



Clinical Safety & Effectiveness

Team # 3

Cohort # 23

Breathe In, Breathe Out



UT Health

San Antonio

Center for Patient Safety
& Health Policy



University
Health System

THE UNIVERSITY OF TEXAS
MD ANDERSON
CANCER CENTER

Educating for Quality Improvement & Patient Safety

Making Cancer History®

The Team

- Division

- Angela L. Birdwell, DO, MA (CS&E Participant)
- 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

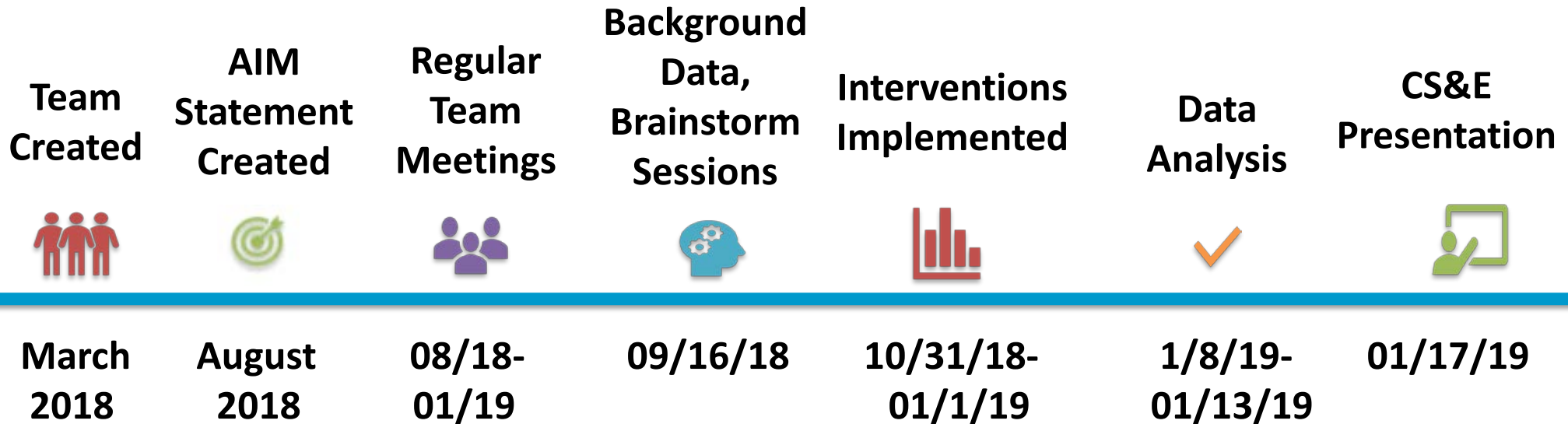
- Sandra G. Adams, MD, MS with the Division of Pulmonary Medicine

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



Background

Chronic obstructive pulmonary disease (COPD)
3rd leading cause of death

Economic burden
in the US > \$50 billion

60% attributed to
direct expenditures

Treatable
condition

Bronchodilators
are mainstay in
treatment

Efficacy:

- Symptom control
- Reduced risk of complications
- Prevention of exacerbations

The Problem...

Inhaled Bronchodilators

Inhaled bronchodilators relax tight airways (bronchoconstriction). Bronchodilators treat the noisy part of asthma: coughing, wheezing, choking and shortness of breath.

= includes built-in dose counter



Short-Acting Inhaled Bronchodilators (3-6 hours)

Inhaled Anti-Inflammatories

Inhaled corticosteroids and other anti-inflammatories reduce and prevent airway inflammation (swelling). Used daily, anti-inflammatories treat the underlying part of asthma that you may not feel or see.



Combination Medications

Combination medications contain both long-acting bronchodilators and inhaled corticosteroid components.



Background

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

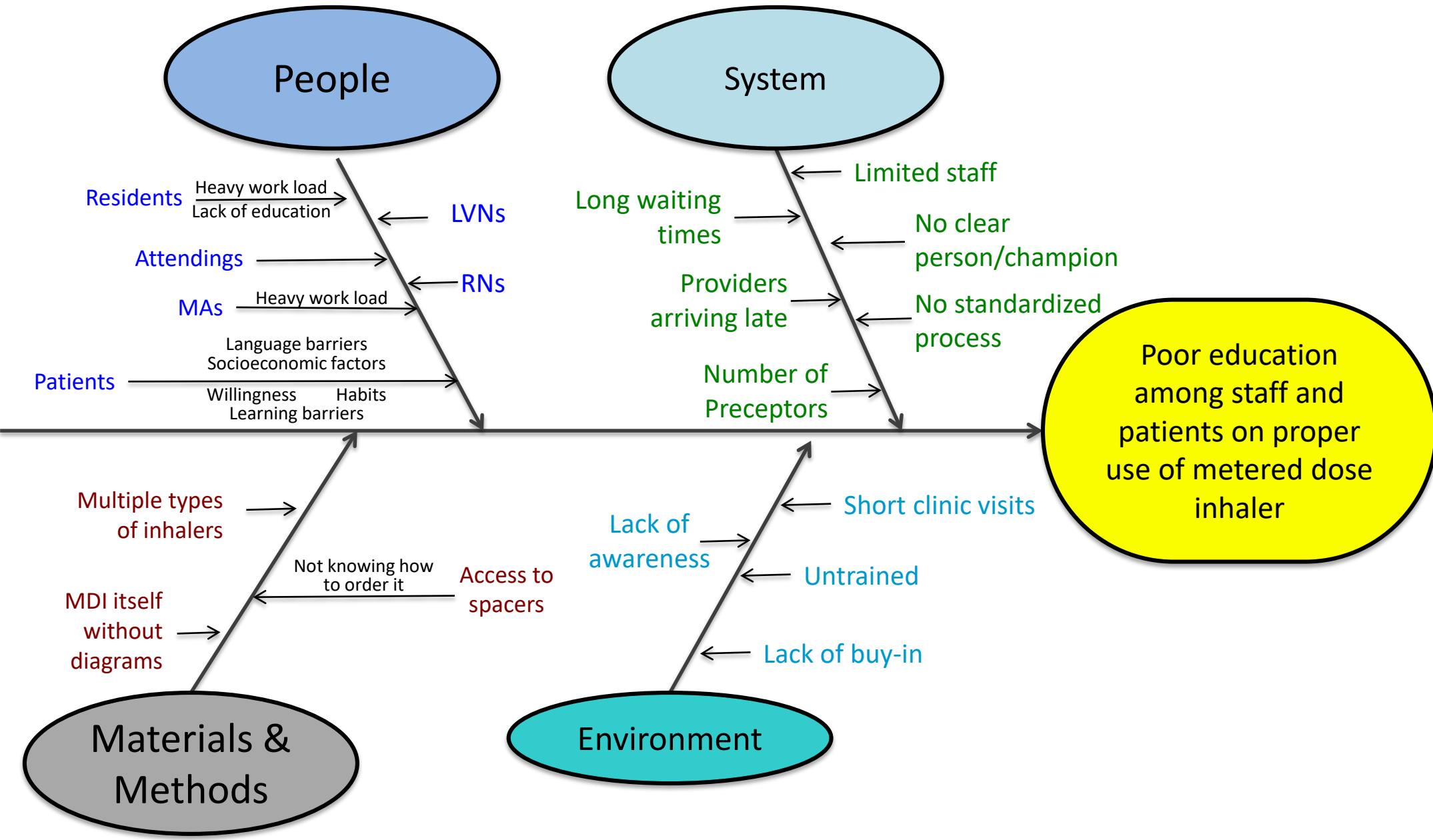
How Will We Know That a Change is an Improvement?

