Improving Pediatric Discharge: Interprofessional Collaboration to Ensure Safety

Danielle Altares Sarik, PhD, CPNP-PC, RN
Michael C. Dejos, PharmD, BCPS
Nemours/Alfred I. duPont Hospital for Children
March 22, 2017
Conflict of Interest

The presenters have no relevant conflicts of interest associated with the materials of this presentation.
Support

- Cardinal Health E3 Grant Program
- Alliance for Integrated Medication Management (AIMM)
- Nemours/Alfred I. duPont Hospital for Children
- DE- ACCEL Center for Biostatistics
Acknowledgements

Christina Calamaro PhD, CRNP*
Elora Hilmas PharmD, BCPS
Rebecca Maines RN
Jane Mericle MHS-CL, BSN, RN, CENP
Julie Mongiello RN
Bob Mullen PharmD
Vy Ngyuen PharmD
Jessica Proctor RN
Mary Pat Winterhalter RN*

*Original grant team members
Learning Objectives

• Identify **best practices** for nurse and pharmacy collaboration to **improve transition of care** for clinically complex children.

• Explore **pediatric patient safety outcomes** related to enhanced discharge planning and medication education and management.
Background

• Discharge process is complex, with many risk factors for medication errors
• 15-40% of patients have at least one discrepancy in their medication at discharge
• Nearly 20% of hospital discharges result in readmission
• Barriers to medication safety are multifold

Heath, Dancel, and Stephens, 2015
Huynh et al., 2013
Balling, Erstad, and Weibel, 2014
Berry et al., 2013
Bishop et al., 2015
Braddock et al., 2015
Allende et al., 2013
Anderegg et al., 2014
Pediatric Patients Are At Increased Risk

- ↑ risk of medication errors resulting in harm or death
  - Less evidence in medical literature
  - Lack of pharmaceutical formulations
  - Psychosocial issues
  - Patient unable to express concerns
  - Complex dosing regimens
  - Age-related variability

Role of Enhanced Discharge Support

• Patient navigators have been shown to improve care coordination
  - Set up follow up appointment
  - Assess for transportation needs
  - Connect families and patients to social work/social services
  - Identify and address barriers facing discharge process
  - Reduce readmission rates

• Little is known about medication safety during pediatric transitions of care, an interprofessional team could improve outcomes

Esparza & Calhoun, 2011
Pederson & Hack, 2010
Patient Navigation/Pharmacy Team visit at bedside

Admission

- Nurses provide condition specific education and standard discharge planning

Discharge

- Pharmacist reconciles patient’s medication list, provides medication education
- Patient Navigation/Pharmacy Team sends admission summary and medication information to PCP

PCP Office

- Phone call to family at day 1, 7, 14 by pharmacist

## Project Implementation: Timeline

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Aug – Sept 2016| • Establish relationship between the Patient Navigation nurse navigators and the pharmacy department  
                  • Develop Patient Navigation/Pharmacy workflow  
                  • Provide education to providers regarding the program |
| Oct – Dec 2016 | • Conduct a pilot of pharmacy counseling services  
                  • Modify workflow processes as needed  
                  • Draft a pharmacist training manual  
                  • Start data collection |
| Jan – Feb 2017 | • Implement pharmacy services with a full-time pharmacist  
                  • Train unit-based pharmacists  
                  • Build tools within the EMR  
                  • Continue data collection |
| After Feb 2017 | • Transition coverage of the service to unit-based pharmacists  
                  • Continue ongoing data collection  
                  • Complete data analysis of the first 6 months of the program |
# Tracking Outcomes

