

Puerto Rico Asthma Surveillance Report, 2008-2010

version August 23, 2013

José A. Bartolomei-Díaz, PhD; Eliseo Acevedo-Díaz, MPH



Contents

Executive summary	5
Acknowledgements	6
Author note	8
About this report	8
Peer review	8
Citation	9
Current version	9
Next version	10
Results: Asthma among adults	11
Current asthma prevalence time trend	11
Socio-demographics	12
Health related quality of life	19
Risk & comorbidities	25
Results: Asthma among children	30
Remarks	37
Adults	39
Child	41
Annex 1	43

List of Tables

1	Current asthma prevalence among adults in Puerto Rico by age group, 2008-2010	12
2	Current asthma prevalence among adults in Puerto Rico by sex group, 2008-2010	13
3	Current asthma prevalence among adults in Puerto Rico by education levels, 2008-2010	14
4	Current asthma prevalence among adults in Puerto Rico by income levels, 2008-2010	15
5	Current asthma prevalence among adults in Puerto Rico by marital status, 2008-2010	16
6	Current asthma prevalence among adults in Puerto Rico by employment status, 2008-2010	17
7	Current asthma prevalence among adults in Puerto Rico by health region, 2008-2010	18
8	Current asthma prevalence among adults in Puerto Rico according to health perception, 2008-2010	20
9	Current asthma prevalence among adults in Puerto Rico by days with physical health perception, 2008-2010	21
10	Current asthma prevalence among adults in Puerto Rico by days of frequent mental distress, 2008-2010	22
11	Current asthma prevalence among adults in Puerto Rico who were unable to conduct usual activities due to physical or mental impairment, 2008-2010	23
12	Current asthma prevalence among adults in Puerto Rico by unhealthy days, 2008-2010	24
13	Current asthma prevalence among adults in Puerto Rico by physical activity, 2008-2010	26

14	Current asthma prevalence among adults in Puerto Rico by body mass index categories, 2008-2010	27
15	Current asthma prevalence among adults in Puerto Rico by smoking status, 2008-2010	28
16	Current asthma prevalence among adults in Puerto Rico by presence of any other chronic disease, 2008-2010	29
17	Current asthma prevalence among children in Puerto Rico by age group, 2008-2010	31
18	Current asthma prevalence among children in Puerto Rico by sex, 2008-2010	32
19	Current asthma prevalence among children in Puerto Rico by respondent health region, 2008-2010	33
20	Current asthma prevalence among children in Puerto Rico by annual income of the interviewee , 2008-2010	34
21	Current asthma prevalence among children in Puerto Rico by marital status of the interviewed, 2008-2010	35
22	Current asthma prevalence among children in Puerto Rico by smoking status of the interviewee, 2008-2010	36
23	Current asthma prevalence among adults and children, 2008-2010	38
24	Current asthma prevalence among adults by Socio-demographic variables, 2008-2010	39
25	Current asthma prevalence among adults by health related quality of life variables, 2008-2010	40
26	Current asthma prevalence among adults by risk and comorbidity variables, 2008-2010	40
27	Current asthma prevalence among children by child demographic variables, 2008-2010	41
28	Current asthma prevalence among children by respondent social variables, 2008-2010	42

List of Figures

1	Current asthma prevalence among adults in Puerto Rico, set <i>years</i>	11
2	Current asthma prevalence among adults in Puerto Rico by age group, 2008-2010	12
3	Current asthma prevalence among adults in Puerto Rico by sex group, 2008-2010	13
4	Current asthma prevalence among adults in Puerto Rico by education levels, 2008-2010	14
5	Current asthma prevalence among adults in Puerto Rico by household income levels, 2008-2010	15
6	Current asthma prevalence among adults in Puerto Rico by marital status, 2008-2010	16
7	Current asthma prevalence among adults in Puerto Rico by employment status, 2008-2010	17
8	Current asthma prevalence among adults in Puerto Rico by health region, 2008-2010	18
9	Current asthma prevalence among adults in Puerto Rico according to health perception, 2008-2010	20
10	Current asthma prevalence among adults in Puerto Rico according to physical health perception, 2008-2010	21
11	Current asthma prevalence among adults in Puerto Rico by days of frequent mental distress, 2008-2010	22
12	Current asthma prevalence among adults in Puerto Rico who were unable to conduct usual activities due to physical or mental impediment, 2008-2010	23
13	Current asthma prevalence among adults in Puerto Rico by unhealthy days, 2008-2010	24
14	Current asthma prevalence among adults in Puerto Rico by physical activity, 2008-2010	26

15	Current asthma prevalence among adults in Puerto Rico by body mass index categories, 2008-2010	27
16	Current asthma prevalence among adults in Puerto Rico by smoking status, 2008-2010	28
17	Current asthma prevalence among adults in Puerto Rico by any other chronic diseases, 2008-2010	29
18	Current asthma prevalence among children in Puerto Rico, 2008-2010 . . .	30
19	Current asthma prevalence among children in Puerto Rico by age group, 2008-2010	31
20	Current asthma prevalence among children in Puerto Rico by sex, 2008-2010	32
21	Current asthma prevalence among children in Puerto Rico by respondent health region, 2008-2010	33
22	Current asthma prevalence among children in Puerto Rico by annual income of the interviewed, 2008-2010	34
23	Current asthma prevalence among children in Puerto Rico by marital status of the interviewed, 2008-2010	35
24	Current asthma prevalence among children in Puerto Rico by smoking status of the interviewee, 2008-2010	36

Executive summary

Dear colleagues;

The following asthma surveillance update represents the Asthma Project effort to be as timely as possible in reporting asthma related health indicators and evidence the effort to design, implement, and sustain an “Asthma Epidemiological Surveillance System”. The data used for this update was the latest available at the Center for Disease, Control and Prevention web site at the date of publication.

It is of general knowledge that asthma is an important health issue in Puerto Rico. The Puerto Rico Asthma Project has intensively worked to address this chronic condition from a public health perspective in collaboration with governmental, non-profit, profit and community based organizations to achieve our goal of reduce the mortality and morbidity due to this condition, and increase the quality of life of our population with asthma.

Sincerely,

Francico Joglar Pesquera, MD, MACP

Puerto Rico Secretary of Health

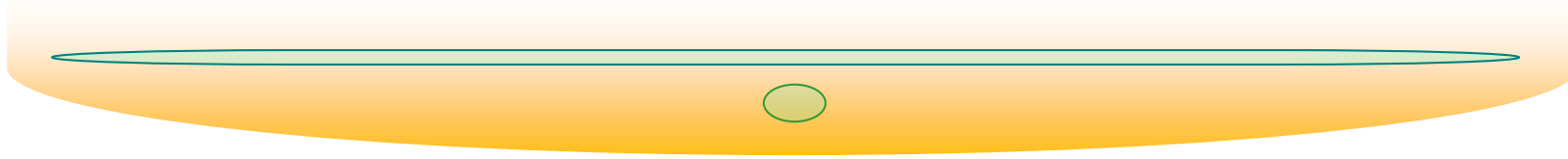
Acknowledgements

This document was prepared by:

- José A. Bartolomei-Díaz, MS, Ph.D
Puerto Rico Asthma Project, Epidemiologist
- Eliseo Acevedo-Díaz, MPH
Puerto Rico Asthma Project, Biostatician

We thank our team partners for their support, excellent recommendations, and editing:

- Wanda I. Hernández-Virella, MPH
Puerto Rico Asthma Project, Coordinator
- María C. Sánchez Gómez, MS
Puerto Rico Asthma Project, Evaluator
- Manuel Vargas-Bernal, MD, MPH
Director - Maternal, Child & Adolescent Health Division
- Dan Burrows
Project Officer - Air Pollution and Respiratory Health Branch, Center for Disease Control & Prevention
- Cathy Bailey
Surveillance Team Lead - Air Pollution and Respiratory Health Branch, Center for Disease Control & Prevention
- Sheri Disler
Evaluator Technical Advisor - Air Pollution and Respiratory Health Branch, Center for Disease Control & Prevention
- Carlos Alonso
Program Official - Air Pollution and Respiratory Health Branch, Center for Disease Control & Prevention



We would also like to thank several people, who in one way or another, have contributed with the asthma project developing this report:

- Francisco Joglar-Pesquera, MD, MACB
Puerto Rico Secretary of Health
- Ruby Serrano-Rodríguez, MS, DrPH
Director & State Coordinator - BRFSS Office, Puerto Rico
Epidemiology & Research Office
- Álvaro U. Aranda, MD
President - Puerto Rico Asthma and Other Chronic Respiratory Diseases Coalition

Special thanks to all of our colleagues of the Maternal, Child and Adolescents Division of the Puerto Rico Health Department, to Sixto Merced for create the art of this document and Alejandro Amill for help us understand the transition to the 2011 BRFSS methodology.

Author note

About this report

This update reports is part of our commitment to continue learning and implementing cost-effective technological tools to improve this epidemiological surveillance system and enhancing its attributes of acceptability, flexibility, simplicity, stability, and timeliness. One of our goals is to make valuable asthma information as timely as possible to the general and scientific population. Is our expectation to work in producing an update for the general and scientific population as soon as the data is available. All updates and surveillance work will be included at our web page:

www.proyectoasmapr.org/Vigilancia.html

We continue our effort in creating an easy to read and understand guide for public health planning and interventions. With that aim, we are providing here what is so far our standard report with measures of the magnitude of a health indicators (e.g. prevalence, mortality, use of health services) across the different populations (e.g. age, sex, income, etc.) and the risk or possibility of having a health indicator (e.g. relative risk, odds ratios, etc.). The health indicator estimate (prevalence) is the percent of individuals with the condition at the stratified group. This measure can help with economic and human resources allocation. The risk is a burden guide for groups selection to prioritize interventions. Furthermore, you will find a document structure where in every page there is a brief interpretation on the observed health indicator, a brief interpretation of the risk measure followed by a graph and a table with the pertinent information.

Peer review

This document has been evaluated by the Puerto Rico Asthma Project Staff. We want you to take part in improving this surveillance system and reports. We encourage any reader to evaluate this document and send recommendations at info@proyectoasmapr.org.

We will seriously consider your insights. A new version with your recommendations will be evidence of this effort and collaboration.

Citation

When use this document we suggest the following citation:

J.A. Bartolomei-Díaz and E. Acevedo. Puerto Rico asthma surveillance 2011 update. Technical report, Puerto Rico Asthma Project, Puerto Rico Department of Health, August 23, 2013.

BibTex citation:

```
@TechReport{Bartolomei_2013,  
author = {Bartolomei-Díaz, J.A. and Acevedo, E.},  
title = {Puerto Rico Asthma Surveillance 2011 Update},  
institution = {Puerto Rico Asthma Project, Puerto Rico Department of Health},  
year = {2013},  
OPTmonth = {May 22}  
}
```

Current version

In this update (August 23, 2013) we present all the measures contained within the April 26, 2011 asthma report, but using the 2008-2010 Puerto Rico BRFSS data. All procedures and methodologies in this update are the posted in our web page in a document title Puerto Rico Asthma surveillance methods. Our standard report contains current asthma measures among adults and children stratified by socio-demographic, health related quality of life and risk factors.

The 2008-2010 BRFSS survey was conducted implementing a new sampling methodology. Furthermore, 2011 data cannot be aggregated with those of previous years. The CDC strongly recommend to start a new trend from 2011 onwards. Please refer to the BRFSS official web site at <http://www.cdc.gov/brfss/> for details on methods changes.

Next version

We are in advance stages to finish our work towards obtaining asthma indicators on medical interventions, asthma medication use, asthma education and asthma control. The information came from the follow-up asthma survey called the "Asthma Call Back" (ACB).

It is in our best interest the extensive use of this information for public health policy, research questions & proposal development.

