

# Airways Research Group - Investigation of Lung Health and Air Quality in Southern Saskatchewan



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- **Mr. Murray Hilderman – Saskatchewan Ministry of Environment**



**ARG Project Manager:  
Ms. Johanne Asselin**

# ARG Group Expertise

- Experts
  - Environmental Epidemiology
  - Industrial Hygiene
  - Occupational Medicine
  - Respiratory Clinicians
  - Lung Immunology
  - Mass Spectrometry
  - Global Information Systems & mapping
- Organizations
  - University of Saskatchewan
  - Lung Association of Saskatchewan
  - Southeast Saskatchewan Airshed Association
  - Saskatchewan Ministry of Environment
  - SaskPower



# Background

- Airborne contaminants can dramatically affect respiratory and cardiovascular health.



# Hypothesis

- Air quality can contribute to respiratory health outcomes.

# Objectives

- To examine the levels and composition of airborne particulate matter in Estevan and Swift Current;
- To characterize the respiratory health of older populations of these communities;
- To determine whether episodic increases in respiratory issues are related to increases in the levels, and/or changes in the composition, of airborne particulate matter.

# Methods

## Assessments

### ▫ Participants

- Twice daily peak flow monitoring (FEV<sub>1</sub>)
- Twice daily diary of respiratory symptom levels

### ▫ Environment

- Continuous measures of particulate matter, SO<sub>2</sub> and NO<sub>2</sub>
- Weekly high volume filter samples of air particulate (2.5 μm and 10 μm cut-size)


# Participants

FOR OFFICE USE: ID NUMBER: \_\_\_\_\_


Name: \_\_\_\_\_

Date: \_\_\_\_\_

**MY  
Respiratory Health  
DAILY DIARY**



**AIR QUALITY AND  
LUNG HEALTH STUDY**

 UNIVERSITY OF  
SASKATCHEWAN



# Environment

## High Volume Sampler (one at each location)



## Continuous Monitoring

### SWIFT CURRENT

Saskatchewan Ministry of  
Environment  
PM, SO<sub>2</sub> and NO<sub>2</sub>

### ESTEVAN

SaskPower  
PM, SO<sub>2</sub> and NO<sub>2</sub>



# Dust Analysis of High Volume Samples

Where there are noticeable episodic increases in respiratory activity, we will analyze the filters collected around the same time points as the respiratory episodes for:

- Inflammatory Activity
  - Bacterial Endotoxin
- } **Assays of biological activity**
- 
- Proteins
  - Total Carbon
  - Elemental Analysis
- } **Physical characterization of dust contents**

# RESULTS - Phase Dates

## 4 Phases to the Study

- Phase 1
  - 1 month: November 2012
- Phase 2
  - 2 months: April and May 2013
- Phase 3
  - 2 months: October and November 2013
- Phase 4
  - 2 months: April and May 2014

# Participant Numbers

	<b>Estevan</b>	<b>Swift Current</b>
<b>November 2012</b>	29	30
<b>April – May 2013</b>	31	28
<b>October – November 2013</b>	40	42
<b>April – May 2014</b>	Still to be collected	

# Phase 1 - Demographics

Sex	Estevan	Swift Current
<b>Total</b>	29	30
<b>Male</b>	12 (41.4%)	8 (26.6%)
<b>Female</b>	17 (58.6%)	22 (73.4%)

Age Groups	Estevan	Swift Current
<b>51-60</b>	8 (27.6%)	18 (60.0%)
<b>61-70</b>	10 (34.5%)	11 (36.7%)
<b>71-80</b>	9 (31.0%)	1 (3.3%)
<b>81-85</b>	2 (6.9%)	0
<b>Total</b>	29	30

## Mean age

Estevan 66.8 years

Swift Current 59.2 years

# Phase 1 - Questionnaire Results

<b>Do you have any respiratory conditions</b>	<b>Estevan</b>	<b>Swift Current</b>
<b>Yes</b>	5 (17.2%)	6 (20%)

<b>Has a doctor ever diagnosed you with asthma</b>	<b>Estevan</b>	<b>Swift Current</b>
<b>Yes</b>	4 (13.8%)	5 (17.2%)
<b>No</b>	25 (86.2%)	24 (82.8%)
<b>Total</b>	29	29

