Reducing Parent Medication Errors: Implementation of the HELPix Intervention within a NYC Hospital Setting

H. Shonna Yin, MD, MS
Assistant Professor of Pediatrics
NYU School of Medicine

Key Collaborators:
Linda van Schaick, MS Ed
Benard P. Dreyer, MD

IOM Roundtable on Health Literacy
Implementation of Attributes of Health Literacy: A Workshop
April 11, 2013
## Attributes of a Health Literate Organization & HELPix Implementation

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HELPix: Organizations Involved

- NYU School of Medicine
- Bellevue Hospital Center
  - Flagship hospital of NYC public hospital system

- Local champions within NYU School of Medicine / Bellevue Department of Pediatrics
  - Linda van Schaick, MS Ed
    - Educator, Bellevue Pediatric Clinic
    - Founder/Director, Health Education and Literacy for Parents (HELP) Program
  - Benard P. Dreyer, MD
    - Senior leadership, Dept. of Pediatrics
HELPix Medication Instruction Sheet

- Patient-specific
- English/Spanish
- Plain language
- Pictogram representations
  - Preparation
  - Route
  - Frequency
  - Storage
  - Duration
  - Questions

Name: Carlos

Information on your prescription for:

Amoxicillin

To treat an infection of the ear

5 mL (1 teaspoon) by mouth
2 times a day for 10 days

Nombre: Carlos

Información sobre su receta para:

Amoxicillin

Para tratar una infección del oído

5 mL (1 cucharadita) por la boca
2 veces al día por 10 días

- Shake well
Agite bien

- Take 2 times a day by mouth
Tome 2 veces al día por la boca

- Store in refrigerator
Guarde en la nevera

- 10 Days
10 Días

Give this medicine for 10 days,
even if your child is feeling better
Dé esta medicina por 10 días,
aunque su niño se sienta mejor

If you have questions call
(212) 562-5524 day or night
Si tiene preguntas llame la
(212) 562-5524 día o noche

Read instructions from your pharmacist about your prescription. Lea las instrucciones de su farmacéutico sobre su receta.

The H.E.L.P. Project
Bellevue Hospital
Pediatric Resource Center
(212) 562-5524

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HELPix
Medication Reminder/Tracking Sheet

- Dosing Diagram
- Date and Number of Doses
- Log
  - Specific to course of medication
  - Time convenient for family discussed
  - Course start/end time circled

Keeping track of Carlos’s Amoxicillin

| 5 mL (1 teaspoon) by mouth | 5 mL (1 cucharadita) por la boca |
| 2 times a day for 10 days | 2 veces al día por 10 días |

- Date of first dose: February 4, 2006
  - Parents: Please check (✓) the correct box each time you give your child the medicine, 20 checks (✓) total.

Day / Día | Circled
--- | ---
9 am | 8 pm

Pediatrician: Please circle the starting dose and ending dose.
HELPix: As-Needed (PRN) Medications

Keeping track of Mary’s Infants’ Ibuprofen Drops (Advil/Motrin)

Your child’s dose is 1.875 mL by mouth on March 11, 2008.

Important
★ Only give this medicine if it has been 6 hours or more since the last dose.
★ Only give this medicine if your child has a fever or does not feel comfortable.

Instructions
Write the exact time that you give the medicine.
You may not need to use all the boxes.

<table>
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<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
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HELPix Intervention Description

5-step Intervention:

1) Use pictogram-based sheets as framework for counseling

2) Show parent dosing diagram & demonstrate dose with syringe

3) Have parent teachback / showback dose with syringe

4) Review log (for tracking medication)

5) Give parent oral syringe to take home

~1-2 minutes
HELPix Development: Partners

- Parents
  - English and Spanish-speaking families
  - HELP program participants

- Providers
  - Physicians (attendings, residents), Nurses, NPs
  - Health educators and volunteers

- Community partner
  - NYC Poison Control Center (Pharmacists, Toxicologists)
HELPix Development: Pilot Testing

- Test materials with intended audience
  - How does sheet work as a whole?
  - How do individual pictograms and phrases work?