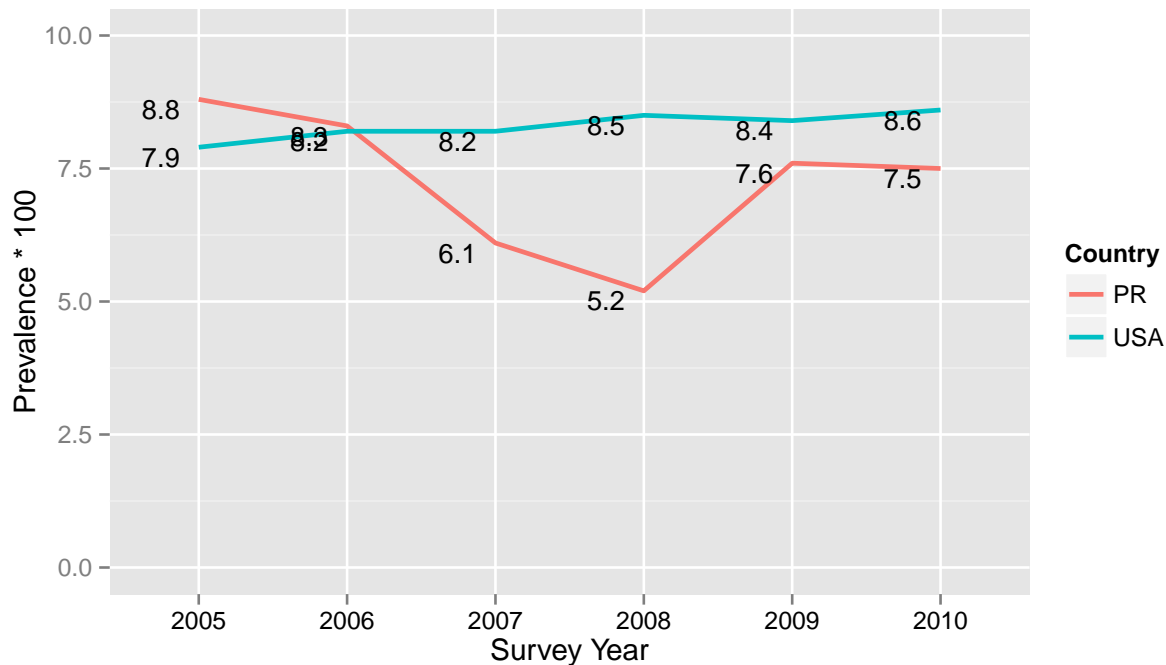
Sincerely,

José A. Bartolomei Díaz, PhD

Results: Asthma among adults

Current asthma prevalence time trend

Figure 1: Current asthma prevalence among adults in Puerto Rico, set years



- The time trend for current asthma prevalence among adults in Puerto Rico, Figure 1, presents a significant downward from 8.8% in 2005 to 5.2% in 2008.
- A decrease is observed to 7.6% and 7.5% in 2009 and 2010, respectively.
- Current asthma prevalence in the United States appears to have a constant trend across the whole period.
- The percent change from 7.9% in 2005 to 8.6% in 2010 was statistically significant (p value < 0.5 .) (Figure 1)
- A dramatic increase was observed in the current asthma prevalence from the year 2008 to 2009 from 5.2 to 7.6, respectively.

Socio-demographics

- Figure 2 shows that the current asthma prevalence for the age group of 45-54 was higher when compared with the other groups.
- Adults in the age group of 35-44 had 37% less possibility of having current asthma prevalence when compared with the 18-24 group. This difference was not significant ($p\text{-value} \geq 0.05$). See Table 1.

Figure 2: Current asthma prevalence among adults in Puerto Rico by age group, 2008-2010

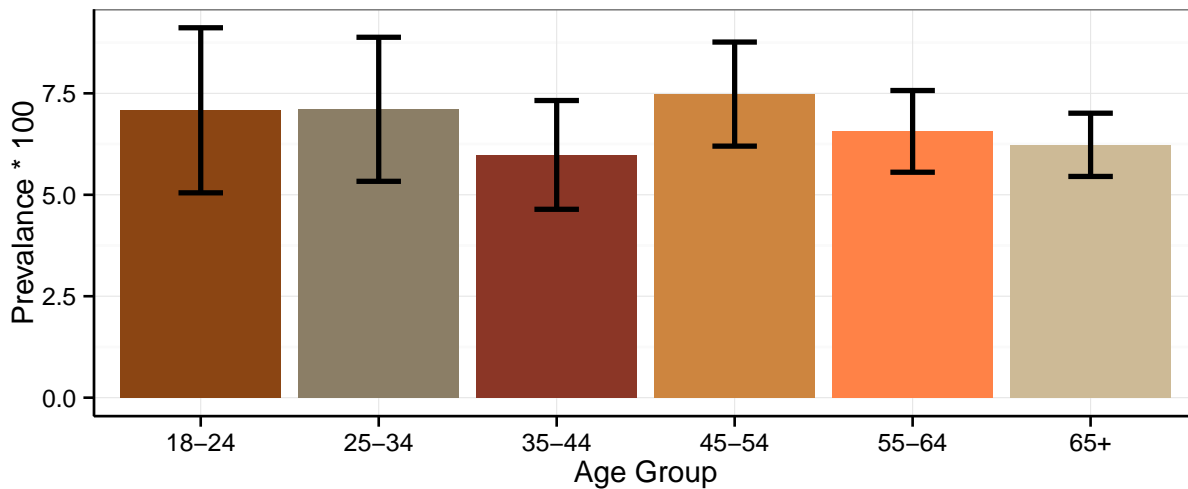


Table 1: Current asthma prevalence among adults in Puerto Rico by age group, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Age group					
18-24	7.08 (5.05-9.12)	29,425	1.00	0.00	1.00
25-34	7.11 (5.33-8.88)	38,905	0.86	0.29	0.62
35-44	5.98 (4.64-7.32)	31,487	0.63	0.3	0.11
45-54	7.48 (6.2-8.76)	35,908	0.8	0.29	0.43
55-64	6.56 (5.56-7.57)	26,427	0.69	0.3	0.21
65+	6.23 (5.45-7.01)	29,645	0.72	0.32	0.29

- Figure 3 shows that males had a lower current asthma prevalence when compared with females.
- Among adults, females had 2.2 times more possibility of reporting current asthma prevalence when compared with males. This difference was significant (p-value < 0.05). See Table 2.

Figure 3: Current asthma prevalence among adults in Puerto Rico by sex group, 2008-2010

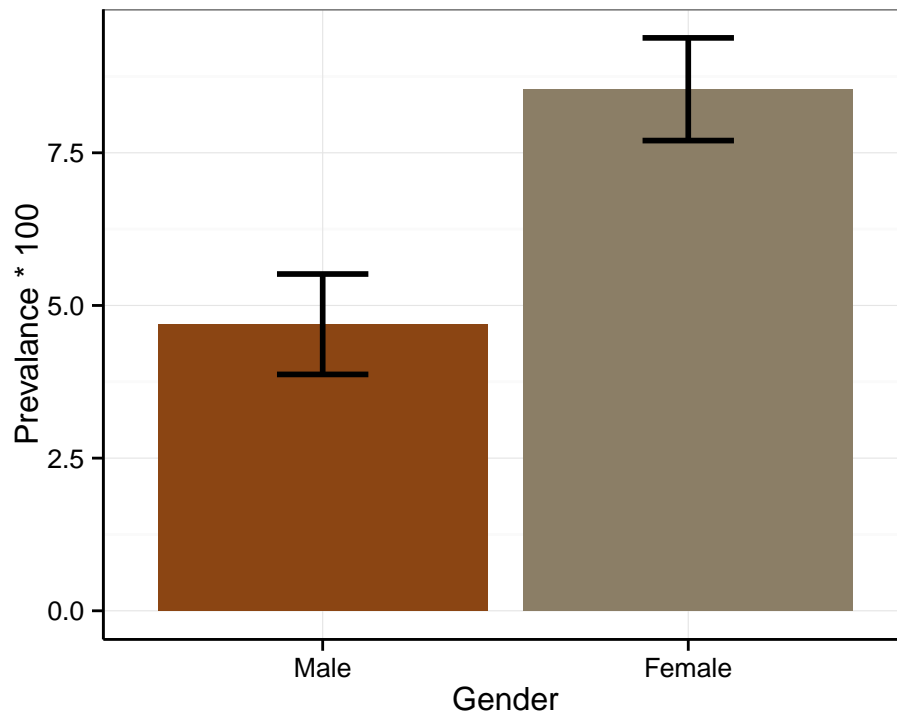


Table 2: Current asthma prevalence among adults in Puerto Rico by sex group, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Sex group					
Males	4.69 (3.87-5.51)	62,693	1.00	0.00	1.00
Females	8.54 (7.7-9.38)	129,104	2.2	0.13	0.00

- When comparing by education level, those with some high school have the highest current asthma prevalence. (Figure 4).
- When comparing by educational level, those who were 7.5% of the asthma patients had some high school of reporting current asthma prevalence when compared with those who report having some high school. This difference was not significant (p-value ≥ 0.05). Data shown in Table 3.

Figure 4: Current asthma prevalence among adults in Puerto Rico by education levels, 2008-2010

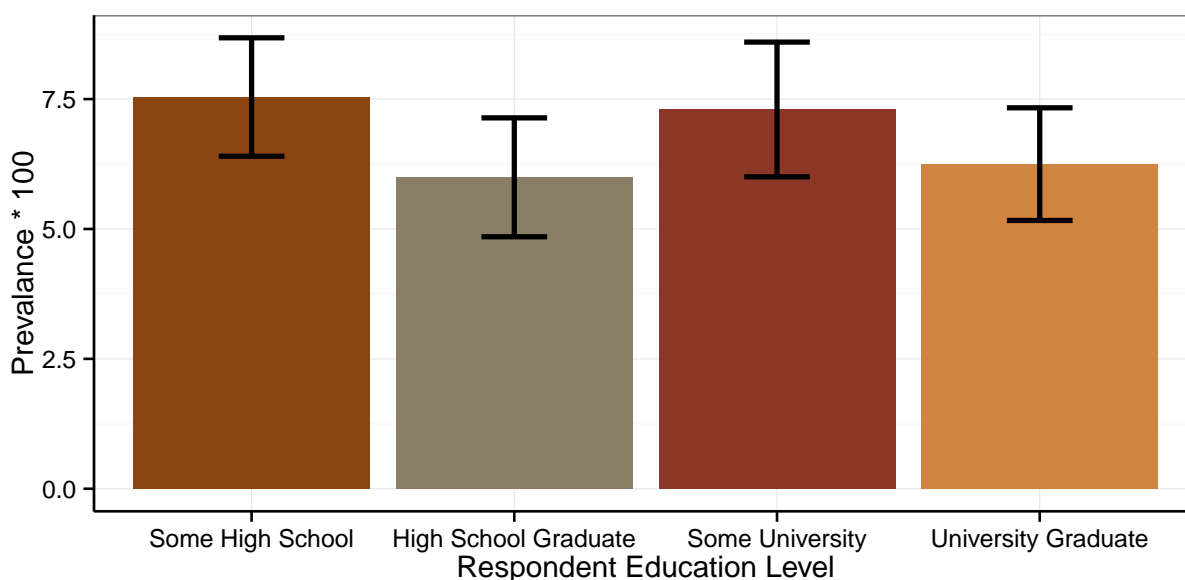


Table 3: Current asthma prevalence among adults in Puerto Rico by education levels, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Education group					
Some High School	7.54 (6.4-8.68)	42,600	1.00	0.00	1.00
High School Graduate	5.99 (4.85-7.14)	39,731	0.75	0.16	0.07
Some University	7.3 (6-8.6)	56,965	1.02	0.16	0.92
University Graduate	6.25 (5.16-7.33)	52,195	0.95	0.18	0.76

- Figure 5 shows that adults whose annual household income is <15k, have a current asthma prevalence higher than the other income groups.
- Those in the range of 15k-<25k had 15% less possibility of reporting current asthma than those whose annual income is less than \$ 14,999. This difference was not significant (p-value ≥ 0.05). For further information, refer to Table 4.

