



INSTITUTE FOR CLINICAL
SYSTEMS IMPROVEMENT

Health Care Order Set: Admission for Asthma Order Set

**Third Edition
January 2008**

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- physicians, nurses, and other health care professional and provider organizations;
- health plans, health systems, health care organizations, hospitals and integrated health care delivery systems;
- health care teaching institutions;
- health care information service departments;
- health care teaching institutions;
- health care information technology departments;
- medical specialty and professional societies;
- researchers;
- federal, state and local government health care policy makers and specialists; and
- employee benefit managers.

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Foreword

Scope and Target Population

This order set template pertains to patients with the diagnosis of asthma who are admitted from the ED or direct admit to the hospital and does not include orders that pertain to intensive care admission.

Clinical Highlights and Recommendations

- Asthma severity and control should be promptly assessed using objective measures of lung function and symptoms. (*Annotation #5 of guideline*)
- Early intervention with Bi-level PAP may prevent mechanical intubations. (*Annotation #3*)

Priority Aims

1. Improve the timely and accurate assessment of patients presenting with an asthma exacerbation.
2. Improve the treatment and management of inpatient asthma.

Key Implementation Recommendations

The following system changes were identified by the order set work group as key strategies for health care systems to incorporate in support of the implementation of this order set.

1. Facilitate the timely and accurate diagnosis of asthma and asthma severity and control.

Related ICSI Scientific Documents

Related Guidelines

- Chronic Obstructive Pulmonary Disease
- Diagnosis and Treatment of Respiratory Illness in Children and Adults

Disclosure of Potential Conflict of Interest

ICSI has adopted a policy of transparency, disclosing potential conflict and competing interests of all individuals that participate in the development, revision and approval of ICSI documents (guidelines, order sets and protocols). This applies to all work groups (guidelines, order sets and protocols) and committees (Committee on Evidence-Based Practice, Cardiovascular Steering Committee, Women's Health Steering Committee, Preventive & Health Maintenance Steering Committee, Respiratory Steering Committee and the Patient Safety & Reliability Steering Committee).

Participants must disclose any potential conflict and competing interests they or their dependents (spouse, dependent children, or others claimed as dependents) may have with any organization with commercial, proprietary, or political interests relevant to the topics covered by ICSI documents. Such disclosures will be shared with all individuals who prepare, review and approve ICSI documents.

No work group members have potential conflicts of interest to disclose.

Introduction to ICSI Document Development

This document was developed and/or revised by a multidisciplinary work group utilizing a defined process for literature search and review, document development and revision as well as obtaining and responding to ICSI members.

For a description of ICSI's development and revision process, please see the Development and Revision Process for Guidelines, Order Sets and Protocols at <http://www.icsi.org>.

Evidence Grading System

A. Primary Reports of New Data Collection:

- Class A: Randomized, controlled trial
- Class B: Cohort study
- Class C: Non-randomized trial with concurrent or historical controls
Case-control study
Study of sensitivity and specificity of a diagnostic test
Population-based descriptive study
- Class D: Cross-sectional study
Case series
Case report

B. Reports that Synthesize or Reflect upon Collections of Primary Reports:

- Class M: Meta-analysis
Systematic review
Decision analysis
Cost-effectiveness analysis
- Class R: Consensus statement
Consensus report
Narrative review
- Class X: Medical opinion

Citations are listed in the guideline utilizing the format of (*Author, YYYY [report class]*). A full explanation of ICSI's Evidence Grading System can be found at <http://www.icsi.org>.

Order Set

Nursing Orders (See Annotation #3)

- Elevate head of bed 30 degrees
- Fall alert
- Intake and output every shift
- Foley catheter Insert now Insert as needed
- Oxygen:
 - O₂ by nasal canula at _____ liters per minute
 - O₂ by nasal canula to keep saturation greater than _____
- Peak flows every _____ hours
- BiPAP
 - IPAP with starting pressure _____ (suggested starting pressures: 10)
 - EPAP with starting pressure _____ (suggested starting pressures: 5)

Call physician if:

- Heart rate greater than _____ or less than _____
- Respiratory rate greater than _____ or less than _____
- O₂ saturation less than _____
- Systolic blood pressure greater than _____ or less than _____
- Temperature greater than _____

Patient weight: _____ kg

Patient height: _____ cm

Diet

- NPO for _____ hours as tolerated No added salt
- constant carbohydrate (CHO)

