

A New Era In Asthma Management

Assessing Asthma Control Children, Adolescents and Adults

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Nebraska
Medical Center



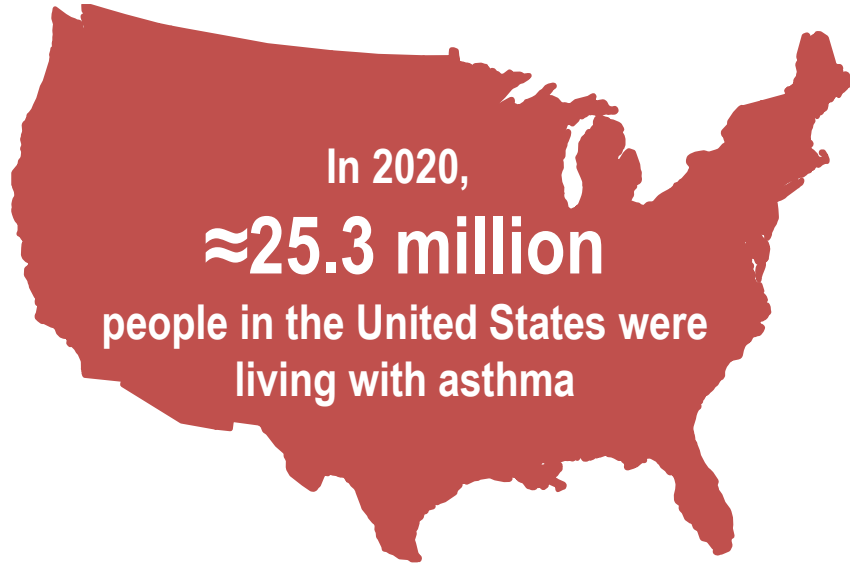
BOYS TOWN
National Research
Hospital



Objectives

- Recognize the impact of uncontrolled asthma on patients with asthma in the United States
- Review the ability of patients, physicians and asthma control tools to identify symptom impairment and exacerbation risk
- Demonstrate that the point-of-care use of the asthma control composite tool AIRQ[®] best identifies uncontrolled asthma resulting in improved asthma control

Burden of Disease: Uncontrolled Asthma in the United States



≈10.3 million
Annual asthma attacks
2020



≈1.8 million
Annual ED visits
2019



≈170,000
Annual hospitalizations
2019



Significant Exposure to OCS
≈65%
Patients over a 2-year period received 1-2 courses of OCS

CDC. Most Recent National Asthma Data. https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm.

Tran TN, MacLachlan S, Hicks W, et al. Oral corticosteroid treatment patterns of patients in the United States with persistent asthma. *J Allergy Clin Immunol Pract.* 2021;9(1):338-346

Projected Health and Economic Burden of Asthma if Control in the US Does Not Improve

Projections from 2019 to 2038 among patients aged 15 years or older...

Asthma prevalence

17.7 Million

patients are projected to be living with asthma in 2038, up from 15.9 million patients in 2019

Uncontrolled asthma

52%

of all patient-years with asthma will be uncontrolled

Cost

≈\$1 Trillion

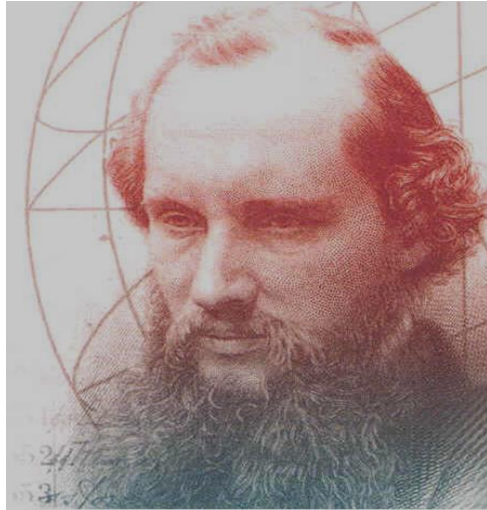
is the projected cumulative total-direct (\$300.65 B) and excess-indirect (\$662.9 B) cost associated with uncontrolled asthma

Unmet Need: Improving Asthma Control

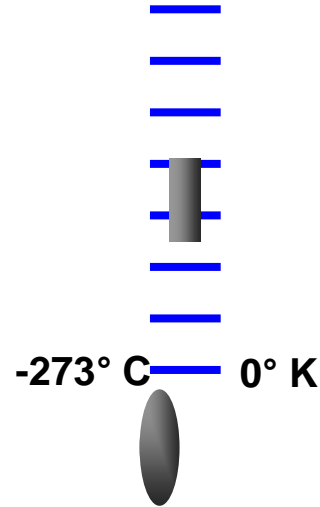


Assessment of Asthma Control

"When you cannot measure what you are speaking about and express it in numbers, your knowledge is meager and unsatisfactory"



Lord Kelvin (1824-1907)



If you can not measure it,
you can not change it !!

Asthma Insights and Management (AIM) Survey

National Survey of Physicians, Asthma and Non-Asthmatic Patients

Population	Sampling Frame	Completed Sample
Patient Surveys: 7/29/09 – 9/10/09		
Current asthma	National 60,682 households screened	2500
Non-asthma population	National	1004
Physician Survey: 8/21/09 – 10/01/09		
Health care professional - Family practice - Allergist - Pulmonologist - Internal medicine	AMA/AOA master list	309 (101) (104) (54) (50)

AMA: American Medical Association
AOA: American Osteopathic Association

Asthma Insights and Management (AIM) Survey



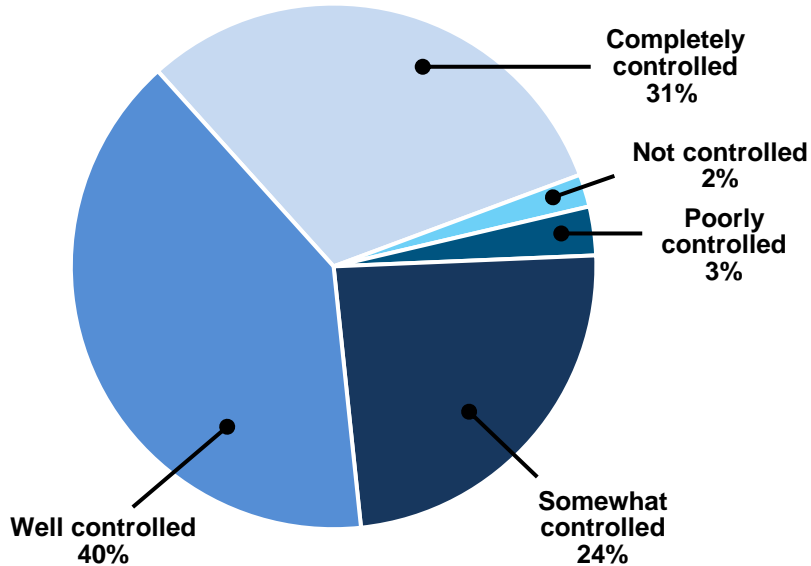
Survey Results: Overview

- Asthma Symptoms
- The Burden of Asthma
- Exacerbations, Flare-ups, and Attacks
- Asthma Control, Management, and Treatment