Figure 5: Current asthma prevalence among adults in Puerto Rico by household income levels, 2008-2010

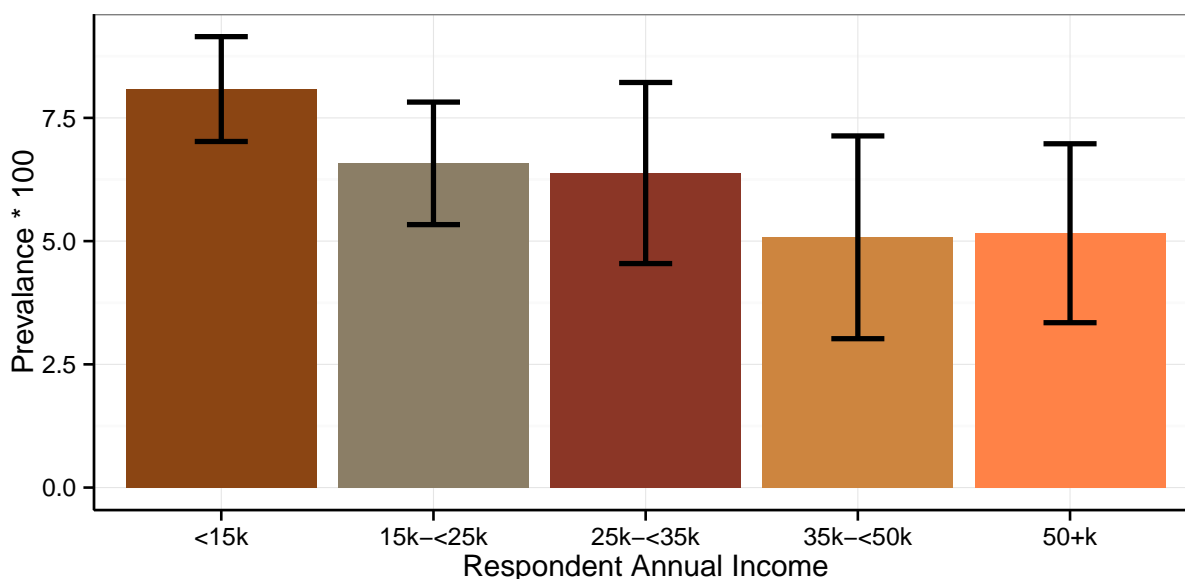


Table 4: Current asthma prevalence among adults in Puerto Rico by income levels, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Income group					
<15k	8.08 (7.02-9.15)	71,142	1.00	0.00	1.00
15k-<25k	6.58 (5.33-7.82)	47,493	0.85	0.14	0.25
25k-<35k	6.38 (4.54-8.22)	16,292	0.93	0.2	0.73
35k-<50k	5.08 (3.02-7.13)	10,036	0.8	0.28	0.42
50+k	5.16 (3.35-6.97)	11,793	0.85	0.25	0.53

- Adults who were divorced at the time of the interview, had the highest asthma prevalence among marital status. Refer to figure 6.
- Those who were widowed had 21% less possibility of having current asthma prevalence when compared with those who responded being married. This difference was not significant ($p\text{-value} \geq 0.05$). Refere to Table 5.

Figure 6: Current asthma prevalence among adults in Puerto Rico by marital status, 2008-2010

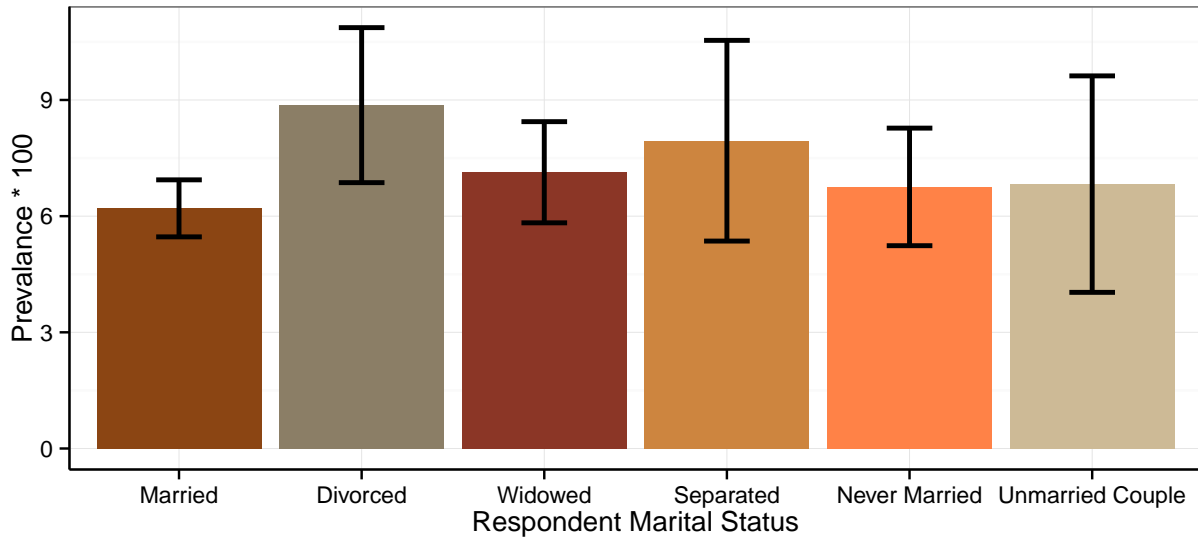


Table 5: Current asthma prevalence among adults in Puerto Rico by marital status, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Marital group					
Married	6.2 (5.47-6.94)	89,555	1.00	0.00	1.00
Divorced	8.87 (6.87-10.87)	22,386	1.23	0.16	0.20
Widowed	7.13 (5.83-8.44)	13,088	0.79	0.16	0.14
Separated	7.95 (5.36-10.54)	7,870	1.06	0.21	0.78
Never Married	6.76 (5.24-8.27)	45,848	0.97	0.2	0.88
Unmarried Couple	6.83 (4.03-9.62)	12,468	1.02	0.26	0.92

- Those adults who were unable to work at the moment of the interview, had the highest current asthma prevalence (Figure 7).
- Adults who were unable to work had 2.44 times more possibility of having current asthma prevalence when compared with those who responded being employed. This difference was significant (p -value < 0.05). Data shown in Table 6.

Figure 7: Current asthma prevalence among adults in Puerto Rico by employment status, 2008-2010

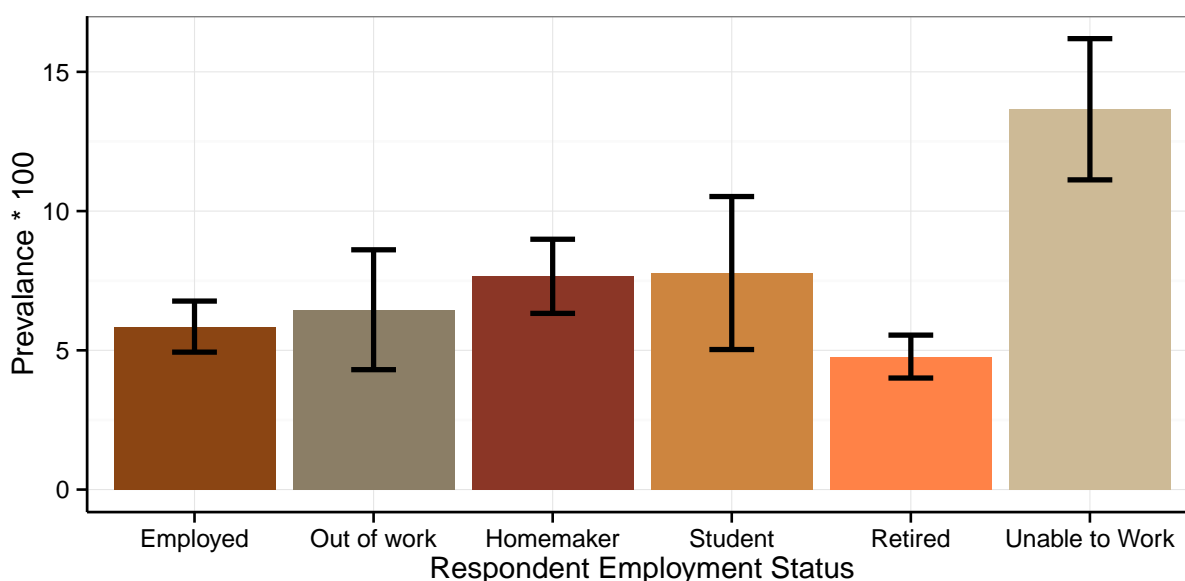


Table 6: Current asthma prevalence among adults in Puerto Rico by employment status, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Employment status					
Employed	5.85 (4.94-6.77)	75,063	1.00	0.00	1.00
Out of work	6.46 (4.31-8.61)	14,590	1.13	0.24	0.61
Homemaker	7.66 (6.33-8.99)	35,749	0.89	0.17	0.49
Student	7.78 (5.03-10.52)	19,298	1.37	0.36	0.37
Retired	4.78 (4-5.55)	20,120	0.82	0.17	0.25
Unable to Work	13.66 (11.12-16.19)	26,830	2.44	0.17	0.00

- Figure 8 shows that the Caguas health region have the highest current asthma prevalence.
- Those living in the health region of Bayamon, metropolitana had 35% less possibility, Bayamon, metropolitana had 42% less possibility of reporting current asthma than those living in the health region of Aguadilla. (see Table 7).

Figure 8: Current asthma prevalence among adults in Puerto Rico by health region, 2008-2010

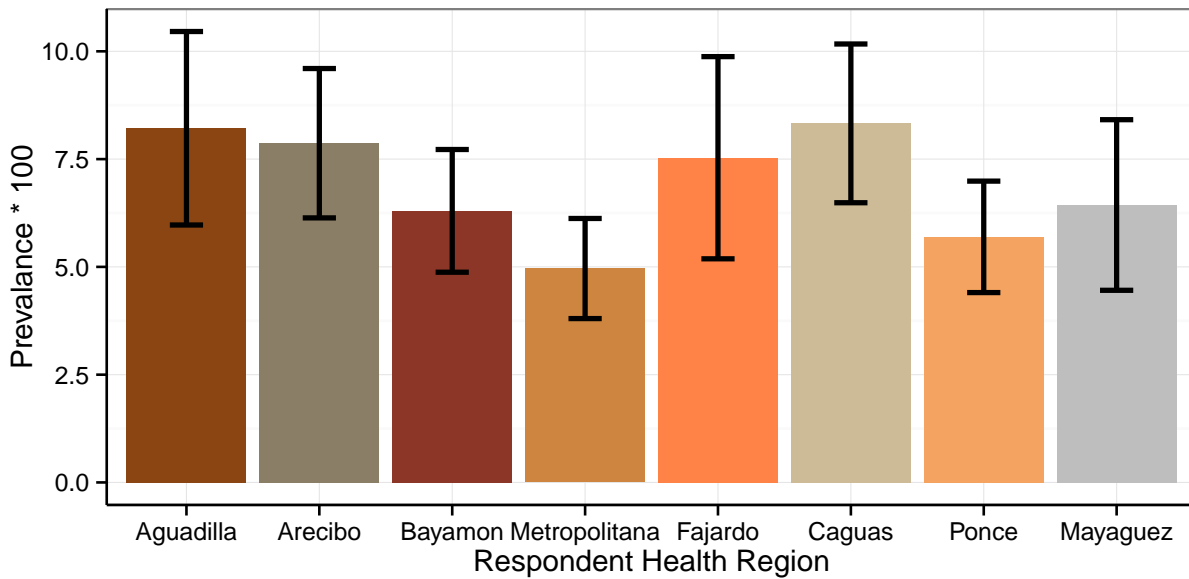


Table 7: Current asthma prevalence among adults in Puerto Rico by health region, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Health region					
Aguadilla	8.22 (5.97-10.46)	22,015	1.00	0.00	1.00
Arecibo	7.87 (6.14-9.6)	25,223	0.98	0.22	0.91
Bayamon	6.3 (4.88-7.72)	29,124	0.65	0.22	0.04
Metropolitana	4.96 (3.8-6.12)	23,908	0.58	0.22	0.01
Fajardo	7.53 (5.19-9.88)	14,502	0.73	0.26	0.22
Caguas	8.33 (6.49-10.17)	36,851	0.91	0.21	0.67
Ponce	5.7 (4.4-6.99)	28,203	0.73	0.21	0.14
Mayaguez	6.44 (4.46-8.41)	11,738	0.73	0.24	0.20

Health related quality of life

Health Related Quality of Life (HRQOL) measures are humanistic outcomes (ISPOR) recognized to supplement traditional measures of morbidity and mortality (CDC 2000; other). HRQOL have been previously used to describe the health perception of persons with asthma. Early studies by Juniper et al. described a relationship between asthma severity and quality of life impairment. [3] Ford et al. (2003) found that persons with asthma reported worse health-related quality of life than respondents who previously had asthma or those who never had asthma [2]. Moreover, uncontrolled asthma has been linked to lower adult and pediatric HRQOL (Dean 2009). These measures are considered valid indicators of service need, interventions outcomes, support surveillance efforts for identifying health disparities and tracking population trends (CDC 2000). This section presents the current asthma prevalence among adults within those who answer the HRQOL questions.

