Breathe in, Breathe out... Now what? Improved pediatric asthma outcomes through improved inhaler technique

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DNP Scholarly Project

The University of Texas at Tyler

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Industry Mentor:
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CMO, Community Health Programs
Pediatric Asthma Prevalence, 2017\textsuperscript{9,10,24-26}

Asthma Prevalence, 2017 (%)

- United States: 8.4
- Massachusetts: 12.1
- Berkshire County: 12.2
- Pittsfield: 14.4
Asthma and Emergency Care in MA

- 10% of children in Massachusetts diagnosed with asthma
- 13,942 Asthma Related Emergency Room (ER) visits ($6,041,000)
- Berkshire County 5th highest asthma-related ER visit rate in Massachusetts
Asthma and Missed School 1,9-10,24-26

In the US: 14.4 million days missed from school

1 asthma exacerbation: 4.1 missed school days

Uncontrolled asthma: exhibited learning difficulties and lower standardized testing scores

Pittsfield School District: 1 missed day school: $72 lost tuition
In 1996, Major Janet L. Bourne (USAF) wrote her master’s thesis in nursing on pediatric inhaler technique:
  – Only 40-45% of patients correctly utilized an inhaler.

In 2016, at the onset of this DNP scholarly project on pediatric inhaler technique:
  – Only 40-45% of patients correctly utilized an inhaler.
How does CHP teach inhaler technique?

• CHP Berkshire Pediatrics did not perform hands on or meaningful verbal education of inhaler technique

• 60% of patients did not have correct technique

• Correct inhaler technique involves 8 steps
In pediatric patients with asthma (P), how does hands on inhaler education (I) compared to verbal only education (C) affect inhaler technique (O1), follow up clinic visits for exacerbations (O2), ER utilization (O3), school attendance (O4), parent work attendance (O5) over a 3-month period-of-time (T)?
**Literature Review**

CINAHL, Cochrane, Pub Med Search, Psych Info, Academic Search Complete, Scholar Works, & Henderson Library

Yield = 1334

Keywords: pediatric asthma, inhaler technique, nebulizers/vaporizers, Emergency room/department, school

Limiters: English, age 5-18, human, peer review

Discarded:
Not scope of project, population: 1,229
Duplicates: 74

Total yield of 31 articles
• Clinical Scholar EBP Model

• Functional Mastery of Health Ownership: Maria Donnelley, PhD, BSN. The University of Texas at Tyler
Synthesis and Recommendations

- 3 studies had improved inhaler technique with respiratory therapy and pharmacist involvement (inter/intra professional) with health provider team \(^7,13,17\)

- Average length of successful inhaler technique program: 3 months \(^1,3-13,16-22,24,30\)

- 17 studies with successful IT utilize IT checklist \(^2,4,6-9,11-14,16-17,19,21-22,26,30\)

- 6 studies with successful IT utilize asthma control test (ACT) \(^2,4,6,10,19-20\)

- 5 studies with successful IT utilize asthma action plan (AAP) \(^2,4,6,13,17\)
Program Guidelines

Asthma, age 5-18
- Given Asthma Control Test (ACT); Asthma Quality of Life (AQOL); ER/urgent care, missed school days questionnaire

Provider:
- Assess asthma
- Asthma Action Plan (AAP)

Patient IT
- Re-educate IT
- Patient re-demonstrate IT
- IT checklist

Follow up appointment 6 months; sooner for exacerbation
Implementation: July-October 2018

• 518 patient visits took place during this time (patients with asthma)

• 25% of patients seen received educational programming
119 patients: 25 correct 1\textsuperscript{st} attempt

Comparison of Correct IT Steps Pre vs Post Education

13 patients had 2\textsuperscript{nd} IT score performed

69\% decreased IT by at least 1 step
## Asthma Control Test

<table>
<thead>
<tr>
<th>Visit</th>
<th>Mean Score</th>
<th>Range of Scores</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21</td>
<td>3-27</td>
<td>93</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>7-25</td>
<td>13</td>
</tr>
</tbody>
</table>

