Clinical Safety & Effectiveness
Team # 3
Cohort # 23

Breathe In, Breathe Out

UT Health San Antonio
Center for Patient Safety & Health Policy

University of Texas Health System
MD Anderson Cancer Center

Educating for Quality Improvement & Patient Safety
The Team

• Division
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  – Cynthia Cantu, DO (CS&E Participant)
  – Juan Ramos Dominguez, MD (CS&E Participant)
  – Tatiana Cordova, MD (Team Member)
  – Ramin Poursani, MD (Team Member)
  – Brenda Briones, MD (Team Member)
  – Ventrice Shillingford-Cole (Facilitator)
  – Sherry Martin (Facilitator)

• Sponsor Department
  – Sandra G. Adams, MD, MS with the Division of Pulmonary Medicine
AIM STATEMENT
What We Are Trying to Accomplish?

To improve critical failure rates of patients in the Family and Community Medicine Clinics at the University Health System Downtown (UHS-D) campus using metered dose inhalers (MDI) with the goal to decrease the critical failure rate from 62.5% to 49% by January 8, 2019.
Project Milestones

- **Team Created**: March 2018
- **AIM Statement Created**: August 2018
- **Regular Team Meetings**: 08/18-01/19
- **Background Data, Brainstorm Sessions**: 09/16/18
- **Interventions Implemented**: 10/31/18-01/1/19
- **Data Analysis**: 1/8/19-01/13/19
- **CS&E Presentation**: 01/17/19
Chronic obstructive pulmonary disease (COPD) 3rd leading cause of death

Economic burden in the US > $50 billion

60% attributed to direct expenditures

Bronchodilators are mainstay in treatment

Efficacy:
- Symptom control
- Reduced risk of complications
- Prevention of exacerbations
The Problem...
At least 70% to 80% of patients do not use their inhalers correctly. Common mistakes include overuse and underuse of their medication with improper technique. 46.9% make at least one critical error.

What about clinicians? Only 14% of >1,500 physicians had adequate knowledge of inhaled therapy. Only 25% check patients' inhalation technique before prescribing new device(s) or drug combinations.
How Will We Know That a Change is an Improvement?

- Types of measures
  - Patient checklist (direct observation)
  - Provider feedback via survey
- How you will measure
  - Score variation
  - Measure of Critical inhaler failures
- Specific targets for change
  - Decrease critical errors
  - Increase awareness among providers

### Metered Dose Inhaler (MDI) Checklist

<table>
<thead>
<tr>
<th>TASK</th>
<th>Done</th>
<th>Not Done</th>
<th>Done Incorrectly</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>PREPARATION</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Remove the protective cap</td>
<td>+10</td>
<td>CE</td>
<td>-100</td>
<td></td>
</tr>
<tr>
<td>2. Inspect for foreign objects/materials</td>
<td>+5</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ensure metal canister is fully inserted into the actuator</td>
<td>+5</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 4. Shake the canister for 5 seconds (or 10-15 times)
- If not shaken at all = critical error | +10 | CE | -100 | +5 |
| 5. Exhale (breathe out) | +5 | 0 | | |
| 6. Hold the inhaler in an upright position | +10 | CE | -100 | |
| 7. Close lips around the mouthpiece with patient’s tongue below it | +5 | 0 | 0 | |
| 8a. Begin breathing in slowly | +5 | 0 | | |
| 8b. press down (actuate) the metal canister with finger/fingers
- If not actuated = critical error | +10 | CE | -100 | |
| 8c. Continue breathing in the medicine until unable to breathe in anymore | +5 | 0 | | |
| 9. Hold breath for up to 10 seconds
- If breath not held at all = critical error
- Held 1-2 sec, done incorrectly | +10 | CE | -100 | +5 |
| 10. Remove inhaler from mouth and breathe out gently | +10 | 0 | +5 | |
| 11. Wait >20 (ideally 30-60) seconds and repeat above steps if prescription directed
- 2 puffs immediately = done incorrectly
- Wait 5-20 seconds = done incorrectly | +10 | | +5 | |
| If inhaler contains a steroid medication, rinse out mouth | | | | N/A |
Cause and Effect Diagram