- Figure 9 shows that current asthma prevalence was higher in persons who perceive their health as fair / poor, than those who claim to have a very good health.
- Adults who perceive their health as fair or poor had 78% more possibility of reporting current asthma prevalence when compared with those who perceived their health as very good. This difference was significant (p-value < 0.05). Data shown in Table 8.

Figure 9: Current asthma prevalence among adults in Puerto Rico according to health perception, 2008-2010

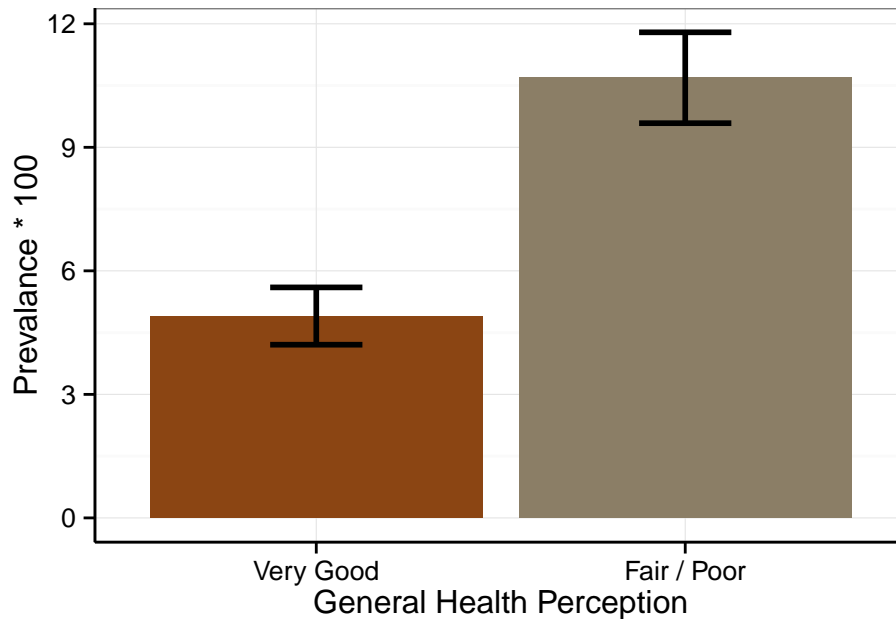


Table 8: Current asthma prevalence among adults in Puerto Rico according to health perception, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Health Perception					
Very Good	4.9 (4.21-5.6)	95,141	1.00	0.00	1.00
Fair / Poor	10.69 (9.59-11.79)	96,316	1.78	0.14	0.00

- Adults who reported being physically unhealthy for 14 days or more in the past 30 days, had an asthma prevalence that was higher when compared with those who reported being physically unhealthy for less than 13 days in the last 30 days.
- Adults who felt physically impaired for 14 days or more had 2.69 times more possibility of reporting having asthma at the moment of the interview, when compared with those who felt physically impaired for 13 days or less (See Table 9).

Figure 10: Current asthma prevalence among adults in Puerto Rico according to physical health perception, 2008-2010

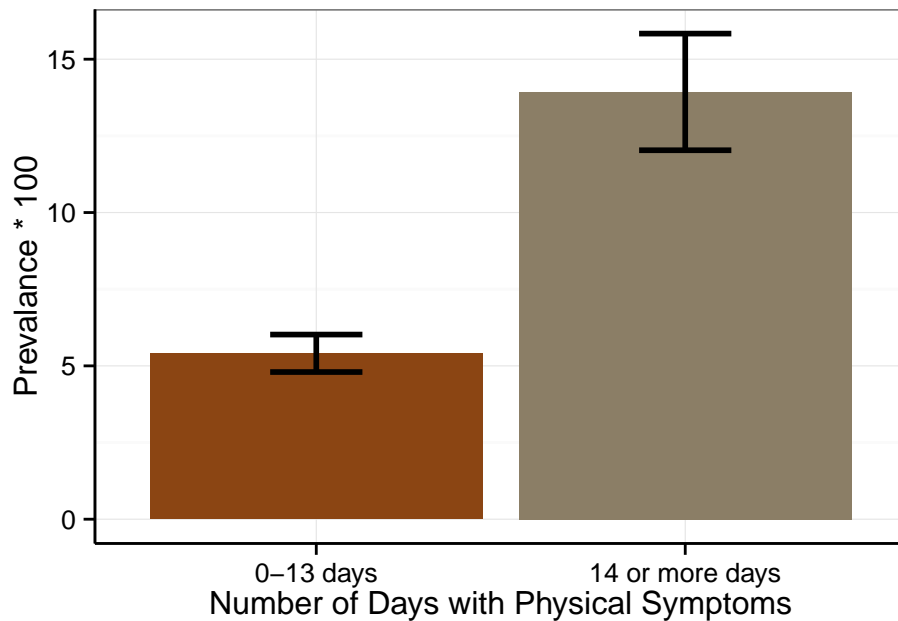


Table 9: Current asthma prevalence among adults in Puerto Rico by days with physical health perception, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Physical Symptoms					
0-13 days	5.41 (4.8-6.02)	129,385	1.00	0.00	1.00
14 or more days	13.93 (12.03-15.83)	58,098	2.69	0.13	0.00

- Current asthma prevalence among adults who reported feeling mentally unhealthy for more than 13 days in the last month, was higher when compared with their counterpart.
- Figure 11 shows that adults who felt mentally impaired for 14 or more days had 83% more possibility of having current asthma prevalence when compared with those who answered 0-13 days. This difference was significant (p-value < 0.05). (See Table 10).

Figure 11: Current asthma prevalence among adults in Puerto Rico by days of frequent mental distress, 2008-2010

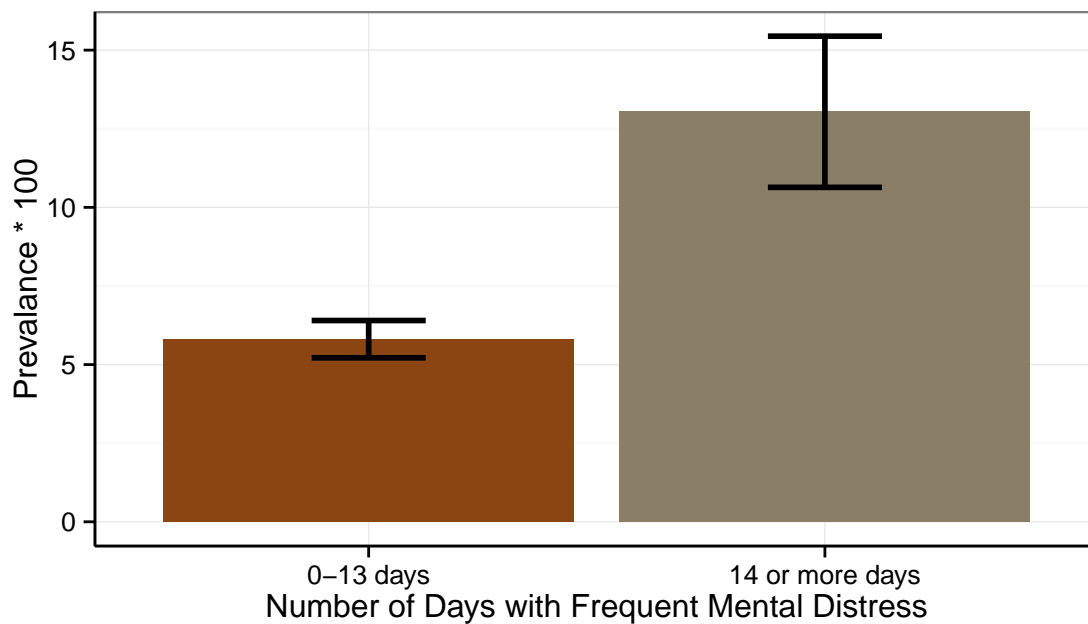


Table 10: Current asthma prevalence among adults in Puerto Rico by days of frequent mental distress, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Mentally Unhealthy					
0-13 days	5.81 (5.22-6.4)	143,848	1.00	0.00	1.00
14 or more days	13.04 (10.64-15.44)	42,337	1.83	0.15	0.00

- A higher current asthma prevalence was observed among adults who were unable to perform their usual activities for 14 days or more due to physical or mental impairment, when compared with the other group. Refer to Figure 12).
- Persons who couldn't conduct their usual daily activities for more than 14 days in the last month had 53% more possibility of reporting current asthma prevalence when compared with those who felt this way for at most 13 days in the last 30.

Figure 12: Current asthma prevalence among adults in Puerto Rico who were unable to conduct usual activities due to physical or mental impediment, 2008-2010

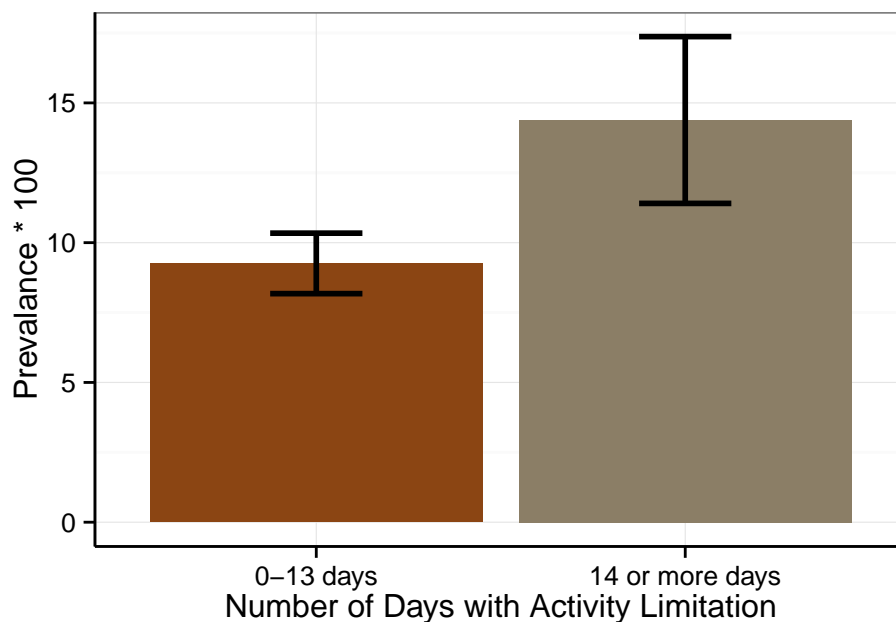


Table 11: Current asthma prevalence among adults in Puerto Rico who were unable to conduct usual activities due to physical or mental impairment, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Activity limitation					
0-13 days	9.26 (8.18-10.34)	102,211	1.00	0.00	1.00
14 or more days	14.39 (11.4-17.37)	28,157	1.53	0.18	0.01

- As seen in Figure 13, those adults who felt mentally or physically unhealthy for more than 14 days in the last 30 days, had a higher current asthma prevalence when compared with their counterpart.
- Those persons who felt mentally or physically unhealthy for more than 14 days in the last month had 53% more possibility of reporting current asthma prevalence when compared with those who felt mentally or physically unhealthy for at most 13 days in the last 30. Data shown in Table 12.