<table>
<thead>
<tr>
<th>Patient Demographics</th>
<th>Program Utilization</th>
<th>Impact on Medical Management/Outcomes</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Age</td>
<td>• Number of patients who receive a Patient Navigation consult</td>
<td>• Pharmacist interventions (number and type of interventions)</td>
<td>• Time utilized by pharmacists to implement program</td>
</tr>
<tr>
<td>• Admitting diagnosis</td>
<td>• Percentage of patients who are seen by a pharmacist at discharge</td>
<td>• Number of questions/concerns from patients/caregivers</td>
<td>• Number of contact attempts &amp; time of day that patients/caregivers are most successfully contacted</td>
</tr>
<tr>
<td>• Primary language</td>
<td>• Percentage of patients/caregivers reached at 1, 7, and 14 day call</td>
<td>• 30-day readmission rate</td>
<td></td>
</tr>
<tr>
<td>• Number of new medications added, changed, and stopped during admission</td>
<td></td>
<td>• Potential cost savings of each intervention</td>
<td></td>
</tr>
</tbody>
</table>

---
Preliminary Results

-Demographics
-IVENTS Reports
-30 day Readmission
-Cost Outcomes
Thank you!

Danielle Altares Sarik: danielle.sarik@nemours.org
@AltaresSarik

Michael C. Dejos: michael.dejos@nemours.org
Improving Discharge Medication Instructions for Health Literacy and Language Barriers

Arno Zaritsky, MD and Charles Lee, MD
March 22, 2017

Project supported by the Cardinal Health Foundation and Children’s Health Foundation
Why This Is Important

- Infant hospitalized for 4 months
- Discharged home on clonidine suspension – 0.015 mg (0.15 mL) by NG tube every 8 hours of compounded Rx: 0.1 mg/mL
- Four days after discharge, grandmother cared for infant – gave 1.5 mL instead of 0.15 mL → severe hypotension and multiorgan system failure → death
What would have been the outcome if the grandmother had this instruction?
Project Objectives

- Safety event illustrated that health systems need to focus on home medication errors and not just hospital-based errors
- Proposal made to Cardinal Health Foundation to improve medication instructions at transitions of care.
- Start with a literature review of the frequency and types of home medication errors
- Identify best practice for medication instructions
- Evaluate our medication errors in the ED and then work with a vendor to trial an improved discharge medication system
Home Dosing Errors

- Multiple studies show that 40% to >50% of parents/caregivers tested on over-the-counter dosing make >20% dosing error
- Errors often related to using inappropriate measuring devices
- Recent trial (Yin HS, et al, *Pediatrics* **2016**:138: e20160357) showed that **84%** of 2,110 parents made a >20% dosing error; **21%** made a >2-fold error. Most errors with dosing cups
Sources of Parental Errors

- Poor caregiver communication
  - Home observation studies found that one caregiver may not tell another that a dose was given leading to a second dose; or second caregiver may assume dose was given leading to missed dose
  - Miscommunication about changed dose

- Differences in formulation (e.g., instructions state to give 2 pills, but pharmacy dispenses more concentrated form and relabels to give 1 pill).

- Misunderstanding dosing instructions – do parents understand mL doses?

- When dose changed, no method to re-label medication with updated dose instructions
Objectives: Improving Medication Instructions at Care Transitions

- Collect baseline data on frequency and types of prescribing errors in the ED
- Determine staff and caregiver satisfaction with our discharge medication instructions in children with medical complexity: 4 or more meds
- Work with vendor to incorporate best practices, especially an improved system to reduce risk of liquid medication measurement errors
- Implement instructions and reassess caregiver and staff satisfaction
ED study

- Reviewed 200 consecutive new medication prescriptions written for ED patients over 2 time periods – last week of June and first week of July (400 total)
  - Looked for dosing errors (+/- 20% from recommended dose), wrong frequency or incorrect med for indication
  - Incorrect medication concentration
  - Unit of measurement if liquid
  - Errors or issues with medication instructions provided
- Planned to repeat after implementing new system
ED Study Findings

- Antimicrobials (37.6%), GI medications (13.4%), analgesics (10.9%), topical meds (7%), asthma meds (6.7%) & antihistamines (6.4%) were most common.
- Medication instructions available only in English or Spanish
- No image of liquid dosing syringe; almost all doses in mL rather than teaspoons
- Frequent duplicated and discontinued medications listed on EMR-generated discharge medications
  - Issue with medication reconciliation—pulls in old medications from EMR
# ED Study Findings