- Alternative pictograms and wordings shown to find out what works best
HELPix Evaluation

- RCT, Bellevue Hospital Pediatric ED (n=245) (Yin 2008)
  - English / Spanish-speaking parents of children prescribed a liquid medication (daily dose short course (≤14d) or prn)
  - Outcomes of interest
    - Dosing accuracy
    - Adherence

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Randomized Controlled Trial of a Pictogram-Based Intervention to Reduce Liquid Medication Dosing Errors and Improve Adherence Among Caregivers of Young Children

H. Shonna Yin, MD, MS; Bernard P. Dreyer, MD; Linda van Schaick, MS Ed; George L. Foltin, MD; Cheryl Dinglas, BA; Alan L. Mendelsohn, MD

Objective: To evaluate the efficacy of a pictogram-based health literacy intervention to decrease liquid medication administration errors by caregivers of young children.

Design: Randomized controlled trial.

Setting: Urban public hospital pediatric emergency department.

Participants: Parents and caregivers (N=245) of children aged 30 days to 8 years who were prescribed liquid medications (daily dose or “as needed”).

Intervention: Medication counseling using plain language, pictogram-based medication instruction sheets. Control subjects received standard medication counseling.

Outcome Measures: Medication knowledge and practice, dosing accuracy, and adherence.

Results: Of 245 randomized caregivers, 227 underwent follow-up assessments (intervention group, 113; control group, 114). Of these, 90 were prescribed a daily dose served dosing accuracy (>20% deviation from prescribed dose) compared with caregivers who received routine counseling (daily dose: 3.4% vs. 47.8%; absolute risk reduction [ARR], 43.4% [99% confidence interval, 24.0%-57.0%]; number needed to treat [NNT], 2 [2-4]; as needed: 15.6% vs. 40.0%; ARR, 24.4% (8.7%-38.8%); NNT, 4 [3-12]). Of intervention caregivers, 9.3% were nonadherent (ie, did not give within 20% of the total prescribed doses) compared with 38.0% of controls (ARR, 28.7% [11.4%-43.7%]; NNT, 3 [2.9]). Improvements were also seen for knowledge of appropriate preparation for both medication types, as well as knowledge of frequency for those prescribed daily dose medications.

Conclusion: A plain language, pictogram-based intervention used as part of medication counseling resulted in decreased medication dosing errors and improved adherence among multilingual, low socioeconomic status caregivers whose children were treated at an urban pediatric emergency department.

Trial Registration: clinicaltrials.gov Identifier: NCT0054333
**Results: Effect of Intervention on Dosing Accuracy**
(by Direct Observation at Follow-up)

Error in dosing defined as **measuring more than +/- 20% of prescribed dose**

**prn** (n=155)
ARR = 24.4%
NNT = 4
p=0.003

**daily dose** (n=83)
ARR = 42.4%
NNT = 2
p=0.0002
Results: Effect of Intervention on Adherence (daily dose medications)

Poor adherence defined as not giving within 20% of total expected doses

daily dose \( (n=93) \)
\( \text{ARR} = 28.7\% \)
\( \text{NNT} = 3 \)
\( p \text{ value} = 0.002 \)
HELPix Recognition

Featured as a Case Study in Joint Commission’s Addressing Patients’ Health Literacy Needs (2009)


Grand Prize 2009 NYC HHC Patient Safety and Quality Expo
HELPix: Pursuing Dissemination  
- PART ONE -

• Recognition of need to develop a computer application for providers to use to generate HELPix instruction sheets

• Buy-in from NYU Langone Medical Center (NYULMC), including IT senior leadership  
  – Commitment of fiscal and human resources  
    • Build standalone HELPix web application
HELPix Web-based Application

50+ common liquid and pill-form medications; 300+ variations
Daily dose medications
As needed (PRN) medications
English / Spanish language
Hosted on NYULMC server
HELPix: Pursuing Dissemination
- PART TWO -

• Link between NYULMC standalone web application and Bellevue EMR recognized as key to facilitating provider use of HELPix

