



Re-assessment of asthma diagnosis in adults with physician-diagnosed asthma

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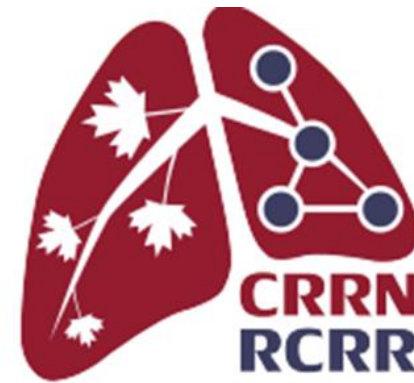
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Re-Evaluation of Diagnosis in Adults with Physician-Diagnosed Asthma



Canadian Respiratory Research Network Réseau canadien de
recherche respiratoire

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Theme of the Talk Today:

- Diagnosis of asthma.
- I'll present a clinical research study that may challenge our assumptions about how the medical community is making diagnoses of asthma in community practice.



An Actual Patient

- 44 year old female, notary.
- Referred to my clinic for 'difficult to control asthma'.
- Chief Complaint- she is short of breath x 4 years. She has noticed some wheezing.
- Previously she was very active and doing long-distance biking, but for the past 2 years she is unable to walk more than 2 blocks 'because of her asthma'.

44 yo patient with 'asthma':

- Past history- 4 ½ years ago she had a ruptured appendix/peritonitis and underwent a 6 hour emergency surgery.
- Her 'asthma' was diagnosed about 3 months after this.

44 yo patient with 'asthma':

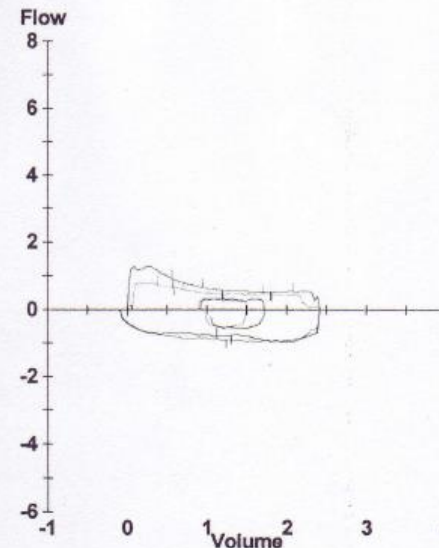
- On exam:
- Patient is tachypneic, RR = 22, looks uncomfortable.
- wheezing over her upper airway, with inspiration and expiration.
- Rest of exam unremarkable.

Clinical Information:

Her Spirometry

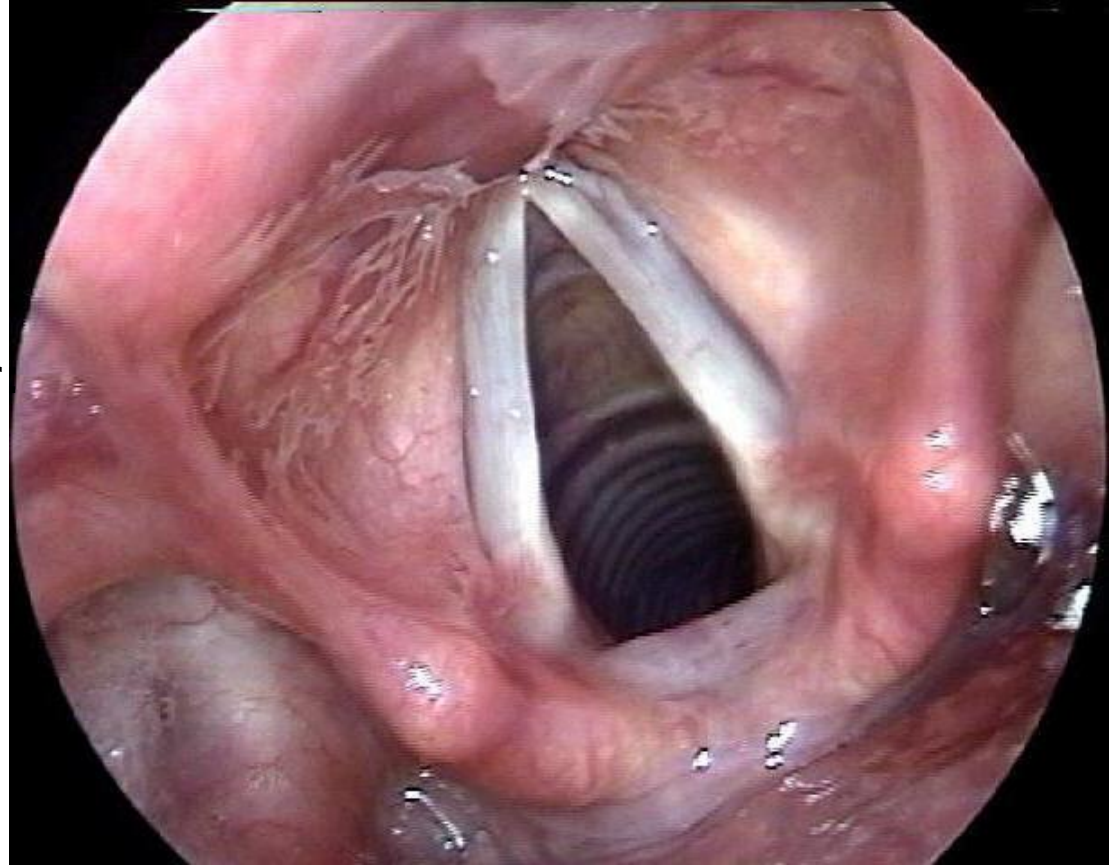
Spirometry		Ref	Pre	% Ref	Post	% Ref	%Chg	
FVC	Liters	3.22	(2.4 - 4.1)	2.42	75	2.43	75	0
FEV1	Liters	2.49	(1.7 - 3.3)	0.91	37	0.95	38	5
FEV1/FVC	%	77	(65.3 - 87.8)	38	39			
FEF25-75%	L/sec	2.95	(1.5 - 4.4)	0.50	17	0.61	21	22
FEF50%	L/sec	3.55	(1.7 - 5.4)	0.46	13	0.59	17	28
FEF75%	L/sec	1.43	(0.1 - 2.8)	0.47	33	0.53	37	13
PEF	L/sec	5.88	(3.0 - 8.7)	1.11	19	1.28	22	15
FIF50%	L/sec			0.88		0.81		-8
FEF/FIF50				0.53		0.73		38