Asthma Insights and Management (AIM) Survey

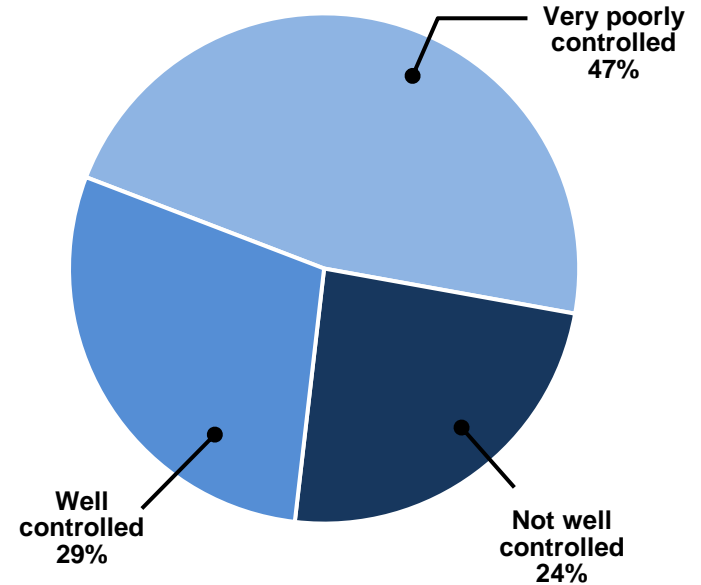
Patient Perspective

71% well or completely controlled



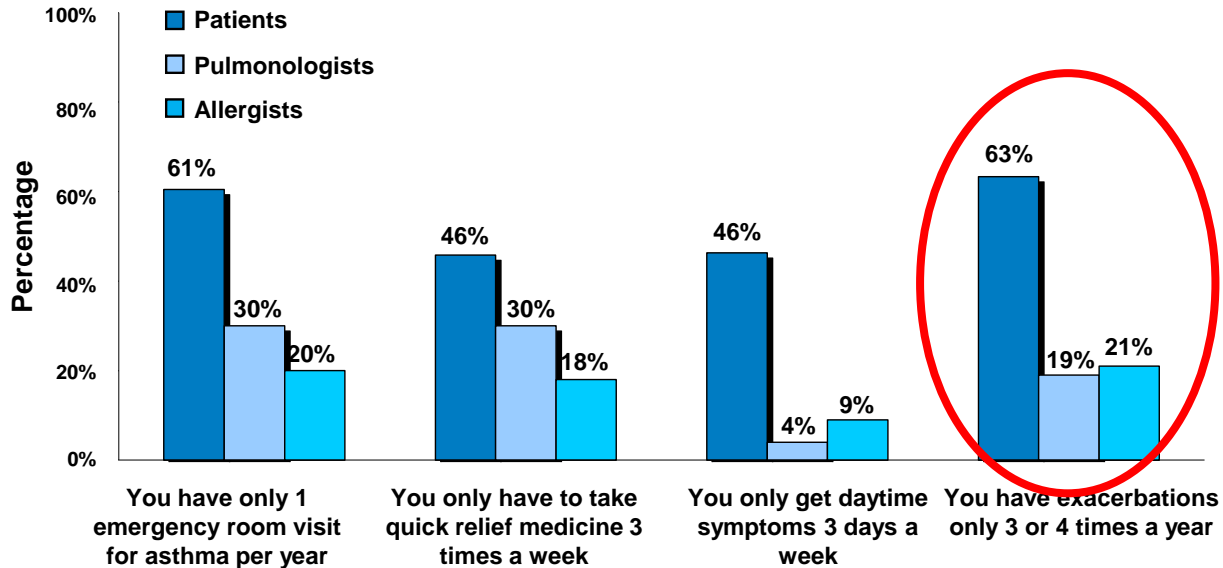
NAEPP Control Classification

29% well controlled



Patient and Physician Attitudes About Asthma Management

Agree Asthma Is Considered Well Managed If:



Unmet Need: Addressing the Comprehensive Assessment of Asthma Control



Asthma control consists of 2 domains, represented by **symptom impairment** and **exacerbation risk**

Many asthma control questionnaires (**ACQ**, **ACT**, **CACT** and **ATAQ**) that are recommended by expert guidelines or reports to assess adolescents and adults with asthma address only the **impairment domain**

Unmet Need: Addressing the Comprehensive Assessment of Asthma Control

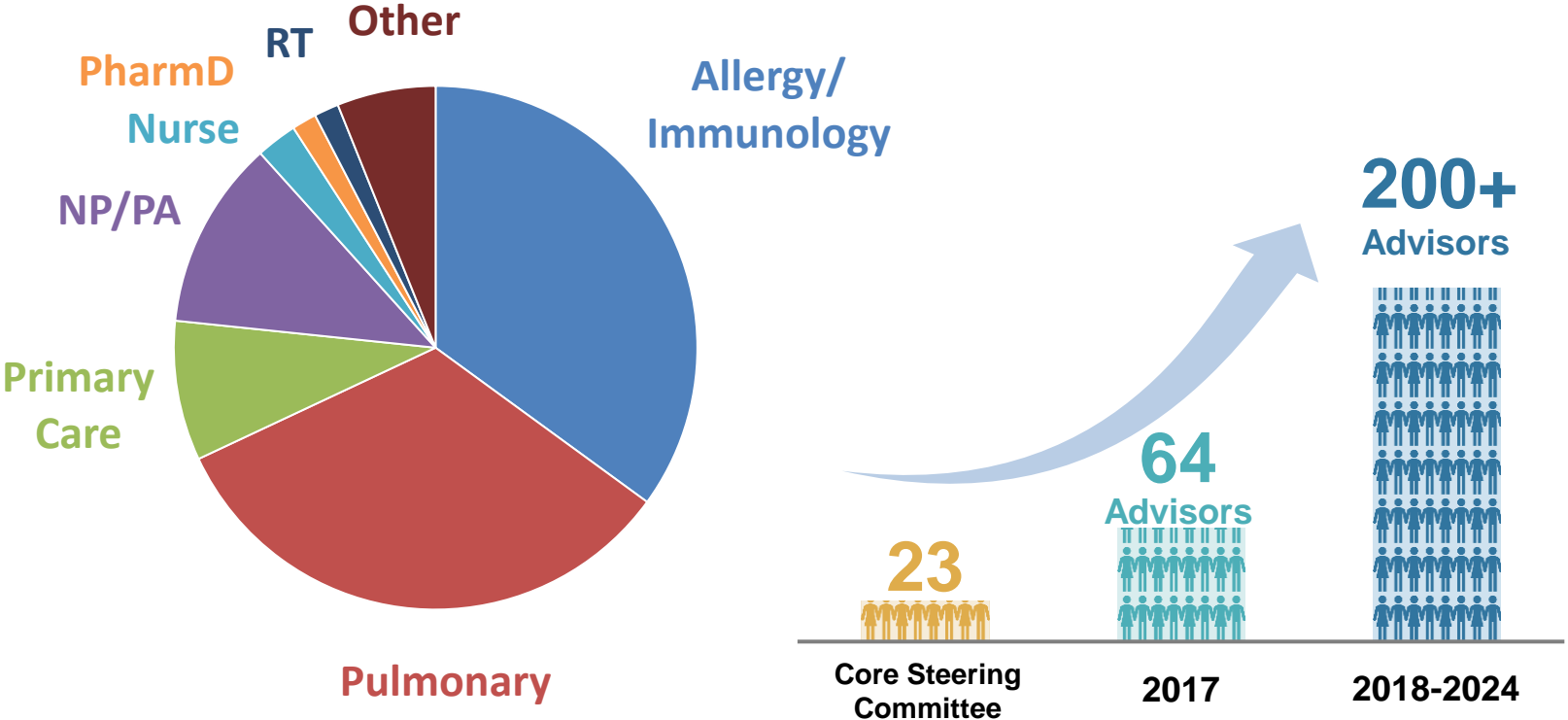


Asthma control consists of 2 domains, represented by **symptom impairment** and **exacerbation risk**