<table>
<thead>
<tr>
<th>Visit Question</th>
<th>% Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrong dose (20% &lt; or &gt; recommended range)</td>
<td>10.0%^</td>
</tr>
<tr>
<td>Indication was <strong>not</strong> stated</td>
<td>62.1%*</td>
</tr>
<tr>
<td>Wrong frequency written</td>
<td>7.8%</td>
</tr>
<tr>
<td>Sufficient medication was <strong>not</strong> dispensed to finish course</td>
<td>1.7%</td>
</tr>
<tr>
<td>Medication was <strong>not</strong> appropriate for indication</td>
<td>1.9%</td>
</tr>
<tr>
<td>Medication discharge instructions were <strong>not</strong> complete</td>
<td>32.3%</td>
</tr>
</tbody>
</table>

^Most often due to not using the AOM dose of amoxicillin/augmentin or too low dose of hydrocodone-acetaminophen

*Indication is **not** a required field except for prn medications.

Project Goal – Inpatient Study

- Evaluate caregiver’s perception of the quality of our current medication instructions provided to children with “medical complexity” as defined by the need for 4 or more medications (includes PRN)
  - Research investigator calls families within a few days after discharge and completes survey
  - Survey identifies who gives medications to the child, how caregivers currently manage their child’s medications, what if any tools are used to track doses given, whether the label agrees with the discharge instructions, how caregivers schedule BID, TID and QID schedules, use of support tools and what measurement device is used to measure liquid medications.
Medication Discharge

- Sought vendor who could provide medication instructions that incorporated best practices in content
- Held several meetings with staff nurses to review home medication errors and sought their input on our current medication instructions.
- Asked for suggestions on what would improve medication discharge teaching & instructions
- Also presented to Patient-Family Advisory Committee and sought input on content
Health Literacy: Our Approach (vs. Skill)

**Gather**
- Consolidate information
- Focus on key messages
- Remove clutter / reduce noise

**Understand**
- Reading level
- Language (written & verbal)
- Visuals
- Font size (elderly & visually impaired)

**Act**
- Specific actions
- Encourage dialogue
- Personalized
Addressing Health Literacy & Language Barriers

- Reading level: 5th-8th
- Key messages: How to use safely
- Universal Medication Schedule
- Pictograms for dosing
- 5 Font sizes
- Multi-language support
**Calendar for Adherence**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Frequency</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CADA DÍA: Medicina que usted necesita tomar todos los días.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardizem 180 MG 24 HR Tablet</td>
<td>1</td>
<td>Para la presión arterial alta.</td>
</tr>
<tr>
<td>Spiriva 18 MCG Inhaler</td>
<td>1 soplo</td>
<td>Medicina para la respiración. Para la enfermedad pulmonar obstructiva crónica (EPOC).</td>
</tr>
<tr>
<td>Lasix 40 MG Oral Tablet</td>
<td>1</td>
<td>Para la hinchazón de las piernas.</td>
</tr>
<tr>
<td>Potassium 10 MEQ Capsule</td>
<td>1</td>
<td>Para reemplazo del potasio. Tome el medicamento con 250 ml (1 taza) de agua.</td>
</tr>
<tr>
<td>Glucophage 500 MG Tablet</td>
<td>2</td>
<td>Para el colesterol alto. Tome el medicamento con el estómago vacío.</td>
</tr>
<tr>
<td>Pravachol 20 MG Oral Tablet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>SEGÚN SEA NECESARIO: Medicina que usted debe tomar si la necesita.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ProAir HFA 0.09 MG Inhaler</td>
<td>Use el medicamento cada 4 a 6 horas. Inhale de una a dos (1 a 2) bocanadas cada vez.</td>
<td>Medicina para la respiración. Para los ataques de asma.</td>
</tr>
<tr>
<td>Vicodin 5/500 Tablet</td>
<td>Tome el medicamento por la boca cada 4 a 6 horas. Tome una o dos (1-2) pastillas cada vez.</td>
<td>Para el dolor de espalda.</td>
</tr>
</tbody>
</table>
OraPred Oral Solution 15 mg/5 mL

This medicine is used to prevent asthma attacks.