Results consistent with Upper airway obstruction!



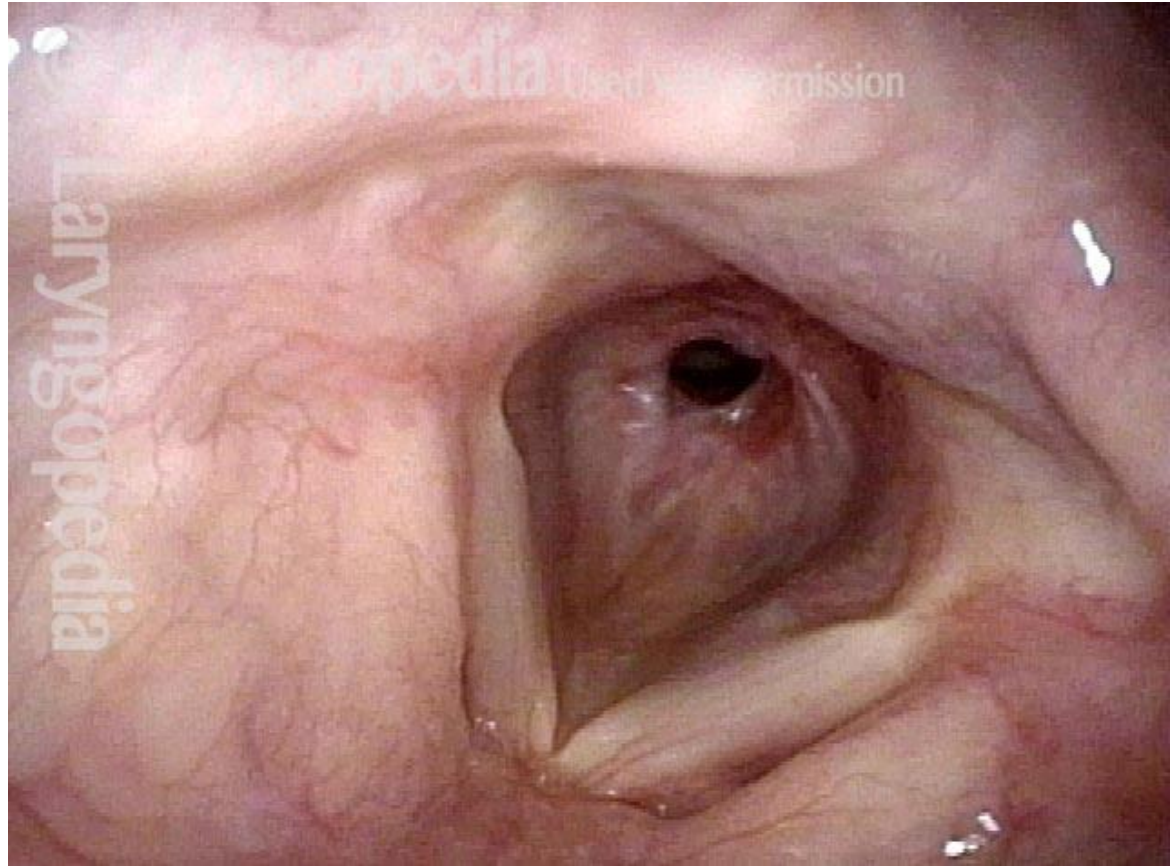
Bronchoscopy View of the Normal Larynx and Upper Airway

