Improving Pharmacist Inhaler Technique Education and Patient Counseling

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In preparation for the webinar, please review the following 4 video links and one medication guide that will be discussed in the webinar. We believe that these are excellent resources to review and use when developing plans for educating and advising patients about the use of inhalation devices.

Good overview of MDI technique
http://www.youtube.com/watch?v=Rdh3p9RZs94

Good overview of a holding chamber
http://www.youtube.com/watch?feature=player_embedded&v=3Q

Pressair (one of the new inhalation devices)
http://www.youtube.com/watch?v=s2qZb8XDRjx

Respimat (one of the new inhalation devices)
http://www.youtube.com/watch?v=U1NV10RuV6Y

Medication Guide for Ellipta device

Development and Support

Developed by the American Pharmacists Association

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Disclosures

Dennis Williams, PharmD, declares that his spouse/partner is an employee and stock/shareholder of GlaxoSmithKline.

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The attendance code is JHTC (not needed for archived webinar)

CPE Information

- Target Audience: Pharmacists
- ACPE#: 0202-0000-13-197-L01-P
- Activity Type: Application-based

The American Pharmacists Association is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. This session is approved for 1 hour of continuing pharmacy education or 0.1 CEU.
Objectives

At the end of this session, the participant will be able to:

- Review the features of inhalation of devices and aerosols that are relevant for optimal delivery and patient response
- Describe effective methods for training patients to use different inhalers
- Describe specific examples of communication strategies, including teach-back, to use with patients on inhaler technique and improve adherence to therapy

Question 1

Optimal particle size for therapeutic effects of inhaled medications when treating patients with asthma or COPD is:

a. Less than 1 μm  
b. 1 to 5 μm  
c. Greater than 10 μm  
d. Greater than 100 μm

Question 2

A rapid and forceful inhalation effort is optimal when using a:

a. Metered-dose inhaler  
b. Metered-dose inhaler with spacer  
c. Dry powder inhaler  
d. Jet nebulizer device
Question 3

The “teach-back” method of patient instruction involves:

a. Summarizing the key points of instruction at the end of the session  
b. Providing a quiz to the patient about the key points  
c. Asking the patient to repeat the instructions in his or her own words  
d. All of the above

Education and Counseling Needs for Patients With Asthma or COPD

- Chronic diseases requiring patient education and advice similar to other conditions  
- Patients should be educated about the goals of therapy and strategies to avoid disease progression  
- Additional self-management skills include:  
  • Self-management based on a change in symptoms  
  • Use of inhalation devices and monitoring strategies

When Assessing Control in Patients With Asthma or COPD, Consider…

- Adherence to all medications  
- Avoidance of known triggers and exacerbators  
- Ability to use inhalation devices  
  • Issues related to inhalation technique are sometimes referred to as unintentional nonadherence  
- Vaccine needs  
  • Influenza and pneumococcal
Rationale for Inhalation Therapies
- Targeted delivery of medication to site of action for treating lung diseases
- Allows for rapid and faster onset of action in many cases
- Lower doses can be used
- Less risk for systemic side effects and adverse reactions

Medication and Device Interactions
- A significant relationship exists between the therapeutic agent and the device used for delivery to the lungs
- Dosage regimens for specific therapies are influenced by the delivery device
- Both effectiveness and safety can be affected by the delivery device

Human Airways
- Airways branch beginning at trachea and ending in the alveoli
- Approximately 23 generations of branches through which the airways become progressively smaller
Fate of Inhaled Dose of Medication for Effects in Lung

- Inhaled Dose
- Lung Deposition
- Therapeutic Benefits
- Systemic Circulation
- Swallowed
- Possible BE

How Aerosol Particles Settle in the Airways

- Inertial impaction
  - Represents 90% of deposition
  - Occurs at bifurcations of airways
- Sedimentation
  - Represents 9% of deposition
  - Influenced by gravity and increased by breath holding
- Diffusion
  - Relevant for very small particle sizes but minimal contribution to clinical effectiveness

