Title
An update on United States asthma centers: 2013

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An update on United States asthma centers: 2013

Asthma is a major public health problem affecting 26 million people in the United States.1 There are an estimated 1.8 million annual emergency department (ED) visits and 440,000 hospitalizations for asthma exacerbations,1 with the number of ED visits and hospitalization rates for asthma stable from 2001 through 2009.2 The annual direct cost of asthma in the United States is $50 billion, with the cost of an ED visit nearly 5 times the cost of an office-based visit.3 A decrease in the number of ED visits for asthma remains one of the US government's public health priorities.4

The prevention of serious asthma exacerbations and the consequent decrease in ED visits and hospitalizations require appropriate asthma monitoring, treatment, and patient education.5 One potentially attractive way to improve guideline-concordant care is through referral of ED patients with acute asthma to local asthma centers.6 In 2004 and 2006, to describe the characteristics of asthma centers, we conducted surveys involving investigators with an interest in asthma who participated in the Emergency Medicine Network (EMNet), allergy and immunology fellowship directors, and pulmonary and critical care fellowship directors.7 We identified several areas for improvement in provided services (eg, extended hours of operation, availability of environmental allergen skin testing on the day of the visit, and increase in the percentage of patients seen at asthma centers undergoing allergy testing). In the present study, we sought to update our characterization of asthma centers and to identify potential changes in asthma centers over time.

We performed surveys of US asthma centers in 2013 and compared the findings to our previous surveys in 2004 and 2006. The methods of the 2 previous surveys have been reported.7 In late 2013, as a part of the 36th Multicenter Airway Research Collaboration (MARC-36), a multicenter observational study on ED management of acute asthma, we repeated the prior survey7 at the 48 participating sites of the MARC-36 study (eAppendix). The survey consisted of 2 parts. An initial online survey asked emergency medicine researchers at the participating sites if there was a local asthma center (ie, a stand-alone clinic focusing on asthma or a usual allergy or pulmonary clinic that has time set aside for preferential scheduling of individuals with asthma). A second online survey, for the hospitals with asthma centers, asked asthma center directors to describe the characteristics at their center, including availability to patients, typical visit volume, staffing, services, and proportion of patients who receive specific asthma-related tests. The institutional review board of each participating center approved the study.

We compared the characteristics of the asthma centers affiliated with the 48 hospitals from the 2013 survey with those in the 2004 and 2006 surveys. We analyzed asthma centers independently across the 2 study periods (2004 and 2006 vs 2013) using Kruskal Wallis, c2, and Fisher exact tests. All tests were 2-tailed, and a P value less than .05 was regarded as statistically significant. All analyses were performed with SAS 9.3 (SAS Institute, Cary, North Carolina).

Among 48 participating hospitals in the MARC-36 study, 48 (100%) completed the initial online survey in 2013, with 22 (46%; 95% confidence interval 31e61) reporting asthma centers. Of these, 22 (100%) asthma centers from 12 US states responded to the second survey in 2013. Our 2004 and 2006 surveys identified 17 sites with asthma centers among these 48

hospitals, so there was a 29% net increase in the availability of asthma centers. More specifically, the 2013 survey identified 7 new asthma centers and found that 1 site had closed its asthma center by no longer setting aside specific days for patients with asthma and another site had closed its center because the lead physician retired.

Asthma center characteristics, staffing, and services are listed in Table 1. For most variables, asthma centers were similar across the 2 periods. For example, there were no significant differences in the median number of days open per week or in the number of patients seen in a half-day. In 2013, 32% of all asthma centers were open 11 to 20 hours. There was no significant difference in the professional affiliations of physicians staffing the centers or in the emergency options available for patients. In contrast, all asthma centers in 2013 reported the availability of environmental allergen blood testing on the same day of the visit, which was a clear increase from 2004 and 2006 to 2013 (71% vs 100%, respectively; P ¼ .01). Nevertheless, the availability of environmental allergen skin testing on the day of the visit was low in 2004, 2006, and 2013. In 2013, 27% of asthma centers reported that at least 90% of patients underwent a skin or blood test for environmental allergens during one of their asthma center visits.