Figure 13: Current asthma prevalence among adults in Puerto Rico by unhealthy days, 2008-2010

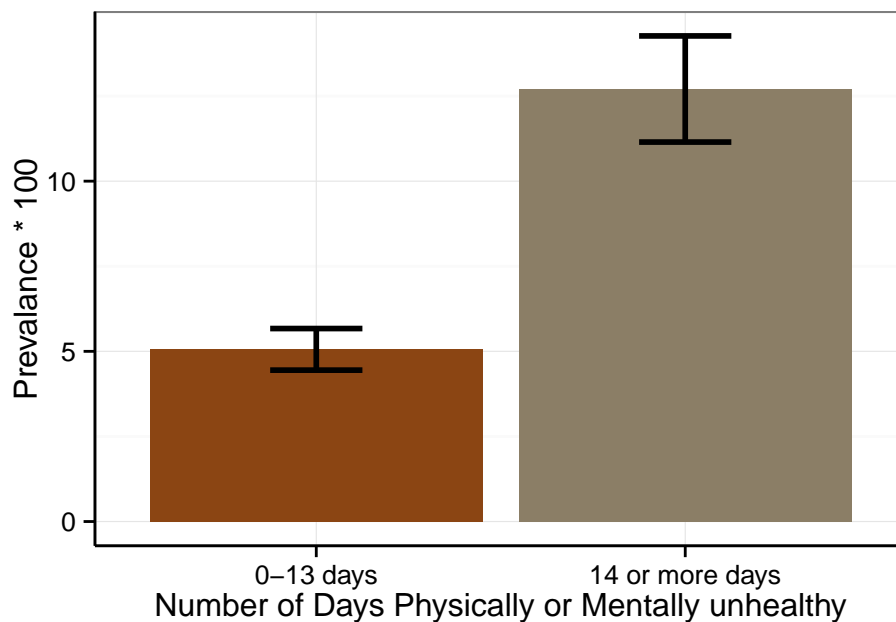


Table 12: Current asthma prevalence among adults in Puerto Rico by unhealthy days, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Unhealthy Days					
0-13 days	5.06 (4.45-5.67)	112,491	1.00	0.00	1.00
14 or more days	12.71 (11.15-14.27)	79,305	2.28	0.12	0.00

Risk & comorbidities

Based on the Dictionary of Epidemiology a behavioral risk factor is a characteristic of behavior associated with increased probability of a specified outcome; the term does not imply a causal relationship. [1] A comorbidity is a disease(s) that coexist(s) in a study participant in addition to the index condition that is the subject of study. [1]. In this section we provide a brief description of risk factors and comorbid conditions that can guide hypothesis in understanding the burden of asthma in Puerto Rico.

- Adults who reported not being physically active had a current asthma prevalence higher than those who are (Figure 14).
- Adults who were not physically active had 2% less possibility of reporting asthma when compared with those who did physical activities.

Figure 14: Current asthma prevalence among adults in Puerto Rico by physical activity, 2008-2010

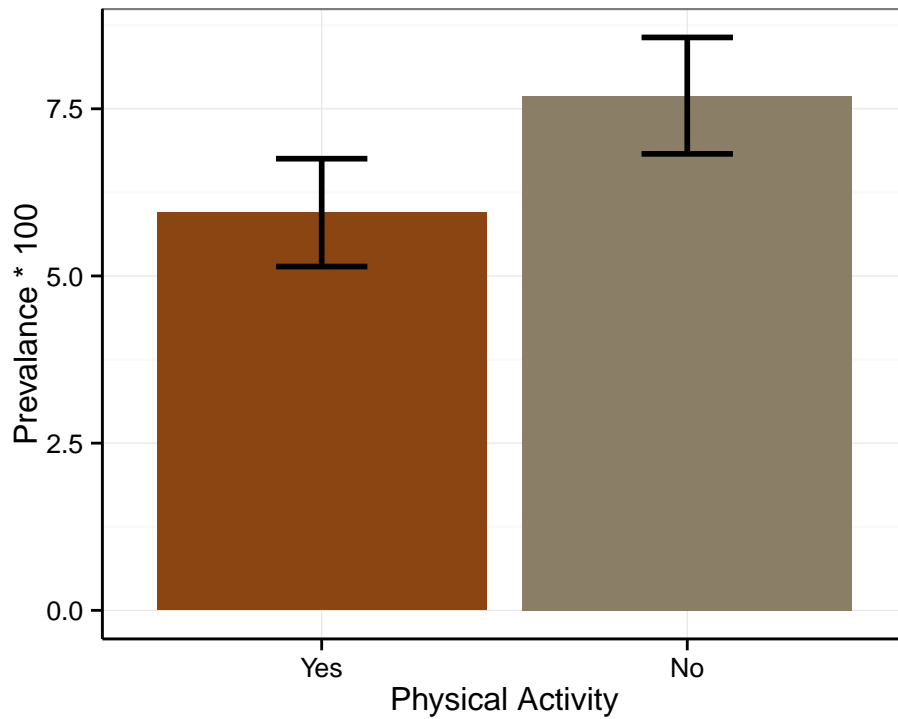


Table 13: Current asthma prevalence among adults in Puerto Rico by physical activity, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Exercise					
Yes	5.95 (5.14-6.75)	92,956	1.00	0.00	1.00
No	7.7 (6.83-8.57)	98,841	0.98	0.11	0.88

- BMI's categories were estimated, in which those who reported being neither overweight nor obese had a lower asthma prevalence (Figure 15).
- Those adults who were classified as overweight or obese had 1.55 times more possibility, 2.12 times more possibility, respectively, of having current asthma prevalence when compared with those in the reference group (neither overweight nor obese). This difference was significant (p -value < 0.05). Data shown in Table 14.

Figure 15: *Current asthma prevalence among adults in Puerto Rico by body mass index categories, 2008-2010*

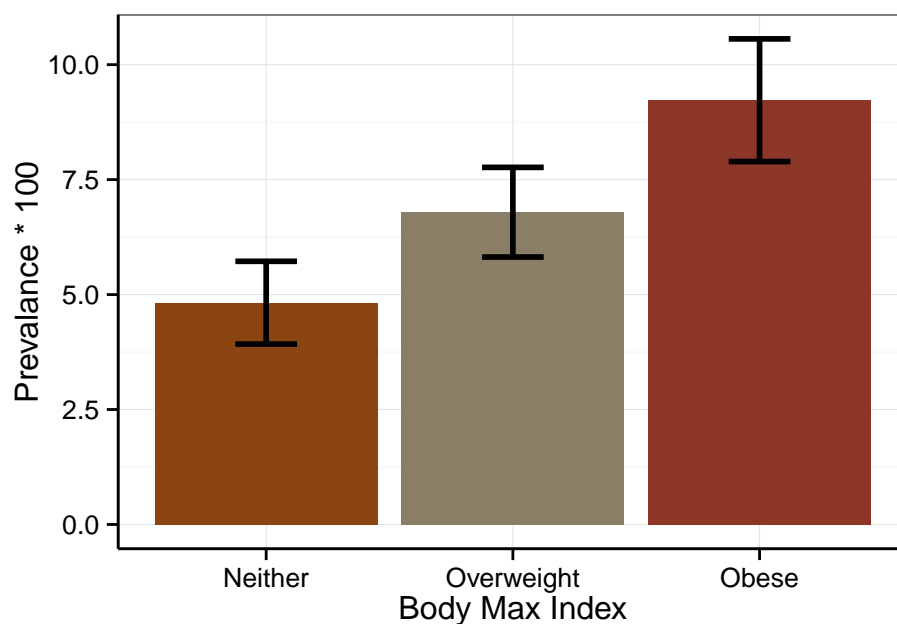


Table 14: *Current asthma prevalence among adults in Puerto Rico by body mass index categories, 2008-2010*

Variables	Prevalence	Number	OR	OR(SE)	p-value
BMI Category					
Neither	4.82 (3.92-5.72)	46,227	1.00	0.00	1.00
Overweight	6.79 (5.82-7.77)	70,940	1.55	0.15	0.00
Obese	9.23 (7.89-10.56)	68,494	2.12	0.15	0.00

- Figure 16 shows that current asthma prevalence was lower among smokers than among non-smokers.
- Adults who did not smoke had 42% more possibility of having current asthma prevalence when compared with those who smoke. This difference was significant (p-value < 0.05).

Figure 16: Current asthma prevalence among adults in Puerto Rico by smoking status, 2008-2010

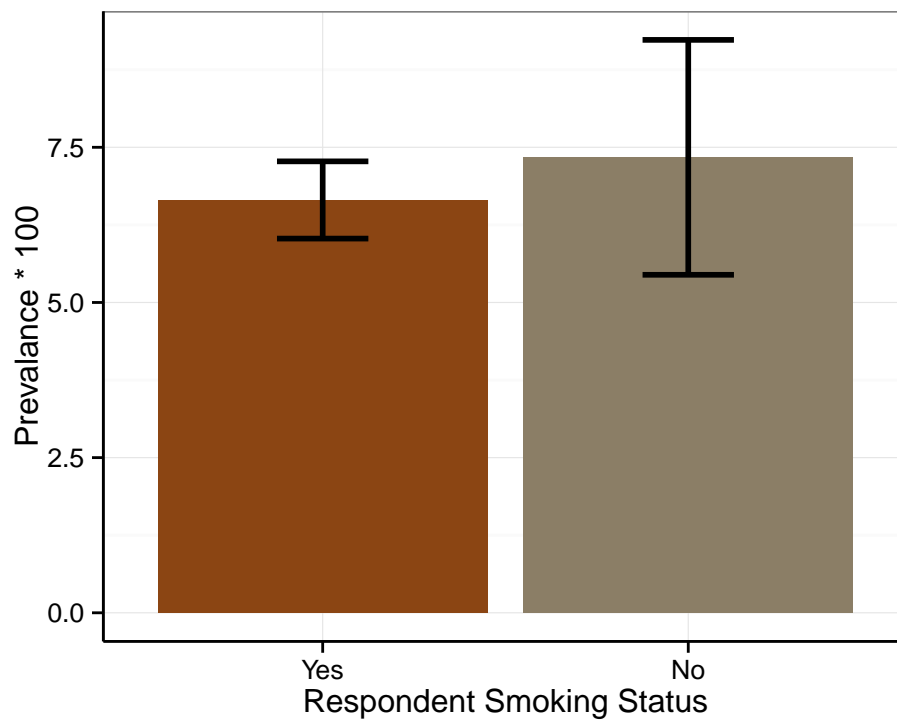


Table 15: Current asthma prevalence among adults in Puerto Rico by smoking status, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Smoke					
Yes	6.65 (6.03-7.27)	167,786	1.00	0.00	1.00
No	7.34 (5.45-9.23)	23,708	1.42	0.17	0.04

- Those persons with one or more chronic diseases, had a higher current asthma prevalence than those without any chronic disease.
- Those adults who reported having one or more chronic condition had one or more had 2.4 times more possibility when compared those who did not had any (See Table 16).