Factors Influencing Particle Deposition in the Airways

- Particle size
- Inhalation device (type)
- Inhalation technique

Available at www.medscape.org/viewarticle/707312
Impact and Relevance of Aerosol Particle Size

- Small particles (<1 μm) can reach peripheral airways, including alveoli, or may be exhaled
- May be optimal for treating inflammation with corticosteroids
- Medium particles (1 to 5 μm) deposit in large and conducting airways
  - May be optimal for acting at β2 receptors on smooth muscle and on M3 receptors in central airways
  - Also useful for anti-inflammatory action from steroids
- Large particles (>5 μm) deposit in upper airways and oropharynx and do not have clinical benefit


Lung Deposition and Particle Size

- Particles >5 μm deposit by impaction
- Particles 1 to 5 μm deposit by sedimentation
- Particles <1 μm deposit and diffuse or are exhaled

Relative Density (Presence) Based on Airway Size

Types of Inhalation Devices

- Pressurized metered-dose inhalers (pMDI)
  - Can be used with ancillary devices (e.g., holding chambers)
- Dry powder inhalers (DPI)
- Breath-actuated, pressurized metered-dose inhalers (BA-MDI)
- Soft mist inhalers
- Jet or ultrasonic nebulizer

Inhalation Delivery Options

- RCTs suggest similar efficacy among devices
- Situational and patient-specific factors are important in selection
- Poor inhalation technique associated with marked decrease in lung deposition (up to 50%)
- Individual delivery devices have specific instructions regarding use


Recommendations for Patient Instructions Regarding Inhalation Devices

- All patients should receive education and training regarding use of prescribed inhalation devices
- Patients should undergo periodic assessments regarding use of prescribed inhalation devices
- These recommendations are included in numerous national and international guidelines (e.g., GOLD, NICE, BTS, GINA, EPR-3, ADMIT)
Instructing Patients About Inhalation Devices

- Manufacturers’ instructions are not adequate
- Verbal instruction improves technique
- Group or individual instruction is effective
- Devoted time is important; and reinforcement is necessary
- Training aids for specific devices are useful


Suboptimal Technique With Inhaler Use

- Efficient inhaler technique with inhaled corticosteroid device demonstrated by 46%–59% of subjects
- Correct technique from a systematic review
  - 63% MDI
  - 75% BA-MDI
  - 65% DPI


Incorrect DPI Technique

- Although DPIs are less patient dependent, a systematic review reported that 4%–94% of patients did not use their inhaler correctly
- Errors in order of frequency
  - No exhalation prior to dose
  - Lack of breath holding
  - Incorrect position or loading dose

**Errors in DPI Use Among Patients With Asthma or COPD (n = 36)**

![Bar chart showing errors in DPI use among patients.](chart.png)


**Breath-Actuated Metered-Dose Inhalers**

- Developed to address issues related to coordination and inhalation from MDIs
- Pirbuterol (in Autohaler) cannot be sold in the United States after 12/31/13 according to the CFC phase-out plan


**Different Techniques Required for MDI and DPI**

- DPIs require fast, forceful, and deep inspiratory effort
  - Lack of force can result in lack of aerosolization of particles or larger particle sizes
- MDIs require slow and deep inspiratory effort
  - A fast inspiratory effort increases inertial impaction and deposition in the oropharynx and upper airway
Improving Pharmacist Inhaler Technique
Education and Patient Counseling
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Differences Between MDI and DPI That Can Be Problematic for Patients
- Slow vs fast inhalation
- Ability to “taste” dose
- Number of inhalations with usual doses
- Cleaning and maintenance