Table 1
Characteristics, staffing, and services of asthma centers according to period[a]

Variables	2004 and 2006	2013	*P* value[b]
	Centers (n = 17)	Centers (n = 22)	
Characteristics			
Days open per week, median (IQR)	5 (3–5)	5 (3–5)	.86
Hours open per week			.29
≤10	29	14	
11–20	6	32	
21–30	12	18	
31–40	24	18	
>40	29	18	
Patients seen in half-day[c]			.50
≤10	18	18	
11–20	35	50	
21–30	24	18	
31–40	18	5	
>40	0	9	
Professional affiliation of physicians[d]			
Allergy/immunology	59	41	.27
Pulmonary	88	82	.67
Primary care	6	9	.71
Other	6	14	.62
Services			
Emergency options available for patients[c]			
Same-day clinic visit	71	73	.51
Answering service	71	55	.23
Pager	59	41	.22
Referral to ED	88	77	.20
Spirometry available on day of visit	100	95	.37
Visits per week that include a spirometry test, %[c]			.76
<10	6	9	
10–49	30	32	
50–89	29	41	
≥90	29	18	
Environmental allergen skin testing available on day of visit	24	36	.39
Environmental allergen blood testing available on day of visit	71	100	.01[e]
Patients who undergo skin or blood testing for environmental allergens during 1 of their asthma center visits, %			.40
<10	29	9	
10–49	35	36	
50–89	6	23	
≥90	18	27	
Unsure	12	5	

Abbreviations: ED, emergency department; IQR, interquartile range.

[a]Data are presented as percentages of centers unless otherwise indicated. Responses were 100% in the 2 study periods.

[b]Assuming independence of sites across study periods.

[c]One unsure response from the 2004 and 2006 study periods.

[d]More than 1 physician may be affiliated with an asthma center, so respondents could select all affiliations that applied to physicians associated with the center. Thus, the column sums to more than 100%.

[e]Statistically significant.

Overall, our surveys show an increase in the number of asthma centers among the 48 hospitals surveyed. This matches the increase in asthma prevalence from 2001 to 20102 and presumably the increased need for specialized asthma services. Most basic characteristics of an asthma center did not change over the years studied (2004 and 2006 vs 2013) The one clear change was an increase in the availability of environmental allergen blood testing on the day of the visit, with 100% of asthma centers reporting availability of this testing. This is a positive step in ensuring that allergy testing is performed for all patients with persistent asthma, as recommended by national guidelines.5

Our sample of mostly academic hospitals and their affiliated asthma centers is relatively small and may not reflect the characteristics of, and services available at, all US asthma centers. Nevertheless, our sample suggests that the number of asthma centers is increasing and that centers have increased availability of environmental allergen blood testing, which are positive signs. Given the potential for asthma centers to decrease the number of hospitalizations and ED visits for acute asthma and improve other asthma outcomes,8,9 the specialized care provided by asthma centers remains an important health care service in a time of increasing asthma prevalence.

