

INSIGHT REPORT

THE ASTHMA GUIDELINES: CLINICAL STRATEGIES TO IMPROVE ADHERENCE

Release Date: 04/08/2011

Valid for credit through 04/08/2012

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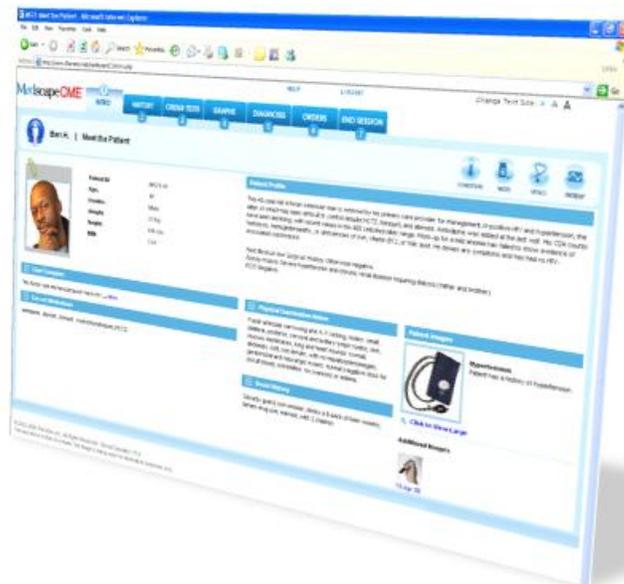
A Medscape Online Patient Simulation Program

FINAL METRICS REPORT

PROGRAM AUTHORS:

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David A. Beuther, MD



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INSIGHT REPORT

**THE ASTHMA GUIDELINES:
CLINICAL STRATEGIES TO IMPROVE ADHERENCE**

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PROGRAM SUMMARY

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Maximum of 2.0 AMA PRA Category 1 Credit(s)[™] for physicians

Rafeul Alam, MD, PhD;
David A. Beuther, MD

INTRODUCTION

Asthma is a common chronic disease worldwide and affects 22 million persons in the United States. The morbidity and mortality from asthma results in a significant and increasing burden to the healthcare system. Between 1989 and 2004, the number of physician office visits for asthma rose from approximately 6 million to nearly 15 million a year, while hospitalization for asthma as a secondary diagnosis jumped sharply, from approximately 400,000 in 1990 to nearly 1.4 million in 2004.

According to recent conducted surveys, although evidence-based guidelines exist for asthma diagnosis and management, adherence to these guidelines is suboptimal, contributing to substantial variation in asthma outcomes. These surveys also found that adherence to asthma medication among asthma patients remains suboptimal

LEARNING OBJECTIVES

Upon completion of this activity, participants will be able to:

1. Describe changes to national guidelines for the diagnosis and management of treatment as reflected in the EPR-3.
2. Identify barriers to implementing the EPR-3 guidelines in their office and steps they can take to overcome those barriers.
3. Use non-invasive tests to correctly identify the severity of their patients' asthma and their level of control.
4. List recommendations from the EPR-3 guidelines for managing patients with severe asthma.
5. Relate the unintentional and reasoned factors causing asthma medication non-adherence in patients.
6. Identify and manage asthma triggers and confounders.

This activity is supported by an independent educational grant from Genentech and Novartis and accredited by National Jewish Health.

EXECUTIVE SUMMARY

BACKGROUND

Using an electronic medical record-like interface, this National Jewish Health-TheraSim program challenges participants to treat their virtual patients using evidence-based principles in an environment designed to parallel the clinical practice. In addition to meeting immediate treatment requirements for asthma, participants are asked to address related conditions of the simulated patients.

This report summarizes decisions made by clinicians within the simulated patient cases. The simulations are unique in the sense that diagnostic and therapeutic choices are not constrained—that is, clinicians can literally choose from the universe of possible diagnoses and available drug therapies. As a result, this data can provide insight into the clinical decisions being made in actual practice.

Because not all participants engage in simulations in the same way, it's necessary to focus on a subset of total participants for reporting purposes to ensure that the data is as accurate a reflection of practice as possible. This methodology ensures that "browsers" or participants only interested in reading the didactic content at the end of the case don't skew the analysis of behavioral metrics. Thus, the analysis for each patient case simulation focuses on those participants that meet the following criteria:

- Completed the case (those participants that made it to the Results tab of the simulation)
- Exhibited engagement with the case by ordering at least one therapy.

For the purpose of this report, specialists are defined as MDs in the field of allergy/immunology and pulmonology.

MAIN FINDINGS

- Most participants appropriately continued existing asthma therapies but were somewhat less likely to add new therapies as required in these cases, for which asthma was not well controlled.
 - For the patient on a rescue inhaler only (Case 01), nearly all participants continued the rescue inhaler. However, only 48% of specialists and 42% of non-specialists appropriately added an inhaled corticosteroid.
 - For the patient failing on the ICS (Case 02), most participants appropriately continued the ICS. However, only 70% of participants added to this regimen: 37% added salmeterol, and another 33% added a leukotriene modifier. (Nearly all participants adding a leukotriene modifier also added salmeterol or budesonide.)

RECOMMENDATIONS FOR FURTHER EDUCATION

Based on these observed behavioral outcomes, future education efforts can emphasize:

- **Aggressive treatment** of poorly-controlled asthma.
- **Comprehensive evaluation** of asthma patients.

CASE ANALYSES

CASE 01 OVERVIEW



Current Diagnoses

Asthma
Obstructive Sleep Apnea

Current Medications

albuterol 90 mcg qid
HCTZ 25 mg qd
simvastatin 20 mg qd
lansoprazole 15 mg qd

Vitals

Age: 48
Weight: 122kg
BMI: 41.7
Temp: 98.3 F
BP: 135/82 mmHg

This 48-year-old obese male with relatively stable GERD, hypertension, and dyslipidemia presents with chronic respiratory symptoms that have recently been ascribed to possible COPD but without formal pulmonary evaluation. His occasional chest pain and multiple cardiovascular risk factors warranted an exercise echocardiogram, which recently was normal. New diagnoses that can be established today include asthma and obstructive sleep apnea.

Asthma

With slightly abnormal spirometry, the clinician user is expected to order pulmonary function tests, pulse oximetry after walking, and of most importance, establish a firm diagnosis of asthma by ordering a bronchial challenge test using increasing doses of methacholine in order to determine a PC[20], or the dose at which the FEV1 declines by 20%, with <8 mg/dL being positive (the patient's result was 1.25 mg/dL). Normal is >25 mg/dL, whereas 8-25 mg/dL represents an intermediate (indeterminate) value.

With a firm diagnosis of asthma, the patient should be treated with a corticosteroid inhaler (ICS), although he may eventually need a combination ICS/LABA (long-acting beta agonist) inhaler. The patient should continue on a rescue inhaler; short-acting beta agonist inhalers are preferred. Education about the appropriate use of inhalers and spacers is important, as is exercise. Asthma triggers and cigarette smoke should be avoided, but since his history and total IgE do not suggest allergic asthma, it is unlikely that an anti-IgE product (omalizumab) will be a consideration even if he fails ICS and ICS/LABA inhalers.

Adherence

While adherence to an asthma control regimen is important for all patients (as it is with the management of many conditions), this patient represents a prime candidate for starting such counseling and encouragement up front. His lack of adherence of prior advice concerning diet and exercise and his initial episodic poor adherence to his antihypertensive agent makes such counseling crucial.

Obstructive Sleep Apnea

With symptoms of morning headache and some recent cognitive decline, overnight polysomnography testing should be pursued. In this patient, there were 18 apnea events/hour, making this a moderate apnea/hypopnea index (AHI) study result. Though this study did not include a second phase using CPAP, the clinician should order CPAP, perhaps after a formal overnight CPAP titration study, with initial orders somewhere in the 10 cm H2O range, or as dictated by the CPAP titration study.

Dyslipidemia, Hypertension, and GERD

The patient should continue on a statin, thiazide and proton pump inhibitor. Diet and exercise are crucial for these problems, and he should be counseled about avoiding eating late in the day, avoiding spice foods and alcohol, considering use of bed blocks at the head of his bed.

CASE 01 FINDINGS

Four tests were considered essential in this case: a Methacholine Challenge Test, Spirometry, Pulmonary Function Tests, and Polysomnography. As highlighted in the table below, specialists were more likely than non-specialists to order all four tests. The Methacholine Challenge Test was the least ordered of these four tests. Additional details on test order rates are available in the Appendix.

Case 01 findings are based on an analysis of those participants that completed the case and ordered at least one therapy. For the purpose of this report, specialists are defined as MDs in the fields of allergy/immunology and pulmonology. Specialists are 21% of participants in Case 01.