Many asthma control questionnaires (**ACQ, ACT, CACT and ATAQ**) that are recommended by expert guidelines or reports to assess adolescents and adults with asthma address only the **impairment domain**

The PRECISION Program was initiated to develop innovative, **validated tools** to improve the **identification** of uncontrolled asthma and **educational resources** for both practitioners and patients

Precision Program: Multidisciplinary Advisor Network



US Advisor-Developed PRECISION Tools

1

Asthma Impairment and Risk Questionnaire: AIRQ™



AIRQ™

10 item, yes/no, low literacy asthma impairment and risk control tool

2

Evaluation and Management Navigator: AIRCOMPASS™

ASSESS pharmacologic, non-pharmacologic, and physiologic-phenotypic factors



EDUCATE patients about their asthma risk, potential management options, and avoidance techniques

TAKE ACTION to confirm asthma diagnosis, help patients control symptoms, or refer to a specialist, if applicable

AIRCOMPASS™

An asthma evaluation and management tool for healthcare providers based on a patient's AIRQ™

3

Asthma Resource Center Website



EDUCATIONAL RESOURCES

Spirometry Comorbidities

Inhalers Phenotyping

Asthma Guidelines

Asthma Resource Center

An asthma educational website for all healthcare providers

Access at www.airqscore.com

AIRQ™ Validation Studies

CROSS-SECTIONAL STUDY

- **Objective:**
 - Derive the final AIRQ™ questions, scoring algorithm, and cut-points to validate AIRQ™ as a measure of current asthma control (Impairment and Risk)
- N = 442 patients, all severities, \geq 12 years, 12 clinical sites

LONGITUDINAL STUDY

- **Objective:**
 - Validate a Follow Up AIRQ™
 - Assess the ability of AIRQ™ to predict future exacerbations
 - Compare the AIRQ™ to other control tools
- N = 1121 patients, 25 clinical sites

AIRQ™ CROSS-SECTIONAL Validation STUDY

Background

- Asthma exacerbation risk increases with worsening asthma control
- Prevailing numerical control tools, such as ACT™ and ACQ™, evaluate only current symptom impairment despite the importance of also assessing risk based on exacerbation history
- An easy-to-use questionnaire addressing impairment and risk domains of control is needed

Objective

- Derive the final AIRQ™ questions, scoring algorithm, and cut points to validate AIRQ™ as a measure of current asthma control (Impairment and Risk)

AIRQ™ CROSS-SECTIONAL VALIDATION STUDY

Characteristics

- 442 patients, aged ≥ 12 years
- Patients had physician-diagnosed asthma and were followed in specialty practices
- Patients spanned all Global Initiative for Asthma (GINA) severities
- Geographic and socio-economic diversity
- 12 unique specialty practices

Methodology

Patients completed:

- 10 original yes/no screener questions in addition to 5 new questions
- A 5-point Likert scale question on self-perceived asthma control
- ACT™

HCPs completed:

- A form summarizing past year's clinical, physiologic, and biomarker data
- A 5-point Likert scale question on patient's asthma control following chart review, patient interview, and exam

The Criterion Standard of Asthma Control

AIRQ™ was Validated Against

ACT™ + Exacerbation Outcome*	ACT™ Score	OCS Use or ED/unplanned Visits in Past 12 Months	Hospitalization in Past 12 Months
Well-controlled	≥20	AND 0	AND 0
Not well-controlled	16-19	OR 1	AND 0
Very poorly controlled	≤15	OR ≥2	OR ≥1

Exacerbation was defined as a change in asthma clinical status requiring a course of systemic corticosteroids (oral steroids for ≥3 days) OR an emergency department, urgent care, or unplanned office visit for an asthma exacerbation (not associated with a hospitalization) OR hospital stay for asthma for >24 hours.

*Well-controlled: ACT™ ≥20 and no OCS use, ED/unplanned visits, or hospitalizations. Not well-controlled: ACT™ of 16-19 **or** 1 burst of OCS **or** 1 visit to the ED/unplanned visit due to asthma in the past 12 months with no hospitalizations in the past 12 months. Very poorly controlled: ACT™ ≤15 **or** ≥2 bursts of OCS **or** ED/unplanned visits or hospitalized due to asthma in the past 12 months.

Murphy KR et al, on behalf of the US PRECISION Advisory Board. *J Allergy Clin Immunol Pract.* 2020;8(7):2263-2274.e5.

Candidate AIRQ™ Questions

Item*	Model 1 Well-controlled vs Not-well-controlled/Very Poorly Controlled	Model 2 Well-controlled/Not-well-controlled vs Very Poorly Controlled
1. Are you currently prescribed any of the inhalers below? (GINA 4/5 ICS/LABA fixed-dose combinations)		
In the past 2 weeks, has coughing, wheezing, shortness of breath, or chest tightness:		
2. Caused you to use your rescue inhaler or nebulizer <u>more than 4 times</u> ?		
3. <i>Limited the activities you want to do <u>every day</u>?</i>	X ^a	
4. <i>Bothered you during the day on <u>more than 4 days</u>?</i>	X ^b	
5. <i>Woke you up from sleep <u>more than 1 time</u>?</i>		X ^a
In the past 12 months, has coughing, wheezing, shortness of breath, or chest tightness:		
6. <i>Caused you to take steroid pills or shots, such as prednisone or Medrol[®]?</i>	X ^b	X ^b
7. <i>Caused you to go to the emergency room or have unplanned visits to a health care provider?</i>		X ^b
8. <i>Caused you to stay in the hospital overnight?</i>		
Has coughing, wheezing, chest tightness, or shortness of breath:		
9. <u>Ever</u> caused you to be in an intensive care unit, have a breathing tube put down your throat, or made you think your life was in danger?		
Spirometry is a breathing test in which you are coached to blow all of your air out as hard and as fast as you can (“blow, blow, blow”) until there is no more air to blow out:		
10. Has it been more than a year since you had this test?		
In the past 2 weeks:		
11. <i>Did you have to limit your social activities (such as visiting friends/relatives or playing with pets/children) because of your asthma?</i>	X ^c	X ^c
12. <i>Do you feel that it is difficult to control your asthma?</i>		X ^c
13. <i>Has wheezing, coughing, shortness of breath, or chest tightness caused you to use your rescue inhaler or nebulizer <u>every day</u>?</i>	X ^c	X ^b
14. <i>Has wheezing, coughing, shortness of breath, or chest tightness limited your ability to exercise?</i>	X ^a	
15. Has wheezing, coughing, shortness of breath, or chest tightness bothered you during the day <u>every day</u> ?		

X indicates significant items in a specific model. ^a $P < .05$, ^b $P < .0001$, ^c $P < .001$. Italicized items retained in validated AIRQ™.