How to take medicine

Drink the medicine.

Your dosage schedule for this medicine is shown below.

Please take the amount of medicine shown for each day.

To help you keep track of the medicine you have taken, please cross out the box as you take each dose.

<table>
<thead>
<tr>
<th>Date</th>
<th>Morning</th>
<th>Noon</th>
<th>Evening</th>
<th>Bedtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/3/2017</td>
<td>6 mL</td>
<td></td>
<td>6 mL</td>
<td></td>
</tr>
<tr>
<td>3/4/2017</td>
<td>6 mL</td>
<td></td>
<td>6 mL</td>
<td></td>
</tr>
<tr>
<td>3/5/2017</td>
<td>6 mL</td>
<td></td>
<td>6 mL</td>
<td></td>
</tr>
<tr>
<td>3/6/2017</td>
<td>6 mL</td>
<td></td>
<td>6 mL</td>
<td></td>
</tr>
<tr>
<td>3/7/2017</td>
<td>6 mL</td>
<td></td>
<td>6 mL</td>
<td></td>
</tr>
<tr>
<td>3/8/2017</td>
<td>3 mL</td>
<td></td>
<td>3 mL</td>
<td></td>
</tr>
<tr>
<td>3/9/2017</td>
<td>3 mL</td>
<td></td>
<td>3 mL</td>
<td></td>
</tr>
<tr>
<td>3/10/2017</td>
<td>3 mL</td>
<td></td>
<td>3 mL</td>
<td></td>
</tr>
<tr>
<td>3/11/2017</td>
<td>3 mL</td>
<td></td>
<td>3 mL</td>
<td></td>
</tr>
<tr>
<td>3/12/2017</td>
<td>3 mL</td>
<td></td>
<td>3 mL</td>
<td></td>
</tr>
<tr>
<td>3/13/2017</td>
<td>3 mL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/14/2017</td>
<td>3 mL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/15/2017</td>
<td>3 mL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/16/2017</td>
<td>3 mL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/17/2017</td>
<td>3 mL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stop taking the medicine after the last day of your dosage schedule.

Use the medicine for 15 days.

IMPORTANT: These are your specific instructions. If they differ from any other information you receive, including the instructions below, talk to your prescriber or pharmacist.
Video Demonstrations
What Have I Learned?

- Ward nurses recognized that our discharge instructions are suboptimal and contain errors
  - They would like to have a resource to use for teaching prior to discharge
- Parent surveys (32 baseline)
  - Mean of 6.4 medications (0-26) on admission and 7.1 (median =6, range 4-22) on discharge
  - Patients on hospitalist, pulmonary, GI or neurology
  - 24 (75%) use some type of home organizer; pill box (7) and alarm reminder (7) were most common.
  - 22 children were taking a liquid medication and most used a dosing syringe; only 1 used a dosing cup. No teaspoons!
What Have I Learned

- Duplicates and discontinued medications often appeared on discharge medication instructions.
- Nurses routinely provided discharge verbal instructions and wrote when next dose was due on the instructions.
- Taper medications difficult—some residents created table or used calendar to detail weaning schedule.
- Indication only included if PRN medication.
- Parents rarely give medications every 8 or six hours when written as 3 or 4 times a day. The UMS schedule seems to work well for most children.
Engaged parent’s comment: “I suggest empowering parents and teaching about my child’s medications during the hospital stay. I realize I was thinking about stopping at the store and getting home in time before the other kids were out of school rather than listening to what the nurse was saying as we were getting ready to leave.”

