td>20.53%</td>
</tr>
<tr>
<td>ADVAIR</td>
<td>439</td>
<td>Poor adherence</td>
<td>LANTUS</td>
<td>45</td>
<td>19.74%</td>
</tr>
<tr>
<td>FUROSEMIDE</td>
<td>398</td>
<td>Dose/Freq./Duration</td>
<td>CARVEDILOL</td>
<td>17</td>
<td>17.71%</td>
</tr>
<tr>
<td>KLORCON</td>
<td>362</td>
<td>Dose/Freq./Duration</td>
<td>CLONIDINE</td>
<td>19</td>
<td>16.52%</td>
</tr>
<tr>
<td>ASA</td>
<td>353</td>
<td>Not Taking</td>
<td>SPIRONOLACTONE</td>
<td>18</td>
<td>15.52%</td>
</tr>
<tr>
<td>METOPROLOL</td>
<td>345</td>
<td>Dose/Freq./Duration</td>
<td>HYDRALAZINE</td>
<td>13</td>
<td>14.61%</td>
</tr>
<tr>
<td>ALBUTEROL</td>
<td>270</td>
<td>Unconfirmed Disc.</td>
<td>METPROLOL</td>
<td>41</td>
<td>11.88%</td>
</tr>
<tr>
<td>SIMVASTATIN</td>
<td>256</td>
<td>Poor adherence</td>
<td>SPIRIVA</td>
<td>21</td>
<td>10.99%</td>
</tr>
<tr>
<td>METFORMIN</td>
<td>241</td>
<td>Poor adherence</td>
<td>PLAVIX</td>
<td>20</td>
<td>10.42%</td>
</tr>
<tr>
<td>LANTUS</td>
<td>228</td>
<td>Dose/Freq./Duration</td>
<td>FUROSEMIDE</td>
<td>41</td>
<td>10.30%</td>
</tr>
<tr>
<td>GABAPENTIN</td>
<td>225</td>
<td>Dose/Freq./Duration</td>
<td>SYMBICORT</td>
<td>13</td>
<td>9.70%</td>
</tr>
<tr>
<td>AMLODIPINE</td>
<td>212</td>
<td>Poor adherence</td>
<td>NITROGLYCERIN</td>
<td>11</td>
<td>9.57%</td>
</tr>
<tr>
<td>PLAVIX</td>
<td>192</td>
<td>Poor adherence</td>
<td>SEROQUEL</td>
<td>10</td>
<td>8.70%</td>
</tr>
<tr>
<td>LIPITOR</td>
<td>192</td>
<td>Poor adherence</td>
<td>ADVAIR</td>
<td>38</td>
<td>8.66%</td>
</tr>
<tr>
<td>SPIRIVA</td>
<td>191</td>
<td>Poor adherence</td>
<td>HCTZ</td>
<td>14</td>
<td>8.54%</td>
</tr>
<tr>
<td>NOVOLOG</td>
<td>190</td>
<td>Dose/Freq./Duration</td>
<td>LYRICA</td>
<td>8</td>
<td>8.42%</td>
</tr>
<tr>
<td>HCTZ</td>
<td>164</td>
<td>Poor adherence</td>
<td>KLORCON</td>
<td>30</td>
<td>8.29%</td>
</tr>
<tr>
<td>PROTONIX</td>
<td>160</td>
<td>Not Taking</td>
<td>LEVOTHYROXINE</td>
<td>8</td>
<td>8.16%</td>
</tr>
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## Most Frequent Problems