• Commitment from NYULMC and Bellevue leadership to link NYULMC HELPix web application to Bellevue EMR system
When ordering a prescription in EMR, say ‘Yes’ to HELPix.
Complete prescription order
Click on HELPix Link

HELPix Medication Instruction Sheets

- Please click on the following link to print your HELPix sheet

https://apps.nyumc.org/helpix/prescription.html?mrn=2169&fname=Sofiya&token=2109-a64t-5b79
Click on “Get Pictogram” button
Information pre-populated into HELPix form

NOTE: Missing information highlighted in a red box; once missing information is filled in, a “Get Pictogram” button will appear
HELPix
Medication Instruction Sheets

Required Fields

Patient Information: Sofiya
Medication Name: Amoxicillin
Form: oral suspension
Strength: 125mg/5ml

Rx Information:
Daily Dose: 
Take 500ml
2 times a day by mouth for 10 days

Dosing Instrument: 5ml Syringe
Start Date: Today
Language(s): English & Spanish

Optional Fields

Indication: Please select one

Buttons:
- RESET FORM
- GET PICTOGRAM
Name: Sofiya

Information on your prescription for:

**Amoxicillin**
125MG/5ML

5 mL (1 teaspoon) by mouth
2 times a day for 10 days

Shake well
Agite bien

Take 2 times a day by mouth
Tome 2 veces al día por la boca

Store in refrigerator
Guarde en la nevera

Give this medicine for 10 days,
even if your child is feeling better
Dé esta medicina por 10 días,
aunque su niño se sienta mejor

Nombre: Sofiya

Información sobre su receta para:

**Amoxicillin**
125MG/5ML

5 mL (1 cucharadita) por la boca
2 veces al día por 10 días

If you have questions call
(212) 562-5524 day or night
Si tiene preguntas llame al
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Key HELPix Implementation Partners

• Providers
  – Attendings
  – Residents/Fellows
  – Nurses
  – Health educators and volunteers (HELP program)

• Parents
  – HELP program

• IT (NYU/Bellevue)
HELPix Provider Training

• 3 training modules
  – Rationale for HELPix
  – How to generate HELPix sheets (through EMR)
  – How to counsel using HELPix sheets
    • Teachback / showback / demonstration
    • Videos to demonstrate use of HELPix

• Modes of training
  – In-person (group, 1:1)
  – Modules available on computers

• Goal: Use HELPix as part of universal precautions approach to counseling families about medications
Study of HELPix Implementation

• Pre / post implementation study design
• 2 urban public hospital pediatric EDs
  – 1 with access to HELPix intervention
  – 1 control group; to have HELPix rolled out at end

• Study Aims
  – To assess the effectiveness of HELPix in…
    – improving parent dosing accuracy and adherence
    – decreasing revisit rates
  – To assess the feasibility of HELPix
    – rate of utilization
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<td><strong>Leadership</strong> allocated fiscal and human resources to support development of HELPix web application and linkage to EMR system</td>
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<td>2 Integrates health literacy into planning, evaluation measures, <strong>patient safety, and quality improvement</strong></td>
<td>Organization supported HELPix program – as a way to integrate health literacy into <strong>patient safety and quality improvement</strong> efforts</td>
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<td>3 Prepares the <strong>workforce</strong> to be health literate and monitors progress</td>
<td>HELPix program involves preparation of <strong>workforce</strong> (nurses, residents, fellows, attendings) to be health literate</td>
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<td><strong>Populations served</strong> (patients and healthcare providers) <strong>involved in the design, implementation, and evaluation</strong> of HELPix</td>
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<td>HELPix uses universal precautions approach to <strong>meet needs of populations with different HL levels</strong>; avoids stigmatization</td>
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<td><strong>Uses health literacy strategies in interpersonal communications</strong> and confirms understanding at all points of contact</td>
<td>HELPix <strong>supports use of low literacy communication strategies</strong> (teachback/showback, demonstration) to confirm understanding</td>
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<td>HELPix <strong>addresses health literacy in the context</strong> of the high-risk situation involving <strong>communications about medicines</strong></td>
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1) What generated the interest in addressing health literacy in these hospitals?