Test Name	Specialists	Others
Pulmonary Function Tests	90%	85%
Methacholine Challenge Test	60%	56%
Spirometry	80%	76%
Polysomnography	90%	80%

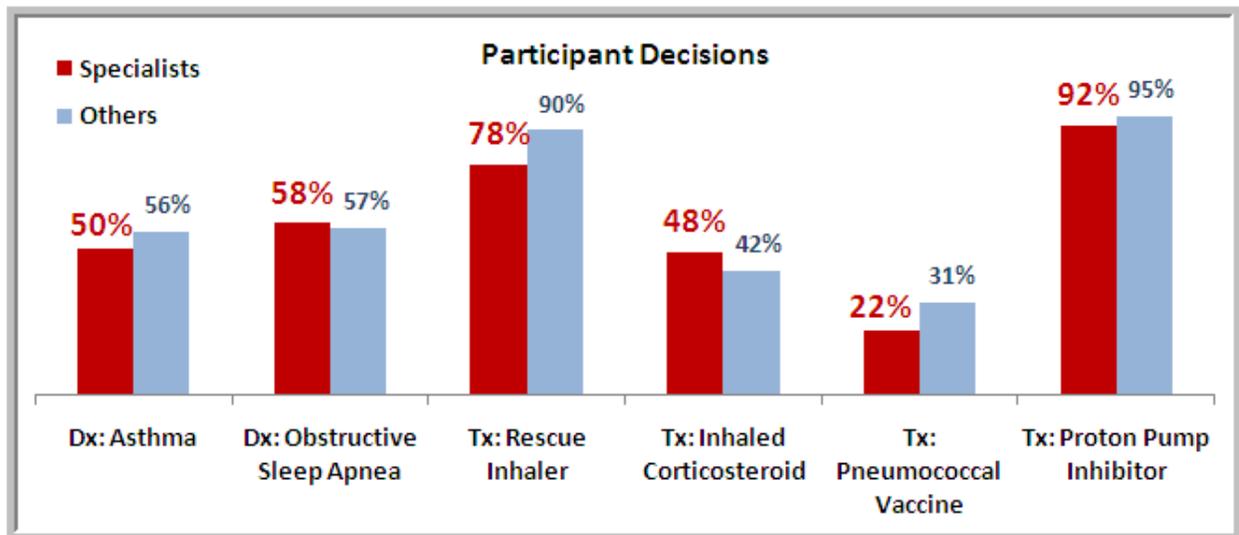
There were two new diagnoses required in this case: Asthma and Obstructive Sleep Apnea (OSA). Diagnosis rates for both conditions were below 60%. However, treatment rates for both of these conditions were significantly higher, suggesting that participants

likely "assumed" such diagnoses in simulation. Past simulation experience gives evidence this is the case, especially in CME programs with the name of the condition in the title. (This may also explain why more specialists recognized OSA than asthma.)

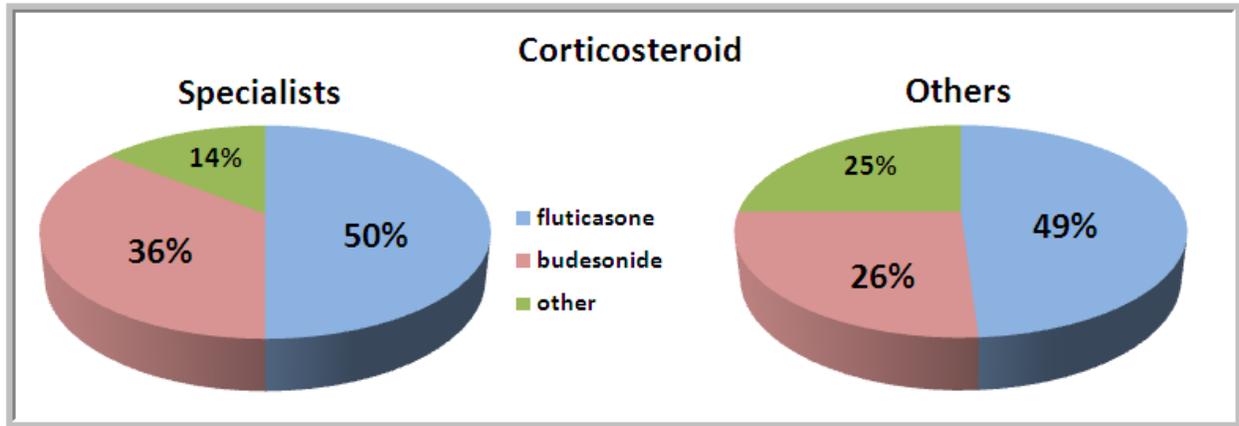
For treatment, the case author recommended continuing a rescue inhaler and adding an inhaled corticosteroid (ICS). Both a pneumococcal vaccine and a proton pump inhibitor were also recommended.

90% of nonspecialists continued the patient's rescue inhaler, but only 78% of specialists did so. However, 48% of specialists added an ICS, compared to only 42% of nonspecialists. Both specialists and nonspecialists alike were far less likely to order the recommended pneumococcal vaccine although nearly all participants continued the patient's proton pump inhibitor.

Participant Choices in Case 01



An inhaled was recommended in this case. The majority of all participants (86% of specialists and 75% of non-specialists) favored fluticasone or budesonide above all other choices, with roughly half of both specialists and nonspecialists selecting fluticasone.



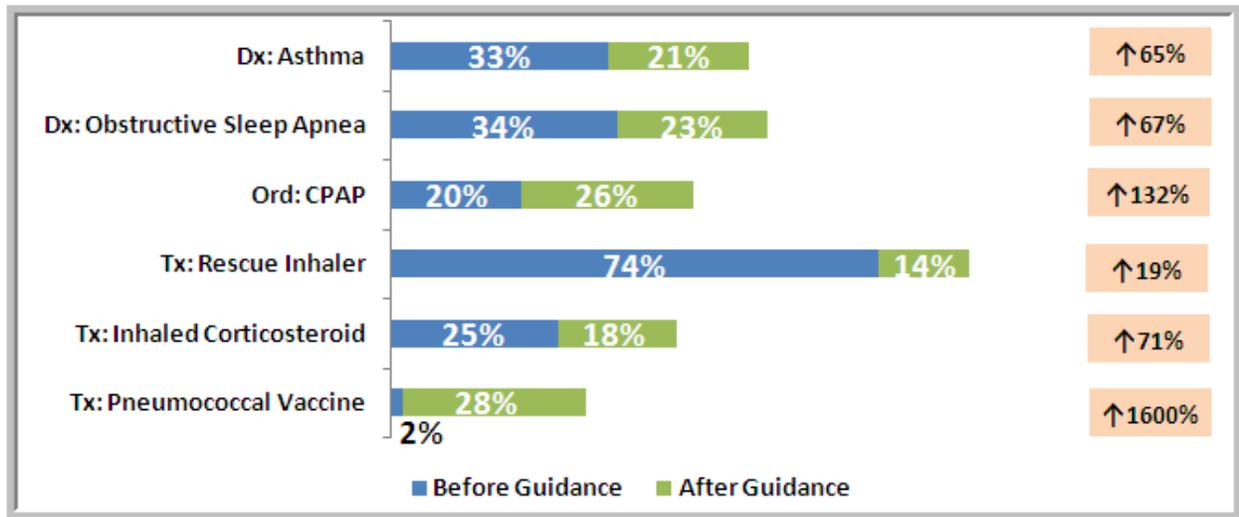
As the table to the right highlights, counseling was "ordered" by a much lower percentage of participants than the treatments described above. This is common within a simulation environment for activities that consist primarily of a conversation between clinician and patient in practice. The order rates among specialists and non-specialists were similar for the recommended counseling. Non-specialists were more likely to recommend avoidance of environmental triggers.

Counseling	Specialists	Others
Adherence	15%	10%
Inhaler Technique	32%	30%
Avoidance of Env. Triggers	8%	11%
CPAP	45%	46%
Diet	38%	36%
Exercise	12%	17%

Impact of Simulation on Clinician Decisions in Case 01

As a participant ends a patient simulation, the TheraSim Clinical Simulator provides "last chance" clinical guidance on critical aspects of each case that the participant has either failed to address or addressed inappropriately. The chart below highlights the percentage of participants that initially made the appropriate decision in the simulation and the percentage that did so after receiving the "last chance" educational guidance. Note that this data measures activity in the simulation and likely underestimates the overall educational impact. It is difficult to measure the entire impact because not all participants that read the feedback associated with their decisions make changes during the simulation.

In Case 01, over half of the participants who offered either required diagnosis did so only after being prompted. As noted earlier, this may be an artifact of condition-centered CME simulation offerings.



Although recommended by the author, nearly 55% of participants failed to order CPAP; over half of the participants that did order this required prompting.

The largest deviation between case author recommendations and participant decisions is seen in the use of pneumococcal vaccine. Indeed, only 2% ordered this vaccine without prompting.

CASE 02 OVERVIEW



Current Diagnoses

- Chronic Sinusitis
- Nasal Polyposis
- Elevated IgE and Eosinophilia
- Severe Persistent Asthma

Current Medications

albuterol 90 mcg inhaler

Vitals

Age: 48
Weight: 57kg
BMI: 22.8
Temp: 98.2 F
BP: 111/74 mmHg

This is a case of a severe allergic patient who manifests multiple allergic diseases, including allergic rhinitis, allergic asthma and nasal polyposis. She is allergic to cats and other environmental allergens, continues to be exposed to cats, and has workplace exposure to irritants that aggravate her asthma. She has co-morbidities that affect the management of asthma. This patient has polypoid rhinitis and possible chronic sinusitis. She needs to have CT of the sinuses to fully assess the degree of inflammation. She should have an evaluation for immunodeficiency, especially antibody deficiency, which could predispose her to recurrent bacterial infections.

A review of previous lab tests indicates that she has elevated IgE and eosinophilia. Although allergic asthma can be associated with mildly elevated IgE and eosinophilia, her test result, especially the IgE level, is higher than what is typically observed in allergic asthma.

Treatment

She needs to reduce asthma triggers. A comprehensive approach to reducing asthma triggers should include minimal or no exposure to the cats and a trial of allergen immunotherapy.