Normal Tracheal Diameter
= 20 mm

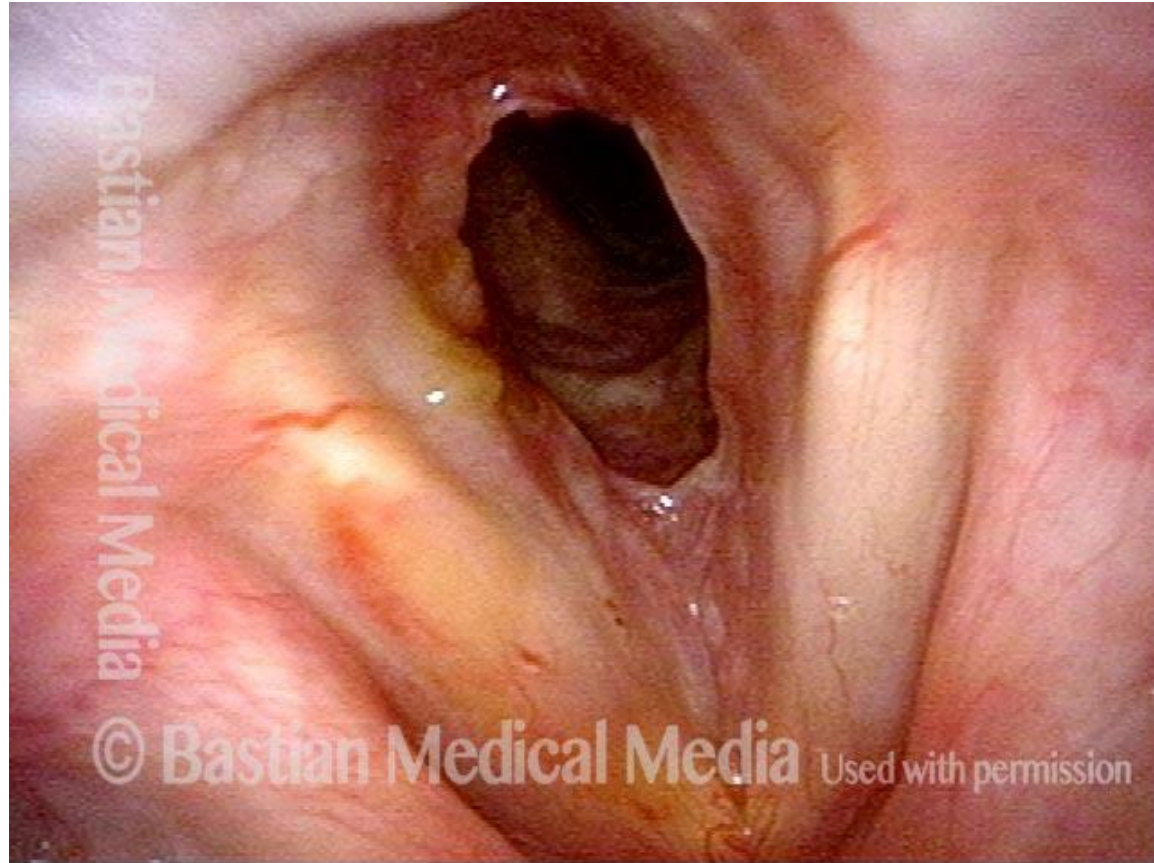


Bronchoscopic View of Patient's Larynx and Upper Airway- Diffusely Narrowed Subglottic Obstruction:

Tracheal Diameter
= 4 mm!



After Bronchoscopic Airway Dilatation:





Second Patient:

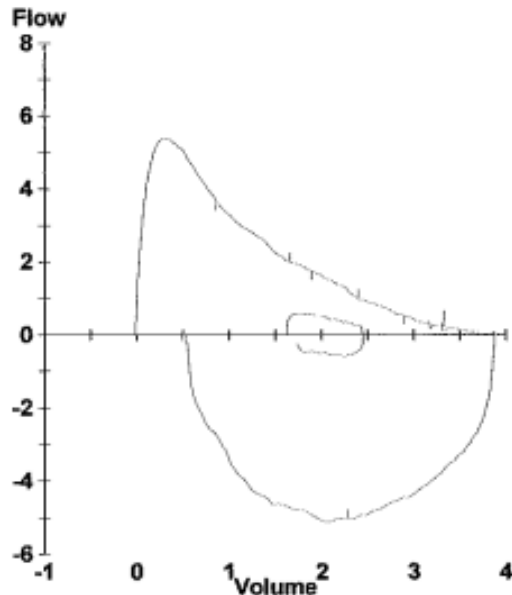
- 24 year old male, allergic to cats.
- 3 months ago he moved in with his girlfriend, she has a cat.
- He complains of wheeze, cough, SOB for 3 months.
- He has classic asthma symptoms, he is wheezy on exam, and his spirometry shows reversible airflow obstruction.
- I diagnose asthma and prescribe Symbicort.



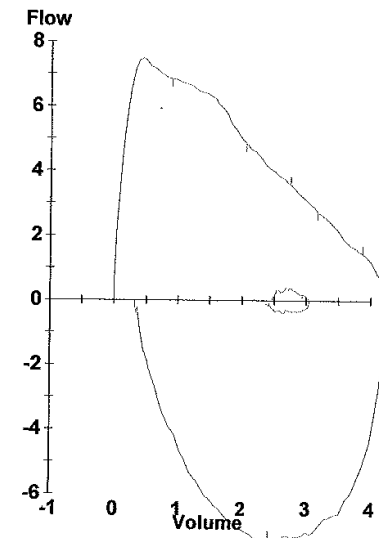
Second Patient- 12 months later:

- He broke up with his girlfriend, moved into a cat-free apartment 11 months ago.
- He is now asymptomatic and feels perfectly well.
- He stopped the Symbicort 6 months ago on his own, and did not notice any difference/worsening in his breathing when he stopped it.
- His lung function is normal.

