TRANSLATING RESEARCH INTO PRACTICE: MEDICATION ADHERENCE FOR CHRONIC DISEASES

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PROCESS OF ADHERENCE

- HCP Guideline Adherence
- HCP visit to obtain prescription
- Prescription taken/sent to pharmacy
- Pharmacy confirms benefits with insurance
- Patient picks up and pays for prescription
- Primary Nonadherence

Adherence
Patient takes medication

Persistence
Patient initiates new refill

NON-ADHERENCE IS COMMON

<table>
<thead>
<tr>
<th>Type of Asthma Controller Medication</th>
<th>N=69,652</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICS</td>
<td>n=63,998</td>
</tr>
<tr>
<td>ICS/LABA</td>
<td>n=3,457</td>
</tr>
<tr>
<td>LTRA</td>
<td>n=2,755</td>
</tr>
</tbody>
</table>

- Primary Adherence = Prescription filled within 30 days.
- Early Stage Persistence = Primary adherent & another fill 31-180 days later
- PDC = days supplied divided by the days in the time period starting the date of the first fill
- ICS = inhaled corticosteroid
- ICS/LABA = ICS/long-acting beta agonist
- LTRA = leukotriene receptor antagonist

NONADHERENCE & HEALTH OUTCOMES

- ↓ Symptom control
- ↑ ED visits
- ↓ Courses oral steroids
- ↑ Hospitalizations
- ↑ School absence
- ↑ ICU admission

Koel et al. Eur Respir J. 2014;43(3):763-81

ICS Adherence
Hazard Ratio for Exacerbation

24% of asthma exacerbations could have been avoided by improved ICS adherence

Asthma Exacerbation = use of oral steroids, asthma ED visit, or asthma hospitalization


ENVIRONMENTAL CONTROL PRACTICES

WHAT CAN THE HEALTHCARE PROFESSIONAL DO?

ASSESSMENT

ADHERENCE ASSESSMENT

Subjective
- Clinical judgment
- MD, RN, RT, etc.
- Parent/child self-report
- questionnaire, diary, clinical interview

Objective
- Medication Measurement
- pill count, canister counter
- Direct Observation
- Pharmacy data
- Electronic Monitors
ADHERENCE TYPOLOGIES

Unwitting
- Patient and provider mistakenly believe that the patient is adherent

Erratic
- Patient understands and agrees with therapy but has difficulty consistently maintaining regimen

“Rationalized”
- Patient deliberately alters or discontinues therapy

UNWITTING NONADHERENCE

Patient, family and provider mistakenly believe that the patient is adherent.

“BUT I THOUGHT I WAS TAKING MY MEDICINE RIGHT . . .”

- Misunderstands regimen
- Poor device technique
- Language barriers
- Cognitive deficits
MEDICATION CONCORDANCE

<table>
<thead>
<tr>
<th></th>
<th>Physician</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rx</td>
<td>No Rx</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Caregiver</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rx</td>
<td>84 (26%)</td>
<td>18 (6%)</td>
<td>102 (32%)</td>
<td></td>
</tr>
<tr>
<td>No Rx</td>
<td>51 (16%)</td>
<td>165 (52%)</td>
<td>216 (68%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>135 (42%)</td>
<td>183 (58%)</td>
<td>318</td>
<td></td>
</tr>
</tbody>
</table>

Percent Agreement = 78.3%, Kappa = 0.54

HEAD START FAMILIES’ ASTHMA MEDICATION AVAILABILITY

<table>
<thead>
<tr>
<th>N (%)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Names all the medications on the treatment plan</td>
<td>190 (83%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifies rescue medication</td>
<td>201 (88%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifies controller medication, (n = 150 prescribed a controller)</td>
<td>126 (84%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locates all the prescribed medications in the home</td>
<td>124 (54%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medications are expired</td>
<td>58 (47%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describes the purpose of the medication counter</td>
<td>68 (55%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counter at 0</td>
<td>58 (47%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can access medication in home that is not expired or empty</td>
<td>52 (23%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

POOR MDI/DPI TECHNIQUE

<table>
<thead>
<tr>
<th>% Good Technique</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>5-68%</td>
<td></td>
</tr>
<tr>
<td>House staff</td>
<td>43-65%</td>
<td></td>
</tr>
<tr>
<td>Nurses</td>
<td>4-47%</td>
<td></td>
</tr>
<tr>
<td>Pharmacists</td>
<td>62%</td>
<td></td>
</tr>
<tr>
<td>Physicians</td>
<td>57%</td>
<td></td>
</tr>
<tr>
<td>Respiratory Therapists</td>
<td>85-92%</td>
<td></td>
</tr>
</tbody>
</table>

References:
- Eakin et al. ATS 2015 Monday afternoon Mini-symposium: Reducing Asthma Disparities for Children with Asthma
- Capanoglu et al., J Asthma. 2015;52(8):838-45
- Fink & Rubin Respir Care. 2005;50(10):1360-74
- Kesten et al., Chest. 1993;104(6):1737-42
ERRATIC ADHERENCE

Patient understands and agrees with regimen, but has difficulty consistently following it.