# Phase 1 - Smoking Results

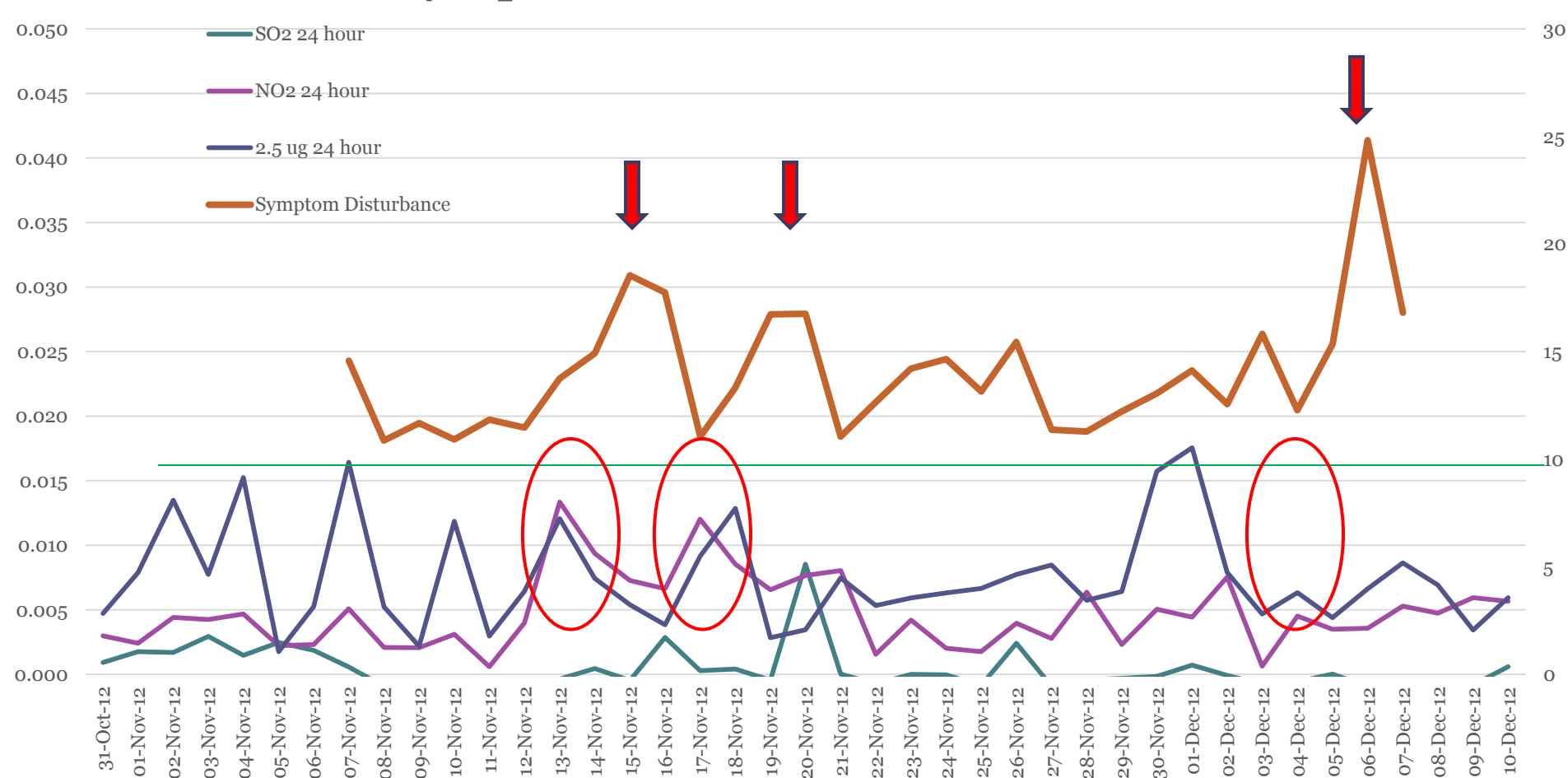
<b>Do you smoke cigarettes now?</b>	<b>Estevan</b>	<b>Swift Current</b>
Yes	1	3
No	28	26
<b>Total</b>	<b>29</b>	<b>29</b>