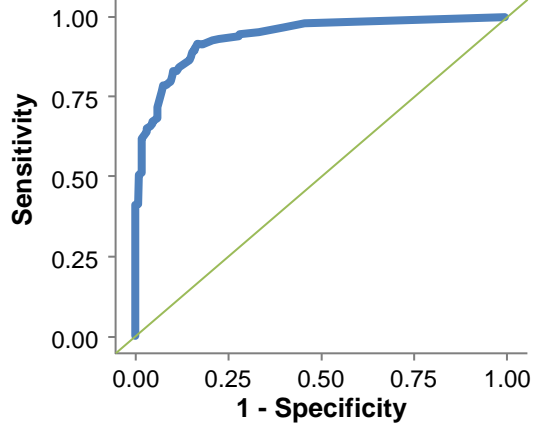
Sensitivity and Specificity Calculations

Determined AIRQ[®] Control Cut Points

Well-Controlled vs Not Well-/Very Poorly Controlled

ROC Curve for Model 1

Area Under the Curve=0.94 for individual items

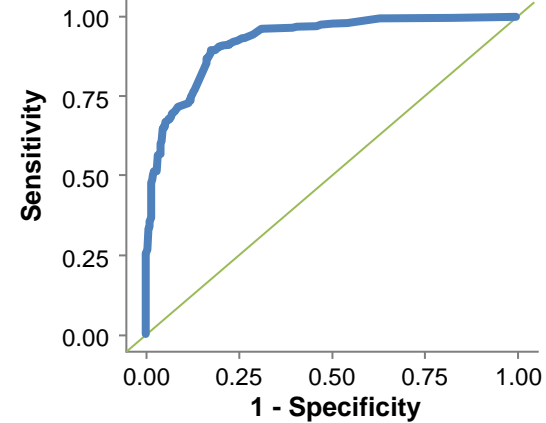


AIRQ [®] Score Cutoff	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value	Area Under ROC
≥1	0.98	0.55	0.82	0.93	0.765
≥2	0.90	0.79	0.90	0.79	0.845
≥3	0.74	0.93	0.96	0.62	0.832
≥4	0.58	0.99	0.99	0.52	0.781
≥5	0.43	0.99	0.99	0.45	0.710

Well-/Not Well-Controlled vs Very Poorly Controlled

ROC Curve for Model 2

Area Under the Curve=0.93 for individual items



AIRQ [®] Score Cutoff	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value	Area Under ROC
≥2	0.96	0.55	0.64	0.94	0.756
≥3	0.85	0.74	0.73	0.85	0.796
≥4	0.74	0.89	0.85	0.80	0.815
≥5	0.59	0.96	0.92	0.74	0.775
≥6	0.46	0.99	0.97	0.69	0.723

The Asthma Impairment and Risk Questionnaire (AIRQ®) Assesses BOTH Impairment and Risk

AIRQ® (Asthma Impairment and Risk Questionnaire)

PRECISION

For use by health care providers with their patients 12 years and older who have been diagnosed with asthma. AIRQ® is intended to be part of an asthma clinic visit.

Please answer all of the questions below.

In the past 2 weeks, has coughing, wheezing, shortness of breath, or chest tightness:

1. Bothered you during the day on **more than 4 days?**
2. Woke you up from sleep **more than 1 time?**
3. Limited the activities you want to do **every day?**
4. Caused you to use your rescue inhaler or nebulizer **every day?**

Yes No
Yes No
Yes No
Yes No

Please see all prescribing information for all products.

In the past 2 weeks:

5. Did you have to limit your social activities (such as visiting with friends/relatives or playing with pets/children) because of your asthma?
6. Did coughing, wheezing, shortness of breath, or chest tightness limit your ability to exercise?
7. Did you feel that it was difficult to control your asthma?

Yes No
Yes No
Yes No

In the past 12 months, has coughing, wheezing, shortness of breath, or chest tightness:

8. Caused you to take steroid pills or shots, such as prednisone or Medrol**?
9. Caused you to go to the emergency room or have unplanned visits to a health care provider?
10. Caused you to stay in the hospital overnight?

Yes No
Yes No
Yes No

Total YES Answers

What Does My AIRQ® Score Mean?

The AIRQ® is meant to help your health care providers talk with you about your asthma control. The AIRQ® does not diagnose asthma. Whatever your AIRQ® score (total YES answers), it is important for your health care team to discuss the number and answers to each of the questions with you. All patients with asthma, even those who may be well-controlled, can have an asthma attack. As asthma control worsens, the chance of an asthma attack increases.¹ Only your medical provider can decide how best to assess and treat your asthma.

Health Care Providers and Patients Take Action Together to Control Asthma

0 1 2 3 4 5 6 7 8 9 10

Well-controlled (0-1) Not Well-controlled (2-4) Very Poorly Controlled (5-10)

SCAN here to visit airqscore.com

**Medrol® (Methylprednisolone)
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10-item, equally weighted, yes/no composite asthma control questionnaire with **7 impairment** and **3 risk items**

- Well-controlled (0-1)
- Not well-controlled (2-4)
- Very poorly controlled asthma (5-10)



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AIRQ™ Validation Studies

LONGITUDINAL STUDY

- **Design:**
 - Year long study
 - 1121 patients, 25 clinical specialty sites

- **Objective:**
 - Develop and validate a Follow Up AIRQ™
 - Evaluate the ability of AIRQ™ to predict future asthma exacerbations
 - Assess patient and physician use of AIRQ™
 - Compare the AIRQ™ to other measures of asthma control

Follow-up AIRQ[®] With a 3-month Exacerbation Recall Period


Follow-up AIRQ[®] (Asthma Impairment and Risk Questionnaire) 

For use by health care providers with their patients 12 years and older who have been diagnosed with asthma. AIRQ[®] is intended to be part of an asthma clinic visit.


Please answer all of the questions below.

In the past 2 weeks, has coughing, wheezing, shortness of breath, or chest tightness:


1. Bothered you during the day on **more than 4 days?** Yes No
2. Woke you up from sleep **more than 1 time?** Yes No
3. Limited the activities you want to do **every day?** Yes No
4. Caused you to use your rescue inhaler or nebulizer **every day?** Yes No




Pulmicort[®] MDI (budesonide) (Pharmaceuticals) or Ciclesonide




ProAir[®] RespiClick[®] (Dive Respirators, LLC) or Albuterol sulfate




Proventil[®] HFA (AstraZeneca, a subsidiary of Merck & Co., Inc.) or Albuterol sulfate



Ventolin[®] HFA (GlaxoSmithKline) or Albuterol sulfate



Xopenex[®] HFA (Sunovion Pharmaceuticals Inc.) or Levalbuterol sulfate



Albuterol sulfate or Xopenex[®] (Sunovion Pharmaceuticals Inc.) or Levalbuterol HCl

Please see all prescribing information for all products.

In the past 2 weeks:

5. Did you have to limit your social activities (such as visiting with friends/relatives or playing with pets/children) because of your asthma? Yes No
6. Did coughing, wheezing, shortness of breath, or chest tightness limit your ability to exercise? Yes No
7. Did you feel that it was difficult to control your asthma? Yes No

In the past 3 months, has coughing, wheezing, shortness of breath, or chest tightness:


8. Caused you to take steroid pills or shots, such as prednisone or Medrol[®]? Yes No
9. Caused you to go to the emergency room or have unplanned visits to a health care provider? Yes No
10. Caused you to stay in the hospital overnight? Yes No

Total YES Answers

What Does My AIRQ[®] Score Mean?

The AIRQ[®] is meant to help your health care providers talk with you about your asthma control. The AIRQ[®] does not diagnose asthma. Whatever your AIRQ[®] score (total YES answers), it is important for your health care team to discuss the number and answers to each of the questions with you. All patients with asthma, even those who may be well-controlled, can have an asthma attack. As asthma control worsens, the chance of an asthma attack increases.¹ Only your medical provider can decide how best to assess and treat your asthma.

Health Care Providers and Patients Take Action Together to Control Asthma



0-1 Well-controlled | 2-4 Not Well-controlled | 5-10 Very Poorly Controlled

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¹Global Strategy for Asthma Management and Prevention: ©2022 Global Initiative for Asthma.

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- Developed to enable monitoring of control and assessment of management interventions between annual visits
- The **Follow-up AIRQ[®]** retains the 2-week recall for the symptom-based questions but has a **3-month recall period for the risk-based exacerbation questions**

In the past 3 months, has coughing, wheezing, shortness of breath, or chest tightness:

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9. Caused you to go to the emergency room or have unplanned visits to a health care provider? Yes No
10. Caused you to stay in the hospital overnight? Yes No

Follow-up AIRQ[®] With a 3-month Exacerbation Recall Period


Follow-up AIRQ[®] (Asthma Impairment and Risk Questionnaire) 

For use by health care providers with their patients 12 years and older who have been diagnosed with asthma. AIRQ[®] is intended to be part of an asthma clinic visit.