Overall, parents highly rated their ability to manage their child’s regimen (overconfidence?)
Survey Results

- Children receiving meds by GT tube often have medication instructions that say give by mouth
  - Creates confusion when cared provided by other caregiver
  - Instructions on how to prepare for GT administration were sometimes missing
- For liquid medications, virtually all received a dosing syringe from the pharmacy
- Sometimes home medications are missing from instructions, or the parent is told incorrectly to stop the medication
8 patients completed survey by 3/4/17

Nurses like the Meducation instructions – easy to understand and appreciate shorter content

7/8 parents liked the instructions; one complained it was too much paper

7/8 preferred Meducation over EMR instructions

Most found calendar and picture of syringe for dosing helpful—several commented it would have been helpful when they first had to give medications to their child
PMI likely not needed for all medications at discharge, especially in chronic patient

- Easy to choose whether you want to include medication in calendar and print PMI

Likely would be helpful in ED, urgent care and other locations where new prescription(s) are written, especially if a liquid medication when you want to show precise dose.

If medication Rx updated, could update in EMR and parent could go to web site to download updated instructions
Compounded medications are challenging – need to assign NDC code (but outside pharmacies may not use your hospital’s formulation)

- Label may not agree with EMR record

Medications by history are not recognized by Meducation since no NDC code associated

Indication can be added in Meducation if the prescriber takes the time – it is not a component of daily medication orders

M education does not write to EMR (yet)
Questions??
Improving the Pediatric Medication Discharge Process: A Multidisciplinary Approach

The Barbara Bush Children’s Hospital at Maine Medical Center
Meredith Bryden MD and Melanie Lord RN BSN CPN
March 22, 2017, 8:00am
Disclosures

Presenters have no relevant financial relationships with the manufacturer of any commercial product and/or provider of commercial services discussed.
Learning Objectives

1. Investigate new methods to improve the hospital medication discharge process
2. Identify benefits of caregiver teach back with medications in hand
The Barbara Bush Children’s Hospital

- An academic, urban children’s hospital within a hospital in Portland, Maine
- The only children’s hospital in the state of Maine
- 37 inpatient pediatric beds
- Pediatric hospitalist service cares for ~50% of inpatient pediatric patients, ~1100 patients per year
Background

• Joined Project IMPACT (Improving Pediatric Patient-Centered Care Transitions) in 2014
  – BBCH baseline:
    ▪ 7% of caregivers unable to teach back medications correctly
    ▪ HCAHPS responses below national average for new medication explanations

• Maine Medical Center opened a 24/7 on-site outpatient pharmacy in January 2015
Aim Statement

Improve the pediatric discharge medication process

1° Drivers

Improved access to new medications

2° Drivers

Access to on-site outpatient pharmacy

Availability of bedside delivery of new medications

Earlier identification of financial barriers to filling medications

Earlier identification of prescription errors

Teaching with medications in hand

Teach-back education technique

Discharge medication teaching by pediatric pharmacists

Better understanding of new medication administrations and side effects

Specific Aims:
1. Increase the percentage of patients leaving the hospital with new medications filled to 70% by 18 months.
2. Increase the percentage of new discharge prescriptions delivered to the bedside (includes teaching by pediatric pharmacists with medications-in-hand) to 70% by 18 months.
Interventions

• Form interdisciplinary team
• EHR optimization
• Expanded capacity of bedside delivery
• Pharmacist or Nurse education at bedside with medications in hand
  – Discuss reason for medicine, potential side effects
  – Employ teach-back method
Nursing Teach Back

An evidence-based method to improve understanding and retention of discharge instructions

“I want to be sure I am explaining this well. Can you repeat this back to me to be sure its clear?”