- 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

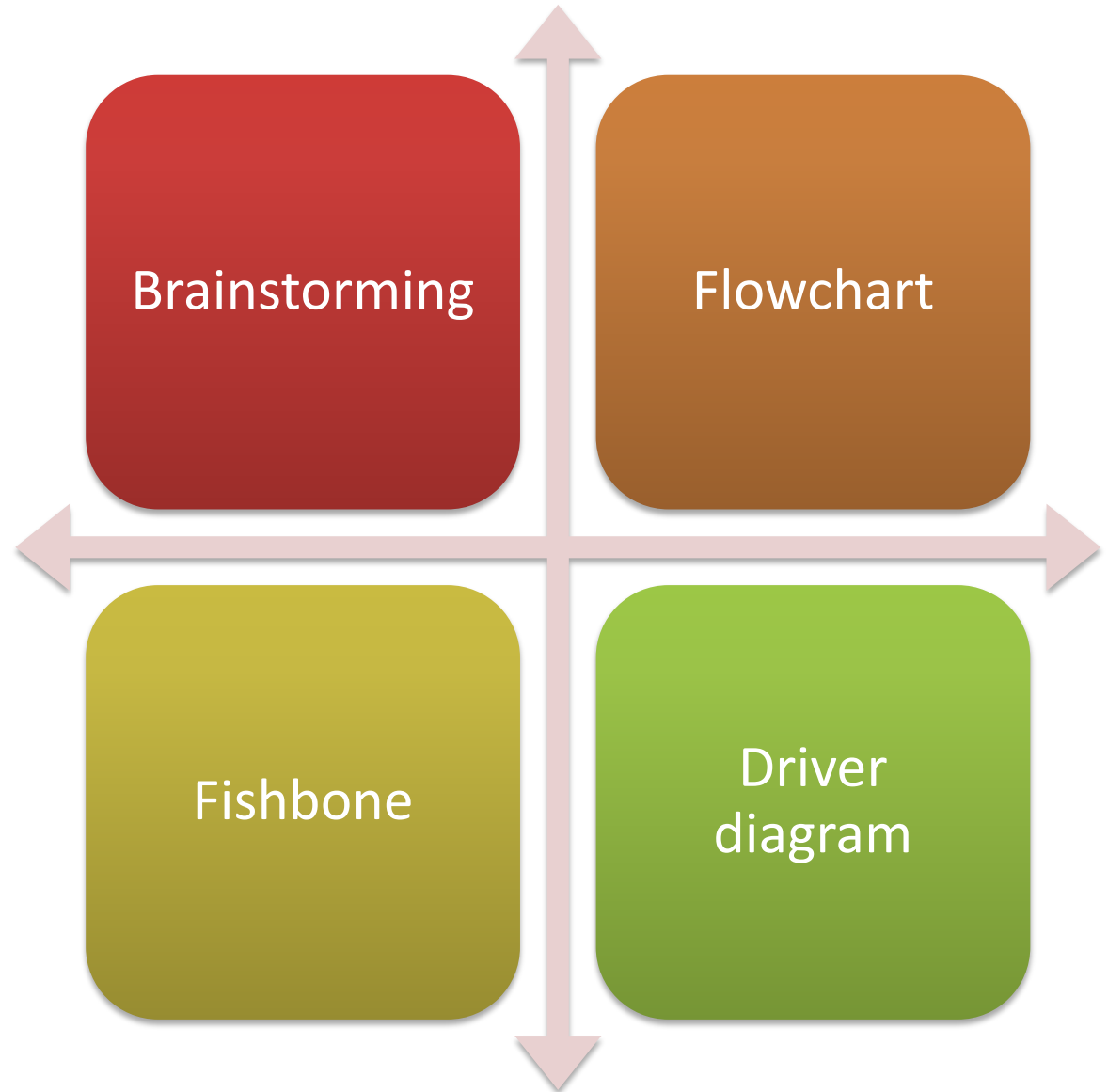
Metered Dose Inhaler (MDI) Checklist

TASK	Done	Not Done	Done Incorrectly	Comments
PREPARATION				
1. Remove the protective cap	+10	CE -100		
2. Inspect for foreign objects/materials	+5	0		
3. Ensure metal canister is fully inserted into the actuator	+5	0		
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