IVs

- Establish IV saline lock with flush every day as needed
- Check IV fluid if appropriate:
 - D5 0.45% NaCl with 20 mEq KCl at _____ mL/hour
 - D5 0.45% NaCl at _____ mL/hour
 - Lactated ringers at _____ mL/hour
 - _____ at _____ mL/hour

Sedative/Symptom Medications

- Acetaminophen 650 mg rectal suppository every 4 hours as needed
- Acetaminophen 1,000 mg by mouth _____ (3-4) times daily as needed for fever or pain (maximum daily adult dose 4,000 mg)

Medications (See Annotation #4)

- Albuterol _____ mg by nebulizer every _____ hours (suggested dose 2.5 mg/neb)
- Albuterol _____ mg by nebulizer continuously (suggested dose 10 mg/hour)
- Albuterol MDI _____ puffs every _____ hours as needed (suggested dose 4 puffs every 20 minutes as needed)
- Levalbuterol _____ mg by nebulizer every _____ hours as needed (suggested dose 0.63 mg-1.25 mg/neb)
- Levalbuterol MDI _____ puffs every _____ hours as needed
- Albuterol/ipratropium MDI _____ puffs every _____ hours as needed (suggested dose 8 puffs every 20 minutes as needed)
- Albuterol/ipratropium _____ mL by nebulizer every _____ hours as needed (suggested dose 3 mL/neb)
- Ipratropium _____ mg by nebulizer every _____ hours (suggested dose 0.5 mg every 2 hours)
- Methylprednisolone _____ mg IV every _____ hours (suggested dose 30 mg-60 mg every 6 hours)
- Prednisone _____ mg by mouth daily (suggested dose 40 mg-60 mg daily)
- Monteleukast _____ mg by mouth at bedtime (maximum adult dose is 10 mg)

Order Set

Corticosteroids (see table in guideline for suggested dosages)

- Mometasone _____ mcg puffs every _____ hours
- Beclomethasone HFA _____ mcg puffs every _____ hours
- Budesonide DPI _____ mcg puffs every _____ hours
- Budesonide _____ mg by nebulizer every _____ hours
- Fluticasone _____ mcg puffs every _____ hours

- Antibiotics
 - _____ mg by _____ every _____ hours
- Antihistamine _____ mg by _____ every _____ hours
- Other _____

Diagnostic Tests (First day – those not performed in ED)

- Indication: _____
- CBC/Plts with differential STAT Routine
 - Theophylline level STAT Routine
 - Blood culture x2 STAT Routine
 - Sputum gram stain and culture STAT Routine
 - Nasal pharyngeal swab for influenza STAT Routine
 - Nasal wash for influenza STAT Routine
 - Arterial blood gases STAT Routine
 - Chest x-ray:
 - PA Lateral Portable Indication: _____
 - _____
 - _____

- A.M. labs at _____ hours

Other

Consults

- Pulmonary consult: reason _____
- Social work referral
- Asthma education consult
- Tobacco cessation education consult (for current users)

Discharge Planning

- Social service consult for assistance in discharge planning
- Financial counselor consult
- Consult for home nebulizer
- Allergy consult

Immunization Evaluation

- Pneumococcal vaccine 0.5 mg IM on discharge if:
 - Never received vaccine or vaccination status unknown
 - Received vaccine before age 65 or it has been greater than 5 years
- Pneumococcal vaccination indicated but not given. Reason: _____
- Influenza vaccine 0.5 mg IM on discharge (October-March only) if patient has not received
- Influenza vaccination indicated but not given. Reason: _____
- Vaccination record sent to primary care

Order Set

Authorized Prescriber Signature: _____

Printed Name: _____

Date/Time of Orders: ____/____/____ ____:_____

Annotations

1. Pre-Checked Orders

ICSI order sets utilize two types of boxes for orders. One is the open box that clinicians will need to check for the order to be carried out. The second box is a pre-checked box and has those orders that have strong evidence and/or are standard of care and require documentation if the clinician decides to "uncheck" the order.

There is increasing evidence that pre-checked boxes are more effective in the delivery of care than are physician reminders, even within the computerized medical record environment (*Dexter, 2004 [A]*). Organizations are recognizing the benefit of using pre-checked boxes for other orders to promote efficiency. Organizations are encouraged, through a consensus process, to identify those orders to utilize pre-checked boxes to increase efficiency, reduce calls to clinicians, and to reduce barriers for nursing and other professionals to provide care that is within their scope.

2. Admitting Data

Patient information would be part of the medical record in electronic ordering. Institutions will need to add this section per their organization's policy.