Asthma can be relapsing and remitting:



24 yo male, exposed to girlfriend's cat
FEV1 = 2.43 L (60% predicted)



Same patient, several months later. Girlfriend kept cat, so patient left girlfriend. Not taking asthma meds.
FEV1 = 3.90L, 97% predicted

How Frequently Does Adult Asthma Go Into Remission?

- Longitudinal cohort study of 250 Swedish adults with recent-onset asthma- remission of asthma after a follow-up interval of 4 to 8 years was observed in only 3.0% - 4.8%.
- Among 203 Finnish patients with adult-onset asthma, only 3% were in remission after a mean follow-up interval of 12 years.
- **Caveat- both studies involved sick patients seen in tertiary care centres.**



These Two Patients Stimulated the Research Question:

- What proportion of patients with an MD diagnosis of asthma do not have current asthma?
- Either because:
 - 1) They were misdiagnosed initially or
 - 2) They had asthma, but it is now in remission.

Definition of Asthma:

- GINA Guidelines 2015:
- “Asthma is a heterogeneous disease usually characterized by chronic lower airway inflammation. It is defined by a history of respiratory symptoms such as wheeze, SOB, chest tightness and cough that vary over time and in intensity, **together with variable expiratory airflow limitation.**”



Proving Asthma:

To confirm a diagnosis of asthma patients must have evidence of **variable airflow obstruction**.

Diagnosing asthma without testing for airflow obstruction is like diagnosing diabetes without testing the patient's blood sugar.

Are Canadian MD's doing tests to prove asthma before they make the diagnosis?

- Probably not!
- Recent study by Gershon et al.

CHEST[®]

Official publication of the American College of Chest Physicians



PULMONARY FUNCTION TESTING IN THE DIAGNOSIS OF ASTHMA: A POPULATION STUDY

Andrea S. Gershon, J. Charles Victor, Jun Guan, Shawn D. Aaron and Teresa To

Are Canadian MD's doing tests to prove asthma before they make the diagnosis?

Retrospective cohort study using Ontario admin. databases.

Looked at all individuals >7 years old with newly MD-diagnosed asthma between 1996-2007.

The study question: What % of newly diagnosed asthmatics in Ontario have had spirometry done between 1 year prior and 2.5 years following the time of their asthma diagnosis?

Are Canadian MD's doing tests to prove asthma before they make the diagnosis?

Gershon et al, Chest 2012

Results:

Only 42.7% (95% CI: 42.6-42.9%) of 465,000 Ontarians newly diagnosed with asthma received PFT testing between 1 year prior and 2.5 years following the time of diagnosis.

Conclusion: Less than half of Ontarians with newly diagnosed asthma received objective testing to confirm the diagnosis.



Our Hypothesis:

Although asthma is a chronic disease many adult patients with physician-diagnosed asthma may not have current asthma.

Why?

Because:

- 1) They were initially misdiagnosed, or
- 2) Their asthma is in remission

The Canadian Asthma Diagnosis Study- Primary Objectives :

1) To determine whether we could rule out a diagnosis of current asthma in randomly selected adult patients with recent physician- diagnosed asthma.

and

2) To determine whether these patients could be safely weaned off asthma medications and kept off meds for one year.



The Canadian Asthma Diagnosis Study- Secondary Study Questions:

How is asthma being diagnosed in Canadian communities? Are spirometry and other measures of airflow limitation being used to establish new diagnoses of asthma?

Research

JAMA | **Original Investigation**

Reevaluation of Diagnosis in Adults With Physician-Diagnosed Asthma

Shawn D. Aaron, MD; Katherine L. Vandemheen, MScN; J. Mark FitzGerald, MD; Martha Ainslie, MD; Samir Gupta, MD; Catherine Lemière, MD; Stephen K. Field, MD; R. Andrew McIvor, MD; Paul Hernandez, MD; Irvin Mayers, MD; Sunita Mulpuru, MD; Gonzalo G. Alvarez, MD; Smita Pakhale, MD; Ranjeeta Mallick, PhD; Louis-Philippe Boulet, MD; for the Canadian Respiratory Research Network

IMPORTANCE Although asthma is a chronic disease, the expected rate of spontaneous remissions of adult asthma and the stability of diagnosis are unknown.

OBJECTIVE To determine whether a diagnosis of current asthma could be ruled out and asthma medications safely stopped in randomly selected adults with physician-diagnosed asthma.

← [Editorial page 262](#)

+

[CME Quiz at jamanetworkcme.com](#) and
[CME Questions page 314](#)

The Canadian Asthma Diagnosis Study

- Multicenter, prospective, longitudinal cohort study of 701 Canadians with recently diagnosed asthma (diagnosed by an MD within 5 years).
- We recruited subjects through random-digit dialing.
- Subjects were not told the purpose of the study, in order to prevent possible selection/recruitment bias.