Selected Process Analysis Tools

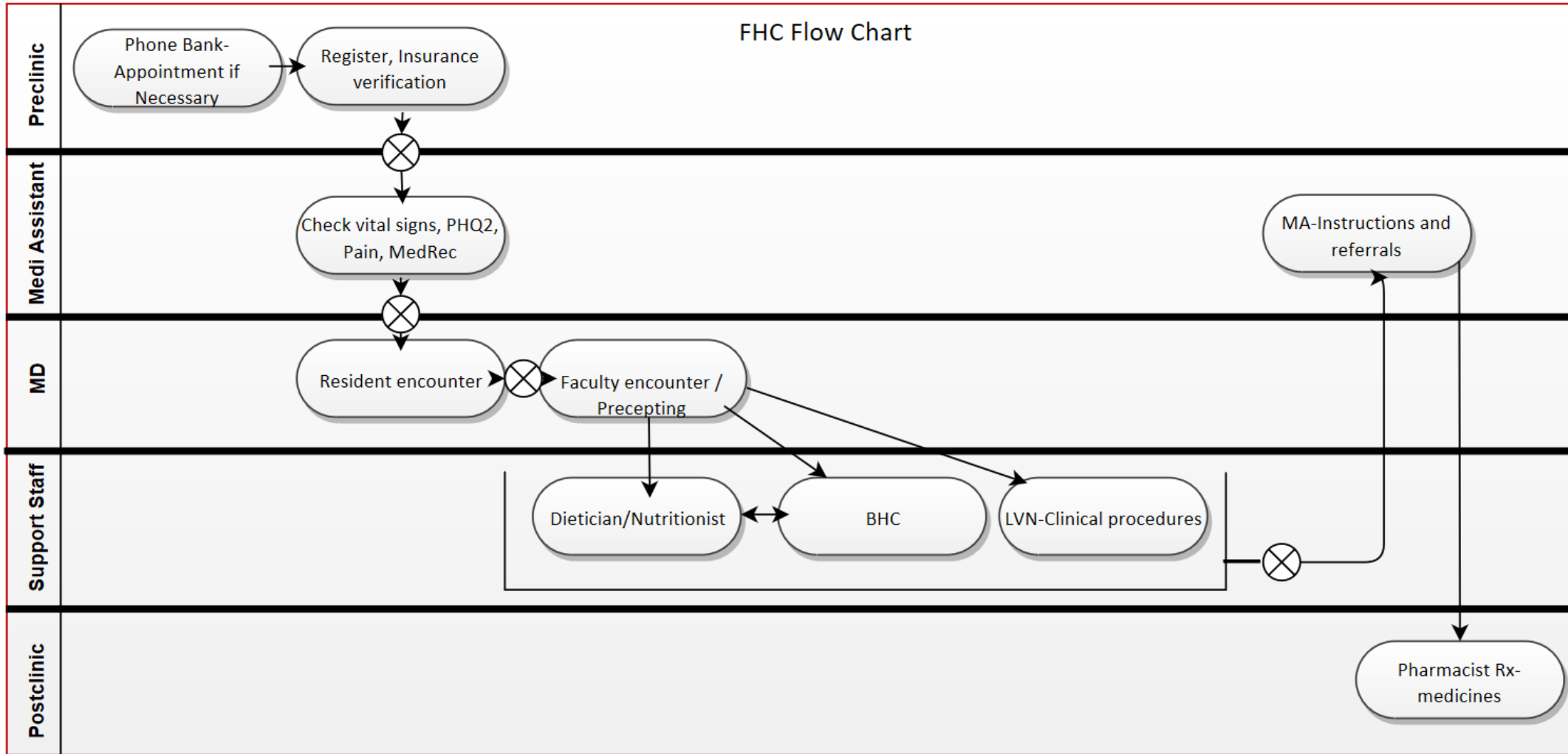


```

graph TD
    Start(( )) --> A[Arrive @ RBG]
    A --> B[Go to correct floor]
    B --> C{Wait}
    C --> D[Check in]
    D --> E{Wait}
    E --> F[Registration]
    F --> G{Wait}
    G --> H[Vitals & meds]
    H --> I[Get in exam room]
    I --> J[Name called]
    J --> K{Wait}
    K --> L[See med student]
    L --> M{Is there a med student?}
    M -- Yes --> H
    M -- No --> N{Is there a resident?}
    N -- Yes --> O[See resident]
    N -- No --> P[Get labs drawn]
    P --> Q[Check into lab]
    Q --> R{Wait}
    R --> S[Go to lab]
    S --> T{Wait}
    T --> U{Labs ordered?}
    U -- Yes --> V[MA discharge patient]
    U -- No --> W[MA gets orders for patient]
    V --> X{Wait}
    W --> X
    X --> Y[Orders/labs placed & printed]
    Y --> Z{Wait}
    Z --> End(( ))
  
```

Polished Flowchart

FHC Flow Chart



Driver
Diagram

Improve
critical
failure rates
of patients
using
metered
dose
inhalers
(MDI)

Primary Drivers	Interventions	Measure	Responsible
Lack of awareness	Daily reminders	Survey	Juan
High cost burden of COPD hospitalizations, ER visits	Decrease number of acute exacerbations of COPD with proper education to patients	Yearly number of ED visits or admissions	Family Health Clinic
Poor education among staff	Educate residents and attendings	Survey	Cynthia
No standardized process/inhaler champion	Monthly classes for patients	Grade sheet to evaluate critical failure rates	Angela

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



Provider Survey

Breathe In, Breathe Out-Quality Improvement Project

Provider Questionnaire

Please circle your response to the below questions:

Tell me who you are:

Medical Student

Resident

APP

Attending

Nurse

MA

Other

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

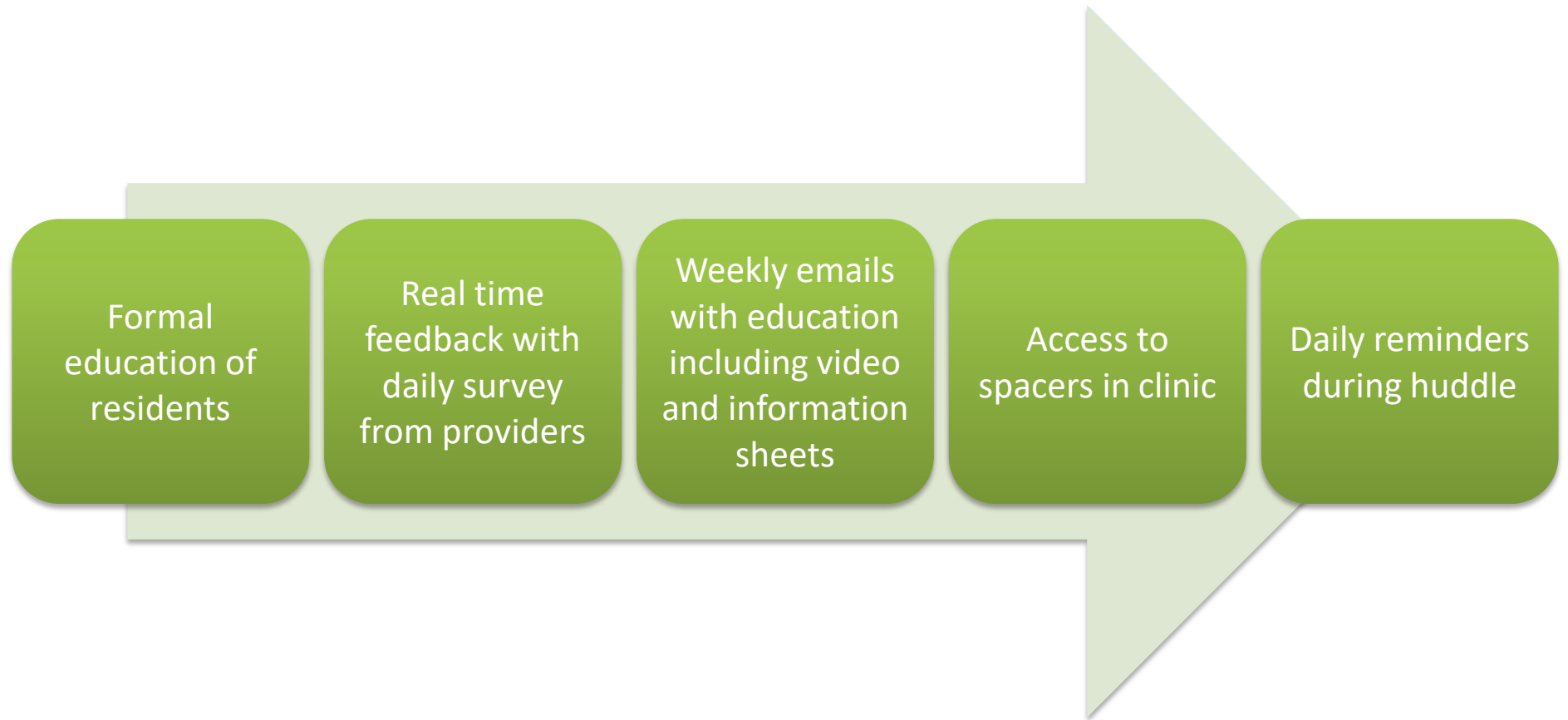
No

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

Yes

No

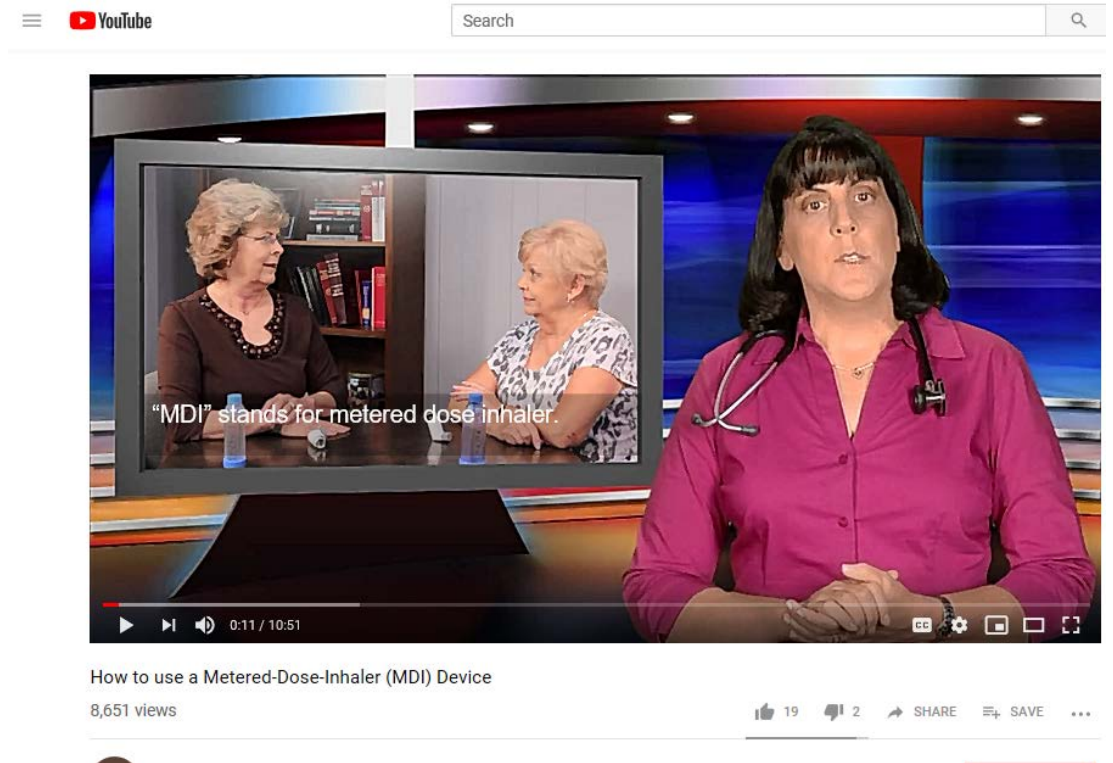
Do you feel you have time to provide education?