She might benefit from a polypectomy surgery and should have an ENT consultation. She should take a nasal steroid spray to suppress the growth of polyps. Nasal saline irrigation is helpful in reducing postnasal drainage and other symptoms of chronic rhinosinusitis. She should apply the nasal steroid after saline irrigation.

Her asthma is poorly controlled. She takes an inhaled steroid at the highest available dose. Despite this treatment she continues to experience symptoms on a daily basis. At this point she should try a combination of controllers.

The options include adding a LABA or a leukotriene receptor antagonist. Given this patient’s high degree of allergic sensitivity the addition of a leukotriene antagonist would be a preferred choice.

Patient Education

She should have a dedicated session with an asthma educator, who will discuss allergen avoidance, environmental control, monitoring lung function (FEV1 and peak flows by Piko), and step down and step up approaches to managing asthma.

Further she should learn the proper technique of the inhalers and diskus (as appropriate), the usage of spacer, and nasal saline irrigation.

She should be advised to wash mouth after inhalation of inhaled steroids.

She should be taught to manage acute asthma with a rescue inhaler.

CASE 02 FINDINGS

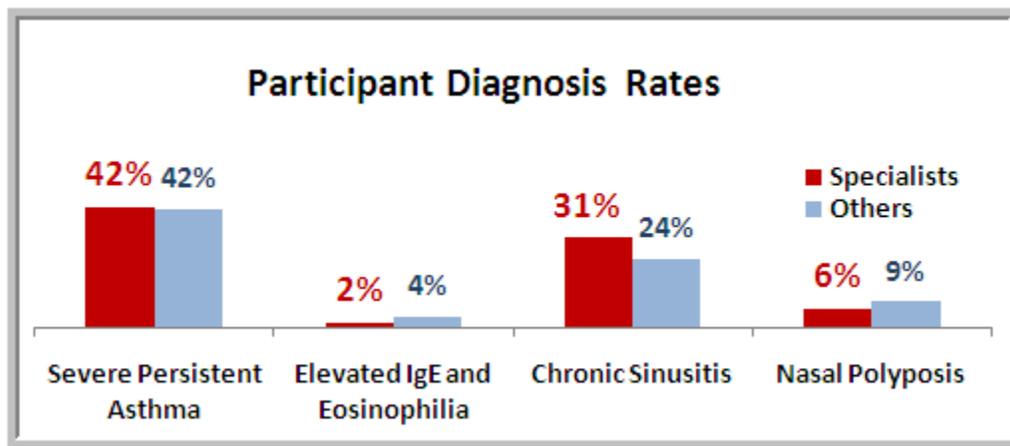
Four tests were considered essential in this case: Pulmonary Function Tests, CBC w/ Differential, Serum Immunoglobulin, and Total Serum IgE. As highlighted in the table below, specialists and non-specialists were approximately equally likely (or unlikely) to order these tests. Pulmonary function tests for airway obstruction (a ratio of FEV1/FVC below 75% for adults) and reversibility (more than 12% and 200 mL) – the main diagnostic criterion for asthma – was almost universally ordered by specialists and nonspecialists alike. Roughly one-third of

Case 02 findings are based on an analysis of those participants that completed the case and ordered at least one therapy. For the purpose of this report, specialists are defined as MDs in the fields of allergy/immunology and pulmonology. Specialists are 20% of participants in Case 02.

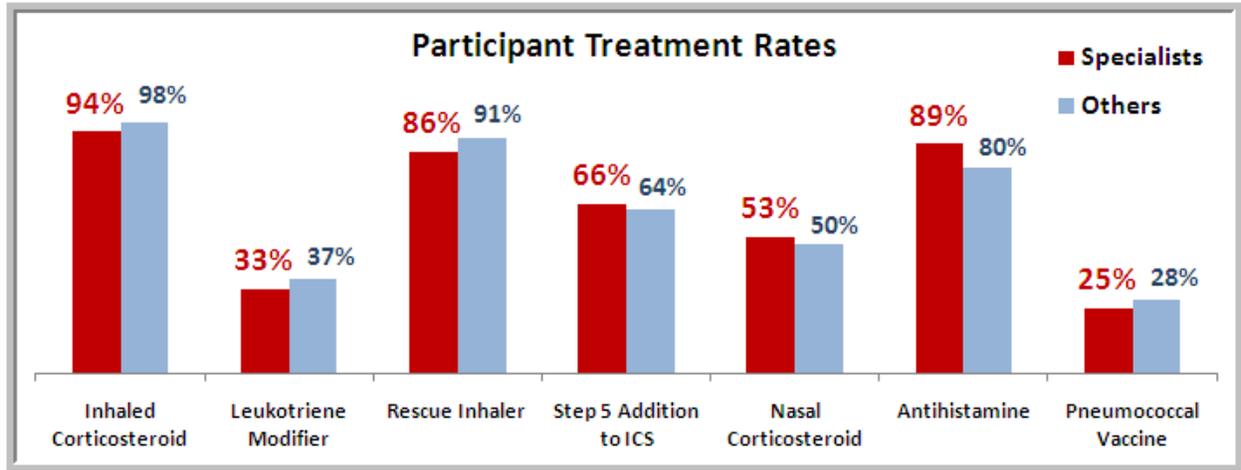
Test Name	Specialists	Others
Pulmonary Function Tests	94%	89%
CBC w/Differential	58%	60%
Serum Immunoglobulin	33%	39%
Total Serum IgE	70%	61%

participants ordered the serum immunoglobulin, described by the author as "appropriate for patients presenting with probable recurrent bacterial infections." Additional details on test order rates are available in the Appendix.

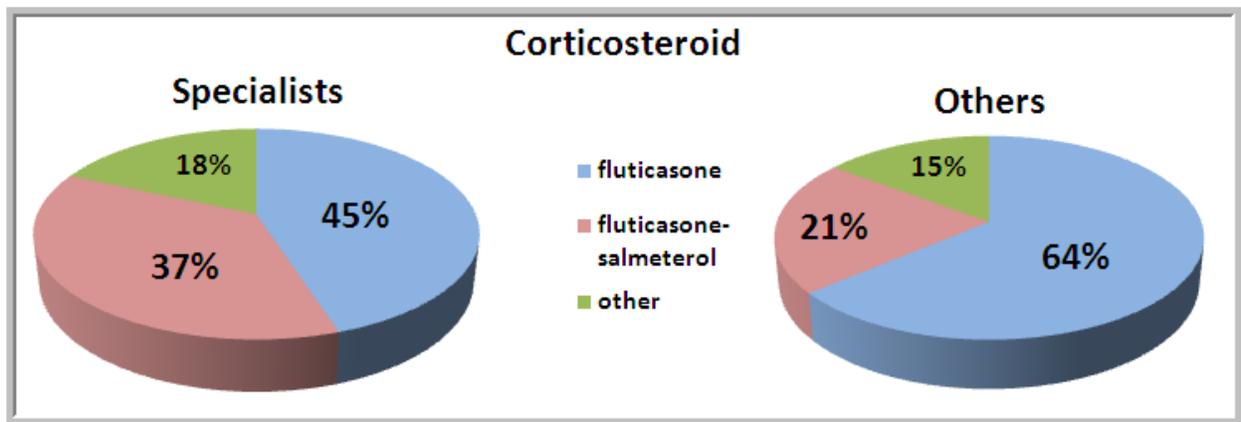
Four new diagnoses were required for this patient. 42% of participants diagnosed Severe Persistent Asthma and even fewer diagnosed chronic sinusitis. Very few participants diagnosed nasal polyposis or elevated IgE and eosinophilia. As mentioned in the previous case analysis, diagnosis rates in simulation tend to be far below treatment rates, and this case was no exception.



For treatment, the case author recommended the continuation of the inhaled corticosteroid and rescue inhaler. As illustrated in the chart below, nearly all participants continued the ICS and close to 90% continued the prescription for a rescue inhaler. The author also recommended a leukotriene modifier for this patient to "reduce allergic inflammation and improve symptoms of allergic rhinitis and asthma". However, only 33% of specialists and 37% of non-specialists added this to the patient's treatment regimen. (The author noted, however, that "Leukotriene antagonists do not work on all patients. Thus, the patient should be reevaluated for efficacy of a leukotriene antagonist in 3 months. If not beneficial, then a LABA should be added or a combination drug be tried.")



As illustrated below, fluticasone alone or combination fluticasone-salmeterol were the most commonly prescribed corticosteroid.

