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The impact of Anxiety Sensitivity in asthma patients with panic disorder on respiratory response to a standard panic (CO_2) challenge

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Links between Anxiety and Asthma

- Link between anxiety and impaired airway function in asthma patients.
  - Increased dyspnea and bronchoconstriction
- Anxiety sensitivity (AS) is a trait associated with excessive fear of anxiety-related sensations based on beliefs about their harmful consequences
  - AS is high in patients with Panic disorder
- Panic disorder (PD)
  - Sudden, recurrent panic attacks, episodes of intense fear or discomfort associated with cognitive and physiological symptoms
  - Common among asthmatics
  - Associated with worse asthma outcomes, possibly due to panic-induced respiratory changes.

CO_2 inhalation as a panic challenge

- CO_2 inhalation is also a well known panic challenge in PD patients
- Inhaling concentrations of CO_2 (e.g., continuous 7% or one vital-capacity inhalation of 35%) induces more anxiety and panic symptoms in PD patients
- Role of Anxiety Sensitivity in PD patients, who are undergoing a panic challenge is unclear

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Aims

- To evaluate the impact of AS on respiratory measures in asthmatics with PD during a panic challenge.
  - CO_2 production [VCO_2; ml/kg/min],
  - O_2 production [VO_2; ml/kg/min],
  - Ventilation rate [VE; L/min]
  - Tidal volume [TV; L]

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Methods

- 17 patients with physician-diagnosed asthma and PD
- Inclusion criteria: a primary diagnosis of asthma (chart evidence of previous positive methacholine test and/or bronchodilator reversibility); be non-smoking; aged 18-70 years.
  - Bronchodilators withheld for at least 8 hours prior to testing.
- Exclusion criteria: Chart evidence of a medical condition that was more severe than asthma (such as cancer, COPD); cognitive or language deficit that would have impaired providing informed consent

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Panic Disorder and Anxiety Sensitivity

- Panic Disorder confirmed by meeting DSM-IV criteria for a primary diagnosis of PD.
  - ADIS-IV; semi-structured interview, good to excellent inter-rater reliability (e.g., PD, $\kappa = 0.72$)

- Anxiety sensitivity index (ASI)
  - 16-item questionnaire
    - measures the extent to which individuals are fearful of anxiety-related symptoms (trait anxiety sensitivity).
  - High internal consistency ($\alpha = 0.83$) and test-retest reliability

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Measures

- CO_2 Panic Challenge
  - Completely exhale, then One vital capacity of 35% CO_2, then told to breath normally
- Breath by breath Respiratory Measures
  - Jaegar Oxycon Pro
- Statistical Analyses:
  - Mixed models assessed the impact of AS and time (pre and post 35% CO_2 inhalation) on respiratory measures.