Interventions

Primary goal: Increase awareness among providers and staff

Educational Materials



- <https://www.youtube.com/watch?v=UbfqTyB-A4U>

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 puts 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 health-care 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 priming or preparing instructions. Your MDI and spacer should be cleaned once a week. See instructions on cleaning your MDI.



American College of Chest Physicians
3300 Dundree Road, Northbrook, IL 60062
(847) 498-1400 phone
(847) 498-5460 fax
www.chestnet.org



1 Take cap off MDI. Check for and remove any dust, lint, or other objects. Shake MDI well.



2 Attach MDI to spacer.



3 Sit up straight and breathe out normally.



4 Put mouthpiece of spacer in your mouth. Close your lips around the mouthpiece and make a tight seal. Press down on the MDI. This puts one puff of medicine into the spacer.



5 To breathe in that one puff of medicine, **TAKE A SLOW, DEEP BREATH.** Breathe in as much air as you can. Try to fill up your lungs completely. It is important that the breath be **SLOW** and **DEEP**.



6 Remove the mouthpiece from your mouth. **HOLD** your breath for 10 seconds. If you cannot hold your breath for 10 seconds, hold your breath as long as you can.



7 If you need to take another puff of medicine, wait 1 minute. After 1 minute, repeat steps 3-6.



8 Recap the MDI. Rinse your mouth with water after you have taken your last puff of medicine. Make sure you spit the water out; do not swallow it. *Rinsing is only necessary if the medicine you just took was a corticosteroid, such as Flovent®, Beclovent®, Vanceril®, Aerobid®, or Armonax®.*

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 puts 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 health-care 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 your MDI, please read the priming or preparing instructions. Your MDI should be cleaned once a week. See the instructions on cleaning your MDI.



American College of Chest Physicians
3300 Dundree Road, Northbrook, IL 60062
(847) 498-1400 phone
(847) 498-5460 fax
www.chestnet.org



1 Take cap off MDI. Check for and remove any dust, lint, or other objects. Shake MDI well.



2 Sit up straight or stand up.



3 Breathe out all the way.



4 Tilt MDI up slightly. Put MDI in your mouth, between your teeth, tongue flat under the mouthpiece, with lips sealed.



5 As you begin to **BREATHE IN SLOWLY, PRESS DOWN ON THE MDI**, as shown in this picture. Keep breathing in until your lungs are completely full.



6 **HOLD** your breath for 10 seconds. If you cannot hold your breath for 10 seconds, hold your breath as long as you can.



7 If you need to take another puff of medicine, wait 1 minute. After 1 minute, repeat steps 2-6.



8 Rinse your mouth out after you take your last puff of medicine. Make sure you spit the water out; do not swallow it. *Rinsing is only necessary if the medicine you just took was a corticosteroid, such as Flovent®, Beclovent®, Vanceril®, Aerobid®, or Armonax®.*



9 Recap the MDI.

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

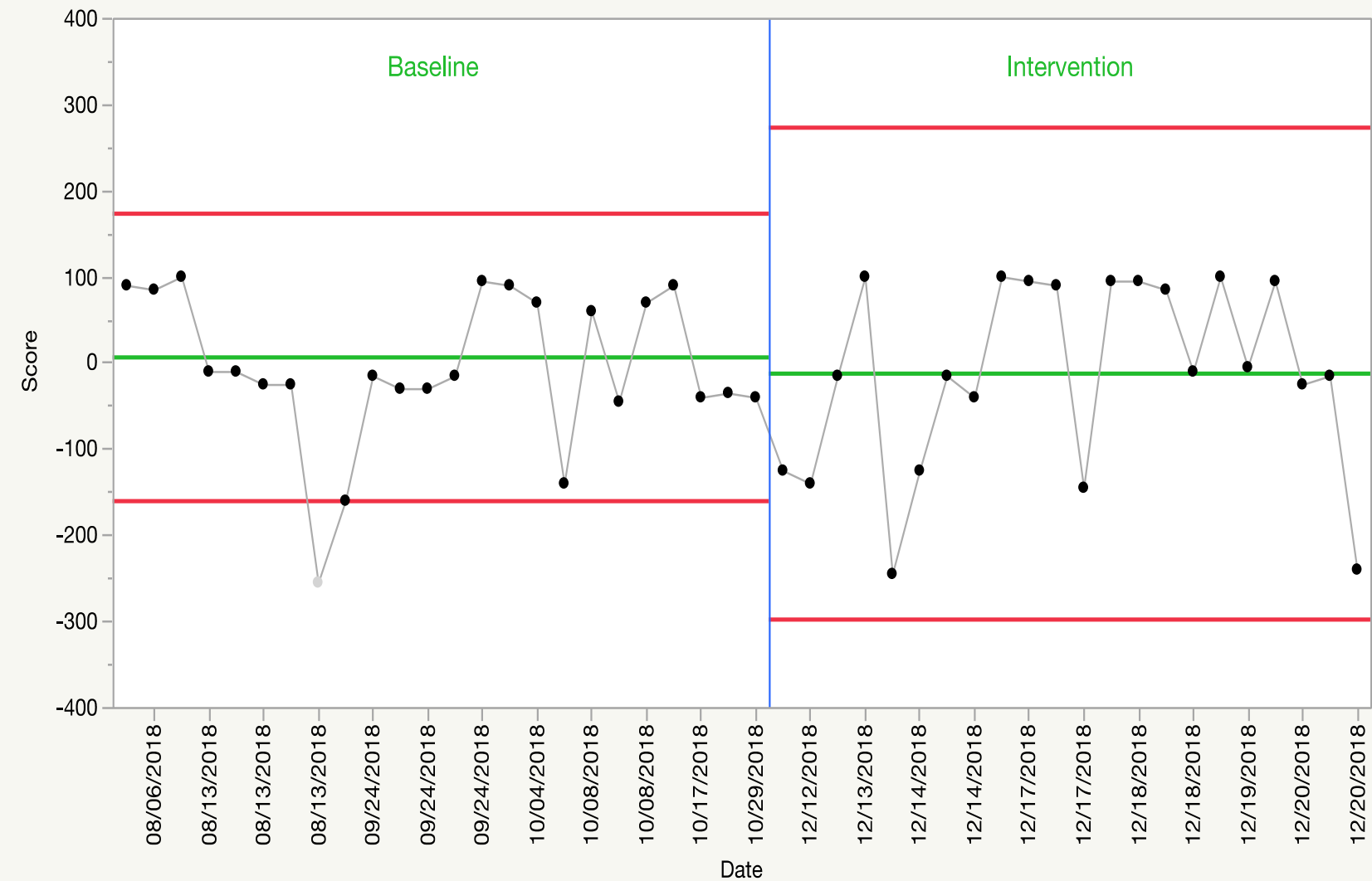
- 1 was a respiratory therapist
- 1 was a nurse
- 1 had received education multiple times by a pharmacist and an allergist