Poor education among staff and patients on proper use of metered dose inhaler

People

- Residents
  - Heavy work load
  - Lack of education

- Attendings
  - Heavy work load

- MAs
  - Language barriers
  - Socioeconomic factors

- RNs

- LVNs
  - Long waiting times
  - Providers arriving late

- MAs
  - Habits
  - Learning barriers

- Patients
  - Willingness
  - Habits
  - Learning barriers

Materials & Methods

- Multiple types of inhalers
  - MDI itself without diagrams
    - Not knowing how to order it

- Access to spacers
  - Lack of awareness

- Short clinic visits
  - Untrained
  - Lack of buy-in

System

- Limited staff
  - No clear person/champion
  - No standardized process

- No standardized process
- Providers arriving late
- Number of Preceptors

Environment

Environment
Selected Process Analysis Tools

- Brainstorming
- Flowchart
- Fishbone
- Driver diagram
Rough Draft Flowchart
Polished Flowchart

FHC Flow Chart

**Preclinic**
- Phone Bank: Appointment if Necessary
- Register, Insurance verification

**Medi Assistant**
- Check vital signs, PHQ2, Pain, MedRec

**MD**
- Resident encounter
- Faculty encounter / Precepting

**Support Staff**
- Dietician/Nutritionist
- BHC
- LVN-Clinical procedures

**Postclinic**
- MA-Instructions and referrals
- Pharmacist Rx-medicines
<table>
<thead>
<tr>
<th>Primary Drivers</th>
<th>Interventions</th>
<th>Measure</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of awareness</td>
<td>Daily reminders</td>
<td>Survey</td>
<td>Juan</td>
</tr>
<tr>
<td>High cost burden of COPD hospitalizations, ER visits</td>
<td>Decrease number of acute exacerbations of COPD with proper education to patients</td>
<td>Yearly number of ED visits or admissions</td>
<td>Family Health Clinic</td>
</tr>
<tr>
<td>Poor education among staff</td>
<td>Educate residents and attendings</td>
<td>Survey</td>
<td>Cynthia</td>
</tr>
<tr>
<td>No standardized process/inhaler champion</td>
<td>Monthly classes for patients</td>
<td>Grade sheet to evaluate critical failure rates</td>
<td>Angela</td>
</tr>
</tbody>
</table>
Implementing the Change

- Training of residents on 10/31/18
- Survey performed to gauge current level of education- 20 completed
- Survey indicated poor education widespread among the residents
# Breathe In, Breathe Out-Quality Improvement Project

## Provider Questionnaire

Please circle your response to the below questions:

Tell me who you are:

<table>
<thead>
<tr>
<th>Medical Student</th>
<th>Resident</th>
<th>APP</th>
<th>Attending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>MA</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

How often do you see patients who use inhalers?

- Daily
- Weekly
- Monthly
- Never

Do your patients know how to use their inhaler?

- Yes
- No

Have you ever received education on how to use inhaler?

- Yes
- No

Have you ever provided education on how to use an inhaler to a patient?

- Yes
- No

Do you feel you have time to provide education?
Interventions

Primary goal: Increase awareness among providers and staff
Educational Materials

- [https://www.youtube.com/watch?v=UbfqTyB-A4U](https://www.youtube.com/watch?v=UbfqTyB-A4U)
### Using Your MDI With a Spacer

**Patient Education Guide**

To make your breathing better, you MUST take your medicine as explained below. Following these instructions will direct more of the medicine into your lungs. This will open up your air passages and help you breathe easier and feel better. You need to ask your healthcare provider or pharmacist how many puffs of medicine your metered-dose inhaler (MDI) has when it is full. You need to keep track of how many puffs of medicine you take every day, so you can have your MDI refilled before you run out of medicine. Before using the MDI, please read the printing or preparing instructions. Your MDI and spacer should be cleaned once a week. See instructions on cleaning your MDI.

1. **Lift up the MDI.** Check for any dry, dust, or other objects. Shake MDI well.
2. **Press MDI twice.**

### Using Your MDI—Closed-Mouth Technique

**Patient Education Guide**

To make your breathing better, you MUST take your medicine as explained below. Following these instructions will direct more of the medicine into your lungs. This will open up your air passages and help you breathe easier and feel better. You need to ask your healthcare provider or pharmacist how many puffs of medicine your metered-dose inhaler (MDI) has when it is full. You need to keep track of how many puffs of medicine you take every day, so you can have your MDI refilled before you run out of medicine. Before using the MDI, please read the printing or preparing instructions. Your MDI should be cleaned once a week. See the instructions on cleaning your MDI.