- Interest of **local champions** in improving care for low literacy populations
  - Recognition of high rate of parent confusion with medication instructions; saw provider frustration with existing resources
  - Spurred on by growing national focus on HL issues

- **Hospital system buy-in** due to
  - Recognition of health literacy as patient safety issue
  - Recognition of prevalence of low health literacy in population served
    - Population served by NYC public hospital system predominantly low SES, immigrant families
2) What strategies did you use to move health literacy forward?

• HELPix intervention developed
  • Incorporated low literacy evidence-based principles
  • Engaged key stakeholders in development
    • Parents, providers, community partners, IT
2) What strategies did you use to move health literacy forward?

- **HELPix intervention developed**
  - Incorporated low literacy evidence-based principles
  - Engaged key stakeholders in development
    - Parents, providers, community partners, IT
2) What strategies did you use to move health literacy forward? (cont’d)

- **Evaluation** of HELPix included as core component
  - QI project, RCT (efficacy), Pre-post (effectiveness)
2) What strategies did you use to move health literacy forward? (cont’d)

• Applied for grant funding to support HELP and HELPix-related development, evaluation, and implementation / dissemination
2) What strategies did you use to move health literacy forward? (cont’d)

• Established HELPix reputation
  • Publication of RCT results in Archives of Pediatrics
  • Recognition in Joint Commission Book
  • Recognition in AAP Plain Language Pediatrics book

• Made presentations about HELPix at numerous settings locally and nationally
  • Local: Grand Prize, 2009 NYC HHC Quality and Safety Expo; NY Academy of Medicine; United Hospital Fund
  • National: Pediatric Academic Societies; APhA; ACP Foundation Health Communications Conference; NICHQ; AcademyHealth; Institute for Healthcare Advancement
3) What factors facilitated implementation of the changes to improve health literacy?

- Support of senior leadership
  - Allocation of fiscal and human resources

- Funding from grants to conduct HELPix evaluation and support dissemination/implementation

- Identification of provider champions to encourage HELPix utilization
  - Pediatric/ED attendings, Pediatric/ED residents, Nurses
4) What factors were barriers to implementation of the changes to improve health literacy?

- Obtaining **buy-in / commitment of funding from senior leadership**
  - NYLUMC IT: HELPix web-based application
  - NYULMC IT & Bellevue IT: integration of NYULMC web-based application with Bellevue Hospital Center EMR

- Getting **buy-in from providers** to use HELPix application
5) How will implementation of changes be maintained over time?

- Continued commitment of **local champions**
- Continued support from **senior leadership**
  - Infrastructure built, minimal fiscal and human resources needed to maintain
- Continued commitment and identification of **provider champions** to encourage HELPix use
- Continued **monitoring / evaluation** of HELPix use
Future steps

• Enhance HELPix technology functionality
  – User ability to add/edit medication information; add languages

• Develop sheets for additional medication types
  – Step-down, chronic medications
  – Other formulations (eg. sprays, drops)
  – Adaptation for adult medications
    – Will need partners to help design, implement

• Dissemination to NYULMC (Epic EMR), across NYC public hospital system, beyond
HELPix Acknowledgements

• Collaborators
  – Linda van Schaick, MS ED
  – Benard P. Dreyer, MD
  – Alan L. Mendelsohn, MD
  – Arthur Fierman, MD
  – Luis Rodriguez, MD
  – Mike Mojica, MD
  – George Foltin, MD
  – Michael S. Wolf, PhD, MPH
  – Lee M. Sanders, MD, MPH
  – Gail Slap, MD
  – ED Fellow: Alvira Shah, MD
  – Residents: Carrie Ng, MD, Christine Marrese, MD, Maureen Egan, MD, Leena Shiwbaren, MD

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  – Bellevue IT
    – Steve Natarajan, Ramon Joa
  – HHC IT
    – Lou Capponi
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  – Project Coordinators
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    – Donna Ugboaja, BA
    – Hannah Moreira, BA
    – Isabel Bazan, BA
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    – Jill Linnell, MPH
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  – Research assistants
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