22% of patients uncontrolled asthma visit 1

23% of patients uncontrolled asthma visit 2
Quality of Life Screen

Patient and Parent Asthma Quality of Life Scores

Why So Difficult?
Missed Visits
All MDs declined to participate in QOL

Number of Responses

0 0 0 0 2 2 2 2 8 8 36 27 23 33

Patient:0 Parent:0
Patient:1 Parent:1
Patient:2 Parent:2
Patient:3 Parent:3
Patient:4 Parent:4
Patient:5 Parent:5
Patient:6 Parent:6
Patient:7 Parent:7

Quality of Life Scores
School & Work Absences, ER/UC Visits

- Missed School Days: 0-2 reported
- Missed Days of Work: 0-2 reported
- ER/Urgent Care Visits: None
- ER/Urgent Care Noted in Chart: 36

Why So Difficult?

My methodology for data collection did not work: “on the spot” parental recall
Number of missed chances
One urgent care in city does not send patient visit alert
Case Study

**Patient I**

- 3 visits total; received education each visit
- IT: improved by 1 step each visit
- ACT: 17, 19, 16
- QOL patient/parent 5 to 6
- ER: no visits

**Patient M**

- 8 visits total; received education twice. Otherwise missed by staff or declined by provider
- IT: decreased by 1 step
- ACT: 24 to 10
- QOL: 7 to 6; parent 7 to 4
- ER: 2 visits
## Project Budget

<table>
<thead>
<tr>
<th>Activity</th>
<th>Amount</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing (time w/RT, GNN, education, and patients)</td>
<td>$30/hour</td>
<td>$1,155.00</td>
</tr>
<tr>
<td>MA (time with GNN, education and patients)</td>
<td>$15/hour</td>
<td>$357.50</td>
</tr>
<tr>
<td>MD (education time, time with patients)</td>
<td>$85/hour</td>
<td>$1600.80</td>
</tr>
<tr>
<td>NP (education time, time with patients)</td>
<td>$43/hour</td>
<td>$1,132.50</td>
</tr>
<tr>
<td>GNN time with project</td>
<td>$43/hour</td>
<td>$5,160.00</td>
</tr>
<tr>
<td>Paper/office supplies</td>
<td></td>
<td>$159.80</td>
</tr>
<tr>
<td>Spacers</td>
<td></td>
<td>$500</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td><strong>$10,065.60</strong></td>
</tr>
</tbody>
</table>
At implementation, an email was sent to all providers with coding information. With education and documentation, it is justifiable to bill at a higher rate.

Gross Billing of all providers: $16,034.00

Here is the Gross Billing for Project:

<table>
<thead>
<tr>
<th>Gross Billing</th>
<th>Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROSS BILLING COMMERCIAL INSURANCE</td>
<td>16,034.00</td>
</tr>
<tr>
<td>GROSS BILLING IF ALL PROVIDERS HAD FULLY BILLED</td>
<td>19,983.00</td>
</tr>
</tbody>
</table>

Gross Billing
Barriers and Successes

Barriers
• Stakeholder Assessment
• Change of Employment during DNP Program (Clinic)
• Transfer from one DNP program to another
• Data retrieval/EMR
• TIME!!!

Successes
• QI initiative for office
• Awareness for baseline patient knowledge and asthma outcomes
• Patient and family statements for program
• Inhaler technique improvement!
• Patients and Spacers
Sustainability

• Address the most significant barrier: Time
• See patients on regular/quarterly basis
• Discussion of both physical as well as socio/emotional needs of asthma care
• Continue inhaler technique training
To my PhD Colleagues:

- Current evidence calls for inhaler technique training at every patient visit. Time is a barrier to this form of care.

- How many visits does it take during a 1 year time to improve IT as well as the outcomes of this stated project?

- Sustainability: None of the evidence noted a sustainability plan

- FMHO model and ownership of care. If a child/teen can own their asthma, does this ownership translate to other areas in their life?
References


References, Cont’d