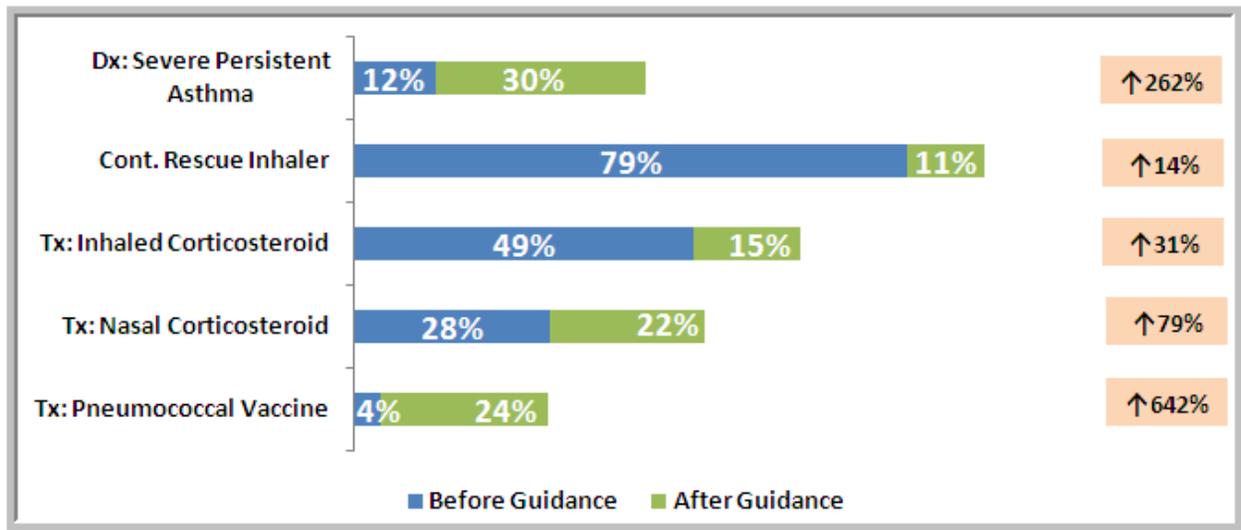


As the table to the right highlights, counseling was "ordered" by a lower percentage of participants than the treatments described above, although order rates were higher than in the first case. Specialists were slightly more likely than non-specialists to order the recommended counseling.

Counseling	Specialists	Others
Allergen Avoidance	39%	36%
Allergen Immunotherapy	28%	18%
Inhaler Technique	41%	37%
ENT Consult	23%	14%
Nasal Irrigation	14%	13%

Impact of Simulation on Clinician Decisions in Case 02

As a participant ends a patient simulation, the TheraSim Clinical Simulator provides "last chance" clinical guidance on critical aspects of each case that the participant has either failed to address or addressed inappropriately. The chart below highlights the percentage of participants that initially made the appropriate decision in the simulation and the percentage that did so after receiving the "last chance" educational guidance. Note that this data measures activity in the simulation and likely underestimates the overall educational impact. It is difficult to measure the entire impact because not all participants that read the feedback associated with their decisions make changes during the simulation. In Case 02, the largest educational impact was again seen in the addition of the pneumococcal vaccine, with a 6-fold increase in the number of participants adding this after prompting.



Only 42% of all participants diagnosed severe persistent asthma in this case (and only one-quarter of those did so before clinical guidance prompting).

Most participants appropriately continued the combination the rescue inhaler. Only half of the participants added a nasal corticosteroid for the patient's sinusitis and nasal polyps, and half of those who did required prompting.

APPENDIX – GENERAL QUERIES FOR CASES 01 TO 02



The Asthma Guidelines
Clinical Strategies To Improve Adherence



: Scores By Case			
Case #	All Sessions	All Registered Users	Avg Dur.
MS48-01	930	792	36:06
MS48-02	1216	1062	36:49

<p>Lab-MS48-01-Chemistry Screen Evaluation of serum electrolytes, renal and hepatic function is appropriate in the management of adult patients with a chronic illness but is optional for today's visit.</p>	<p>Lab-MS48-01-Chest X-Ray It is reasonable to order a chest x-ray in patients with ongoing pulmonary symptoms in order to obtain possible clues as to the etiology of the patient's respiratory problems.</p>	<p>Lab-MS48-01-Complete Blood Count (CBC) - Basic It is reasonable to order a CBC in patients with respiratory symptoms in order to seek evidence of anemia, leucocytosis and eosinophilia.</p>																								
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<p>Lab-MS48-01-Methacholine Challenge Test (MCT) A bronchial challenge with increasing doses of methacholine for patients with non-specific respiratory symptoms, including here COPD, GERD, or asthma, may allow the clinician to determine whether or not asthma is likely to be one of the patient's diagnoses.</p>	<p>Lab-MS48-01-Polysomnography (Sleep Study) With morning headaches and cough, obesity, and a recent diminution of cognitive functioning, a polysomnogram (sleep study) is indicated in order to seek evidence of a sleep disorder, such as significant sleep apnea, a generally treatable disorder.</p>	<p>Lab-MS48-01-Pulmonary Function Tests (w/ images) Pulmonary function testing with DLCO can confirm normal volumes and degree of air trapping, and a normal DLCO is supportive of asthma, essentially excluding clinically significant emphysema or interstitial lung disease.</p>																								
<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>57%</td></tr> <tr><td>Other</td><td>56%</td></tr> <tr><td>Specialists</td><td>60%</td></tr> </table>	Category	Percentage	All	57%	Other	56%	Specialists	60%	<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>81%</td></tr> <tr><td>Other</td><td>79%</td></tr> <tr><td>Specialists</td><td>90%</td></tr> </table>	Category	Percentage	All	81%	Other	79%	Specialists	90%	<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>86%</td></tr> <tr><td>Other</td><td>84%</td></tr> <tr><td>Specialists</td><td>90%</td></tr> </table>	Category	Percentage	All	86%	Other	84%	Specialists	90%
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<p>Lab-MS48-01-Pulse Oximetry - After Walking Pulse oximetry is important for helping to differentiate any degree of desaturation with exercise, with normal values being less likely in those with COPD.</p>	<p>Lab-MS48-01-Pulse Oximetry - At Rest Resting pulse oximetry is important for establishing a baseline value in patients with chronic respiratory symptoms.</p>	<p>Lab-MS48-01-Spirometry Office spirometry is highly advised in the initial workup of patients with respiratory symptoms suggestive of COPD or asthma.</p>																								
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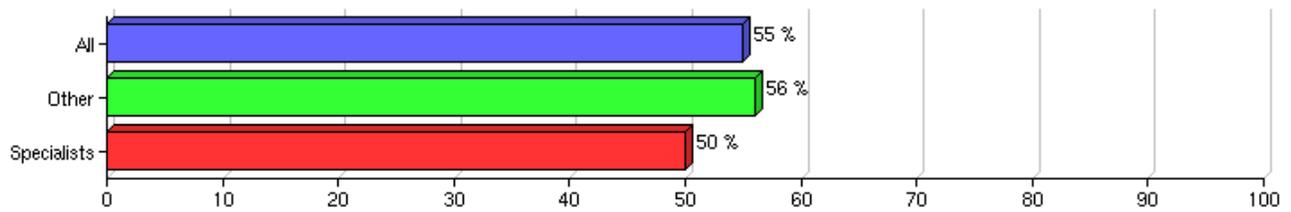
<p>Lab-MS48-01-Alpha-1-Antitrypsin Level Although alpha-1 antitrypsin deficiency only accounts for about 3% of cases of emphysema, all patients with a new diagnosis of COPD should be screened with a measurement of a serum level or phenotype (which reflects the patient's alpha-1 antitrypsin genotype). It is reasonable to screen recovered smokers with COPD once for evidence of this deficiency.</p>	<p>Lab-MS48-01-Electrocardiogram (ECG) Due to a recent ECG showing only non-specific changes and a normal exercise echocardiogram, a repeat ECG is not required but may be optionally repeated.</p>																
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<p>Lab-MS48-01-Glycated Hemoglobin (A1C) With obesity, hypertension and dyslipidemia, it is quite reasonable to screen this 48-year-old man for evidence of type 2 diabetes as well.</p>	<p>Lab-MS48-01-Total Serum IgE A total serum IgE may be ordered, and becomes more important for those with allergic asthma who have not responded to combined moderate to high dose ICS/LABA treatment, leukotriene inhibitor treatment and whose IgE level is abnormally elevated.</p>																
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<p>Lab-MS48-01-Upper GI Endoscopy An esophagogastroduodenoscopy (EGD) may be optionally ordered in this patient without confirmation of GERD but with continued cough despite chronic treatment with a proton pump inhibitor.</p>	<p>Lab-MS48-01-Upper GI Series An esophagogastroduodenoscopy (EGD) or UGI series may be optionally ordered in this patient without confirmation of GERD but with continued cough despite chronic treatment with a proton pump inhibitor.</p>																
<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>56 %</td> </tr> <tr> <td>Other</td> <td>56 %</td> </tr> <tr> <td>Specialists</td> <td>55 %</td> </tr> </tbody> </table>	Category	Percentage	All	56 %	Other	56 %	Specialists	55 %	<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>34 %</td> </tr> <tr> <td>Other</td> <td>34 %</td> </tr> <tr> <td>Specialists</td> <td>33 %</td> </tr> </tbody> </table>	Category	Percentage	All	34 %	Other	34 %	Specialists	33 %
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Dx-MS48-01-Asthma

Required in Simulation

With this patient's respiratory symptoms, decreased FEV1 and FVC but normal FEV1/FVC, lack of low resting or post-walking pulse oximetry and a very abnormal methacholine challenge test, a diagnosis of asthma is confirmed.

User appropriately diagnosed Asthma

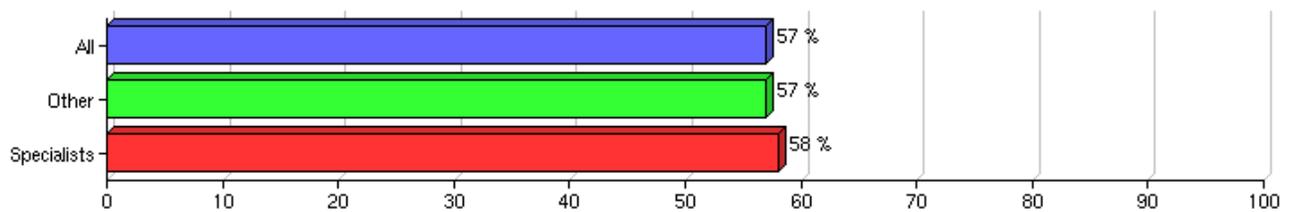


Dx-MS48-01-Obstructive Sleep Apnea (OSA)

Required in Simulation

This obese patient's morning headache, mild memory impairment, and abnormal polysomnogram support a diagnosis of obstructive sleep apnea.