Study Collaborators

The following individuals were MARC-36 site investigators who are collaborators in this article: Annette O. Arthur, PharmD, Oklahoma University Medical Center, Oklahoma City, Oklahoma; Brigitte M. Baumann, MD, MSCE, Cooper University Hospital, Camden, New Jersey; Ronald S. Benenson,MD, York Hospital, York, Pennsylvania; RoseM. Chasm, MD, University ofMarylandMedical Center, Baltimore, Maryland; Sunday Clark, ScD, MPH, New York-Presbyterian Hospital/Weill Cornell Medical Center, New York, New York; Francis L. Counselman, MD, Sentara Norfolk General Hospital, Norfolk, Virginia; Cameron Crandall,MD, PhD, University of NewMexico Health Sciences Center, Albuquerque, NewMexico; Rita K. Cydulka, MD, MS, MetroHealth Medical Center, Cleveland, Ohio; Stewart O. Sanford, MD, Albert Einstein Medical Center, Philadelphia, Pennsylvania; Michael J. Drescher, MD, Hartford Hospital, Hartford, Connecticut; Daniel J. Egan, MD, St Luke's- Roosevelt Hospital Center, New York, New York; Christopher Fee, MD, University of CaliforniaeSan Francisco Medical Center, San Francisco, California; Theodore J. Gaeta, DO, MPH, New York Methodist Hospital, Brooklyn, New York; Michael G. Gonzalez, MD, Ben Taub General Hospital, Houston, Texas; John E. Gough, MD, East Carolina University, Vidant Medical Center, Greenville, North Carolina; Blanca Grand, DO, St Barnabas Hospital, Bronx, New York; Richard O. Gray, MD, Hennepin County Medical Center, Minneapolis, Minnesota; Megan Healy, MD, Temple University Hospital, Philadelphia, Pennsylvania; Eva Tovar Hirashima, MD, MPH, Massachusetts General Hospital, Boston, Massachusetts; Talmage M. Holmes, PhD, MPH, University of Arkansas for Medical Sciences, Little Rock, Arkansas; P. Charles Inboriboon, MD, MPH, Truman Medical Center Hospital, Kansas City, Missouri; Mark J. Leber, MD, MPH, Brooklyn Hospital Center, New York, New York; Heather A. Lindstrom, PhD, Buffalo General Hospital, Buffalo, New York; Bernard L. Lopez, MD, MS, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania; Frank LoVecchio, DO, Maricopa Medical Center, Phoenix, Arizona; Rashid F. Kysia, MD, MPH, John H. Stroger Jr Hospital of Cook County, Chicago, Illinois;Mark I. Langdorf, MD, MHPE, University of CaliforniaeIrvine Medical

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Supplementary Data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.anai.2014.07.013.

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Internet searches and allergy: temporal variation in regional pollen counts correlates with Google searches for pollen allergy related terms

Allergies affect 20% to 40% of the US population,1 with an increasing prevalence of ocular and nasal symptoms. The exacerbation of allergies has been shown to directly correlate with seasonal elevations in aeroallergens as reported with pollen counts.2 Google and similar search engines increasingly serve as primary sources of medical information for the public. Approximately 72% of Internet users seek health-related information on the Internet, with 77% using search engines.3 Google searches account for approximately 67%.4

Increased Google searches for influenza-related terms have been noted 1 to 2 weeks before heightened influenza like illness using Centers for Disease Control and Prevention surveillance reports, 5 with similar correlations for West Nile virus and respiratory syncytial virus.6 In the United Kingdom, Google Trends showed seasonal variation in search volume trends for seasonal allergic rhinoconjunctivitis.7 Thus, interest and search volume exhibit a

correlation with the temporal distribution of inflammatory airborne biomaterial. However, the effect of pollen fluctuations on patients' searches into allergy topics has not been investigated. We examined pollen counts (grains or spores per cubic meter of air measured by Rotorod [IMS Health, Plymouth Meeting, Pennsylvania]) on a weekly averaged basis (2010e2011) in the New Jersey and New York metropolitan area and compared these with search volume trends for allergy-related terms generated by Google Insights, an analytics tool for gauging and comparing interest in search terms entered into Google. Search terms included allergic rhinitis (AR), nasal allergy (NA), allergic conjunctivitis, eye allergy, ocular allergy (OA), pollen allergy, hay fever (HF), and rose fever for the total US population. A frequency curve corresponding to temporal trends in search volume was generated for each term using the number of searches for the term relative to the total searches, with the data normalized and scaled (0e100, with each point divided by the highest value and then multiplied by 100). Some curves are valued at 0 throughout, a result of a traffic threshold. All searches were performed on March 9, 2012.

Correlation of weekly comparisons was tested, with H0 indicating no linear correlation between Google Insights scores and pollen count and Ha indicating some linear correlation. An F

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eAppendix

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Stanford University Medical Center	Nancy E. Wang, MD
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