Please answer all of the questions below.

In the past 2 weeks, has coughing, wheezing, shortness of breath, or chest tightness:

1. Bothered you during the day on **more than 4 days?** Yes No
2. Woke you up from sleep **more than 1 time?** Yes No
3. Limited the activities you want to do **every day?** Yes No
4. Caused you to use your rescue inhaler or nebulizer **every day?** Yes No



Please see all prescribing information for all products.



In the past 2 weeks:

5. Did you have to limit your social activities (such as visiting with friends/relatives or playing with pets/children) because of your asthma? Yes No
6. Did coughing, wheezing, shortness of breath, or chest tightness limit your ability to exercise? Yes No
7. Did you feel that it was **difficult** to control your asthma? Yes No

In the past 3 months, has coughing, wheezing, shortness of breath, or chest tightness:

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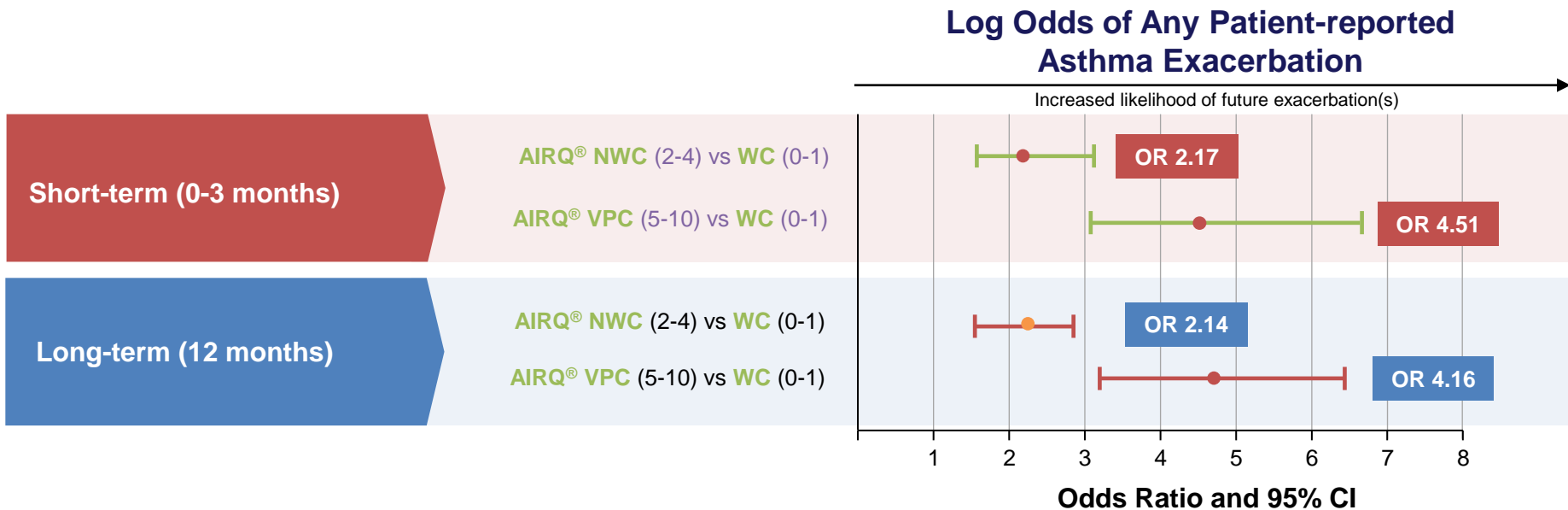
The Follow-up AIRQ[®] offers the opportunity to assess the impact of educational and/or therapeutic interventions!

AIRQ® in Clinical Practice: Predictor of Asthma Exacerbations



AIRQ[®] Control Level is Highly Predictive of Exacerbation Risk

The year long longitudinal study enrolled 1121 patients from 24 geographically diverse specialty care (allergy or pulmonology) sites



AIRQ control level over the short term (0-3 months) and long term (12 months) predicts those patients who are at increased likelihood of future exacerbations

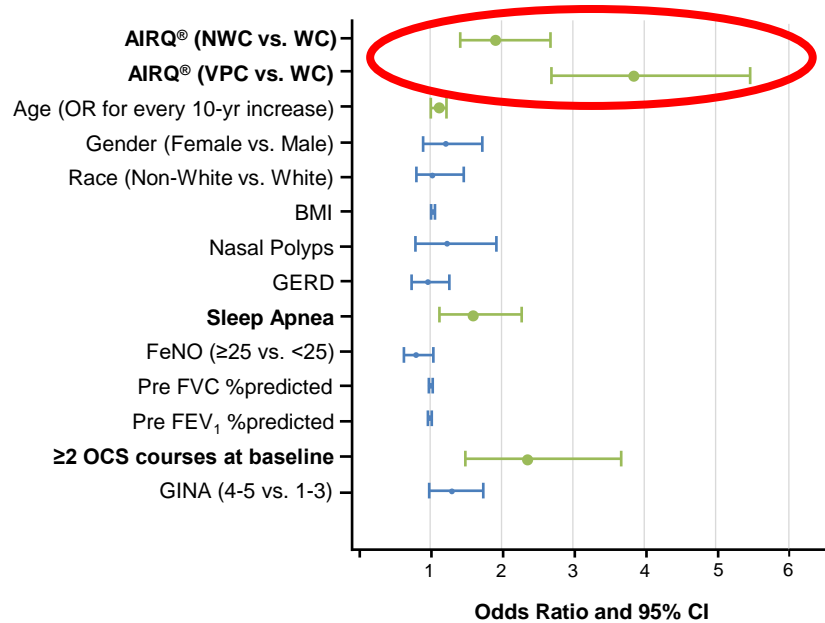
Beuther DA, et al. J Allergy Clin Immunol Practice. 2022;10(12):3204-3212.e2.

McCann W, et al. Poster presented at: The American Academy of Allergy, Asthma & Immunology (AAAAI); February 24-27, 2023.

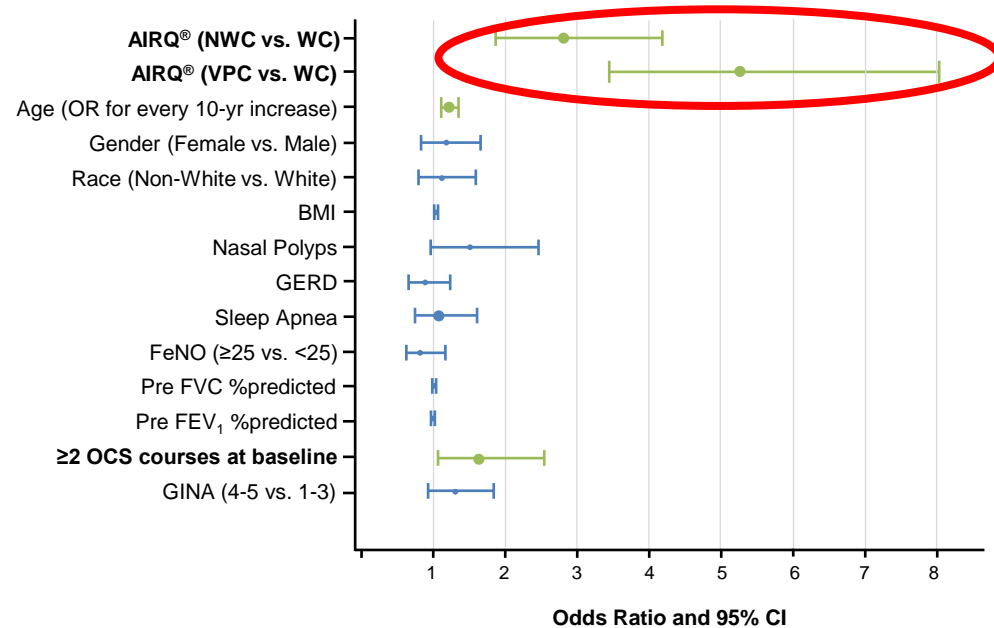
Odds Ratio of Patient-Reported Asthma Exacerbations in 12-Month Follow-up