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

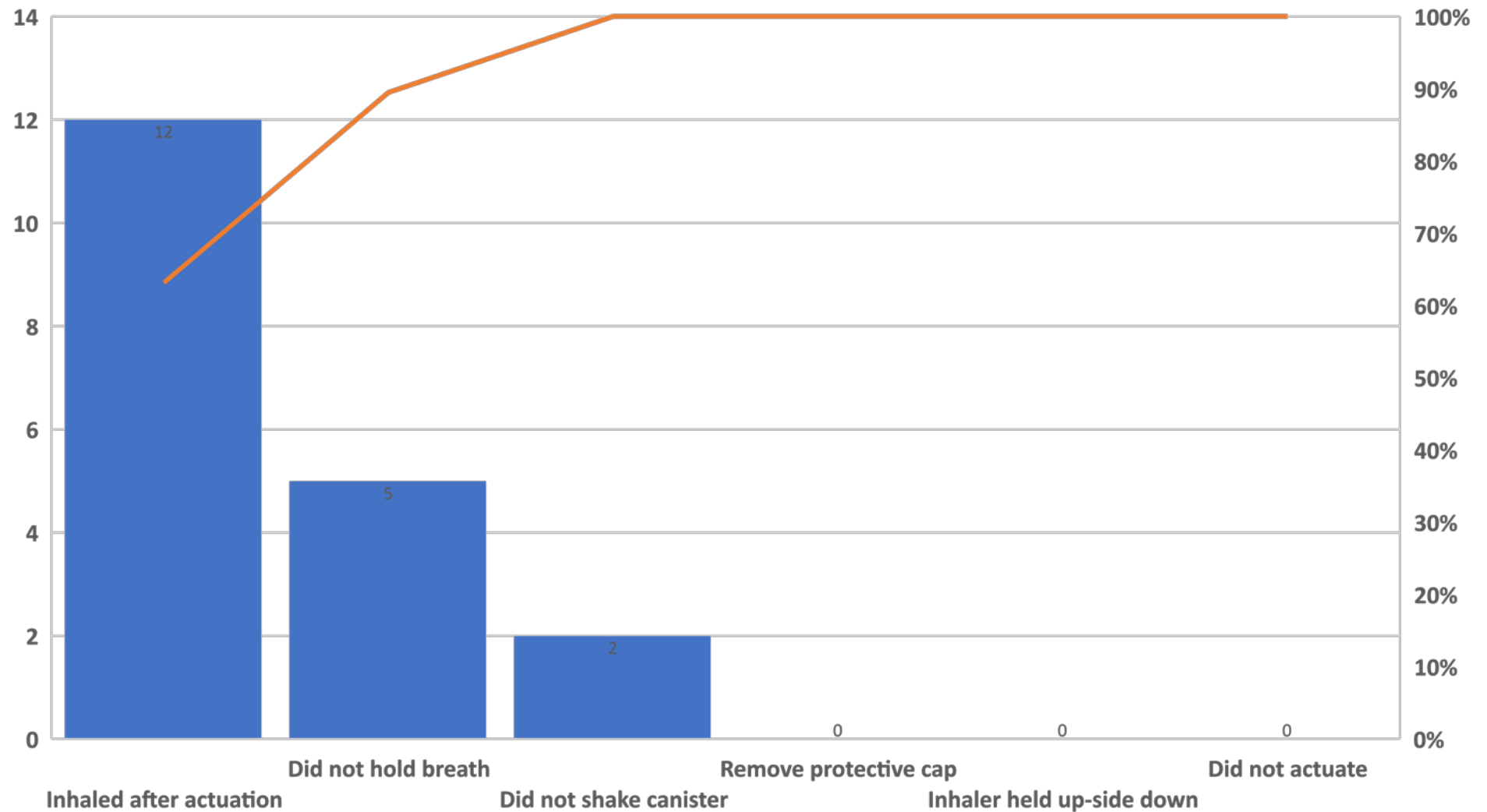
Note: 1 sample was excluded.