**Have you smoked more than 20 packs of cigarettes in your lifetime?**

<b>Yes</b>	13	18
<b>No</b>	15	10
<b>Total</b>	<b>28</b>	<b>28</b>

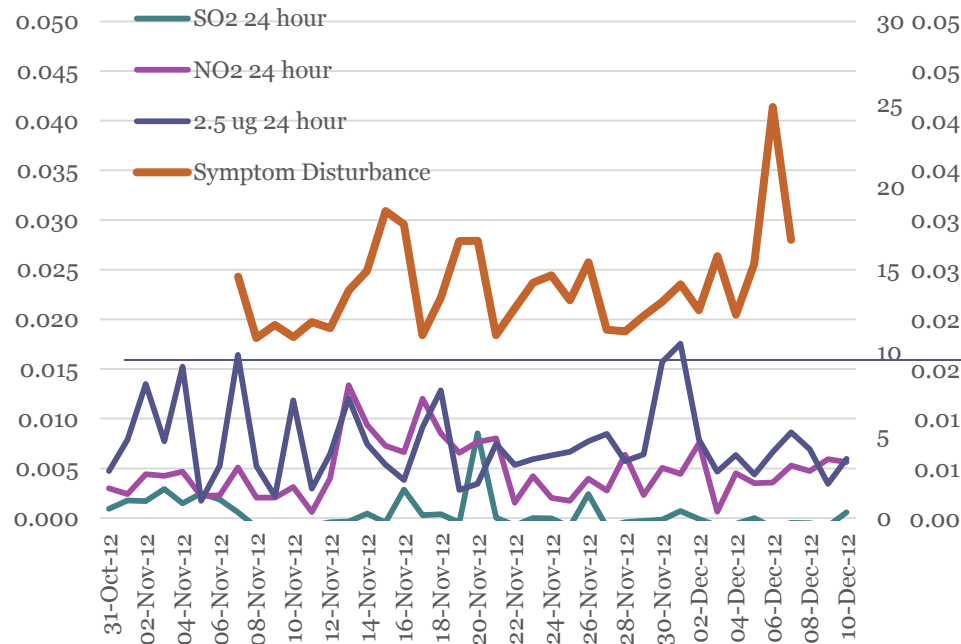
# Daily Symptom Disturbance and Environmental Measures (phase I)