The year long longitudinal study enrolled 1121 patients from 24 geographically diverse specialty care (allergy or pulmonology) sites

Odds Ratio of ≥ 1 Patient-Reported Asthma Exacerbations in 12-Month Follow-up



Odds Ratio of ≥ 2 Patient-Reported Asthma Exacerbations in 12-Month Follow-up



Asthma Impairment and Risk Questionnaire (AIRQ®)

AIRQ®

- Easy to use, point of care assessment of asthma control
- 10-item, equally weighted, yes/no composite asthma control questionnaire with 7 impairment and 3 risk items
- Follow up AIRQ demonstrated construct validity using a 3-month exacerbation recall

PRECISION Asthma Impairment and Risk Questionnaire (AIRQ™)

For use by health care providers with their patients 12 years and older who have been diagnosed with asthma. AIRQ™ is intended to be part of an asthma clinic visit.

Please answer all of the questions below.

In the past 2 weeks, has coughing, wheezing, shortness of breath, or chest tightness:

1. Bothered you during the day on **more than 4 days?**
2. Woke you up from sleep **more than 1 time?**
3. Limited the activities you want to do **every day?**
4. Caused you to use your rescue inhaler or nebulizer **every day?**

Provent® HFA (Formoterol fumarate dihydrate) Inhaler | **Proair® HFA (Albuterol sulfate) Inhaler** | **Proair® RespClick® (Albuterol sulfate) Inhaler** | **Provent® HFA (Formoterol fumarate dihydrate) Inhaler** | **Wixelon® HFA (Ciclesonide) Inhaler** | **Spiriva® HFA (Umeclidinium fumarate dihydrate) Inhaler** | **Albuterol sulfate or Xopenex® (Levalbuterol HCl) Inhaler**

Please see all prescribing information for all products.

In the past 2 weeks:

5. Did you have to limit your social activities (such as visiting with friends/relatives or playing with pets/children) because of your asthma?
6. Did coughing, wheezing, shortness of breath, or chest tightness limit your ability to exercise?
7. Did you feel that it was difficult to control your asthma?

In the past 12 months, has coughing, wheezing, shortness of breath, or chest tightness:

8. Caused you to take steroid pills or shots, such as prednisone or Medrol®?
9. Caused you to go to the emergency room or have unplanned visits to a health care provider?
10. Caused you to stay in the hospital overnight?

Total YES Answers

What Does My AIRQ™ Score Mean?

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0 1 2 3 4 5 6 7 8 9 10

Well-controlled (0-1) | Not Well-controlled (2-4) | Very Poorly Controlled (5-10)

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AIRQ® Levels of Control

- 0-1 = Well-controlled
- 2-4 = Not Well-controlled
- 5-10 = Very Poorly Controlled

AIRQ® MID of 2

AIRQ® Predicts Future Exacerbations

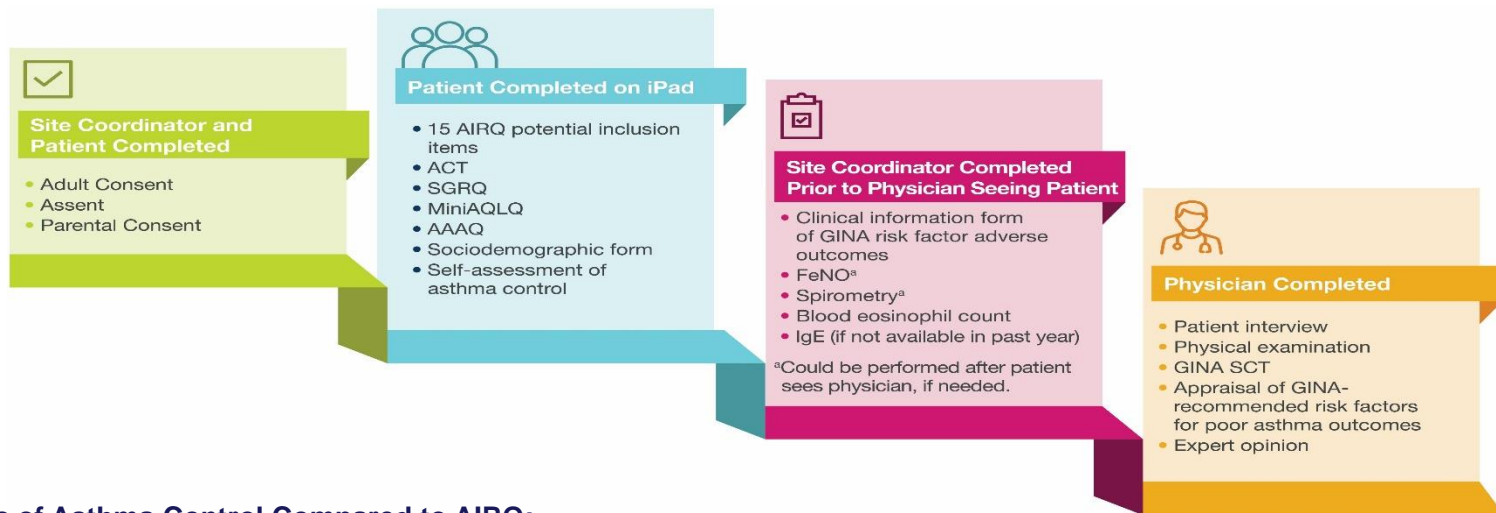
- Not Well-Controlled (2-4): [OR] [95% (CI)] = **2.14** [1.58, 2.89]
- Very Poorly Controlled (5-10): [OR] [95% CI] = **4.60** [3.26, 6.50]

AIRQ[®] Compared to Existing Assessments of Asthma Control



Performance of the AIRQ[®] Compared to Existing Asthma Control Measures

The year long longitudinal study enrolled 1121 patients from 24 geographically diverse specialty care (allergy or pulmonology) sites