Inhalation Devices Resistance Properties
- MDIs present little resistance to airflow (propellant-driven)
  - Can result in too forceful of an inhalation
- DPIs have greater resistance to airflow which requires greater force to aerosolize particles
  - Can be concern for young, elderly, or in presence of severe airflow obstruction
- Clinician observation and feedback about technique can be helpful
- Training devices are available for many specific MDI and DPI products
- In-Check DIAL inspiratory flow meter is a tool to assess a patient’s inspiratory flow rate

Pressurized Metered-Dose Inhalers
- Among elderly patients, inhalation therapy is common with pMDI use being most common
- Not all patients can achieve acceptable technique, even with repeated instruction
- Most frequent challenges
  - Coordination of pressing and breathing
  - Inhalation rate too fast

Dry Powder Inhalers

- Breath-actuated (aerosol generated by inspiratory effort)
- Require a minimum inspiratory flow rate
- Appear less technique-dependent but a systematic review reported incorrect use in up to 94% of patients

Most common issues:
- Failure to exhale
- Failure to breath hold
- Failure to generate adequate inspiratory flow rate
- Holding device incorrectly


Types of Dry Powder Inhalers

- Discreet
  - HandiHaler
  - Aerolizer
- Multiple Dose
  - Turbuhaler
  - Diskus
  - Flexhaler
  - Twisthaler
  - Pressair

Using an MDI: Generic Instructions

- Remove the cap from the mouthpiece
- Shake inhaler unit (with canister inserted) well for a few seconds
- Exhale fully away from the device
- Place the mouthpiece in your mouth, between the teeth, and close lips around it
- Begin a slow, deep inhalation, while pressing down on the inhaler one time
- Continue to breathe in for several seconds
- Remove from mouth and hold breath for up to 10 seconds
- Repeat the above steps for the prescribed number of puffs
How Spacers Help pMDI Use

- Provide a reservoir for medication in aerosol
- Valved holding chamber allows separation of actuation and inhalation
- Reduce particle size and particle velocity
- Can reduce adverse effects with inhaled corticosteroid therapy

Available at www.medscape.org/viewarticle/757312

Spacers, Holding Chambers, and Valved Holding Chambers

- Similar to inhaler devices, many options are available
- Valved holding chambers are designed to assist patients who have difficulty with coordinating the use of an MDI; and these devices reduce deposition in the oropharynx
- Spacers and holding chambers reduce oropharyngeal deposition but do not help with technique problems related to coordination of actuation and inhalation

Using an MDI With a Valved Holding Chamber: Generic Instructions

- Remove the cap from the mouthpiece of the inhaler and the chamber
- Shake inhaler-chamber unit well for a few seconds
- Exhale fully away from the device
- Place the mouthpiece of the chamber in your mouth, between the teeth, and close lips around it
- Press the inhaler canister once
- Begin a slow, deep inhalation
- Continue to breathe in for several seconds
- Remove from mouth and hold breath for up to 10 seconds
- Repeat the above steps for the prescribed number of puffs
Newer pMDIs: Transitions From CFC Propellants to HFA

- Contain extra-fine particles
- Improved deposition may result in similar clinical efficacy at reduced doses compared with previous products
- May be less technique dependent
- Softer and warmer plumes from HFA-containing devices reduce the “cold Freon” effect


Cleaning and Maintenance of MDIs

- Remove the canister from the plastic mouthpiece
- Remove the mouthpiece cover
- Rinse the plastic mouthpiece in warm running water for several seconds
- Shake well to remove excess water
- Allow to air dry before re-inserting the canister

Cleaning and Maintenance of Holding Chambers

- Remove the mouthpiece cover
- Soak chamber in warm soapy water for several minutes
- Rinse in clean running water
- Shake well to remove excess water
  - Do not hand dry
- Allow to air dry before replacing the mouthpiece cover
Care and Maintenance of DPIs

- Do not immerse in water or get wet
- Wipe the mouthpiece with a clean and dry tissue every 2 to 3 days