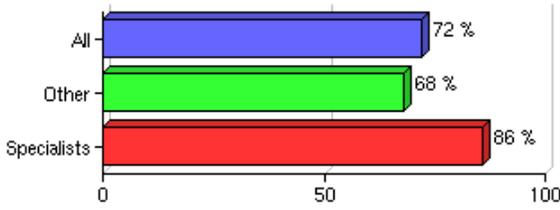
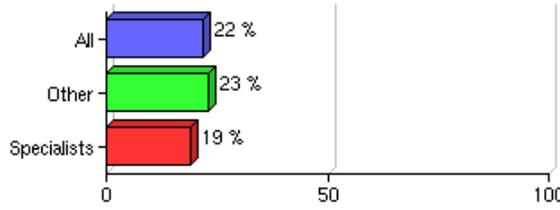
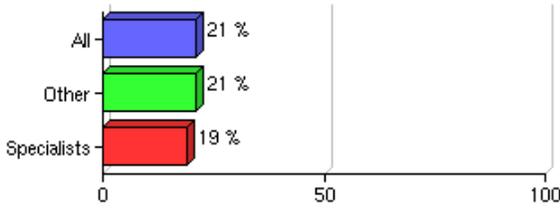
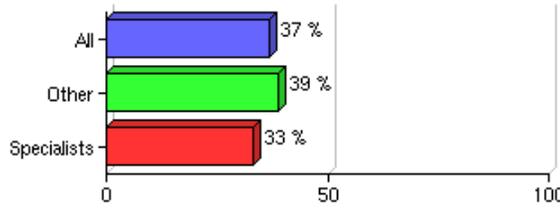
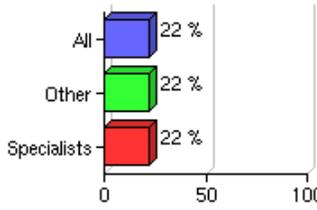
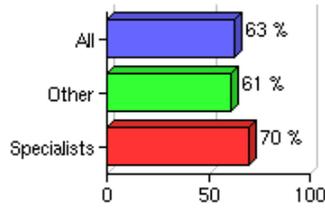
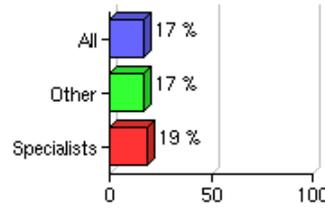
User appropriately diagnosed Obstructive Sleep Apnea (OSA)