- Discharge medications
- Follow up appointments
- Contingency Plan
- Home Care and/or equipment
Teach Back

• Our project focused specifically on medication instructions (dosing, side effects, reason for treatment)

• Prior to implementation of teach back, nursing staff was provided education through a mandatory skills fair and on-line education
Teach Back

Perceived nursing concerns:
  – Talked down to/paternalistic
  – Family offended

Actual feedback:
  – Families appreciated the reinforcement
  – Sustained use with ongoing evidence and education
Data Collection

Series of planned sequential interventions (PDSA)

• Observational time series: Jan 2015 – Sept 2016
• Population - all patients, with a focus on hospitalist patients
• EHR review including post-discharge phone call transcripts performed by transition team RN
• HCAHPS responses via NRC Picker Survey
Percentage of patients with new medications filled prior to discharge

P Chart

- Hospital opens Outpatient Pharmacy
- Consult to “Outpatient Pharmacist” order is available in the EMR
- Bedside medication delivery starts
- “Discharge Medication Improvement Process” Workgroup formed with the goal to “take it to the next level” and increase bedside delivery further

CL=81%
CL=50%

CL=5%
Percentage of patients who received bedside delivery of medications.
“Before your child left the hospital, did a provider or hospital pharmacist explain in a way that was easy to understand about possible side effects of these new medicines?”
"Before your child left the hospital, did a provider or hospital pharmacist explain in a way that was easy to understand how your child should take these new medicines after leaving the hospital?"
Choices: Yes, definitely. Yes, somewhat. No
n= 1425
Patients discharged to home

873 (61%)
Prescribed new medications at discharge

515 (59%)
Medications filled prior to discharge

358 (41%)
Medications not filled prior to discharge

292 (56.7%)
Patients contacted by phone after discharge

290 (99.32%)
Successfully teach back medication administration instructions on phone call

2 (0.7%)*
Cannot successfully teach back medication administration instructions on phone call

246 (68.7%)
Patients contacted by phone after discharge

238 (96.75%)
Successfully teach back medication administration instructions on phone call

8 (3%)*
Cannot successfully teach back medication administration instructions on phone call
Inability to teach back medication plans on follow-up phone call

Inaccuracy of teach back fell from 3% to 0.7% when patients left the hospital with medications in hand.
How does this affect the outpatient pharmacy?

- Outpatient pharmacy volume has increased 51% over the past year
- Revenue has increased 66% over the last year
- Reinvestment:
  - Over $1,300,000 in medication assistance for patients
  - A full-time position for pharmacist bedside delivery and medication teaching (and another starting soon)
Other benefits of utilizing on-site pharmacy

• Resolving prescription discrepancies on-site
• Seamless transitions to new medications requiring prior authorization or formulary changes
• Pharmacists have access to EHR enabling
  • Allergy confirmation
  • Medication reconciliation confirmation
  • Ability to read provider notes
Conclusions

• Improving the discharge process and medication discharge plan was achieved:
  • Increasing the percentage of patients leaving the hospital with new medications in hand
  • Increasing the percentage of patients receiving bedside delivery with medication teaching
  • Improving family understanding of medication and patient satisfaction
Keys To Success

• Opening on-site outpatient pharmacy
• Interdisciplinary collaboration, allowing for:
  • EHR optimization
  • Implementing bedside medication delivery
  • Educating families (by pharmacists and nurses) with “medications in hand”
  • Earlier identification of imminent discharge and problem solving
Next Steps

• Expanding hours of bedside delivery and teaching via additional full time pharmacist position
• Expansion of service to the newly born (Vitamin D)
• Measuring patient outcomes including medication-related morbidity and hospital reutilization
Acknowledgements

Transitions Team
• Steve Prato
• Aggie Bellevue, RN
• Anna Martens
• Nancy Bouthot
• Nicole Manchester, RN
• Sarah Thompson, RN
• Teresa Morgan, RN
• Jennifer Hayman, MD
• Shannon Bennett, DO
• Jennifer Jewell, MD
• Logan Murray, MD
• Jonathan Bausman, DO

Discharge Medication Process Improvement Work Group
• Lorraine L McElwain, MD
• Noah Diminick, MD
• Meredith Bryden, MD
• Jonathan Bourque, PharmD
• Jessica Miller, PharmD
• Nancy Nystrom, PhD
• Melanie Lord, RN
• Leah Mallory, MD
Thank You!

Meredith Bryden – mbryden@mmc.org
Melanie Lord – lordm@mmc.org