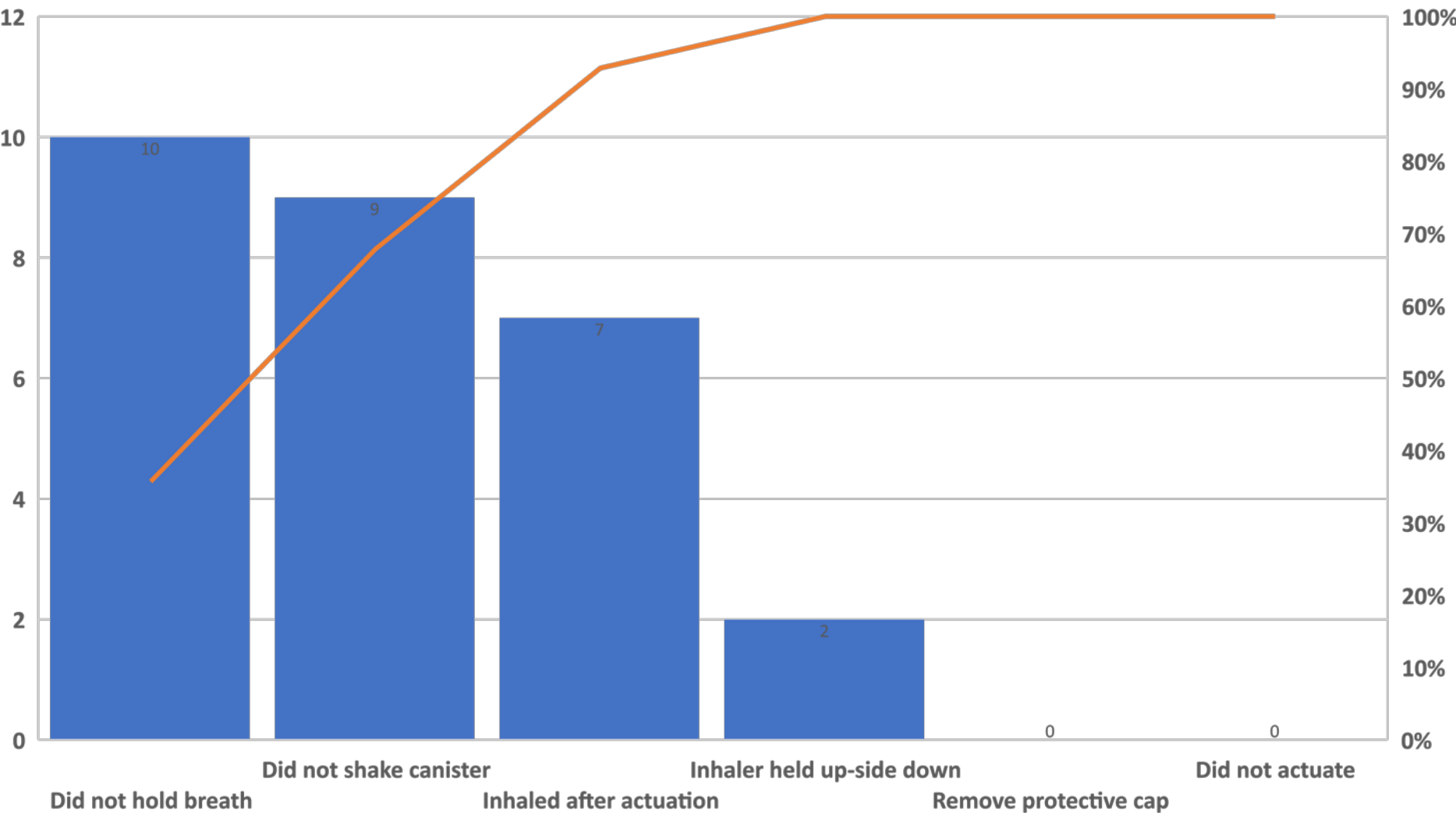
Phase Limits

Phase	LCL	Avg	UCL
Baseline	-161	6	172
Intervention	-299	-13	272

Pre-Intervention Pareto Chart: Critical Errors



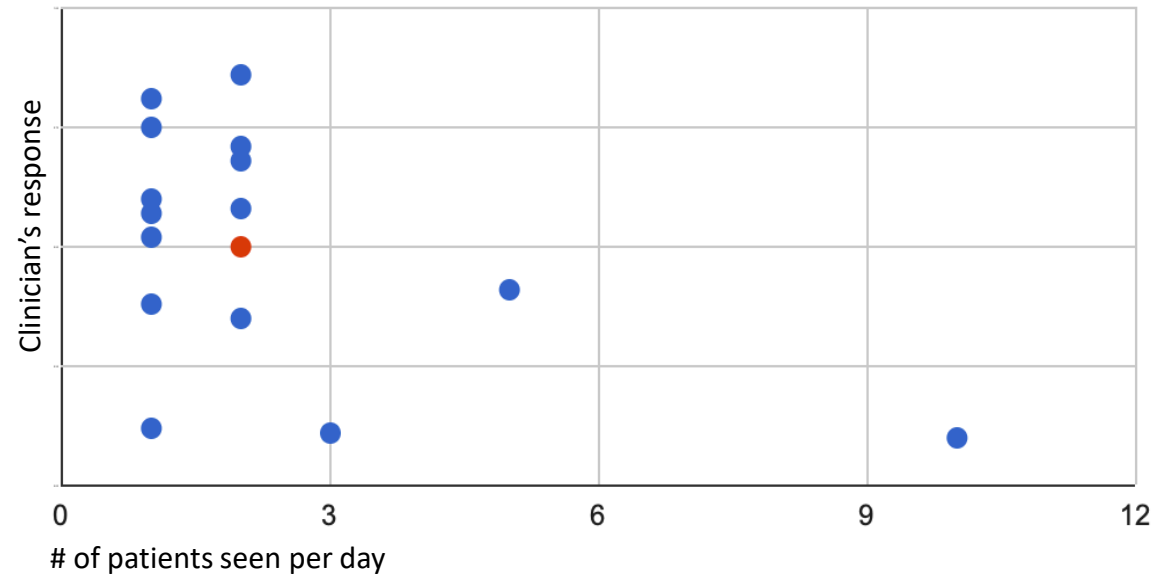
Post-Intervention Pareto Chart: Critical Errors