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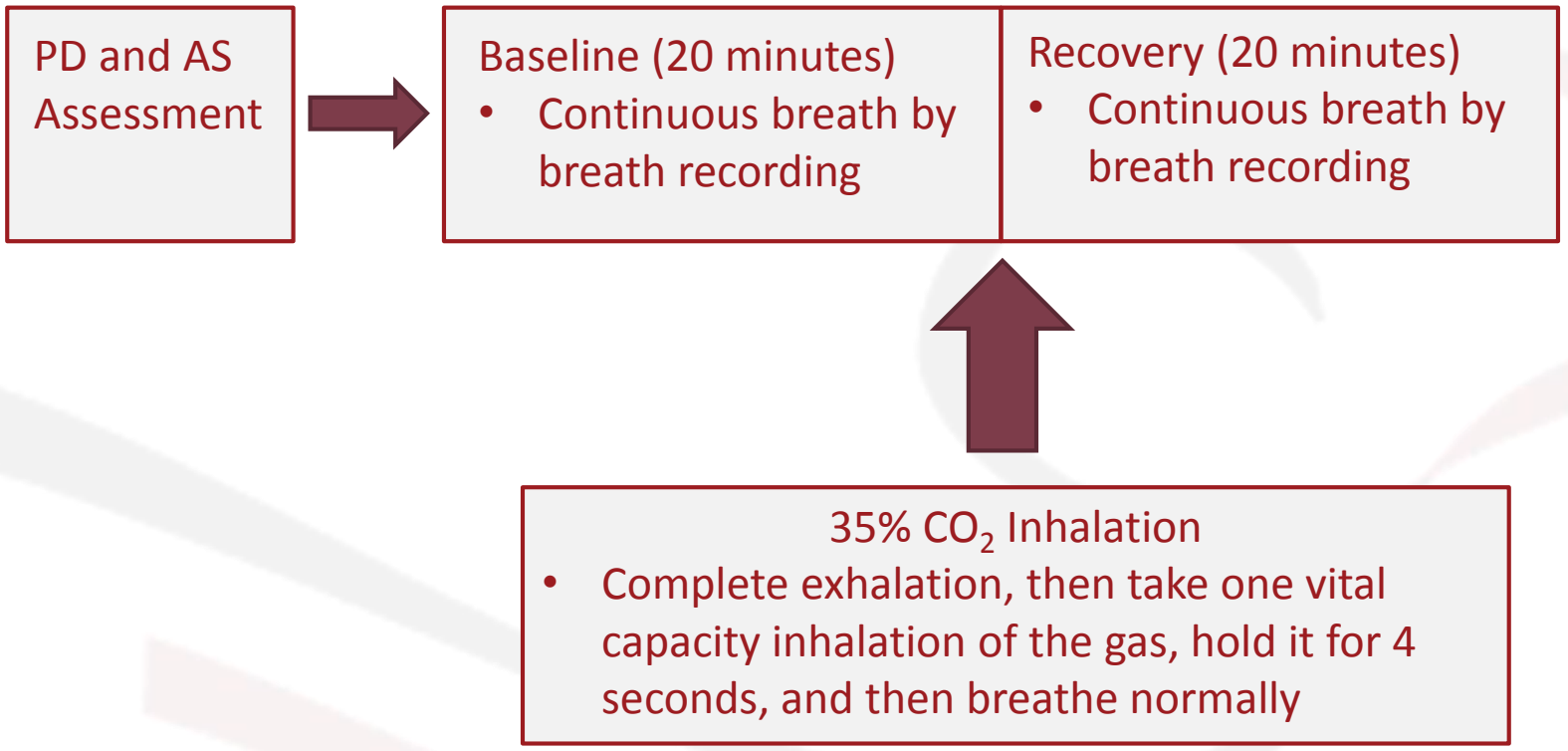
Study design



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Results

Characteristic	Mean (SD) or % (N)
Age (years)	43.5 (14.5)
Sex (% Women)	82.4 (14)
ASI Total Score	20.0 (9.9)
ACQ Mean Score	1.20 (1.12)
PC20 response to Metacholine challenge	0.71 (2.53)
Morisky Total Score	3.65 (2.1)
Resting VCO_2 (ml/kg/min)	172.8 (75.5)
Resting VO_2 (ml/kg/min)	174.4 (80.7)
Resting Ventilation Rate (L/min)	8.23 (3.3)
Resting Tidal volume (L)	0.70 (0.3)

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Exhaled CO2

	F	p
ASI	2.5	0.11
Time	0.58	0.44
ASI X Time Interaction	4.0	0.046

- No main effect of time
- No main effect of ASI
- Interaction effect for ASI by time