1. **Lift up the MDI.** Check for any dry, dust, or other objects. Shake MDI well.
2. **Press straight against the spacer.**

### Cleaning Your MDI

1. **Remove the mouthpiece from your mouth.** 
2. **Rinse in warm water.**
3. **Dry with a cloth.**
4. **Store in a dry place.**

**For your safety:**

- Do not use in a bathtub.
- Do not use hot water.
- Do not leave in direct sunlight.
- Do not use in a microwave.
- Do not use in a dishwasher.
Pre & Post Intervention Data

- **62.5%** of patients using MDI without spacer had at least one critical error (n= 24)
- **100%** of patients who use a spacer had no critical error in the preintervention period (n=4)

- **59.1%** of patients using MDI without spacer had at least one critical error (n= 22)
- **50%** of patients who use a spacer had at least one critical error in the post-intervention period (n=8)
Data Observations

Pre intervention:
- 5 patients without a spacer stated they had a current Pulmonologist
  - 2 patients had 1 critical error
  - 3 patients with no critical error
  - 0 patients with multiple critical errors
- 3 of the 4 patients with spacer had received education in the past
  - 1 was a respiratory therapist
  - 1 was a nurse
  - 1 had received education multiple times by a pharmacist and an allergist

Post intervention:
- 11 patients stated they had received education in the past, but only one had seen a pulmonologist or allergist
Individuals SPC Chart - Score

Phase Limits

<table>
<thead>
<tr>
<th>Phase</th>
<th>LCL</th>
<th>Avg</th>
<th>UCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>-161</td>
<td>6</td>
<td>172</td>
</tr>
<tr>
<td>Intervention</td>
<td>-299</td>
<td>-13</td>
<td>272</td>
</tr>
</tbody>
</table>

Note: 1 sample was excluded.
Weekly surveys

- Surveys sent out bi-weekly to residents to complete after their clinic day
- Collected data from 12/12/18-01/8/19
  - 19 surveys were completed
  - 4/19 were completed by attendings; remainder by resident physicians
  - 15/19 = 78.9% saw at least 1 or more patients on that day with inhalers
  - 8/15 providers (53.3%) attempted to educate
Reasons for providers not to educate are the following:

Other reasons provided:
- Education previously provided
- Breathing/lung condition not discussed
Return on Investment

- CPT 99664
  - Demonstration and/or evaluation of patient utilization of an aerosol generator, nebulizer, metered dose inhaler or IPPB device can be used demonstrating (teaching) patients to use an aerosol generating device property
- Reimbursement rate = $16.50
- Average time spent educating = 5-8 minutes
- Patients educated = 59
- **Potential Revenue = $973.50**
## Summary

### Barriers

1. Absence of dedicated inhaler champion (attempted to identify: MA ± RT ± Clinician ± Pharmacist ± RN ± etc.)
2. Suboptimal inclusion and exclusion criteria for patients’ assessments
   a. Healthcare professionals as patients were included
   b. Patients with a UHS pulmonologist were included
   c. Limited sample size
3. Limited time for interventions before outcomes were assessed
4. Transition to new Electronic Medical Record (EPIC): inability to implement IT intervention currently

### Next Steps

1. Further discuss additional staff support/resources with leadership
2. Analyze healthcare professionals and patients with UHS pulmonologist separately and increase sample size over time for a more accurate assessment of impact of interventions
3. Continue project interventions
4. IT reminders and interventions to be determined by clinic team
Conclusions

Plan to continue to adapt lessons in Family and Community Medicine clinics and expand to Internal Medicine clinics at RBG in Spring 2019

Patient information handouts in English and Spanish now being provided to patients and working toward iPad vs. computer videos while waiting

Promotoras and Advanced Primary Care Teams to integrate patient inhaler education into daily workflow

IT interventions to be determined by clinic team and include patient inhaler checklists, identification of patients who are prescribed inhalers, other strategies to implement guideline concordant care
Thank you!

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