Weekly surveys

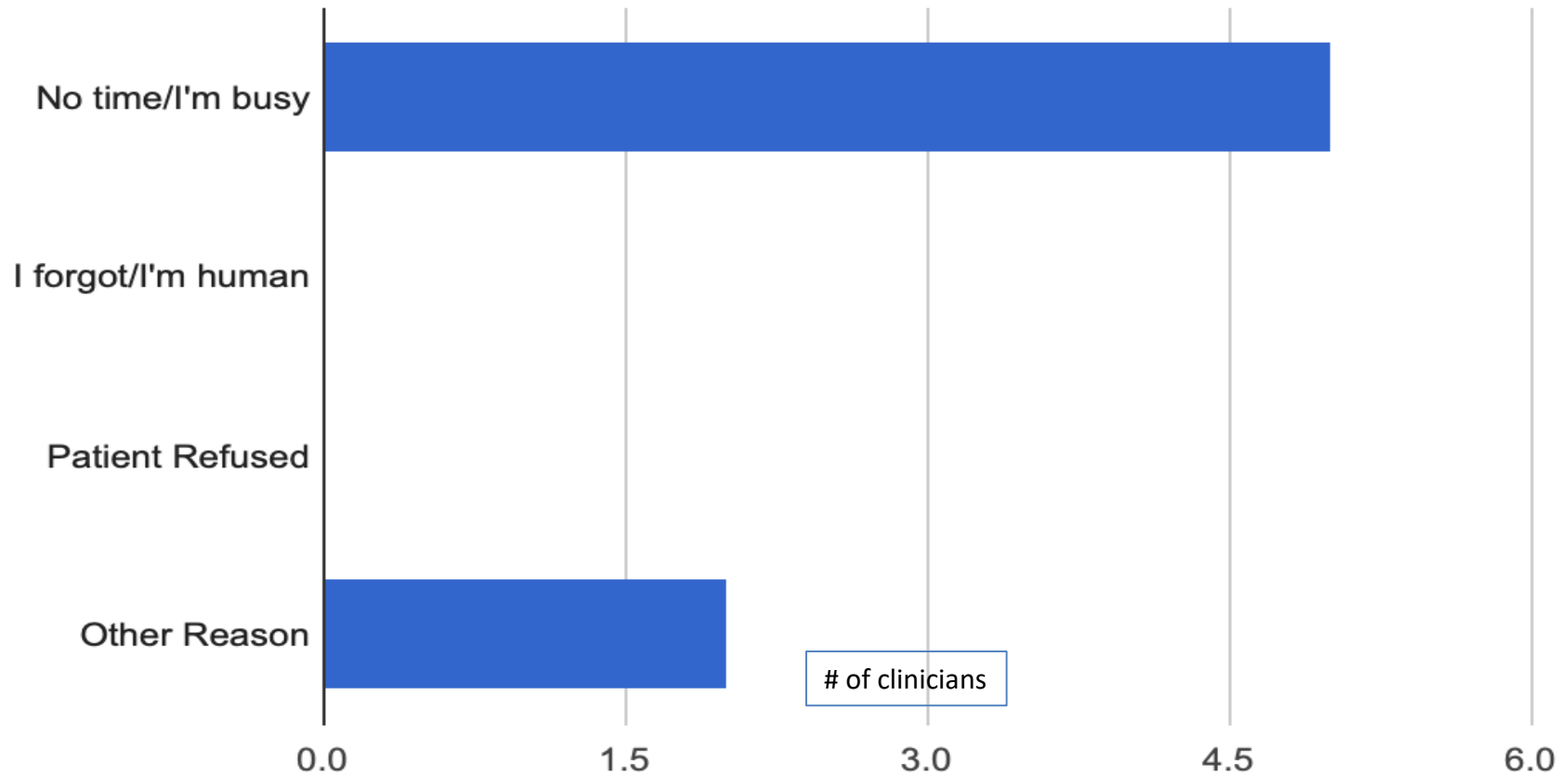
Lowest values: 1, 1, 1, 1, 1

Highest values: 2, 2, 3, 5, 10



- 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**

Select Procedure

Search Option: ☐ By Code ☒ By Description

Procedure Lookup:

☐ Search Custom codes ☒ Show Unique Terms

Add	Code	Description
Add	94640	Metered dose inhaler (MDI) treatment in patient 37 months to 6 years of age
Add	94640	Metered dose inhaler treatment in patient 37 months to 6 years of age
Add	94640	Initial metered dose inhaler (MDI) treatment with assessment
Add	94640	Initial metered dose inhaler treatment with assessment
Add	94640	Initial metered dose inhaler (MDI) treatment with assessment in newborn
Add	94640	Initial metered dose inhaler treatment with assessment in newborn
Add	94640	Demonstration of use of inhaler
Add	94664	Administration of metered-dose inhaler by nursing
Add	94640	Inhalation therapy using meter dose inhaler
Add	94640	Pulse oximetry with metered dose inhaler (MDI) treatment
Add	94640	Pulse oximetry with metered dose inhaler treatment

Selected Procedures:

94640 x

Summary

Barriers

1. Absence of dedicated inhaler champion (attempted to identify: MA \pm RT \pm Clinician \pm Pharmacist \pm RN \pm 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!



UT Health
San Antonio
Center for Patient Safety
& Health Policy



University
Health System

Educating for Quality Improvement & Patient Safety