<p>Tx-MS48-01-Rescue Inhalers Required in Simulation The continued ready availability of a rescue inhaler, particularly a short-acting beta agonist (such as albuterol), is crucial.</p> <p>User appropriately ordered Rescue Inhaler</p>	<p>Tx-MS48-01-Inhaled Corticosteroid (ICS) Required in Simulation A medium-potency inhaled corticosteroid (ICS) is a good choice at this time in this patient with asthma.</p> <p>User appropriately ordered an ICS</p>																
<table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>88%</td> </tr> <tr> <td>Other</td> <td>90%</td> </tr> <tr> <td>Specialists</td> <td>78%</td> </tr> </tbody> </table>	Group	Percentage	All	88%	Other	90%	Specialists	78%	<table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>44%</td> </tr> <tr> <td>Other</td> <td>42%</td> </tr> <tr> <td>Specialists</td> <td>48%</td> </tr> </tbody> </table>	Group	Percentage	All	44%	Other	42%	Specialists	48%
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<p>Tx-MS48-01-Pneumococcal Vaccine Required in Simulation Administration of a pneumococcal vaccine is appropriate for this patient with asthma and no evidence of prior vaccination against this organism.</p> <p>User appropriately ordered a Pneumococcal Vaccine</p>	<p>Tx-MS48-01-Proton Pump Inhibitors Required in Simulation Use of a proton pump inhibitor, or perhaps an H2 antagonist, is often a very good choice in patients with GERD, particularly when the clinician and patient have difficulty distinguishing the etiology of respiratory symptoms.</p> <p>User appropriately ordered a Proton Pump Inhibitor</p>																
<table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>30%</td> </tr> <tr> <td>Other</td> <td>32%</td> </tr> <tr> <td>Specialists</td> <td>22%</td> </tr> </tbody> </table>	Group	Percentage	All	30%	Other	32%	Specialists	22%	<table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>94%</td> </tr> <tr> <td>Other</td> <td>95%</td> </tr> <tr> <td>Specialists</td> <td>92%</td> </tr> </tbody> </table>	Group	Percentage	All	94%	Other	95%	Specialists	92%
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<p>Tx-MS48-01-Statins Required in Simulation Continuation of a statin is appropriate in this patient with a history of dyslipidemia (elevated LDL-C).</p> <p>User appropriately ordered a Statin</p>	<p>Tx-MS48-01-Thiazides Required in Simulation Continuation of an antihypertensive agent, such as a thiazide diuretic, is appropriate in this patient with hypertension that was controlled only after the addition of hydrochlorothiazide.</p> <p>User appropriately ordered a Thiazide</p>																
<table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>95%</td> </tr> <tr> <td>Other</td> <td>95%</td> </tr> <tr> <td>Specialists</td> <td>92%</td> </tr> </tbody> </table>	Group	Percentage	All	95%	Other	95%	Specialists	92%	<table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>93%</td> </tr> <tr> <td>Other</td> <td>94%</td> </tr> <tr> <td>Specialists</td> <td>90%</td> </tr> </tbody> </table>	Group	Percentage	All	93%	Other	94%	Specialists	90%
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<p>Ord-MS48-01-Adherence Counseling Required in Simulation With this patient's history, specific education and counseling about the importance of adherence to appropriate use, dosage and frequency of his asthma medications is crucial.</p> <p>User appropriately ordered Adherence Counseling</p>	<p>Ord-MS48-01-Inhaler Technique Counseling Required in Simulation Counseling as to appropriate inhaler and asthma medication techniques and frequencies is important in this patient.</p> <p>User appropriately ordered Inhaler Technique Counseling</p>	<p>Ord-MS48-01-Avoidance of Environmental Triggers Required in Simulation The avoidance of tobacco and other established or potential environmental triggers of this patient's respiratory problem is crucial.</p> <p>User appropriately ordered Avoidance of Environmental Triggers</p>																								
<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>11%</td> </tr> <tr> <td>Other</td> <td>10%</td> </tr> <tr> <td>Specialists</td> <td>15%</td> </tr> </tbody> </table>	Category	Percentage	All	11%	Other	10%	Specialists	15%	<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>30%</td> </tr> <tr> <td>Other</td> <td>30%</td> </tr> <tr> <td>Specialists</td> <td>32%</td> </tr> </tbody> </table>	Category	Percentage	All	30%	Other	30%	Specialists	32%	<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>11%</td> </tr> <tr> <td>Other</td> <td>11%</td> </tr> <tr> <td>Specialists</td> <td>8%</td> </tr> </tbody> </table>	Category	Percentage	All	11%	Other	11%	Specialists	8%
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<p>Ord-MS48-01-CPAP Required in Simulation CPAP treatment and weight loss are the therapies of choice in this patient with obstructive sleep apnea.</p> <p>User appropriately ordered a CPAP</p>	<p>Ord-MS48-01-Reflux Precautions Required in Simulation The patient should be advised as to non-pharmacologic measures that may help control his GERD symptoms; these include not eating late in the evening (soon before retiring), avoiding alcohol and spicy foods, and considering use of blocks to elevate the head of his bed.</p> <p>User appropriately ordered Reflux Precautions</p>																									
<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>46%</td> </tr> <tr> <td>Other</td> <td>46%</td> </tr> <tr> <td>Specialists</td> <td>45%</td> </tr> </tbody> </table>	Category	Percentage	All	46%	Other	46%	Specialists	45%	<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>4%</td> </tr> <tr> <td>Other</td> <td>4%</td> </tr> <tr> <td>Specialists</td> <td>3%</td> </tr> </tbody> </table>		Category	Percentage	All	4%	Other	4%	Specialists	3%								
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<p>Ord-MS48-01-Weight Reduction Required in Simulation Weight reduction is very important in this patient with sleep apnea and may be life-prolonging in patients with hypertension and dyslipidemia. Small studies in obese asthmatics have shown significant improvements in asthma symptoms and control following weight loss.</p> <p>User appropriately ordered Weight Reduction</p>	<p>Ord-MS48-01-Exercise Required in Simulation Exercise may be helpful for either asthma or COPD in addition to improving cardiovascular risk factors and postponing the development of overt type 2 diabetes.</p> <p>User appropriately ordered Exercise</p>																									
<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>37%</td> </tr> <tr> <td>Other</td> <td>36%</td> </tr> <tr> <td>Specialists</td> <td>38%</td> </tr> </tbody> </table>	Category	Percentage	All	37%	Other	36%	Specialists	38%	<table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>16%</td> </tr> <tr> <td>Other</td> <td>17%</td> </tr> <tr> <td>Specialists</td> <td>12%</td> </tr> </tbody> </table>		Category	Percentage	All	16%	Other	17%	Specialists	12%								
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<p>Lab-MS48-02-Allergy Skin Tests An allergy work-up is an important component of a comprehensive asthma evaluation as noted by EPR3.</p>	<p>Lab-MS48-02-Anti-Strongyloides and Giardia antibodies It is appropriate for the clinician to exclude common parasites as the etiology of significant eosinophilia and elevated serum IgE.</p>	<p>Lab-MS48-02-Total ANCA A negative result for antineutrophil cytoplasmic autoantibodies makes Churg-Strauss syndrome (CSS) and Wegner's granulomatosis less likely but does not rule them out.</p>																								
<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>65%</td></tr> <tr><td>Other</td><td>63%</td></tr> <tr><td>Specialists</td><td>73%</td></tr> </table>	Category	Percentage	All	65%	Other	63%	Specialists	73%	<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>27%</td></tr> <tr><td>Other</td><td>26%</td></tr> <tr><td>Specialists</td><td>30%</td></tr> </table>	Category	Percentage	All	27%	Other	26%	Specialists	30%	<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>30%</td></tr> <tr><td>Other</td><td>30%</td></tr> <tr><td>Specialists</td><td>30%</td></tr> </table>	Category	Percentage	All	30%	Other	30%	Specialists	30%
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<p>Lab-MS48-02-Asthma Control Test An asthma control test is helpful for quantifying and following the degree of recent asthma control.</p>	<p>Lab-MS48-02-Chemistry Screen Evaluation of serum electrolytes, renal and hepatic function is appropriate in the management of adult patients with a chronic illness.</p>	<p>Lab-MS48-02-CBC w/Differential An eosinophil count above 500 is considered abnormal. The eosinophil count in asthma can be normal or slightly elevated, especially in highly allergic patients. However, an elevated count should prompt an inquiry into other causes of eosinophilia.</p>																								
<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>82%</td></tr> <tr><td>Other</td><td>81%</td></tr> <tr><td>Specialists</td><td>89%</td></tr> </table>	Category	Percentage	All	82%	Other	81%	Specialists	89%	<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>43%</td></tr> <tr><td>Other</td><td>44%</td></tr> <tr><td>Specialists</td><td>38%</td></tr> </table>	Category	Percentage	All	43%	Other	44%	Specialists	38%	<table border="1"> <tr><th>Category</th><th>Percentage</th></tr> <tr><td>All</td><td>59%</td></tr> <tr><td>Other</td><td>60%</td></tr> <tr><td>Specialists</td><td>58%</td></tr> </table>	Category	Percentage	All	59%	Other	60%	Specialists	58%
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<p>Lab-MS48-02-Exhaled Nitric Oxide (eNO) Exhaled nitric oxide (eNO) is produced at increased levels with inflammation. Such testing may indicate the presence and level of inflammation in the airways.</p>	<p>Lab-MS48-02-Post-vaccination Response Measurement of pre- and post-vaccination antibody response represents an easy and readily accessible method for evaluating humoral immunity in patients with low IgG levels.</p>	<p>Lab-MS48-02-Pulmonary Function Tests The demonstration of airway obstruction (a ratio of FEV1/FVC below 75% for adults) and reversibility (more than 12% and 200 ml) remains the main diagnostic criterion for asthma.</p>																								
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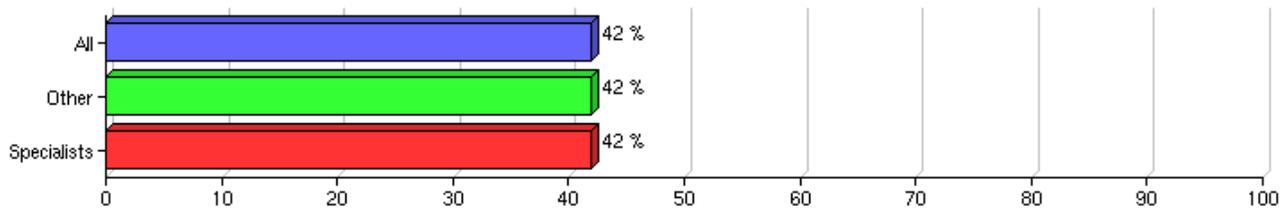
<p>Lab-MS48-02-CT Sinuses Sinus CT is the definitive diagnostic study for chronic sinusitis.</p>  <table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>72 %</td> </tr> <tr> <td>Other</td> <td>68 %</td> </tr> <tr> <td>Specialists</td> <td>86 %</td> </tr> </tbody> </table>	Group	Percentage	All	72 %	Other	68 %	Specialists	86 %	<p>Lab-MS48-02-HIV Diagnostic Panel It is appropriate to consider ordering an HIV diagnostic assay in patients who present with recurrent infections.</p>  <table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>22 %</td> </tr> <tr> <td>Other</td> <td>23 %</td> </tr> <tr> <td>Specialists</td> <td>19 %</td> </tr> </tbody> </table>	Group	Percentage	All	22 %	Other	23 %	Specialists	19 %									
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<p>Lab-MS48-02-Lupus Panel A negative result for these autoantibodies makes Churg-Strauss syndrome (CSS) and Wegner's granulomatosis less likely but does not rule them out.</p>  <table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>21 %</td> </tr> <tr> <td>Other</td> <td>21 %</td> </tr> <tr> <td>Specialists</td> <td>19 %</td> </tr> </tbody> </table>	Group	Percentage	All	21 %	Other	21 %	Specialists	19 %	<p>Lab-MS48-02-Serum Immunoglobulin Measurement Ordering a serum immunoglobulin measurement is appropriate for patients presenting with probable recurrent bacterial infections.</p>  <table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>37 %</td> </tr> <tr> <td>Other</td> <td>39 %</td> </tr> <tr> <td>Specialists</td> <td>33 %</td> </tr> </tbody> </table>	Group	Percentage	All	37 %	Other	39 %	Specialists	33 %									
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<p>Lab-MS48-02-Stool - O & P It is appropriate to exclude common parasites as the etiology of significant eosinophilia and elevated serum IgE.</p>  <table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>22 %</td> </tr> <tr> <td>Other</td> <td>22 %</td> </tr> <tr> <td>Specialists</td> <td>22 %</td> </tr> </tbody> </table>	Group	Percentage	All	22 %	Other	22 %	Specialists	22 %	<p>Lab-MS48-02-Total Serum IgE The patient's IgE is elevated and requires a further investigation.</p>  <table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>63 %</td> </tr> <tr> <td>Other</td> <td>61 %</td> </tr> <tr> <td>Specialists</td> <td>70 %</td> </tr> </tbody> </table>	Group	Percentage	All	63 %	Other	61 %	Specialists	70 %	<p>Lab-MS48-02-Transbronchial Lung Biopsy A transbronchial lung biopsy is inappropriate at this point in the patient's management.</p>  <table border="1"> <thead> <tr> <th>Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>17 %</td> </tr> <tr> <td>Other</td> <td>17 %</td> </tr> <tr> <td>Specialists</td> <td>19 %</td> </tr> </tbody> </table>	Group	Percentage	All	17 %	Other	17 %	Specialists	19 %
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Dx-MS48-02-Asthma, Severe Persistent

Required in Simulation

Our patient has daily symptoms requiring SABA usage multiple times a day. She also complains of nocturnal asthma. Her prebronchodilator lung function shows an obstructive pattern. She has functional limitation as reflected by ACT score. The presence of the foregoing puts her in the severe persistent asthma category.

User appropriately diagnosed Severe Persistent Asthma

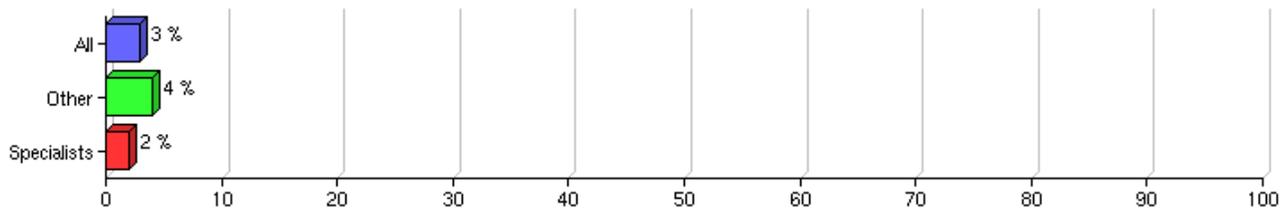


Dx-MS48-02-Elevated IgE and Eosinophilia

Required in Simulation

The patient's medical history and initial workup for elevated IgE and eosinophilia does not support a role for ABPA, CSS, atopic dermatitis, allergy to foods or drugs (including ASA sensitivity). The workup for parasitic infection is in progress.