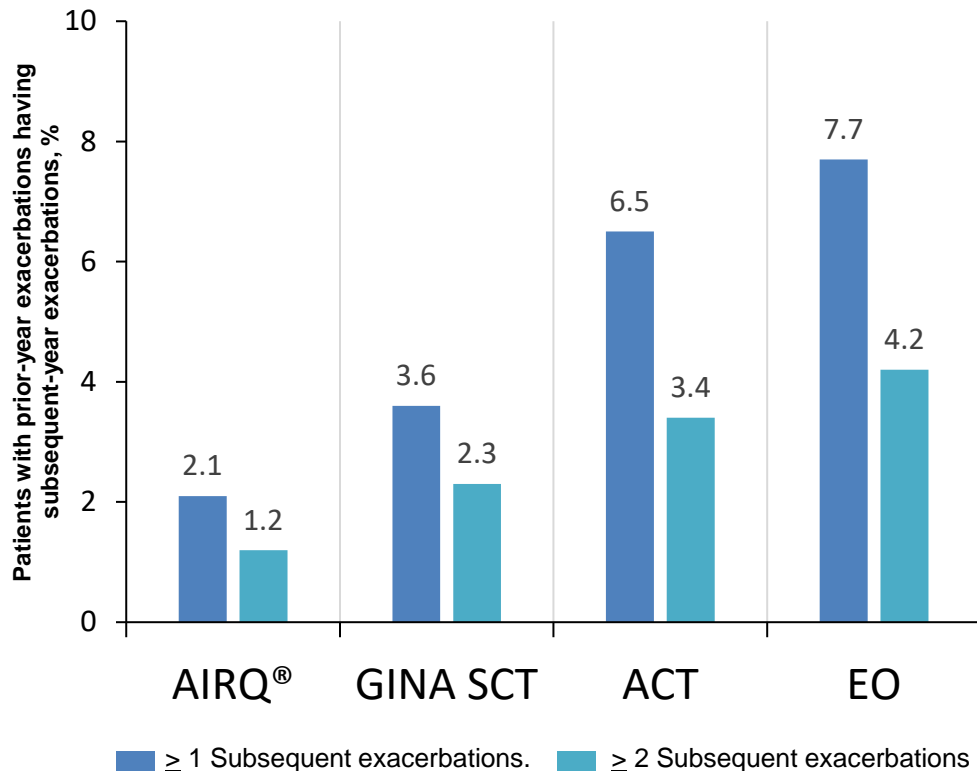
Measures of Asthma Control Compared to AIRQ:

GINA SCT, symptom control tool comprises 4 “yes/no” questions assessing the occurrence of asthma-related daytime symptoms, night awakenings, short-acting b2-agonist use, and activity limitations over the previous 4 weeks. Using the GINA SCT, asthma was assessed as well-controlled if 0 yes responses were recorded, partly controlled if 1 or 2 yes responses were indicated, or uncontrolled for 3 or 4 yes responses.

EO, expert opinion of asthma control was informed by physician interview, physical examination, patient responses to the GINA SCT questions, and review of the chart-abstracted GINA risk factors for poor asthma outcomes. Physician investigators provided their EO using a scale of completely controlled, well-controlled, somewhat controlled, poorly controlled, and not controlled.

ACT[™], Asthma Control Test, a total 5-item score: 5-25 with ≥20 well controlled, 13-19 not well-controlled and ≤12 very poorly controlled

Patients with Prior Year and Subsequent Exacerbations: Rated as Well Controlled

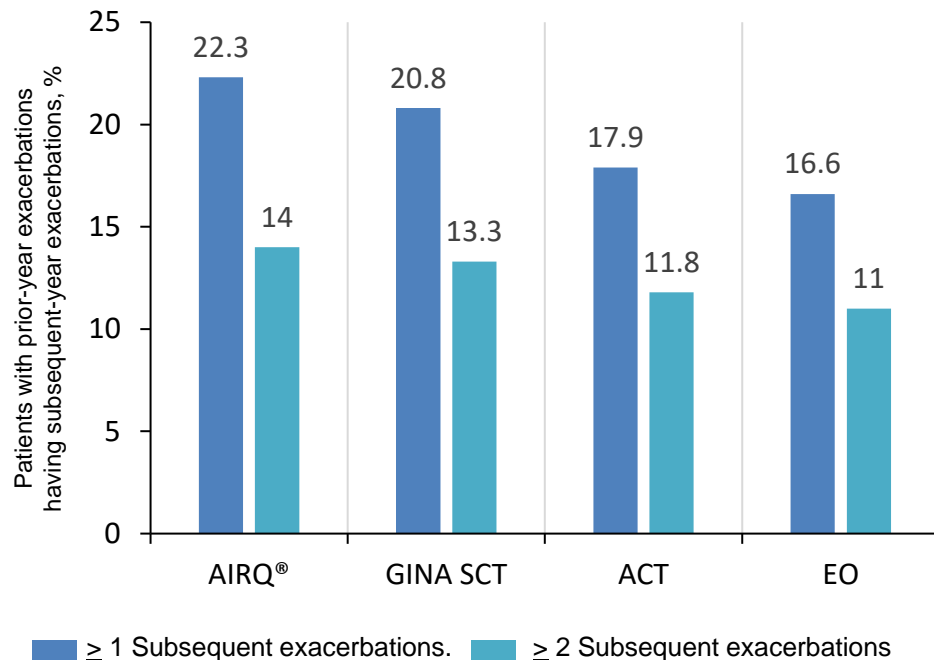


Significantly more patients with prior-year exacerbations who were **rated as completely or well-controlled** at baseline by GINA SCT, ACT, or EO had ≥1 and ≥ 2 subsequent-year exacerbations than **those similarly assessed by AIRQ** ($p < 0.001$).

AIRQ is the least likely control tool to place patients into well controlled who have prior and subsequent exacerbations

ACT™, Asthma Control Test; AIRQ®, Asthma Impairment and Risk Questionnaire; EO, expert opinion; GINA, Global Initiative for Asthma; SCT, symptom control tool.

Patients with Prior Year and Subsequent Exacerbations: Rated as Uncontrolled



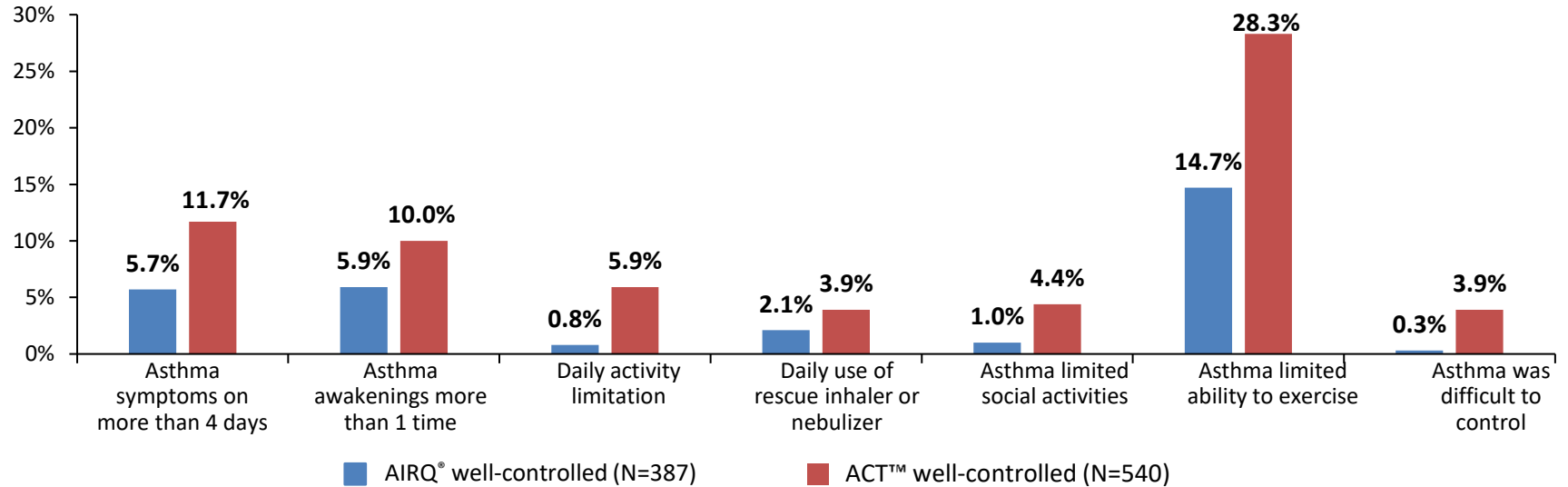
Significantly more patients with prior year exacerbations who were identified at baseline by the AIRQ as **uncontrolled** went on to have ≥ 1 and ≥ 2 subsequent-year exacerbations than those similarly rated by GINA SCT, ACT, or EO ($p < .01$)

AIRQ is the most likely control tool to place patients with prior and subsequent exacerbations into the uncontrolled category.

