Mobile Phone Asthma Action Plan Application; Use in Adolescents

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Introduction

- Asthma is a chronic disease of the airways and a significant public health problem
- Written asthma action plans are standard of care but are often not done (Global Initiative for Asthma, 2012).
- The purpose of this project was the creation of an asthma action plan application for use in adolescents.
  - Improved accessibility
  - Improved utilization
  - Simplify asthma care for providers and patients
Asthma burden affects mortality, morbidity, quality of life, and the economy.

- **Mortality**
  - 3,300 deaths in the United States in 2011 (CDC, 2014)
  - 80% increase in death rate over last 30 years in children (AAFA, 2014)

- **Morbidity**
  - Incidence of asthma increased by 15% over the last decade (CDC, 2014).
Background

- **Quality of Life**
  - 2 million emergency department visits each year
  - 25% of total ER visits (CDC National Ambulatory Survey, 2011).
  - Leading cause of school absenteeism (AAFA, 2014).

- **Economy**
  - Asthma direct cost is >$50 billion (CDC Vital Statistics, 2014).
  - Indirect asthma cost additional $5.9 billion (American Lung Association, 2012).
The *British Medical Journal* found that two thirds of deaths from asthma are preventable (Torjesen, 2014).

Written action plans are widely recommended by health care providers but inconsistently used by patients (Andrews, 2014).

**At the project site, the asthma action plan utilization rate was 1.3% (n=1,162)**

Most cited reason for lack of asthma action plan was TIME (Tolomeo, 2014)
Asthma' Burden

Disease & Severity
Hospitalizations
Medication & Equipment Costs
Frequency of Exacerbations

Mortality
Morbidity
Quality of Life
Economic Burden
Framework: Social Cognitive Theory

Behavioral Factors

Self-efficacy
Skills
Practice

Asthma Control

Personal Factors

Environmental Factors

Outcome
Expectations
Knowledge
(Observational Learning)

Social Norms
Access in
Community
Influence on
Others
Project Design

- Improvement of electronic asthma action plan
- Design screenshots for mobile phone application
- Development of mobile phone application
- Evaluation of application
**Project Plan and Methodology:**
**Improve Electronic Asthma Action Plan**

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**BREATHING ACTION PLAN**
ALLERGY ASTHMA & SINUS CENTER
1-800-600-7551 / 1-865-584-8588

**NAME:** ___________________  **PROVIDER:** ___________________
**BEST PEAK FLOW:** _______  **CHART#** _______  **DATE:** _______

<table>
<thead>
<tr>
<th>ZONE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEN ZONE</td>
<td>1. Use Preventive Meds Regularly</td>
</tr>
<tr>
<td></td>
<td>2. Use Rescue every 4 HRS as needed</td>
</tr>
<tr>
<td>GOOD TO GO</td>
<td>1. Use Rescue 2 puffs every 20 min for 1 hr. or 1 NEB treatment.</td>
</tr>
<tr>
<td></td>
<td>ADDED/USE: ____________</td>
</tr>
<tr>
<td>PF Range</td>
<td>2. After 1 hr. check PF.</td>
</tr>
<tr>
<td></td>
<td>IF not GREEN ZONE use RESCUE every 4 hours regularly and call our office</td>
</tr>
<tr>
<td></td>
<td>to let us know your status.</td>
</tr>
<tr>
<td>RED ZONE</td>
<td>1. 2-4 puff of RESCUE or NEB treatment.</td>
</tr>
<tr>
<td>STOP</td>
<td>2. ______ mg of Prednisone / Medrol.</td>
</tr>
<tr>
<td>PF &lt; ______</td>
<td>3. Call our office.</td>
</tr>
</tbody>
</table>

**EMERGENCY = CALL 911 if you can’t walk or talk!**

If you call our office please have the following information ready: 1) Current and normal peak flow numbers, 2) Medications 3) Drug Allergies 4) Pharmacy Number

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**GREEN ZONE: Doing well**
No Breathing Difficulties
- No Coughing
- No Wheezing
- No Shortness of Breath
- No nighttime awakening
- Able to do usual activities (work, play, exercise)

**If using peak flow:**
Peak flow is more than 80% of personal best: (______)

**YELLOW ZONE: Caution**
Mild Breathing Difficulties
- Cough
- Wheeze
- Shortness of breath
- Waking from sleep because of these symptoms
- Some activity limitation because of breathing difficulty

**If using peak flow:**
Peak flow is 60%-80% of personal best (______ to ______)

**RED ZONE: Medical Alert**
Severe Breathing Difficulties
- Breathing is hard and fast
- Extreme shortness of breath
- Cannot do usual activities
- Difficulty talking or walking
- Rescue medicine not helping
- Symptoms worsening

**If using peak flow:**
Peak flow is less than 60% of personal best (______)

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**CONTROLLER MEDICATIONS**
Listed medication(s) are DAILY controller medication(s)

**Medication**  
Directions
1.  
2.  
3.  
4.  
**For exercise-induced symptoms, add**

**QUICK-RELIEF (RESCUE) MEDICATIONS**
Continue daily controller medication(s) as prescribed
Add 2-4 puffs of _______ or nebulizer treatment
Recheck symptoms and/or peak flow after 15 minutes
If symptoms improved and peak flow within normal range, return to Green zone