User appropriately diagnosed Elevated IgE and Eosinophilia

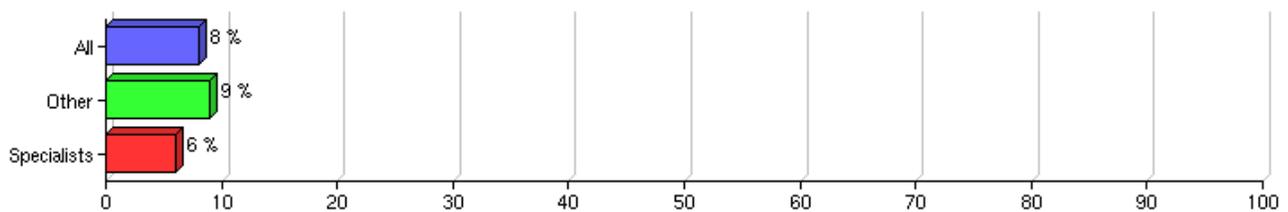


Dx-MS48-02-Nasal Polyposis

Required in Simulation

Physical exam supports a diagnosis of nasal polyposis.

User appropriately diagnosed Nasal Polyposis

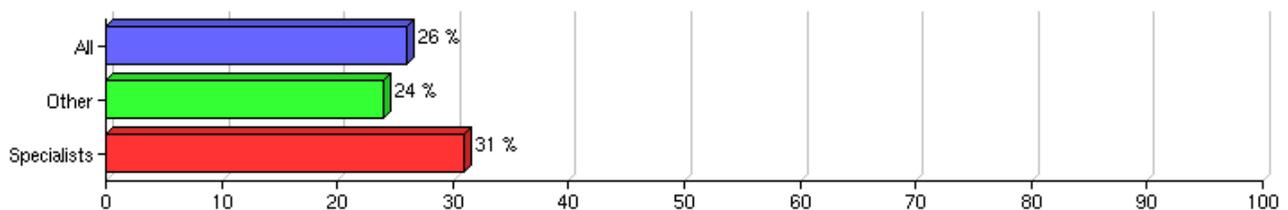


Dx-MS48-02-Chronic Sinusitis

Required in Simulation

Besides having a stated history of apparent recurrent episodes of acute infectious sinusitis, this patient now exhibits ongoing signs and symptoms of chronic sinusitis despite the absence of evidence of overt infection.

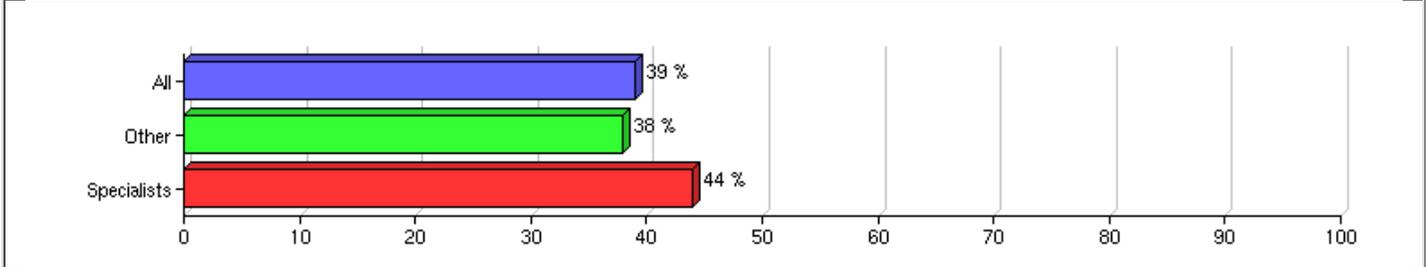
User appropriately diagnosed Chronic Sinusitis



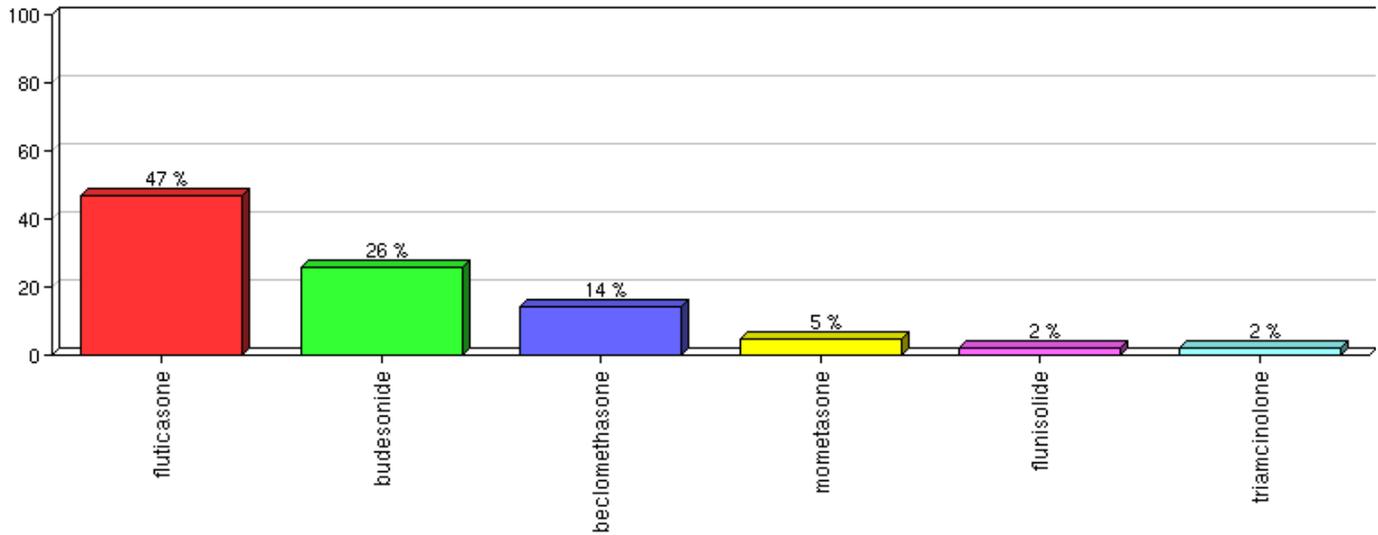
<p>Tx-MS48-02-Corticosteroids (inhaled) Required in Simulation Continued use of an inhaled corticosteroid in moderate to high doses is required. User appropriately ordered an inhaled Corticosteroid</p>	<p>Tx-MS48-02-Leukotriene Modifiers Required in Simulation LTRA block allergic mediators called leukotriene C4 and D4. They reduce allergic inflammation and improve symptoms of allergic rhinitis and asthma. User appropriately ordered a Leukotriene Modifier</p>	<p>Tx-MS48-02-Rescue Inhalers Required in Simulation The continued ready availability of a rescue inhaler, particularly a short-acting beta agonist (such as albuterol), is crucial. User appropriately ordered a Rescue Inhaler</p>																								
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<p>Tx-MS48-02-Step 5 Addition to ICS Required in Simulation The present options include adding a LABA and/or a leukotriene receptor antagonist to her ICS. There is rationale for both options. User appropriately ordered a Step 5 Addition to ICS</p>	<p>Tx-MS48-02-Nasal Corticosteroid Spray Required in Simulation Nasal steroids are effective in suppressing nasal polypoid growth. User appropriately ordered a Nasal Corticosteroid Spray</p>																									
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<p>Tx-MS48-02-Antihistamines Required in Simulation Continuation of an oral antihistamine is appropriate in this patient with chronic allergic rhinitis. User appropriately ordered an Antihistamine</p>	<p>Tx-MS48-02-Pneumococcal Vaccine Required in Simulation Administration of a pneumococcal vaccine is appropriate for this patient with asthma. User appropriately ordered a Pneumococcal Vaccine</p>																									
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<p>Ord-MS48-02-Allergen Avoidance Counseling Required in Simulation Environmental controls play an important role in the management of allergic asthma (EPR3). User appropriately ordered Allergen Avoidance Counseling</p>	<p>Ord-MS48-02-Allergen Immunotherapy Required in Simulation Immunotherapy improves symptoms of allergic rhinitis and allergic asthma and reduces medication need. User appropriately ordered Allergen Immunotherapy</p>																
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<p>Ord-MS48-02-Inhaler Technique Counseling Required in Simulation Proper inhalation technique is essential for delivery of the drug to the lungs. User appropriately ordered Inhaler Technique Counseling</p>	<p>Ord-MS48-02-Follow-up Clinic Visit with Spirometry Required in Simulation EPR3 recommends that a follow-up clinic visit be scheduled to make sure that the intervention helped bring asthma under control. User appropriately ordered a Follow-up Clinic Visit with Spirometry</p>																
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<p>Ord-MS48-02-Nasal Saline Irrigation Required in Simulation Counseling concerning appropriate nasal saline irrigation technique should be offered and recommended. User appropriately ordered Nasal Saline Irrigation</p>	<p>Cons-MS48-02-ENT Required in Simulation Surgical polypectomy improve symptoms of rhinitis and chronic sinusitis in most patients and induces long-lasting remission in many patients. User appropriately ordered an ENT consult</p>																
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MS48-01-Tx-ICS+Rescue
User ordered both a rescue inhaler and an ICS