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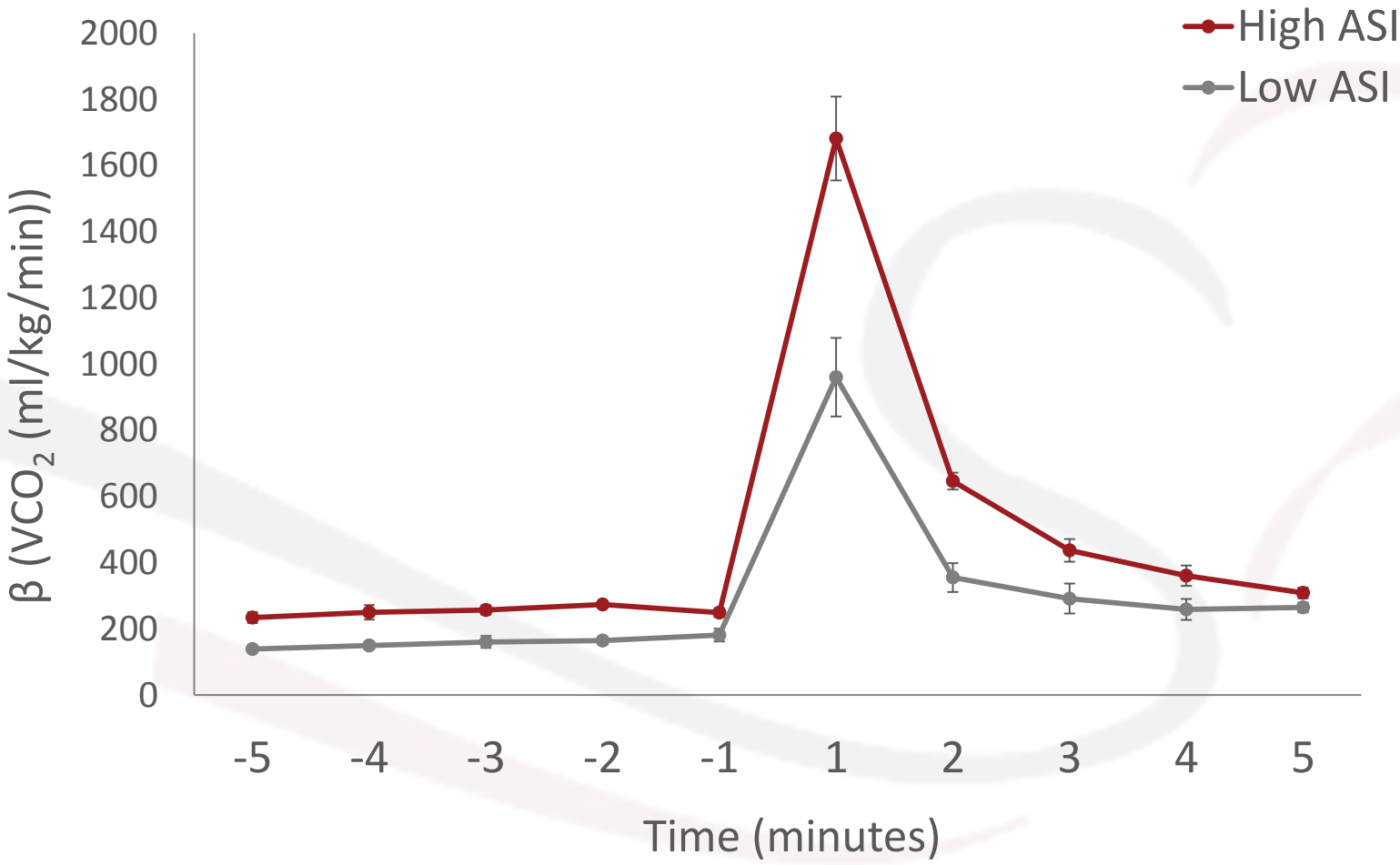
Exhaled CO_2 changes over time



Exhaled O_2

	F	p
ASI	1.24	0.27
Time	3.40	0.07
ASI X Time Interaction	2.45	0.12

- No main effect of time
- No main effect of ASI
- No interaction effect for ASI by time

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Ventilation Rate

	F	p
ASI	6.85	0.008
Time	0.14	0.71
ASI X Time Interaction	1.91	0.17

- Main effect of time: Higher Ventilation Rate in high ASI
- No main effect of ASI
- No interaction effect for ASI by time

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Tidal Volume

	F	P
ASI	1.06	0.30
Time	0.09	0.77
ASI X Time Interaction	27.48	<.001

- No main effect of time
- No main effect of ASI
- Interaction effect for ASI by time