Figure 17: Current asthma prevalence among adults in Puerto Rico by any other chronic diseases, 2008-2010

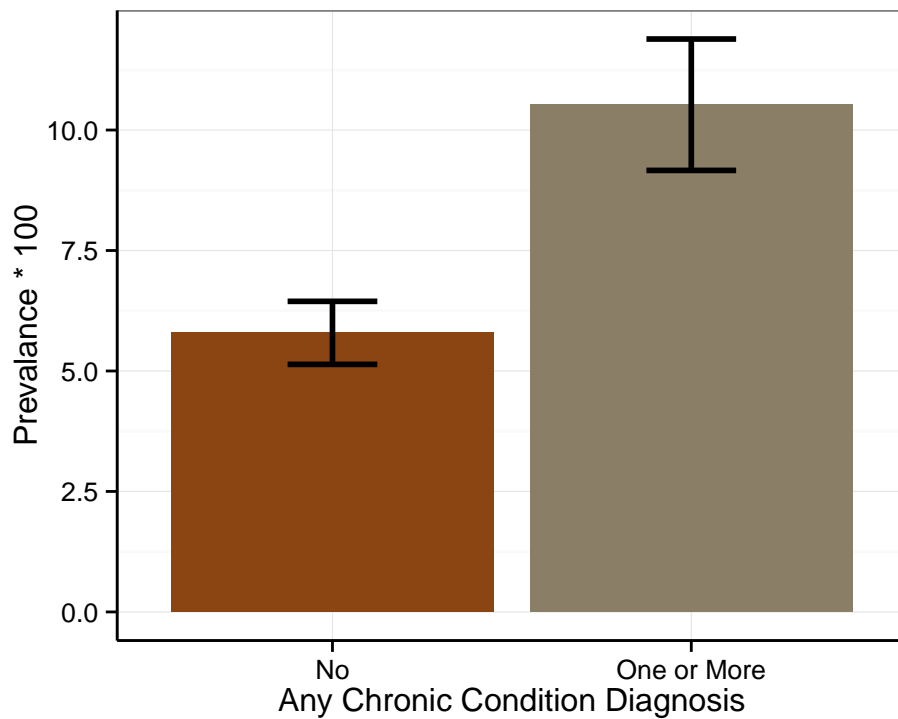
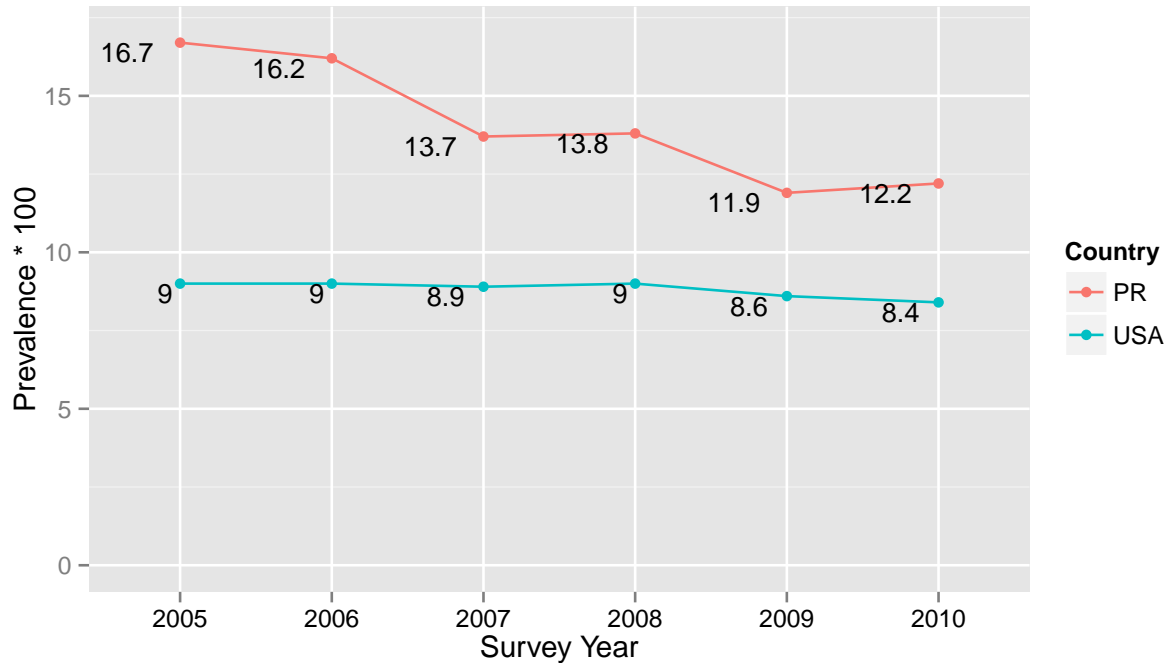


Table 16: Current asthma prevalence among adults in Puerto Rico by presence of any other chronic disease, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Any Chronic Disease					
No	5.79 (5.14-6.45)	132,019	1.00	0.00	1.00
One or More	10.53 (9.16-11.89)	59,778	2.4	0.14	0.00

Results: Asthma among children

Figure 18: Current asthma prevalence among children in Puerto Rico, 2008-2010



- The time trend for current asthma prevalence among children in Puerto Rico, ??, presents a significant downward from 16.7% in 2005 to 12.2% in 2008.
- Current asthma prevalence in the United States appears to have a constant trend across the whole period.
- The children for Puerto Rico in 2010 had 1.45 higher risk than those children from the other BRFSS participants.

- The highest current asthma prevalence among children was in the 05-09 age group.
- Children in the age group of 05-09 had 78% more possibility of having current asthma prevalence when compared with those in with less than 5 years. This difference was significant (p-value < 0.05). See Table 17.

Figure 19: Current asthma prevalence among children in Puerto Rico by age group, 2008-2010

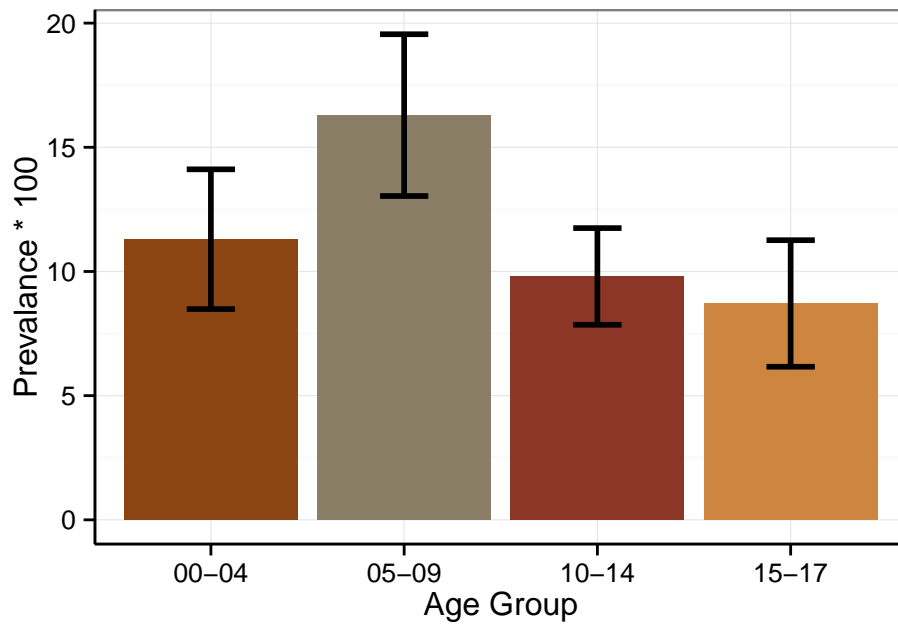


Table 17: Current asthma prevalence among children in Puerto Rico by age group, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Child Age					
00-04	11.3 (8.49-14.11)	29,203	1.00	0.00	1.00
05-09	16.3 (13.04-19.55)	34,953	1.78	0.21	0.00
10-14	9.8 (7.85-11.75)	37,280	0.95	0.21	0.81
15-17	8.71 (6.16-11.26)	17,616	0.85	0.23	0.49

- Figure 20 shows higher current asthma prevalence among male children.
- In children, females had 46% less possibility of reporting current asthma prevalence when compared with males. This difference was significant (p-value < 0.05). (See Table 18).

Figure 20: Current asthma prevalence among children in Puerto Rico by sex, 2008-2010

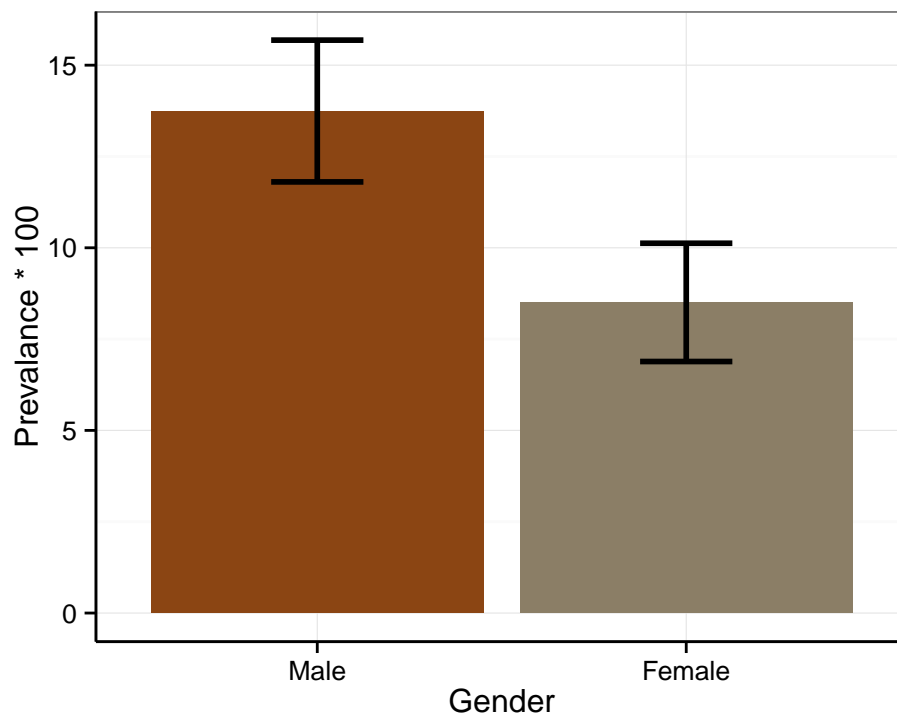


Table 18: Current asthma prevalence among children in Puerto Rico by sex, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Child sex					
Male	13.74 (11.8-15.69)	76,808	1.00	0.00	1.00
Female	8.51 (6.89-10.12)	42,245	0.54	0.15	0.00

- As observed in Figure 21, children who lived in the Aguadilla health region have the highest current asthma prevalence.
- Those living in the health region of Metro, ponce had 49% less possibility, Metro, ponce had 51% less possibility of reporting current asthma prevalence than those living in the health region of Aguadilla. Data shown in Table 19.

Figure 21: Current asthma prevalence among children in Puerto Rico by respondent health region, 2008-2010

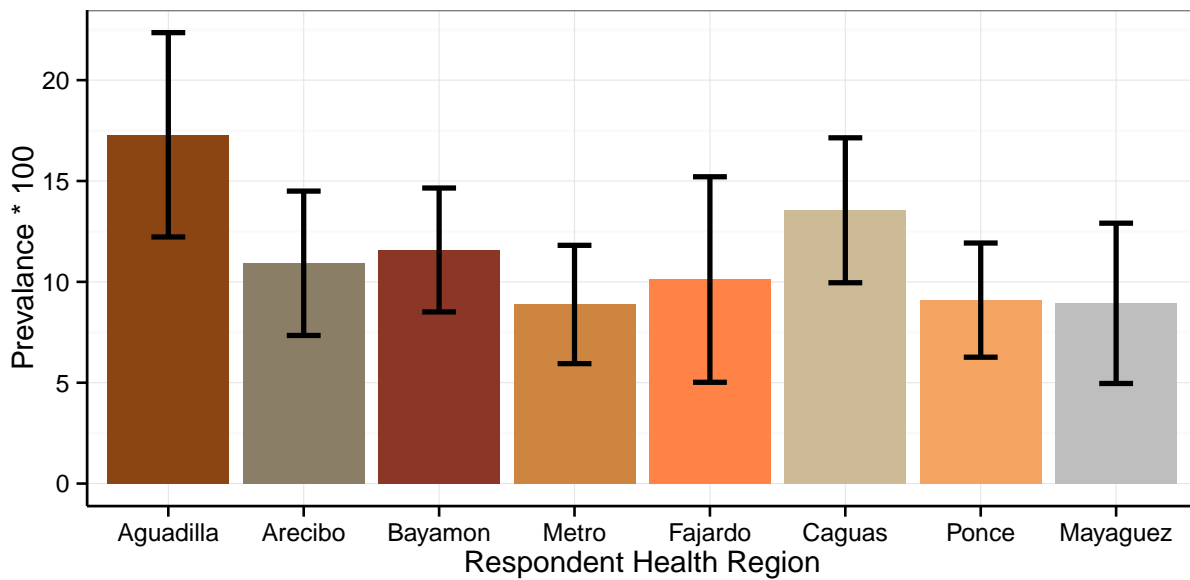


Table 19: Current asthma prevalence among children in Puerto Rico by respondent health region, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Health region					
Aguadilla	17.29 (12.23-22.35)	17,329	1.00	0.00	1.00
Arecibo	10.92 (7.34-14.5)	13,755	0.67	0.29	0.16
Bayamon	11.58 (8.51-14.65)	20,707	0.73	0.27	0.22
Metro	8.88 (5.94-11.81)	14,485	0.51	0.29	0.02
Fajardo	10.12 (5.02-15.21)	7,061	0.6	0.37	0.17
Caguas	13.55 (9.96-17.14)	22,688	0.77	0.27	0.32
Ponce	9.09 (6.26-11.93)	16,643	0.49	0.29	0.01
Mayaguez	8.94 (4.96-12.91)	5,940	0.52	0.34	0.05

- Figure 22 shows that children whose parents or guardian’s annual income was < 15k, had a higher current asthma prevalence when compared to other income groups.
- Children whose parents or guardian’s annual income was 25k-<35k had 20% less possibility of having current asthma prevalence when compared with those whose annual income is less than \$15,000.