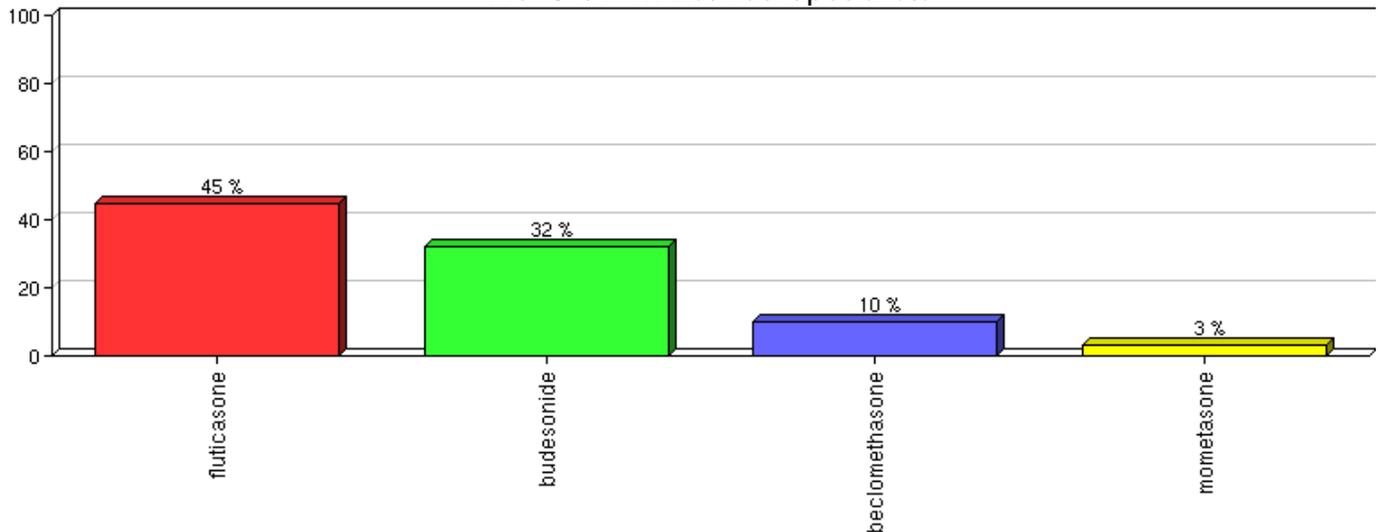
MS48-01-Tx List - ICS - All



Report Description

fluticasone	62	133	47%
budesonide	35	133	26%
beclomethasone	18	133	14%
mometasone	7	133	5%
flunisolide	2	133	2%
triamcinolone	2	133	2%

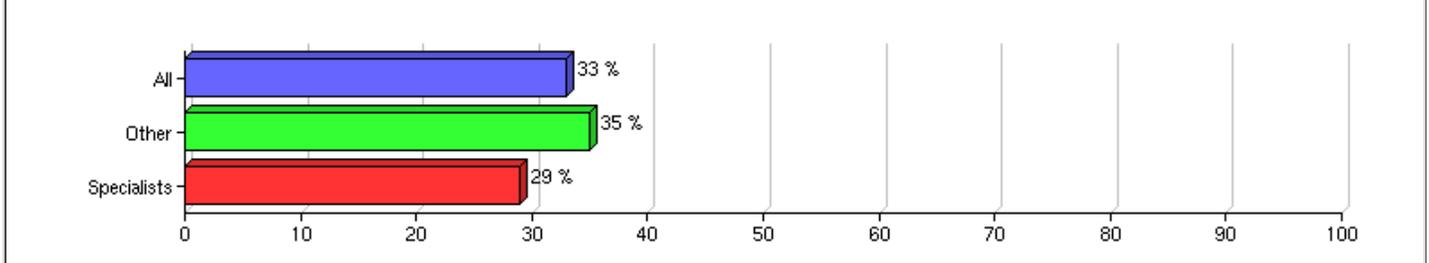
MS48-01-Tx List-ICS-Specialists



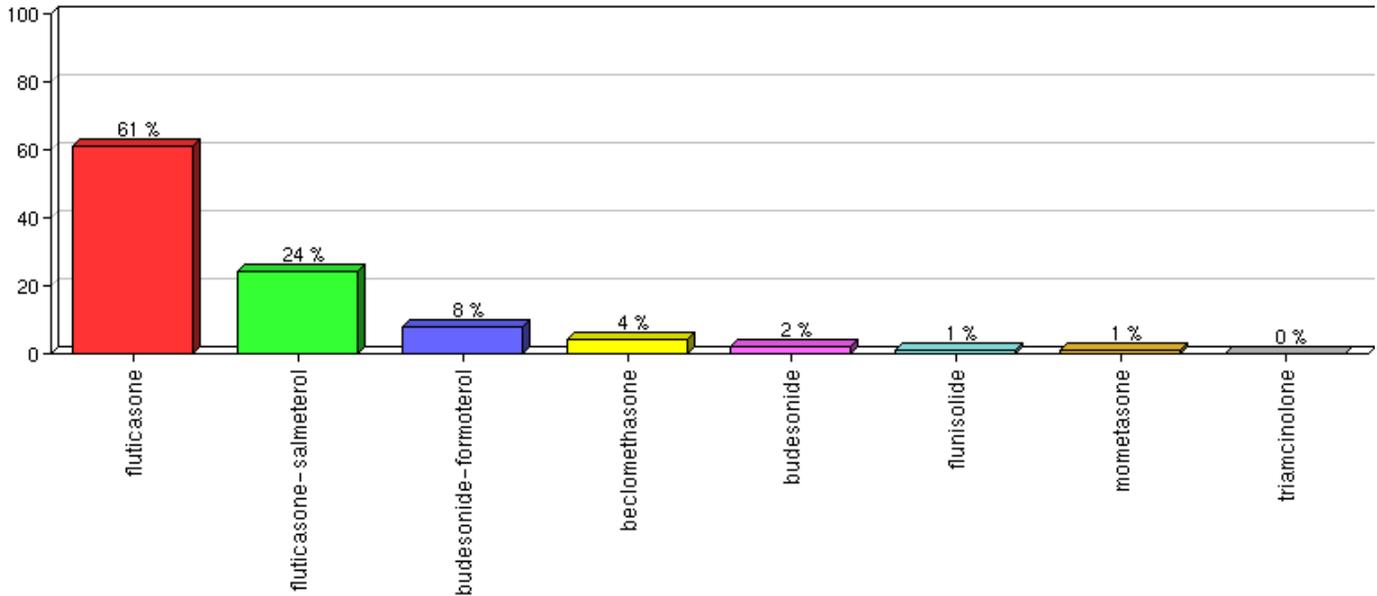
Report Description
fluticasone
budesonide
beclomethasone
mometasone

14 31 45%
10 31 32%
3 31 10%
1 31 3%

MS48-02-Tx-Cortico + Leuk + Step



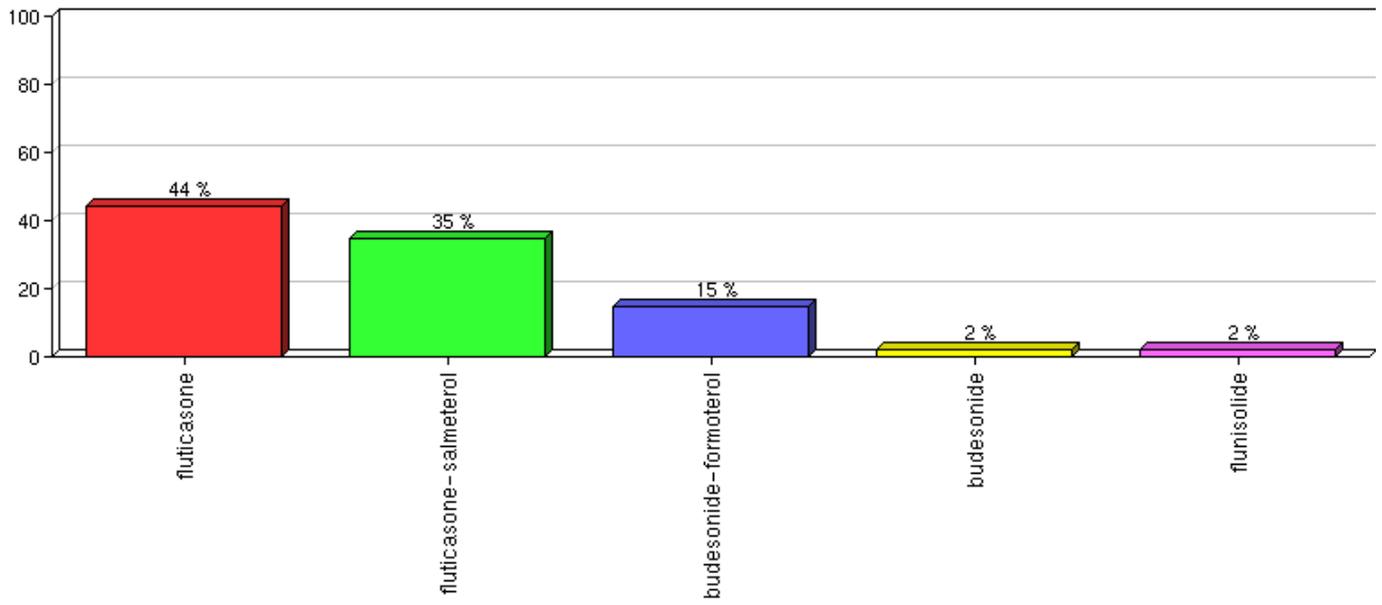
MS48-02-Tx-List-Cortico-All



Report Description

fluticasone	191	315	61%
fluticasone-salmeterol	77	315	24%
budesonide-formoterol	26	315	8%
beclomethasone	12	315	4%
budesonide	5	315	2%
flunisolide	3	315	1%
mometasone	2	315	1%
triamcinolone	1	315	0%

MS48-02-Tx-List-Cortico-Specialists



Report Description

fluticasone	27	62	44%
fluticasone-salmeterol	22	62	35%
budesonide-formoterol	9	62	15%
budesonide	1	62	2%
flunisolide	1	62	2%