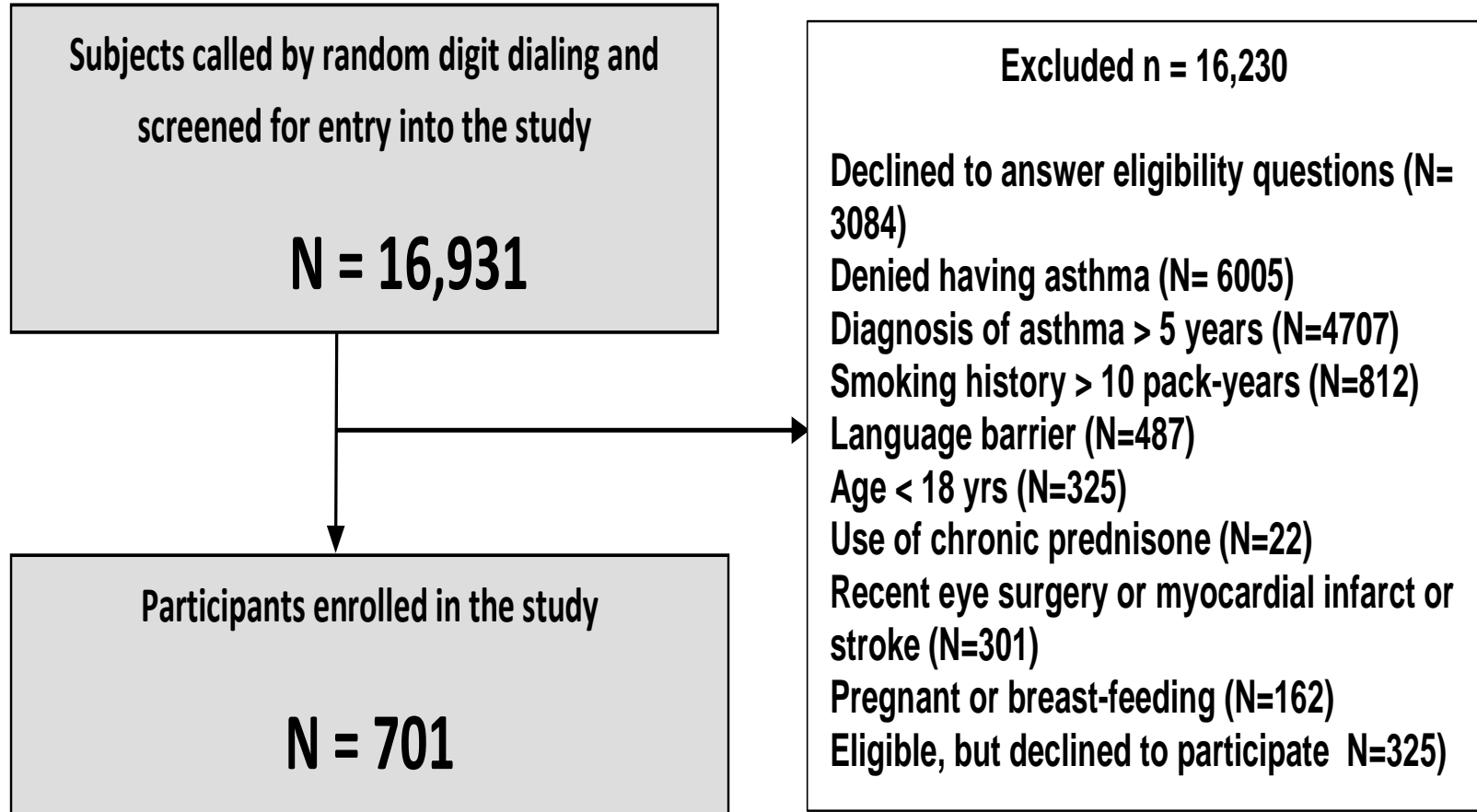
The Canadian Asthma Diagnosis Study:

This was a population-based study of asthmatics.

We recruited random participants from their homes, not from physician offices.

So this is real life; this study reflects healthcare as it is happening in our communities.

Study Recruitment:



Results: Study Participants

N=701

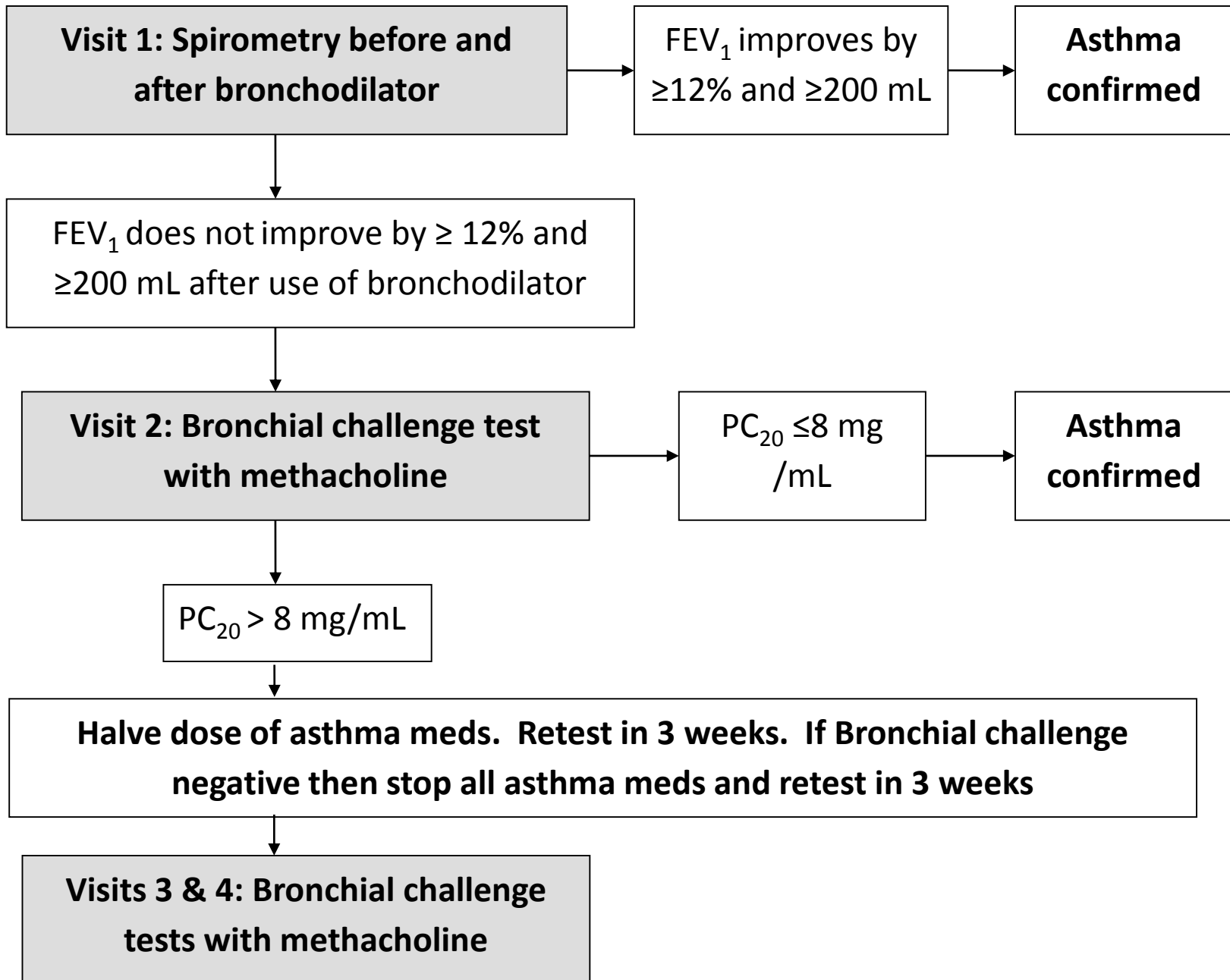
- Mean age: 51 years old
- 66% Female.
- Mean BMI: 29.6
- 70% college/university educated.
- 60% had asthma diagnosed by family MD.
- Mean time from first diagnosis: 4 years.
- 87% currently using asthma medication.
- 45% using asthma controlling medication daily.