ACT™, Asthma Control Test; AIRQ®, Asthma Impairment and Risk Questionnaire; EO, expert opinion; GINA, Global Initiative for Asthma; SCT, symptom control tool.

AIRQ[®] vs ACT[™] in Detecting Symptom Impairment

Proportion of Well Controlled Patients with Symptom Impairment in the past 2 Weeks*



With AIRQ as an asthma control measurement tool, less patients with significant disease burden go unnoticed when compared to ACT.

AIRQ[®] vs ACT[™]

AIRQ[®]

- **Simple** yes/no, low-literacy tool that includes both domains of asthma control
- **Superior** in identifying patients who are experiencing symptom impairment
- **Includes** past exacerbations and is a robust predictor of future exacerbations



ACT[™]

- **Complicated** 5-point Likert scale questions, assessing only symptom control
- Despite being a standard of impairment, **misidentifies** patients as well-controlled with active symptoms
- **No inclusion** of past exacerbations as a risk for future exacerbations

AIRQ can alert clinicians to patients that otherwise would have been misidentified as well controlled by ACT, resulting in a Shared Decision-Making conversation that can change both patients and clinician's behaviors and outcomes.

AIRQ® in Clinical Practice: Effect on Asthma Control

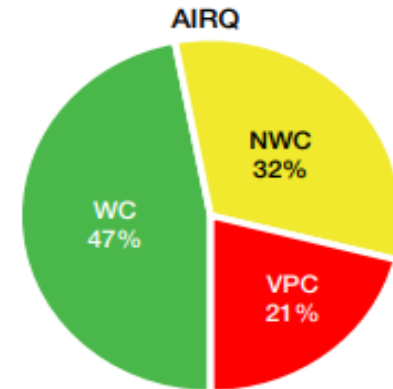


AIRQ[®] in Clinical Practice: Effect on Asthma Control

- 711 patients with asthma aged ≥ 13 years participated in the 9-month study
- 431 patients in primary care and 280 patients in specialty practice.
- The AIRQ and Asthma Checklist (a point of care decision support tool) was implemented into clinical practice
- Assessment of asthma control (AIRQ) was completed at baseline and at 9 months.



Baseline Assessment of Asthma Control

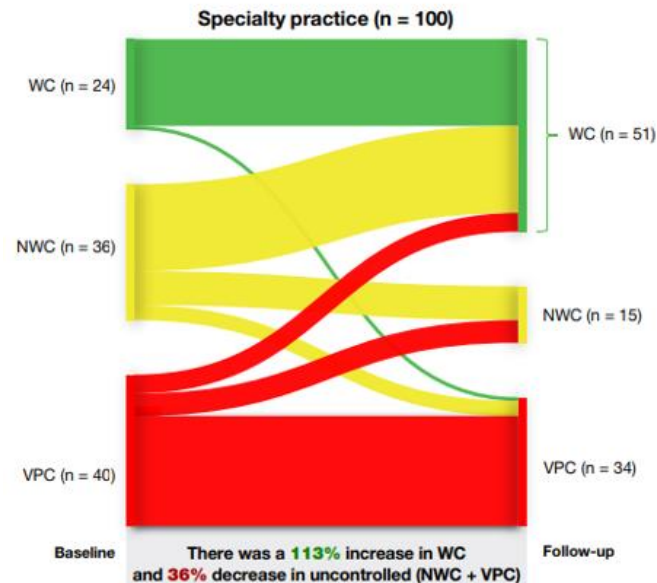


What Did We Find at Follow-up?

Specialty Practice

- Most patients (95.7%) who were WC at baseline were WC at follow-up
- Over half (65.7%) of NWC patients at baseline were WC at follow-up
- A quarter of VPC patients improved (12.8% WC and 12.8% NWC)

Overall, there was a 113% increase in WC asthma and a 36% decrease in uncontrolled asthma (NWC & VPC)



Significant improvements in asthma control occurred in patients where AIRQ was implemented into clinical practice

A New Era In Asthma Management

Asthma Impairment and Risk Questionnaire (AIRQ®)

Asthma Impairment and Risk Questionnaire (AIRQ™)

For use by health care providers with their patients 12 years and older who have been diagnosed with asthma. AIRQ™ is intended to be part of an asthma clinic visit.

Please answer all of the questions below.

In the past 2 weeks, has coughing, wheezing, shortness of breath, or chest tightness:

1. Bothered you during the day on **more than 4 days?** Yes No
2. Woke you up from sleep **more than 1 time?** Yes No
3. Limited the activities you want to do **every day?** Yes No
4. Caused you to use your rescue inhaler or nebulizer **every day?** Yes No

Please see all prescribing information for all products.

Proventil® HFA (Albuterol Sulfate) or Ephedrine

Proair® HFA (Clenbuterol Sulfate) or Albuterol Sulfate

ProAir RespiClick® (Clenbuterol Sulfate) or Albuterol Sulfate

Proventil® HFA (Albuterol Sulfate) & Formoterol Fumarate, a subsidiary of Teva R.S. Co., Inc.

Vortec® HFA (Albuterol Sulfate) or Albuterol Sulfate

Xopenex HFA® (Levalbuterol Tartrate) or Levalbuterol Tartrate

Albuterol Sulfate or Xopenex® (Clenbuterol Sulfate) or Levalbuterol HCl

In the past 2 weeks:

5. Did you have to limit your social activities (such as visiting with friends/relatives or playing with pets/children) because of your asthma? Yes No
6. Did coughing, wheezing, shortness of breath, or chest tightness limit your ability to exercise? Yes No
7. Did you feel that it was difficult to control your asthma? Yes No

In the past 12 months, has coughing, wheezing, shortness of breath, or chest tightness:

8. Caused you to take steroid pills or shots, such as prednisone or Medrol®? Yes No
9. Caused you to go to the emergency room or have unplanned visits to a health care provider? Yes No
10. Caused you to stay in the hospital overnight? Yes No

Total YES Answers

What Does My AIRQ™ Score Mean?

The AIRQ™ is meant to help your health care providers talk with you about your asthma control. The AIRQ™ does not diagnose asthma. Whatever your AIRQ™ score (total YES answers), it is important for your health care team to discuss the number and answers to each of the questions with you. All patients with asthma, even those who may be well-controlled, can have an asthma attack. As asthma control worsens, the chance of an asthma attack increases.¹ Only your medical provider can decide how best to assess and treat your asthma.

Health Care Providers and Patients Take Action Together to Control Asthma

0 1 2 3 4 5 6 7 8 9 10

0-1 Well-controlled 2-4 Not Well-controlled 5-10 Very Poorly Controlled

®Medrol® (Prednisone, Inc.) or methylprednisolone
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Global Strategy for Asthma Management and Prevention ©2020 Global Initiative for Asthma

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- The AIRQ™ provides an efficient, easy-to-use assessment of both impairment and risk domains of control
- A Follow-up AIRQ™ has been validated and available for the assessment of ongoing asthma control
- Compared to ACT, AIRQ™ is superior in identifying asthma control and predicting risk
- Pediatric AIRQ™ for children 5-11 yrs. is presently being developed and validated

The AIRQ enhances the clinical assessment of asthma patients and heighten awareness of current uncontrolled asthma and potential future exacerbations.

Access AIRQ® at www.airqscore.com

A New Era In Asthma Management

Assessing Asthma Control
Children, Adolescents and Adults