Soft Mist Inhalers

- Do not require propellant or inspiratory flow rate to generate aerosol
- Use internal spring to generate aerosol over extended time and low velocity
- Can improve efficiency of delivery to target site and reduce oropharyngeal deposition
- Prototype device: Respimat

Instructions for Diskus DPI

- Place thumb in thumb grip and push away from body to expose lever
- Holding the device horizontally, slide the lever away from body to load dose of medication
- Exhale fully and away from the device
- Holding horizontally, raise mouthpiece to lips and begin a forceful and steady inhalation for a few seconds
- Remove from mouth and hold breath for up to 10 seconds
- If more than one puff is prescribed, repeat the entire process
Instructions for Flexhaler

- Remove the cover and hold upright with brown grip at bottom
- Twist the brown grip in one direction until it stops, then twist completely back in the other direction until it clicks
- Exhale fully away from the device
- Place the mouthpiece between your lips and inhale forcefully and steadily for a few seconds
- Remove mouthpiece and hold breath for up to 10 seconds
- If more than one puff is prescribed, repeat above steps

Instructions for Pressair

- Remove cap to access mouthpiece
- With the mouthpiece facing you, push the green button down on the back and release (the button will stay down)
- The control window on the front of the inhaler will be green (instead of red)
- Exhale fully away from the device and place in your mouth
- Inhale quickly and deeply over 3 to 4 seconds (you will hear a click but keep inhaling)
- Remove from your mouth and hold your breath for up to 10 seconds
- Check to see that the control window is red, which indicates that your inhalation was adequate

Instructions for Ellipta

- Slide the cover down to access the mouthpiece
- Exhale fully away from the device
- Place the inhaler in your mouth and take in a steady and deep breath
- Remove the inhaler from your mouth and hold your breath for up to 10 seconds if possible
- Close the cover over the mouthpiece
Instructions for Respimat

- Holding the device with the orange cap on top, twist the base in the direction of the arrows until it clicks
- Flip the orange cover to access the mouthpiece and exhale fully away from the device
- Begin a slow deep breath in and press the dose release button on top of the device—continue to breathe in for 3 to 4 seconds
- Remove device from mouth and hold breath for up to 10 seconds
- Wait 30 seconds to 1 minute to repeat dose if prescribed

Patients and Health Care Information

- Patients have a right to understand health care information that is necessary for them to care for themselves and to make informed choices
- Clinicians have a duty to provide information in simple, clear, and plain language and to check that patients understand the information

Adapted from 2008 White House Conference on Aging, Health Literacy, and Health Disparities.

Remembering Information

- A reported 40% to 80% of medical information that patients receive is forgotten immediately
- Up to 50% of the information retained is recalled incorrectly

Teach-Back Strategy

- Actively engages the patient in the educational and counseling session
- Assesses how well the “teacher” explained the concept and the “student’s” understanding
- Allows the patient to express his or her understanding in own words

Examples of Teach-Back

- “I want to be sure that I explained this correctly. Can you tell me how you will use this inhaler?”
- “We discussed a lot of details about your lung condition today. Let’s review a few important points. What are three things for you to do at home to control your asthma?”
- “How will you use your inhaler when you wake up in the morning?”
- “Please show me how you will use your inhaler.”

Teach-Back Method

1. Clinician assesses patient recall and comprehension
2. Clinician clarifies and tailors education and advice
3. Clinician reassesses patient recall and comprehension
4. Clinician provides new education or advice
5. Patient demonstrates recall and comprehension
6. Reinforces adherence with treatment plan

Educating Patients About Inhalation Devices and Using Teach-Back

- Explain
- Demonstrate
- Discuss
- Observe
- Congratulate!
- Clarify and emphasize
- Reinforce
- Assess periodically

Summary

- Inhalation therapies are central in the management of common lung diseases
- Delivery devices are an important component of medication therapy
- Good inhalation technique is essential for optimal benefit from pharmacotherapy
- Effective education and teaching using techniques such as teach-back can improve patient outcomes

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