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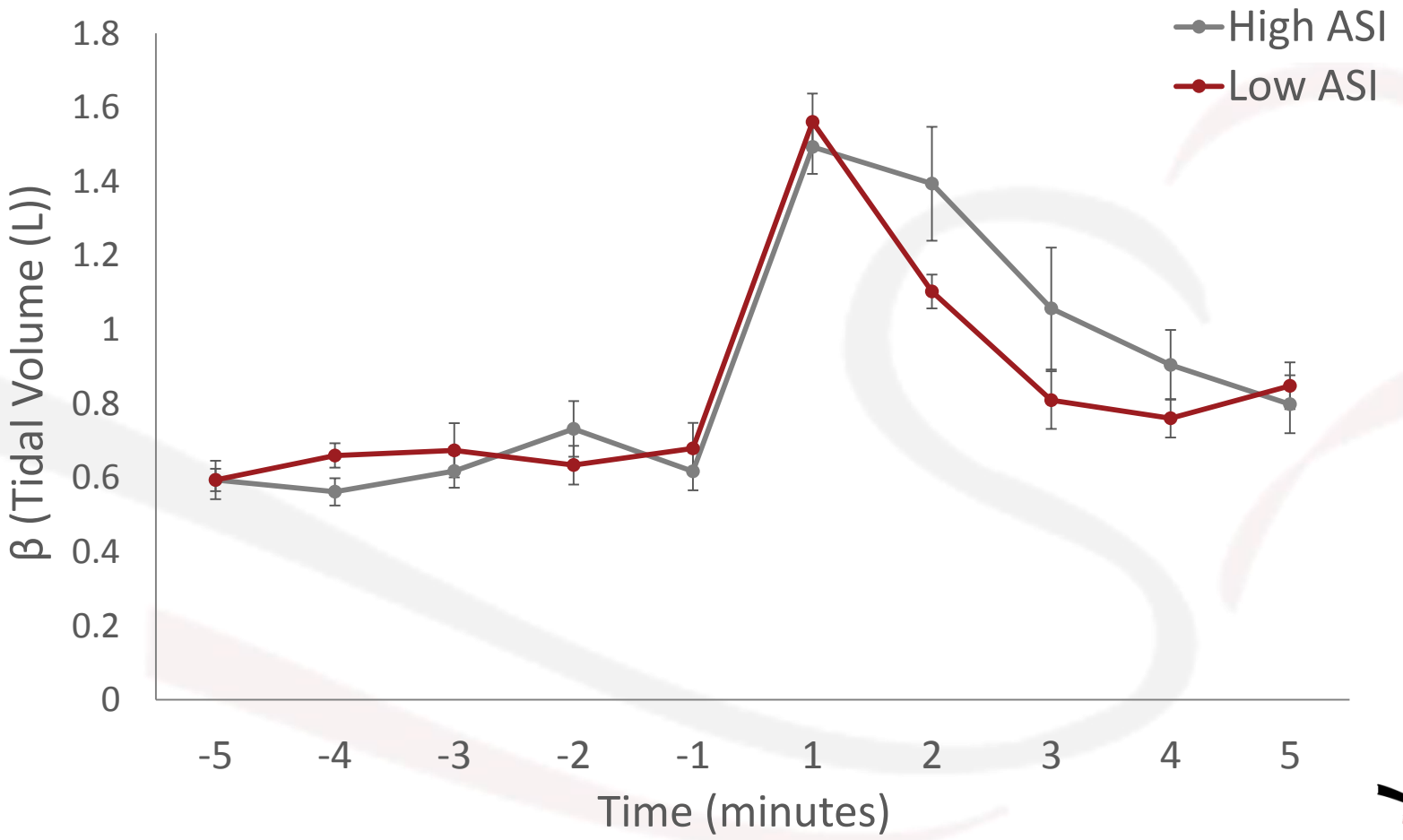
Tidal Volume changes over time



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Conclusion

- Asthma patients with PD and higher AS had increased and more prolonged VCO_2 and TV responses to the panic challenge than patients with PD and lower AS.

- This could indicate that in addition to PD, AS contributes above diagnoses of PD to respiratory responses to a panic-inducing challenge.

- As well as the presence of PD in asthma patients, AS seems to be critical in determining the respiratory response to a panic inducing challenge.