Figure 22: Current asthma prevalence among children in Puerto Rico by annual income of the interviewed, 2008-2010

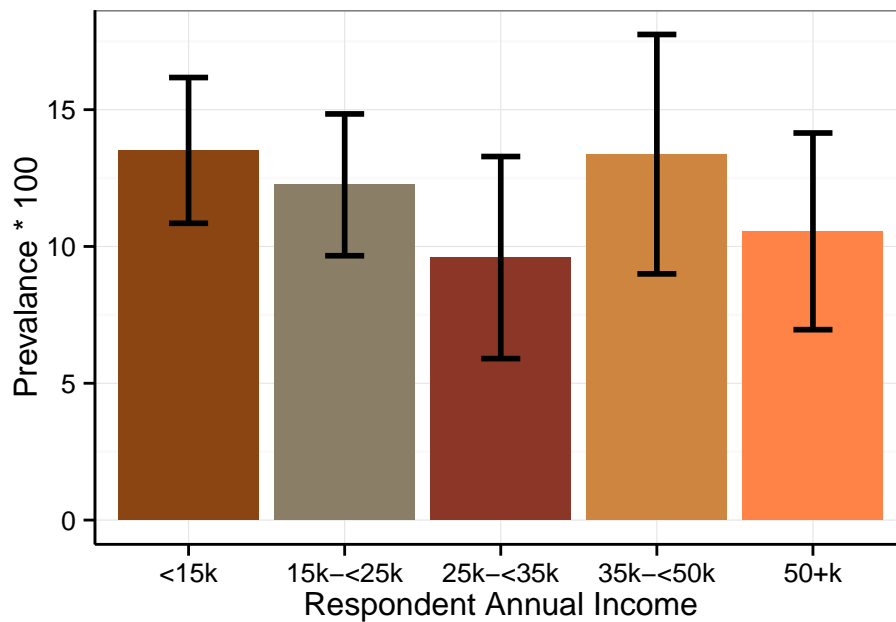


Table 20: Current asthma prevalence among children in Puerto Rico by annual income of the interviewee , 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Annual income					
<15k	13.51 (10.85-16.17)	36,184	1.00	0.00	1.00
15k-<25k	12.25 (9.66-14.84)	37,327	1.03	0.19	0.86
25k-<35k	9.59 (5.9-13.29)	10,490	0.8	0.28	0.42
35k<50k	13.37 (9-17.75)	11,677	1.22	0.27	0.45
50+k	10.55 (6.96-14.15)	11,485	0.9	0.27	0.71

- Current asthma prevalence among children was higher where the interviewed described their marital status as separated.
- Children of households where the interviewed responded their marital status as separated had 55% more possibility of reporting current asthma prevalence when compared with those whose parents or guardians where married. (See Table 21).

Figure 23: Current asthma prevalence among children in Puerto Rico by marital status of the interviewed, 2008-2010

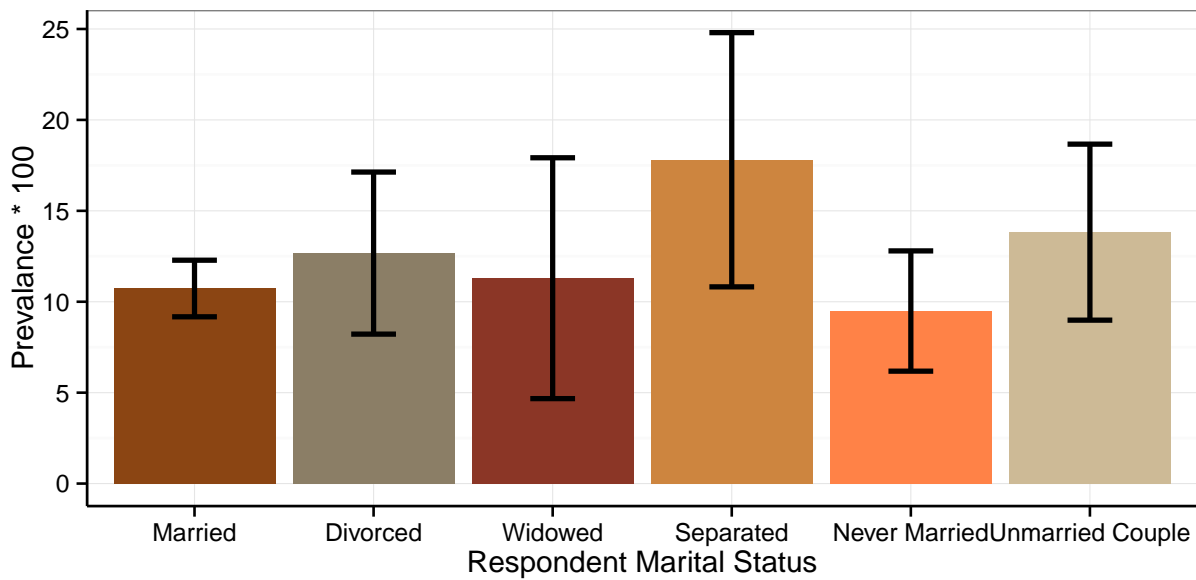


Table 21: Current asthma prevalence among children in Puerto Rico by marital status of the interviewed, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Marital status					
Married	10.73 (9.17-12.28)	66,446	1.00	0.00	1.00
Divorced	12.68 (8.22-17.13)	9,971	1.1	0.24	0.69
Widowed	11.29 (4.67-17.92)	1,786	1.14	0.41	0.75
Separated	17.81 (10.82-24.8)	7,058	1.55	0.28	0.12
Never Married	9.49 (6.18-12.8)	17,729	0.92	0.26	0.75
Unmarried Couple	13.83 (8.99-18.67)	15,743	1.24	0.26	0.41

- Children whose guardian was an active smoker at the time of the interview, reported a higher current asthma prevalence when compared with their counterpart (Figure 24).
- Those children living in a household where the interviewee smoked, had 15% more possibility of having current asthma prevalence when compared with those whose parents or guardians didn't smoke at the time of the interview. This difference was not significant (p-value ≥ 0.05). Refer to Table 22 for further information.

Figure 24: Current asthma prevalence among children in Puerto Rico by smoking status of the interviewee, 2008-2010

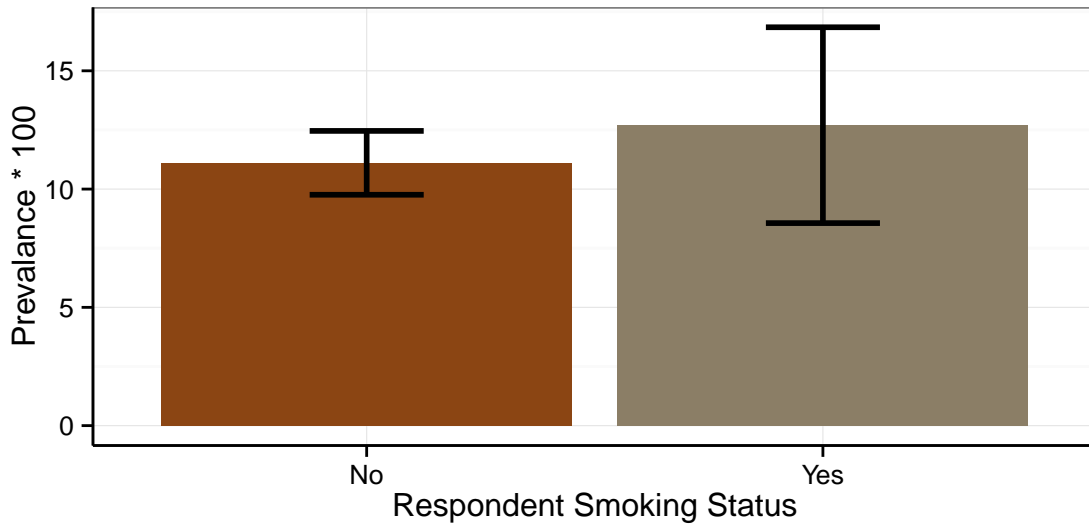


Table 22: Current asthma prevalence among children in Puerto Rico by smoking status of the interviewee, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Smoking status					
No	11.11 (9.76-12.46)	830,344	1.00	0.00	1.00
Yes	12.7 (8.56-16.84)	104,995	1.15	0.23	0.54

Remarks

This report suggest that asthma in Puerto Rico should continue be considered a priority for the public health authorities in Puerto Rico. An estimate of 191,797 (6.74%) adult and 119,052 (11.28%) children in Puerto Rico had current asthma prevalence as of the period of 2008-2010. When evaluating by the socio-demographic variables, no specific group has been disproportionately affected with asthma prevalence in age groups, educational level or marital status. With regards to gender the asthma prevalence was 2.2 times higher in women. Although not statistically significant those in the household income range of $35k- < 50k$ and $50+$ had 0.2 and 0.15 respectively less possibility of current asthma prevalence that the group in the $< 15k$ income range.

Moving to the health related quality of life measures, the possibility of reporting current asthma prevalence in adults that perceived their health as fair or poor was 1.78 times higher than those who considered their health as good, very good or excellent. The adults who said that they felt physically bad for 14 days or more for the last 30 days had 2.69 times higher possibility of report current asthma prevalence than those reporting less than 13 days. In the same manner, adults who felt mentally distress for 14 days or more in a month had 1.83 times higher possibility of report current asthma prevalence than those reporting less than 13 days. From 1.6 million adults who were unable to carry on with their normal activities more than 14 days in a month 12.71 (11.15-14.27) percent reported current asthma prevalence.

People who exercise, or are exposed to physical activities reported 0.02 % higher risk than those who don't. Regarding, body mass index (BMI) those obese and overweight had -0.55% and 1.12% more possibility of current asthma prevalence than those neither obese nor overweight. The estimation of the current asthma prevalence on smokers was 6.65 (6.03-7.27) percent. Adults with diabetes were 0.27 more likely to have current asthma prevalence than their counterpart.

Regarding children estimates those in the 05-09 age group reported a current asthma prevalence of 16.3 (13.04-19.55) percent. Male children have a 1.62 times higher cur-

rent asthma prevalence than their counterpart. Children whose parents annual income is less than \$15,000, reported to have a current asthma prevalence of 13.51 (10.85-16.17) percent. Among employment status, The only group with significant difference was the Student group with 0.24 less possibility of current asthma prevalence than the reference group.

Progress has been made in understanding the burden of asthma in Puerto Rico. Advancements in the diagnose and treatment of the condition have had considerably improve in the last 20 years, but it still an uncontrolled condition. The disclosed information is part of the effort of the Puerto Rico Asthma Project to provide an update of the state of asthma in our country. The report present information that can aid in the development of public policy, guide changes in the health care system, monitor population asthma control, enhance educational material, and guide all efforts to target factors of disparities as a way of reducing morbidity and mortality associated with asthma in Puerto Rico.