Physician information would not be necessary in electronic ordering. How to contact would not be actionable in electronic ordering.

3. Nursing

BiPAP therapy should be considered for patients presenting with an acute asthma exacerbation. Accumulating studies have shown a benefit in using BiPAP for patients presenting with non-cardiogenic respiratory failure (*Soroksky, 2003 [A]*).

See the ICSI Diagnosis and Management of Asthma guideline for more information.

4. Medication

The evaluation of leukotrienes for acute asthma care is in its infancy. Pulmonary function has been shown to improve more rapidly when a leukotriene is added to the standard therapy of asthma care (beta-agonists/corticosteroids) in the emergency room settings (*Emerman, 2001 [R]*; *Silverman, 1999 [A]*). More studies are needed to confirm these reports.

Corticosteroids

Parenteral and enteral administration of corticosteroids requires about 6-24 hours to be effective. IV and oral routes of corticosteroid administration appear to be equivalent (*Becker, 1999 [A]*; *Barnett, 1997 [A]*; *Cunnington, 2005 [A]*). Medium to high doses of corticosteroids appear to be better than low doses; however, there is still a large range: roughly 160 mg Methylprednisolone per day or 2mg/kg/day in children. There is no evidence to support very high doses of steroids (*Rodrigo, 1999 [M]*). The National Asthma Education and Prevention Program guidelines recommend that patients admitted to the hospital should receive IV or PO steroids (*National Heart, Lung, Blood Institute EPR-3, 2007 [R]*). There may be a role for inhaled high-dose corticosteroids in the emergency department in addition to the IV or PO route; however, the data do not support this as standard of care at this time (*Edmonds, 2002 [M]*; *Edmonds, 2003 [M]*; *Rodrigo, 2004 [A]*).

Annotations

In adult asthmatic cases where intolerance or non-compliance with oral steroid therapy is a concern, consider the use of IM methylpredisone (*Lahn, 2004 [A]*).

Anticholinergics

Ipratropium bromide or another anticholinergic may be used as an additional bronchodilator in conjunction with a beta₂-agonist in cases of acute moderate to severe asthma. Its most beneficial effects appear to be in multiple doses in more severe exacerbations (*Plotnick, 1998 [M]*; *Plotnick, 2000 [M]*; *Westby, 2004 [M]*). Literature has been inconsistent, but indicates that anticholinergic therapy may increase FEV₁ or PEF (*FitzGerald, 1997 [A]*; *Lanes, 1998 [M]*), may decrease hospital admission rates slightly (*Qureshi, 1998 [A]*), may decrease the amount of beta-agonist needed, and may prolong bronchodilator effect. These findings were not always statistically significant, and some studies found no benefits (*Diaz, 1997 [A]*; *Karpel, 1996 [A]*). There were no significant adverse reactions, however. In view of this, it is recommended to consider anticholinergic use in moderate to severe asthma exacerbations.

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The next scheduled revision will occur within 12 months.

Availability of references

References cited are available to ICSI participating member groups on request from the ICSI office. Please fill out the reference request sheet included with your order set and send it to ICSI.

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Brief Description of Evidence Grading

Individual research reports are assigned a letter indicating the class of report based on design type: A, B, C, D, M, R, X.

A full explanation of these designators is found in the Foreword of the order set.

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- FitzGerald JM, Grunfeld A, Pare PD, et al. The clinical efficacy of combination nebulized anticholinergic and adrenergic bronchodilators vs nebulized adrenergic bronchodilator alone in acute asthma. *Chest* 1997;111:311-15. (Class A)
- Karpel JP, Schacter N, Fanta C, et al. A comparison of ipratropium and albuterol vs albuterol alone for the treatment of acute asthma. *Chest* 1996;110:611-16. (Class A)
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- Plotnick LH, Ducharme FM. Combined inhaled anticholinergics and beta₂-agonists for initial treatment of acute asthma in children. *Cochrane Database of Systematic Reviews* 2000, Issue 3. (Class M)
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- Rodrigo G, Rodrigo C. Corticosteroids in the emergency department therapy of acute adult asthma: an evidence-based evaluation. *Chest* 1999;116:285-95. (Class M)
- Silverman RA, Chen Y, Bonuccelli CM, Simonson SG. Zafirlukast improves emergency department outcomes after an acute asthma episode. *Ann Emerg Med* 1999;34:S1. (Class A)
- Soroksky A, Stav D, Shpirer I. A pilot prospective, randomized, placebo-controlled trial of bilevel positive airway pressure in acute asthmatic attack. *Chest* 2003;123:1018-25. (Class A)
- Westby M, Benson M, Gibson P. Anticholinergic agents for chronic asthma in adults. *Cochrane Database of Systematic Reviews* 2004, Issue 3. (Class M)

This section provides resources, strategies and measurement specifications for use in closing the gap between current clinical practice and the recommendations set forth in the order set.