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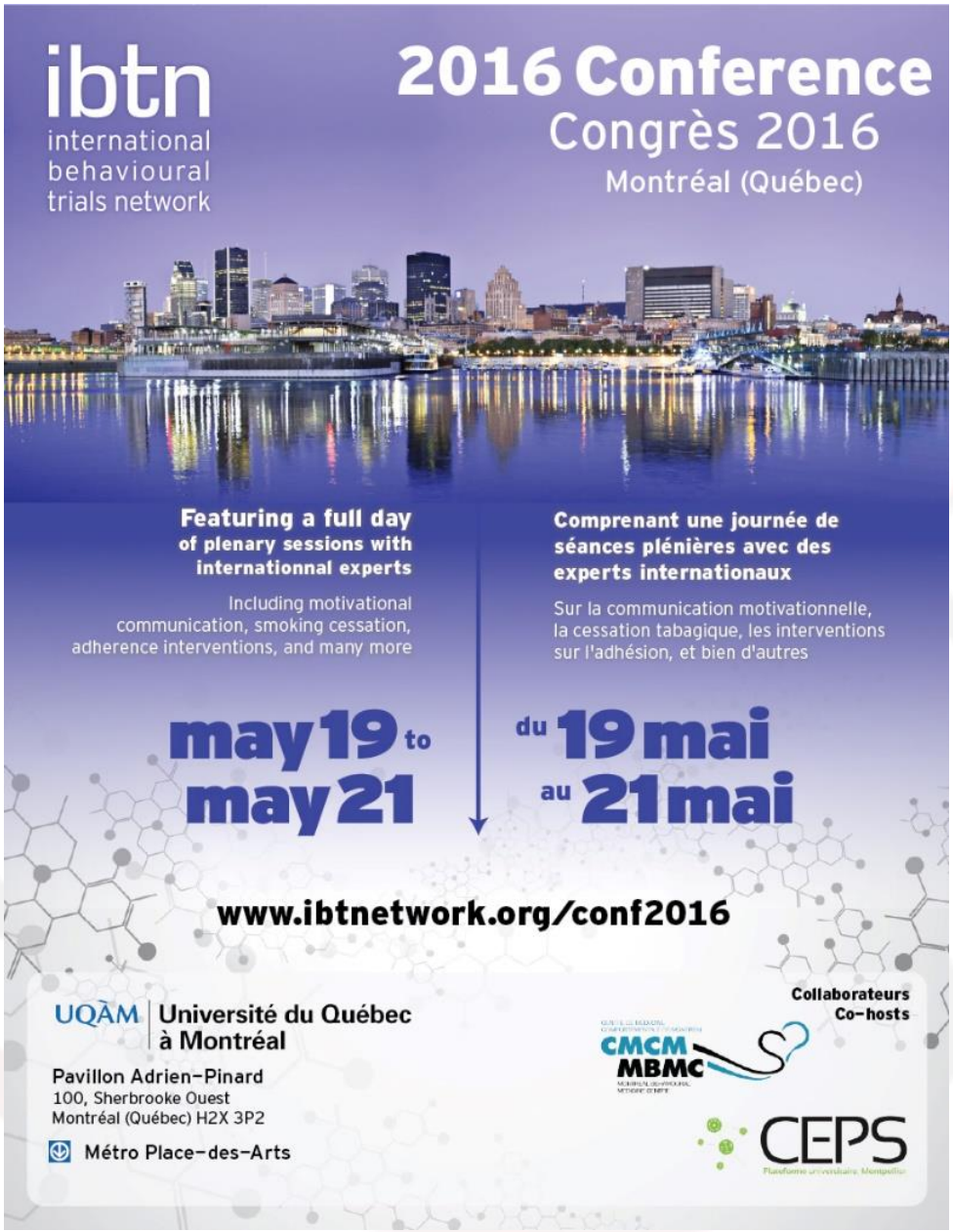
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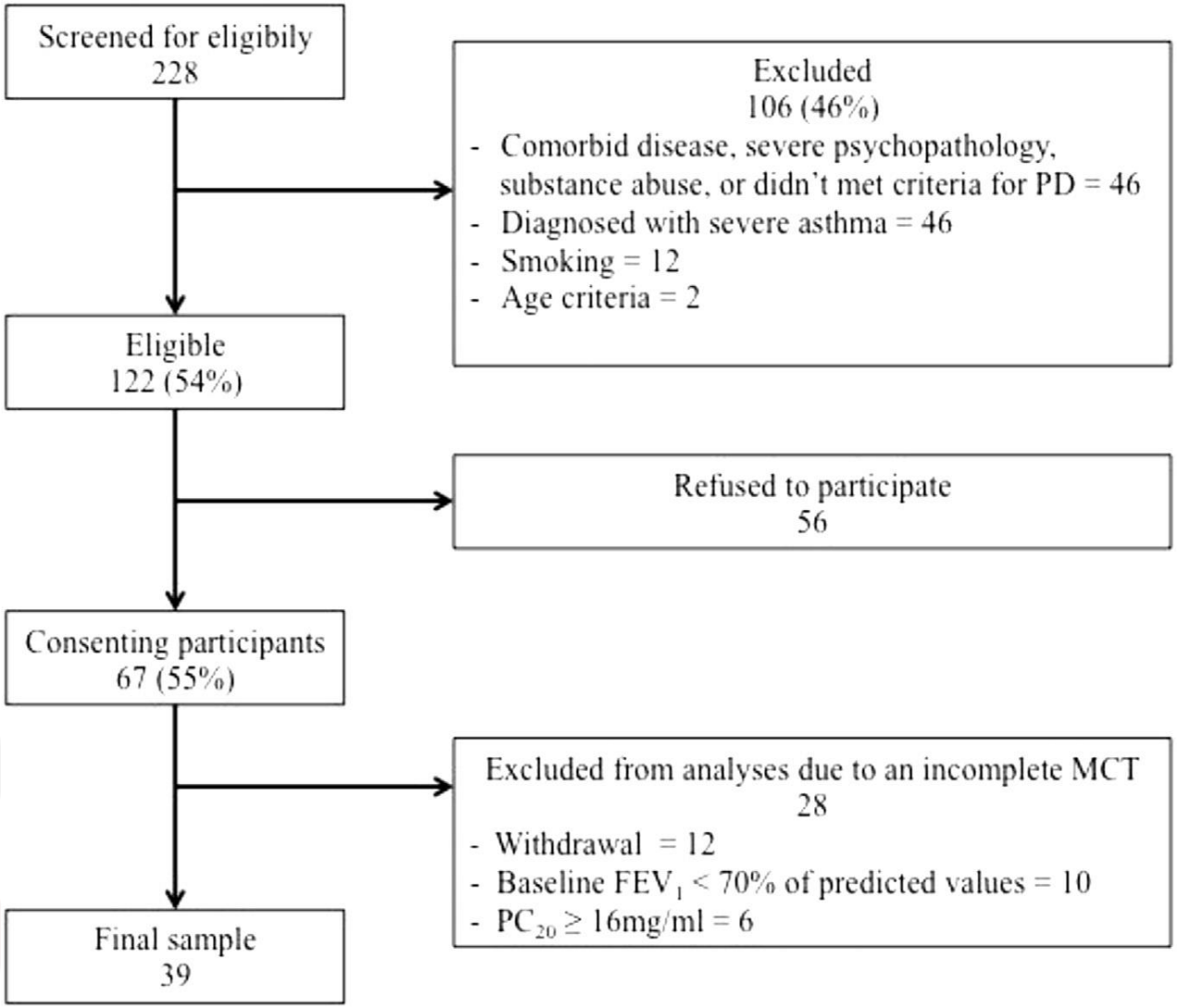
Screened for eligibily
228
Excluded
106 (46%)
- Comorbid disease, severe psychopathology, substance abuse, or didn't met criteria for PD = 46
- Diagnosed with severe asthma = 46
- Smoking = 12
- Age criteria = 2
Eligible
122 (54%)
Refused to participate
56
Consenting participants
67 (55%)
Excluded from analyses due to an incomplete MCT
28
- Withdrawal = 12
- Baseline FEV_1 < 70% of predicted values = 10
- $PC_{20} \geq 16mg/ml$ = 6
Final sample
39