<table>
<thead>
<tr>
<th>Problem Discovered</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute Contraindication</td>
<td>112</td>
<td>1.32%</td>
</tr>
<tr>
<td>Adverse Event/Side Effect</td>
<td>178</td>
<td>1.37%</td>
</tr>
<tr>
<td>Discontinued Med on Discharge</td>
<td>307</td>
<td>2.69%</td>
</tr>
<tr>
<td>Drug Allergy</td>
<td>37</td>
<td>0.16%</td>
</tr>
<tr>
<td>Interaction Non-absolute</td>
<td>644</td>
<td>3.28%</td>
</tr>
<tr>
<td>Med Dose/Frequency/Duration</td>
<td>3,565</td>
<td>20.66%</td>
</tr>
<tr>
<td>Not Taking Discharge Medication</td>
<td>4,385</td>
<td>22.83%</td>
</tr>
<tr>
<td>Poor Adherence</td>
<td>3,499</td>
<td>22.84%</td>
</tr>
<tr>
<td>Transcription Error/Combo Drug</td>
<td>354</td>
<td>1.97%</td>
</tr>
<tr>
<td>Therapeutic Duplication</td>
<td>1,268</td>
<td>5.86%</td>
</tr>
<tr>
<td>Unconfirmed Discontinuation</td>
<td>4,361</td>
<td>15.36%</td>
</tr>
<tr>
<td>Other</td>
<td>312</td>
<td>1.67%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19,022</td>
<td>100%</td>
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## Urgency

<table>
<thead>
<tr>
<th>Number Urgent</th>
<th>Percent Urgent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1133</td>
<td>5.96%</td>
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</table>

## Origin

<table>
<thead>
<tr>
<th>Origin</th>
<th>Count</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>6340</td>
<td>33.33%</td>
</tr>
<tr>
<td>Patient</td>
<td>4013</td>
<td>21.10%</td>
</tr>
<tr>
<td>Patient/Pre-existing</td>
<td>2057</td>
<td>10.81%</td>
</tr>
<tr>
<td>Other</td>
<td>6612</td>
<td>34.76%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19,022</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

## Timing

<table>
<thead>
<tr>
<th>Timing</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post/During</td>
<td>9645</td>
<td>50.70%</td>
</tr>
<tr>
<td>Hospital</td>
<td>1621</td>
<td>8.52%</td>
</tr>
<tr>
<td>Pre-Hospitalization</td>
<td>7756</td>
<td>40.77%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19,022</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
Where We Are Going

- Build out Community Pharmacy Model
- More Embedding, Less Centralization
- Partner with Hospital Pharmacists
- Transitions to Ambulatory
- Establish broad “goals/standards/consistent practice models for CCNC Pharmacists
- Reporting to Legislature
- Build out Payment Reform Delivery Model
CCNC “Medical Home” Pharmacist
~ 1:10,000 Enrollees

**PCMH Panel #1**
- CMRs
- Post Acute Med Recs
- Gap Identification and Resolution
- Referrals
- Pharmacy Admin

**PCHM Panel #2**
- CMRs
- Post Acute Med Recs
- Gap Identification and Resolution
- Referrals
- Pharmacy Admin

Service Provision To:
1. PCMH Prescribers
2. PCMH Office Staff
3. PCMH Patients
Where We Are Going

Provider Portal

Pharmacy Home

Case Management Information System

Medication Management Module
Our Results

Making Headway on Cost, Utilization and Quality

CCNC's population-based, doctor- and data-driven approach to healthcare is saving money while improving the care delivered to CCNC enrollees. This result has been confirmed by several leading consulting firms and examined in detail in peer-reviewed studies.

"CCNC is to be congratulated for moving from opaque actuarial studies to the harsh glare of peer-reviewed publications... [which] are sufficiently positive to believe that North Carolina's taxpayers got their money's worth."

-- Jean Sidorov, Community Care North Carolina Style Medical Home Saves Money, the Disease Management Care Blog, 9/25/13

"During the past 10 years, improvement work has flourished in a number of developed nations, including the United States. Most of this work, however, takes place in one institution -- a hospital safety project or a primary care diabetes program -- and is small. The Community Care of North Carolina innovation encompasses many institutions -- 1,200 primary care practices -- and is large, 750,000 patients... Health care needs large projects, and Community Care of North Carolina should grab many leaders' attention..."


See how CCNC is transforming the delivery of healthcare in North Carolina by:

- Reducing cost
- Reducing hospital inpatient and emergency room utilization
Building Ecosystems for Ensuring the Safe and Effective Use of Medications

Unprecedented Opportunities