"I TRY TO TAKE MY MEDICINE REGULARLY BUT I'M TOO . . . "

- busy
- forgetful/disorganized
- out of medicine
- regimen too complex
- depressed

MATERNAL DEPRESSION

DEPRESSION & ADHERENCE POST-HOSPITAL DISCHARGE

Factors Associated with <50% ICS Use

<table>
<thead>
<tr>
<th>Predictor</th>
<th>OR</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Depressive Symptoms</td>
<td>11.4</td>
<td>2.2-58.2</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Age</td>
<td>0.9</td>
<td>0.9-1.0</td>
<td>0.06</td>
</tr>
<tr>
<td>Female Gender</td>
<td>4.8</td>
<td>0.8-29.2</td>
<td>0.08</td>
</tr>
<tr>
<td>Lower Education</td>
<td>0.3</td>
<td>0.1-1.7</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Krishnan et al., Am J Respir Crit Care Med. 2004;170(12):1281-5

“RATIONALIZED” NONADHERENCE

Patient deliberately alters or discontinues therapy.

"I DON’T NEED TO TAKE MY MEDICINE BECAUSE I . . ."

- don’t think the therapy makes a difference to my health.
- feel fine so I don’t need it.
- am worried about side-effects.
- fear addiction/drug tolerance.
BELIEFS ABOUT ASTHMA MEDICATION

- Adult patients
- Parents of Children

<table>
<thead>
<tr>
<th>Belief</th>
<th>Percent Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It’s hard to remember to get refills</td>
<td>13.9</td>
<td>38.7</td>
</tr>
<tr>
<td>Taking meds makes me worry more about asthma</td>
<td>19.4</td>
<td>32.7</td>
</tr>
<tr>
<td>It’s hard to take meds when I feel fine</td>
<td>32.2</td>
<td>45.9</td>
</tr>
<tr>
<td>Benefits of meds make side effects worth it</td>
<td>45.9</td>
<td>51.6</td>
</tr>
<tr>
<td>Even if I take meds, I will have symptoms</td>
<td>51.5</td>
<td>62</td>
</tr>
</tbody>
</table>

Riekert et al., 2003; Riekert et al., 2004

INCONSISTENT BELIEFS

<table>
<thead>
<tr>
<th>Belief</th>
<th>Hispanic</th>
<th>Black</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are serious risks of uncontrolled asthma</td>
<td>80%</td>
<td>75%</td>
<td>50%</td>
</tr>
<tr>
<td>Controllers work best when taken daily</td>
<td>50%</td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>OK to take less controller when symptoms decrease</td>
<td>50%</td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>OK to stop controller when no longer have symptoms</td>
<td>25%</td>
<td>20%</td>
<td>10%</td>
</tr>
</tbody>
</table>


STRATEGIES TO IMPROVE ADHERENCE
COMMUNICATION IS TALKING AND LISTENING

ASSESSMENT
- Use open-ended questions
- Ask 1 question at a time
- Elicit patient & Family’s perspectives and beliefs
- Explore social context
  - family, culture, SES, spirituality
- Clarification
  - what does “rarely” or “usually” mean?

ASKING QUESTIONS

**DON’T**
- You’re taking [lists meds], right?
- Any problems with your medicines?

**DO**
- Which, if any meds, have you been taking?... How do you use [name med]?
- Taking medications can be hard. What gets in the way of you taking [name med]?... Tell me more about [barrier].
- What have tried to [overcome barrier]?
- What are some reasons you want to take [name med]?... What are some reasons you DON’T want to take [name med]?
STRATEGIES FOR IMPROVING ADHERENCE

Unwitting Nonadherence

- Provide & review written treatment plan
- Provide education
- Review device technique
- Ask patient to repeat dosing instructions (“Tell me back”)
- Get objective data on adherence levels

“TELL ME BACK” STRATEGY

- Ideal for confirming patient understands
  - Diagnosis/prognosis
  - Treatment options
  - Treatment plan

  “I want to make sure I’ve covered the main points well enough for you to make a good decision, would you please tell me...”
  “Tell me what you’re going to do when you get home?”