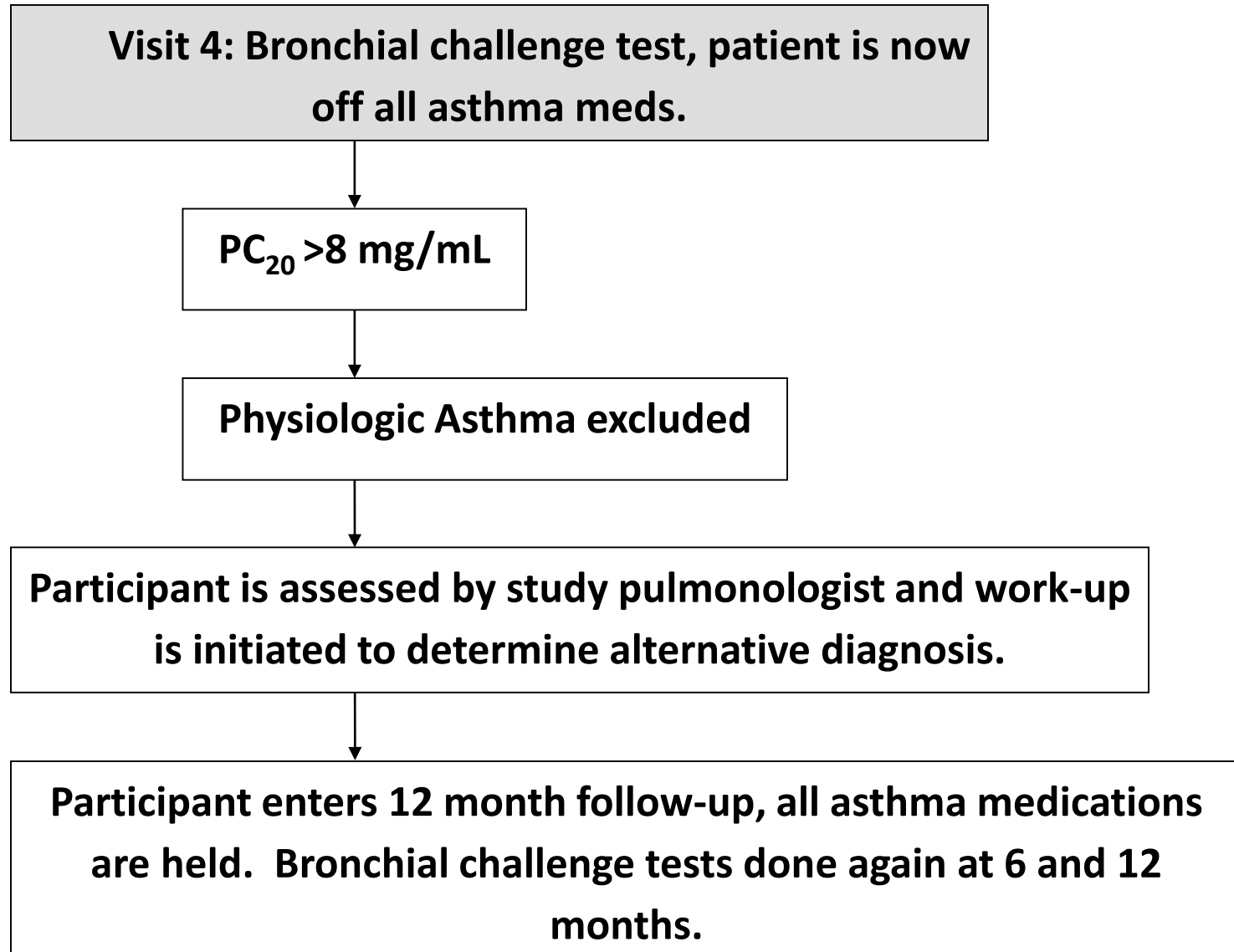
Study Procedures

- Study participants were put through an extensive testing algorithm to confirm or rule out current asthma. The algorithm progressively weaned asthma medications.
- The participant's community MD was contacted to determine how asthma had been initially diagnosed in the community.

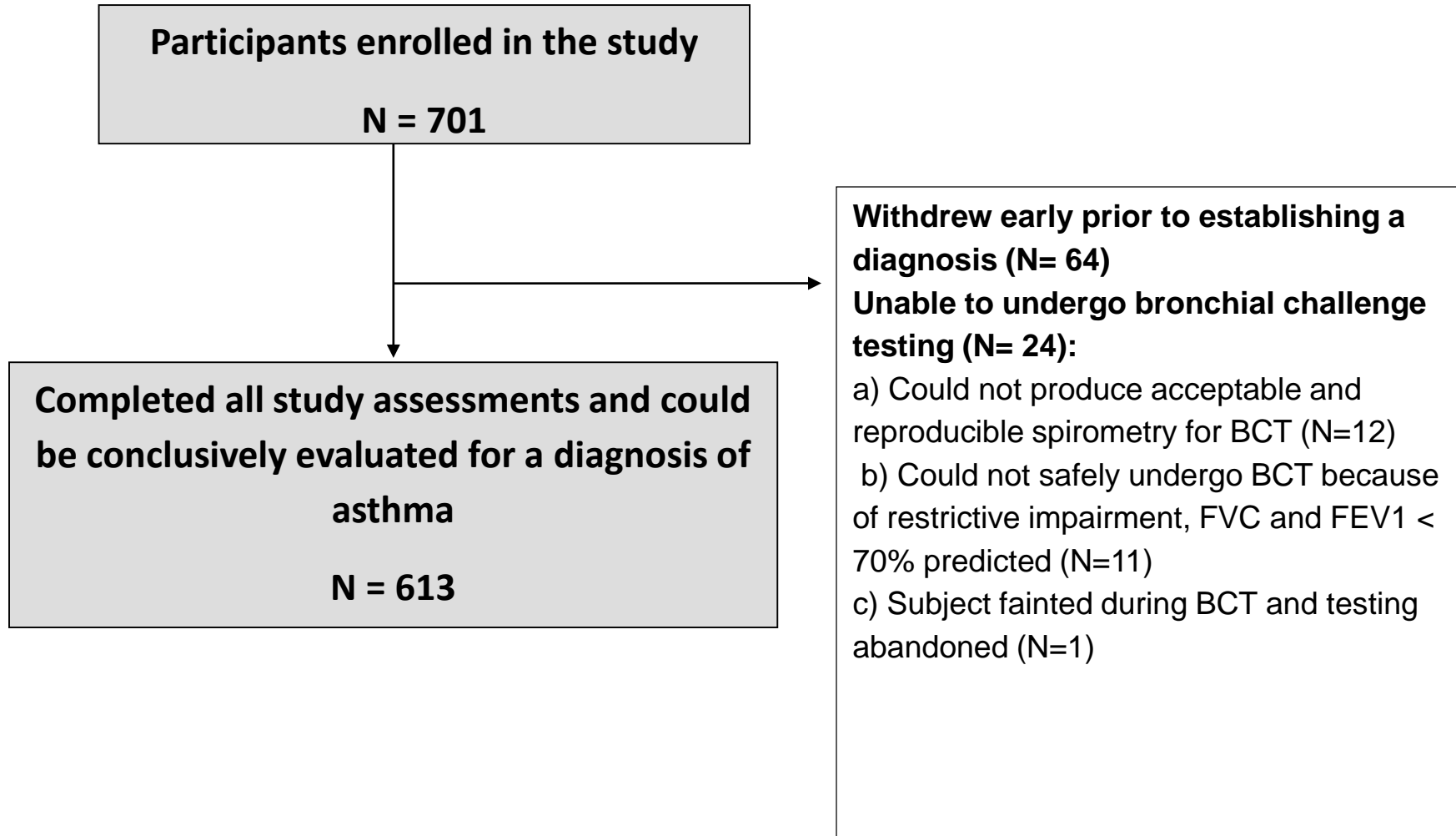
The Asthma Testing Algorithm:



The Asthma Testing Algorithm:



Study Flow:



Primary Outcome:

**Completed all study assessments and
could be conclusively evaluated for a
diagnosis of asthma**

N = 613

**Current asthma confirmed
N = 410 (67%)**

**Reversible airflow obstruction at 1st
study visit (N=86).**

**Bronchial hyper-responsiveness at
visits 2, 3 or 4 (N=287).**

**Acute worsening of asthma during
medication tapering period (N=9).**

**Asthma diagnosed by study
pulmonologist (N=28).**

**Current asthma
excluded
N = 203 (33%)**

Primary outcome- Asthma ruled out by diagnostic algorithm and by pulmonologist:

Number Enrolled	Number who completed algorithm	Number with confirmed asthma	Number with asthma ruled out by algorithm
701	613	382 (62%)	231 (38%)

Diagnostic algorithm alone

↓ + Pulmonologist assessment

Number Enrolled	Number who completed algorithm	Number with confirmed asthma	Number with asthma ruled out
701	613	410 (67%)	203 (33%)

Primary Study Outcome

(95% CI: 29-37%)

Study Results after 12 months of F/U:

Number Enrolled	Number who completed algorithm	Number with confirmed asthma	Number with asthma ruled out
701	613	410 (67%)	203 (33%)

Primary Study Outcome

12 months clinical F/U with repeat bronchial challenge tests at 6 and 12 months.



Number Enrolled	Number who completed algorithm	Number with confirmed asthma	Number with asthma ruled out
701	613	432 (70%)	181 (30%)

12 month outcome

(95% CI: 26-33%)

Subgroup Analysis: Participants Using Daily Asthma Controlling Medications:

- Of 273 participants who were using **daily** asthma controlling medications upon study entry (ICS or ICS/LABA or antileukotriene):
 - 1) Current asthma was ruled out in 71 (26.0%; 95% CI: 20.8-31.2%).
 - 2) After 12 months of follow-up 68 (24.9%; 95% CI: 19.8-30.0%) remained free of current asthma.

What's happening in the community?

- Only 51% of 701 participants in our study had undergone tests of lung function in the community.
- Patients whose initial workup in the community did not include spirometry or pulmonary function tests were significantly less likely to have current asthma ($P = 0.02$).

Some important lessons from our study:

Patients who had spirometry testing at the time of their initial diagnosis were significantly more likely to have current asthma.

- What does this prove?
- Many patients who are being diagnosed with asthma without undergoing a proper workup don't end up actually having asthma.

Patients who were taking asthma medications daily were significantly more likely to have current asthma.

- What does this prove?
- Patients are smarter than their doctors!

Pulmonologist's diagnosis in those who were potentially misdiagnosed

Final Diagnosis (N = 213)	N (%)
Asymptomatic	61 (29%)
Rhinitis	54 (25%)
Asthma	28 (13%)
GERD	18 (9%)
Anxiety/hyperventilation	8 (4%)
Obesity/deconditioning	7 (3%)
Cough due to ACE Inh.	4 (2%)
Ischemic heart disease	4 (2%)
Subglottic stenosis	2 (2%)
Bronchiectasis	2 (2%)
Pulmonary hypertension	1 (1%)
Interstitial lung disease	1 (1%)
Other causes	23 (11%)

Serious Misdiagnoses:

- 12 patients (2%) of the entire cohort had been misdiagnosed with asthma when they instead had a serious cardio-pulmonary disease responsible for their symptoms.
 - Coronary artery disease = 4
 - Subglottic stenosis = 2
 - Bronchiectasis = 2
 - ILD, Sarcoid, Pulm Hypertension, Tracheo-Bronchomalacia = 4

Remission of Adult-Diagnosed Asthma in our Study:

- At least 24/203 (12%) had asthma that was in remission- we know this because their initial tests in the community were diagnostic of asthma.
- This suggests that remission of adult asthma is more common than previously thought.



Conclusions:

- 1) Among adults with recent physician-diagnosed asthma a current diagnosis of asthma could not be established in 33.1% who were not taking daily asthma medications or had medications weaned.
- 2) Failure to confirm current asthma results from both initial misdiagnoses plus remissions of previously active asthma.



Conclusions:

3) Asthma is sometimes improperly worked up in the community.

Improper work-up is associated with failure to confirm current asthma.

Practical Take-Home Ways in Which Patients Can Advocate for Better Asthma Care:

- 1) Patients should insist that physicians order spirometry to try to confirm asthma prior to assigning them with a diagnosis of asthma.
- 2) Patients who are asymptomatic on treatment should ask their MD's to do spirometry, and if their spirometry is normal, then their MD's should try to taper and potentially discontinue their asthma medications.

Practical Take-Home Ways in Which This Study Should Change Practice:

- 1) Physicians should order pre and post BD spirometry to try to confirm asthma prior to assigning a patient with a lifetime diagnosis of asthma.
- 2) Physicians should periodically reassess asthma control and try to taper and potentially discontinue medications in patients with asthma who are asymptomatic with normal spirometry.



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