The subdivisions of this section are:

- Priority Aims and Suggested Measures
- Key Implementation Recommendations
- Knowledge Resources
- Resources Available

Priority Aims and Suggested Measures

1. Improve the timely and accurate assessment of patients presenting with an asthma exacerbation.

Possible measures of accomplishing this aim:

- a. Percentage of patients with diagnosed asthma who have documentation of peak flow measurement during the initial assessment in ED or hospital.
- b. Percentage of patients with asthma with any assessment of asthma severity documented during the initial assessment in ED or hospital.
- c. Percentage of patients with diagnosed asthma who receive appropriate treatment as rapidly as possible based on response.

2. Improve the treatment and management of inpatient asthma.

Possible measures of accomplishing this aim:

- a. Percentage of inpatients with diagnosed asthma for which the admission order set is used.

<p>At this point in development for this order set, there are no specifications written for possible measures listed above. ICSI will seek input from the medical groups on what measures are of most use as they implement the order set. In a future revision of the order set, measurement specifications may be included.</p>

Key Implementation Recommendations

The following system changes were identified by the order set work group as key strategies for health care systems to incorporate in support of the implementation of this order set.

1. Facilitate the timely and accurate diagnosis of asthma and asthma severity and control.

Knowledge Resources

Criteria for Selecting Resources

The following resources were selected by the Admission for Asthma order set work group as additional resources for providers and/or patients. The following criteria were considered in selecting these resources.

- The site contains information specific to the topic of the order set.
- The content is supported by evidence-based research.
- The content includes the source/author and contact information.
- The content clearly states revision dates or the date the information was published.
- The content is clear about potential biases, noting conflict of interest and/or disclaimers as appropriate.

Resources Available to ICSI Members Only

ICSI has a wide variety of knowledge resources that are *only* available to ICSI members (these are indicated with an asterisk in far left-hand column of the Resources Available table). In addition to the resources listed in the table, ICSI members have access to a broad range of materials including tool kits on CQI processes and Rapid Cycling that can be helpful. To obtain copies of these or other Knowledge Resources, go to <http://www.icsi.org/knowledge>. To access these materials on the Web site you must be logged in as an ICSI member.

The resources in the table on the next page that are not reserved for ICSI members are available to the public free-of-charge.

Resources Available

*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	Allergy and Asthma Network/Mothers of Asthmatics	A national non-profit network of families whose desire is to overcome allergies and asthma through knowledge. This Web site produces accurate, timely, practical and livable alternatives to suffering.	Patients Professionals	http://www.aanma.org 1-800-878-4403
	American Academy of Allergy, Asthma and Immunology (AAAAI)	The Web site offers asthma education resources for patients and providers. The site includes special sections for children and seniors, seasonal educational materials. Health Headlines are posted daily.	Patients Professionals	http://www.aaaai.org/ 1-800-822-2762
	American College of Allergy, Asthma and Immunology	Provides both patient- and professional-oriented information on asthma diagnosis and management.	Patients Professionals	http://www.acaai.org
	American Lung Association (ALA)	Offers comprehensive information for patients and practitioners on asthma care and reduction of exacerbations and asthma triggers.	Patients Professionals	http://www.lungusa.org/ 1-800-548-8252
	Asthma and Allergy Foundation of America	Focus is on improving the quality of life for people with asthma and allergies and their caregivers, through education, advocacy and research. Provides practical information, community-based services, support and referrals through a national network of chapters and educational groups.	Patients Professionals	http://www.aafa.org
	EPA (U.S. Environmental Protection Agency)	Offers asthma education that incorporates an awareness of indoor environmental asthma triggers (e.g., secondhand smoke, dust mites, mold, pet dander and cockroaches) and actions that can be taken to reduce children's exposure to them in homes, schools and child care settings.	Patients Professionals	http://www.epa.gov/iaq
	National Heart, Lung, and Blood Institute (NHLBI)	Provides asthma health education resources for patients, school/day care providers and health professionals. Materials written in Spanish are available.	Patients Professionals	http://www.nhlbi.nih.gov

* Available to ICSI members only.