ASSESS COMPREHENSION

15/124 Assessed Patient Recall or Comprehension
124 New Concepts Presented
Patient Recall and Comprehension
Adherence

8/15 Recalled or Comprehended
7/15 Clarified and Tailored Explanation
6/7 Reassessed Recall or Comprehension

Schulz et al., Arch Intern Med. 2002;162(1):83-88
IT'S MORE THAN NEEDING EDUCATION

- Poor inhaler technique is correlated with poor adherence
- Education is NOT enough
  - Necessary but NOT sufficient
  - Readmission associated with ↑ knowledge & ↑ nonadherence.
- Written Asthma Action Plans alone NOT enough
- Simplifying the regimen doesn't always work, either
  - Although DPI adherence consistently higher than MDI

**STRATEGIES FOR IMPROVING ADHERENCE**

**Erratic Adherence**

- Query barriers & problem-solve
- Simplify & tailor regimen
- Behavioral strategies
  - Self-monitoring (e.g., diaries)
  - Cueing (e.g., toothbrush, pillbox)
  - Reminders (e.g., cell phone)
  - Pair with habits or pleasurable activities
- Reinforcement
- Encourage accessing social support

**PROBLEM SOLVING STEPS**

- Define the Problem
- Brainstorm Solutions
- Vote on Solutions
- Operationalize Solution
- Evaluate the Outcome
Efficacy of Reminders

![Graph showing Childhood Asthma Control Test Score over time for Control and Intervention groups.]

Control (n=110) vs Intervention (n=110)


Strategies for Improving Adherence

- "Rationalized" Nonadherence
  - Include patient & family in decision-making
  - Identify beliefs & concerns about therapy
  - Develop discrepancy between behavior & personal values & goals
    - Link therapy with these values & goals
  - Personalized adherence & health feedback

Putting it all together in real-life

The Game of Life
“PEER” TRAINERS

- Phone-based coaching over 12 months to parents encouraging effective use of medications, symptom monitoring, & attending regular doctor visits
- 12mo: more symptom-free days, better parent quality of life, more positive medication outcome expectancies.
- 24mo: better parent quality of life, fewer ED visits
- No different in hospitalization or courses or oral steroids
- When limit sample to Medicaid
  - Fewer ED visits and hospitalizations at 12 and 24mo.


PUBLIC HEALTH NURSE DELIVERED SCHOOL INTERVENTION

- Roaring Adventures of Puff (http://www.educationforasthma.com)
- 6 sessions during lunch
- Asthma Friendly Schools Resource Kit (www.asthmainschools.com)
  - Goals: (1) process to ID students with asthma, (2) increase access to inhalers, (3) process for managing worsening symptoms, (4) ID triggers within school environment, (5) encourage students with asthma to participate in activities, (6) improve general population’s asthma knowledge, (7) collaboration.

Cicutto et al., J Sch Health. 2013;83(12):876-84

PUBLIC HEALTH NURSE DELIVERED SCHOOL INTERVENTION: OUTCOMES

Child

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Urgent Care</td>
<td>51</td>
<td>41</td>
</tr>
<tr>
<td>School Absences</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Interrupted daily activity due to asthma</td>
<td>63</td>
<td>63</td>
</tr>
</tbody>
</table>

School

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID students</td>
<td>52</td>
<td>91</td>
</tr>
<tr>
<td>Access Meds</td>
<td>49</td>
<td>53</td>
</tr>
<tr>
<td>Handle Sx &lt; Triggers</td>
<td>24</td>
<td>14</td>
</tr>
</tbody>
</table>

all ps < .01

Cicutto et al., J Sch Health. 2013;83(12):876-84
SCHOOL-BASED DIRECTLY OBSERVED THERAPY

**Intervention**
- Web-screening to assess asthma
- Communication with healthcare provider to authorize DOT and prescribe controller medicine
- School nurse or health aid does DOT

**Outcomes**

<table>
<thead>
<tr>
<th>Days activity limitation</th>
<th>Days rescue med use</th>
<th>Days absent due to asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>DOT</td>
<td>all ps &lt;.05</td>
</tr>
<tr>
<td>2.04</td>
<td>2.44</td>
<td>1.03</td>
</tr>
<tr>
<td>0.85</td>
<td>0.37</td>
<td>0.85</td>
</tr>
</tbody>
</table>


**SUMMARY**

- Nonadherence is common & under-estimated
  - If a patient reports any nonadherence, assume s/he is nonadherent.
  - Objective measures are best
  - Many factors contribute to nonadherence – unique to the individual
  - Identifying why the patient is nonadherent (typologies) helps target your intervention
  - Efficacious interventions are multi-factored and require partnerships with multiple systems