**If symptoms persist, add the following medication(s):**

**MEDICAL ALERT!**
Take these medications and then CONTACT OUR OFFICE NOW!

1.  
2.  
If symptoms are GETTING WORSE or NOT IMPROVING, go to the hospital or call 9-1-1

**CALL OUR OFFICE**
865-584-8588
1-800-600-7551
Project Plan and Methodology: Designing the Application
Project Design

Asthma Control in the Palm of Your Hand
How it Works

SIMPLE LOGIN PROCESS
How it Works

EASY SIGN ON PROCESS
THAT LINKS EACH
PATIENT WITH THEIR
SPECIFIC PROVIDER AND
CHART NUMBER
How it Works

TRIGGERS FOR ASTHMA ARE EASILY ENTERED INTO THE ACTION PLAN.
How it Works

**First Time Sign Up**

Do you use a Peak Flow Meter?  

Peak Flow

Adjust the slider to your personal best peak flow

0  

800

570

Back  Next
CUSTOMIZE PATIENT’S UNIQUE MEDICATIONS FOR GREEN, YELLOW, AND RED ZONE
How it Works

Specific Instructions Are Provided to Patient

Controller Medications
Listed medication(s) are DAILY controller medication(s)

- No Breathing Difficulties
- No Coughing
- No Wheezing
- No Shortness of Breath
- No nighttime awakening
- Able to do usual activities (work, play, exercise)
How it Works

Patients can call their asthma provider or 911 directly from the app.
Project Design

HOME PAGE FOR PATIENT
Data Analysis and Results

- 17 participants completed surveys
  - 12 patients (60% female; mean age 14.5)
  - 5 medical providers
- Results of evaluation revealed either agree or somewhat agree for each question.
- Important feedback came from comments
Asthma Action Plan Application Survey

Appendix F
Evaluation Tool for Asthma Action Plan Application

Your familiarity with using apps:

- Use them all the time
- Often use them
- Sometimes use them
- Have a few and barely use them
- Don’t have any, but have used some friend’s app
- Never use them
- What’s an app?

If you use an app, please choose the answer that best represents your experience:

I found the Asthma Action Plan app easy to use:

- Agree
- Somewhat Agree
- No Opinion
- Somewhat Disagree
- Disagree

I can use the app without written instructions:

- Agree
- Somewhat Agree
- No Opinion
- Somewhat Disagree
- Disagree

The app does everything I would expect it to:

- Agree
- Somewhat Agree
- No Opinion
- Somewhat Disagree
- Disagree

The app is designed for adolescents with asthma of any severity:

- Agree
- Somewhat Agree
- No Opinion
- Somewhat Disagree
- Disagree

Areas that need simplification

This app helps me understand what to do in the event of an asthma attack:

- Agree
- Somewhat Agree
- No Opinion
- Somewhat Disagree
- Disagree

I think that I would use this app frequently:

- Agree
- Somewhat Agree
- No Opinion
- Somewhat Disagree
- Disagree

Features I liked

Features that need improvement

Functions that you would like to see expanded
## Results of Survey

### Excerpts of Key Comments from the Survey

<table>
<thead>
<tr>
<th>Comment</th>
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<tbody>
<tr>
<td>&quot;This would be helpful, especially if you didn’t have your paper copy&quot;</td>
</tr>
<tr>
<td>&quot;Love that it is portable. I like that you can call the office and 911 directly from the phone&quot;</td>
</tr>
<tr>
<td>&quot;This would be a good thing to use/ Include chest tightness under the yellow zone instructions&quot;</td>
</tr>
<tr>
<td>&quot;I think that my mom would like it a lot&quot;</td>
</tr>
<tr>
<td>&quot;Incorporate a reminder to do peak flow or medication, Some way to track patient information, Have some sense of fear within the app so patients take it seriously, Possibility to communicate with office via a database&quot;</td>
</tr>
<tr>
<td>&quot;I think that a medication reminder might be helpful, or maybe a reminder to use the app&quot;</td>
</tr>
<tr>
<td>&quot;There needs to be a way to communicate the information to the provider during office visits- maybe a symptom tracker&quot;</td>
</tr>
<tr>
<td>&quot;I would use this much more than my paper copy. I don’t even know where that is!&quot;</td>
</tr>
<tr>
<td>&quot;I think my Mom would feel better if I had this- she wouldn't worry so much&quot;</td>
</tr>
<tr>
<td>&quot;It would be nice to be able to print this in addition to giving it to the patient&quot;</td>
</tr>
<tr>
<td>&quot;I would like to see an education piece within the app in addition to the action plan&quot;</td>
</tr>
<tr>
<td>&quot;Love it!&quot;</td>
</tr>
</tbody>
</table>
Impact of Results on Practice

- Patient feedback focused on user-interface with the application
  - Concerned with functionality
  - User-friendly experience
- Provider feedback focused on efficiency in clinical setting
Strengths and Limitations

- **Strengths**
  - Improved access for patients
  - Simplify asthma care through step wise approach

- **Limitations**
  - HIPAA compliance
  - Data transfer from mobile phone to electronic medical records
  - Survey participants may have experienced bias
Future Implications for Practice

- Possibility to decrease emergency department rates among patients with asthma
- Potential for the application to be used for research purposes
- Marketing potential for other chronic disease management
References

References