Overall Prevalence

Table 23: *Current asthma prevalence among adults and children, 2008-2010*

Group	Prevalence	Frequency	Sample.size
Adults	6.74 (6.14-7.33)	191,797	12,257
Children	11.28 (9.99-12.56)	119,052	2,971

Source: Behavioral Risk Factor Surveillance Survey, 2008-2010

Adults

Table 24: Current asthma prevalence among adults by Socio-demographic variables, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Age group					
18-24	7.08 (5.05-9.12)	29,425	1.00	0.00	1.00
25-34	7.11 (5.33-8.88)	38,905	0.86	0.29	0.62
35-44	5.98 (4.64-7.32)	31,487	0.63	0.3	0.11
45-54	7.48 (6.2-8.76)	35,908	0.8	0.29	0.43
55-64	6.56 (5.56-7.57)	26,427	0.69	0.3	0.21
65+	6.23 (5.45-7.01)	29,645	0.72	0.32	0.29
Gender					
Males	4.69 (3.87-5.51)	62,693	1.00	0.00	1.00
Females	8.54 (7.7-9.38)	129,104	2.2	0.13	0.00
Escolarity					
Some High School	7.54 (6.4-8.68)	42,600	1.00	0.00	1.00
High School Graduate	5.99 (4.85-7.14)	39,731	0.75	0.16	0.07
Some University	7.3 (6-8.6)	56,965	1.02	0.16	0.92
University Graduate	6.25 (5.16-7.33)	52,195	0.95	0.18	0.76
Household income					
<15k	8.08 (7.02-9.15)	71,142	1.00	0.00	1.00
15k-<25k	6.58 (5.33-7.82)	47,493	0.85	0.14	0.25
25k-<35k	6.38 (4.54-8.22)	16,292	0.93	0.2	0.73
35k-<50k	5.08 (3.02-7.13)	10,036	0.8	0.28	0.42
50+k	5.16 (3.35-6.97)	11,793	0.85	0.25	0.53
Marital status					
Married	6.2 (5.47-6.94)	89,555	1.00	0.00	1.00
Divorced	8.87 (6.87-10.87)	22,386	1.23	0.16	0.20
Widowed	7.13 (5.83-8.44)	13,088	0.79	0.16	0.14
Separated	7.95 (5.36-10.54)	7,870	1.06	0.21	0.78
Never Married	6.76 (5.24-8.27)	45,848	0.97	0.2	0.88
Unmarried Couple	6.83 (4.03-9.62)	12,468	1.02	0.26	0.92
Employment status					
Employed	5.85 (4.94-6.77)	75,063	1.00	0.00	1.00
Out of work	6.46 (4.31-8.61)	14,590	1.13	0.24	0.61
Homemaker	7.66 (6.33-8.99)	35,749	0.89	0.17	0.49
Student	7.78 (5.03-10.52)	19,298	1.37	0.36	0.37
Retired	4.78 (4-5.55)	20,120	0.82	0.17	0.25
Unable to Work	13.66 (11.12-16.19)	26,830	2.44	0.17	0.00
Health region					
Aguadilla	8.22 (5.97-10.46)	22,015	1.00	0.00	1.00
Arecibo	7.87 (6.14-9.6)	25,223	0.98	0.22	0.91
Bayamon	6.3 (4.88-7.72)	29,124	0.65	0.22	0.04
Metropolitana	4.96 (3.8-6.12)	23,908	0.58	0.22	0.01
Fajardo	7.53 (5.19-9.88)	14,502	0.73	0.26	0.22
Caguas	8.33 (6.49-10.17)	36,851	0.91	0.21	0.67
Ponce	5.7 (4.4-6.99)	28,203	0.73	0.21	0.14
Mayaguez	6.44 (4.46-8.41)	11,738	0.73	0.24	0.20

Table 25: Current asthma prevalence among adults by health related quality of life variables, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Health perception					
Very Good	4.9 (4.21-5.6)	95,141	1.00	0.00	1.00
Fair / Poor	10.69 (9.59-11.79)	96,316	1.78	0.14	0.00
Physical unhealthy					
0-13 days	5.41 (4.8-6.02)	129,385	1.00	0.00	1.00
14 or more days	13.93 (12.03-15.83)	58,098	2.69	0.13	0.00
Mental unhealthy					
0-13 days	5.81 (5.22-6.4)	143,848	1.00	0.00	1.00
14 or more days	13.04 (10.64-15.44)	42,337	1.83	0.15	0.00
Activity limitation					
0-13 days	9.26 (8.18-10.34)	102,211	1.00	0.00	1.00
14 or more days	14.39 (11.4-17.37)	28,157	1.53	0.18	0.01
Physical and mental unhealthy					
0-13 days	5.06 (4.45-5.67)	112,491	1.00	0.00	1.00
14 or more days	12.71 (11.15-14.27)	79,305	2.28	0.12	0.00

Source: Behavioral Risk Factor Surveillance Survey, 2008-2010

Table 26: Current asthma prevalence among adults by risk and comorbidity variables, 2008-2010

Variables	Prevalence	Number	OR	OR(SE)	p-value
Exercise					
Yes	5.95 (5.14-6.75)	92,956	1.00	0.00	1.00
No	7.7 (6.83-8.57)	98,841	0.98	0.11	0.88
BMI					
Neither	4.82 (3.92-5.72)	46,227	1.00	0.00	1.00
Overweight	6.79 (5.82-7.77)	70,940	1.55	0.15	0.00
Obese	9.23 (7.89-10.56)	68,494	2.12	0.15	0.00
Smoker					
Yes	6.65 (6.03-7.27)	167,786	1.00	0.00	1.00
No	7.34 (5.45-9.23)	23,708	1.42	0.17	0.04
Any chronic condition					
No	5.79 (5.14-6.45)	132,019	1.00	0.00	1.00
One or More	10.53 (9.16-11.89)	59,778	2.4	0.14	0.00

Source: Behavioral Risk Factor Surveillance Survey, 2008-2010

Child

Table 27: Current asthma prevalence among children by child demographic variables, 2008-2010

Variables	Prevalence	Population	OR	OR(SE)	p-value
Age group					
00-04	11.3 (8.49-14.11)	29,203	1.00	0.00	1.00
05-09	16.3 (13.04-19.55)	34,953	1.78	0.21	0.00
10-14	9.8 (7.85-11.75)	37,280	0.95	0.21	0.81
15-17	8.71 (6.16-11.26)	17,616	0.85	0.23	0.49
Gender					
Male	13.74 (11.8-15.69)	76,808	1.00	0.00	1.00
Female	8.51 (6.89-10.12)	42,245	0.54	0.15	0.00
Health region					
Aguadilla	17.29 (12.23-22.35)	17,329	1.00	0.00	1.00
Arecibo	10.92 (7.34-14.5)	13,755	0.67	0.29	0.16
Bayamon	11.58 (8.51-14.65)	20,707	0.73	0.27	0.22
Metro	8.88 (5.94-11.81)	14,485	0.51	0.29	0.02
Fajardo	10.12 (5.02-15.21)	7,061	0.6	0.37	0.17
Caguas	13.55 (9.96-17.14)	22,688	0.77	0.27	0.32
Ponce	9.09 (6.26-11.93)	16,643	0.49	0.29	0.01
Mayaguez	8.94 (4.96-12.91)	5,940	0.52	0.34	0.05

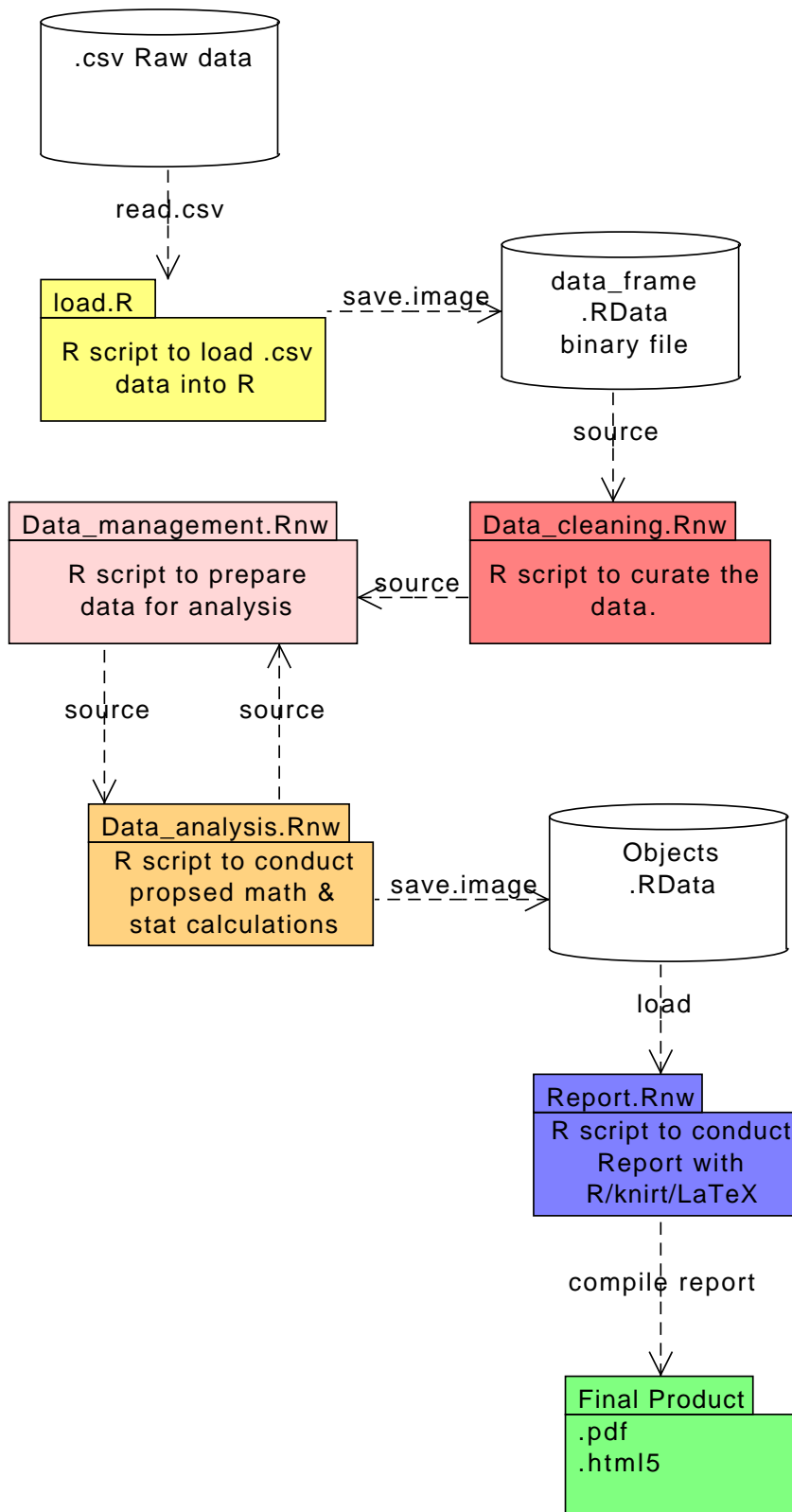
Source: Behavioral Risk Factor Surveillance Survey, 2008-2010

Table 28: Current asthma prevalence among children by respondent social variables, 2008-2010

Variables	Prevalence	Population	OR	OR(SE)	p-value
Household income					
<15k	13.51 (10.85-16.17)	36,184	1.00	0.00	1.00
15k-<25k	12.25 (9.66-14.84)	37,327	1.03	0.19	0.86
25k-<35k	9.59 (5.9-13.29)	10,490	0.8	0.28	0.42
35k<50k	13.37 (9-17.75)	11,677	1.22	0.27	0.45
50+k	10.55 (6.96-14.15)	11,485	0.9	0.27	0.71
Marital status					
Married	10.73 (9.17-12.28)	66,446	1.00	0.00	1.00
Divorced	12.68 (8.22-17.13)	9,971	1.1	0.24	0.69
Widowed	11.29 (4.67-17.92)	1,786	1.14	0.41	0.75
Separated	17.81 (10.82-24.8)	7,058	1.55	0.28	0.12
Never Married	9.49 (6.18-12.8)	17,729	0.92	0.26	0.75
Unmarried Couple	13.83 (8.99-18.67)	15,743	1.24	0.26	0.41
Smoking status					
No	11.11 (9.76-12.46)	830,344	1.00	0.00	1.00
Yes	12.7 (8.56-16.84)	104,995	1.15	0.23	0.54

Source: Behavioral Risk Factor Surveillance Survey, 2008-2010

Annex 1



References

- [1] Last JM. Fourth edition 2000. A dictionary of epidemiology. *New York: Oxford University Press, 2000.*
- [2] E.S. Ford, D.M. Mannino, D.M. Homa, C. Gwynn, S.C. Redd, and A.H. Moriarty, D.G. Mokdad. Self-reported asthma and health related quality of life: Findings from the behavioral risk factor surveillance system. *CHEST, 2003.*
- [3] E.F. Juniper, G.H. Guyatt, R.S. Epstein, P.Ja Ferrie, R. Jaeschke, and T.K. Hiller. Evaluation of impairment of health related quality of life in asthma: development of a questionnaire for use in clinical trials. *Thorax, 1992.*