## Estevan Symptom Disturbance and Environmental

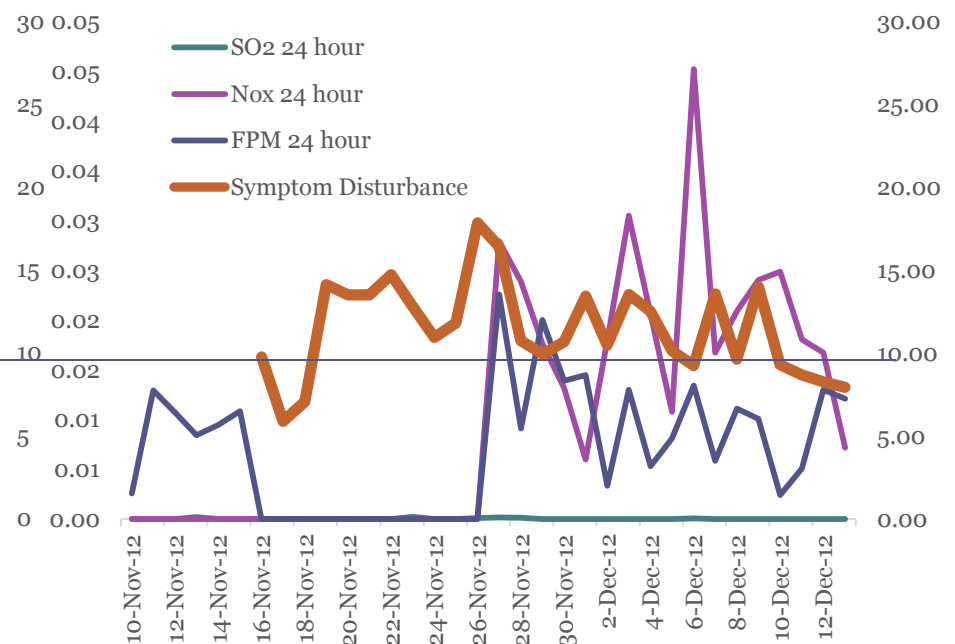


# Comparison of Daily Symptom Disturbance and Environmental Measures (phase I)

## Estevan



## Swift Current





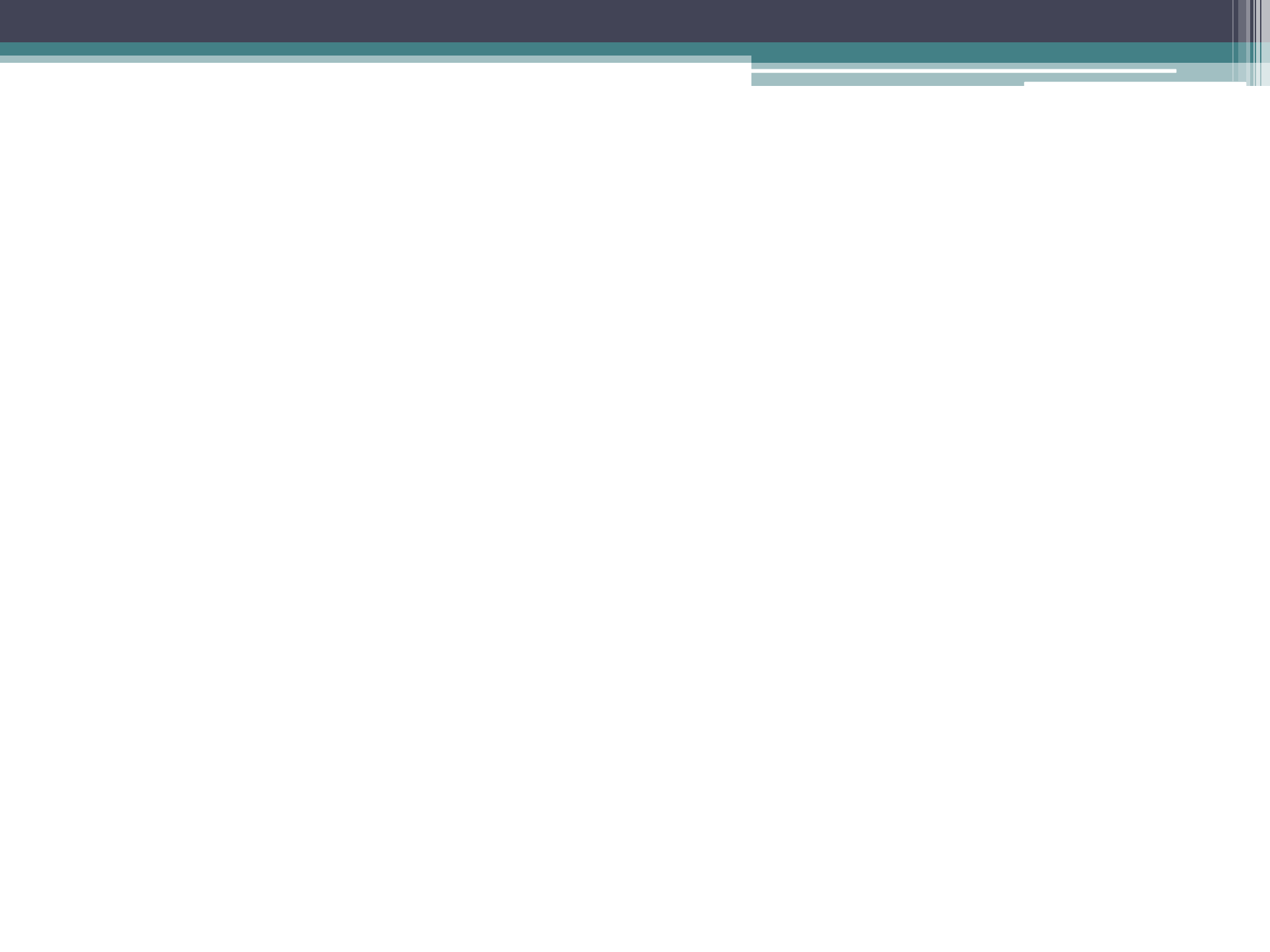
# Next Steps in data analysis

- Strategies:
  - Are there any associations between respiratory outcomes and airborne dust contaminants.
    - Are there temporal associations between spikes in air contaminant levels and respiratory outcomes?
    - Are there associations between individual constituents within the dust samples collected and spikes in respiratory symptoms within the communities? (Do they differ between high and low contaminant timeframes?)

# Thank you

- Questions?





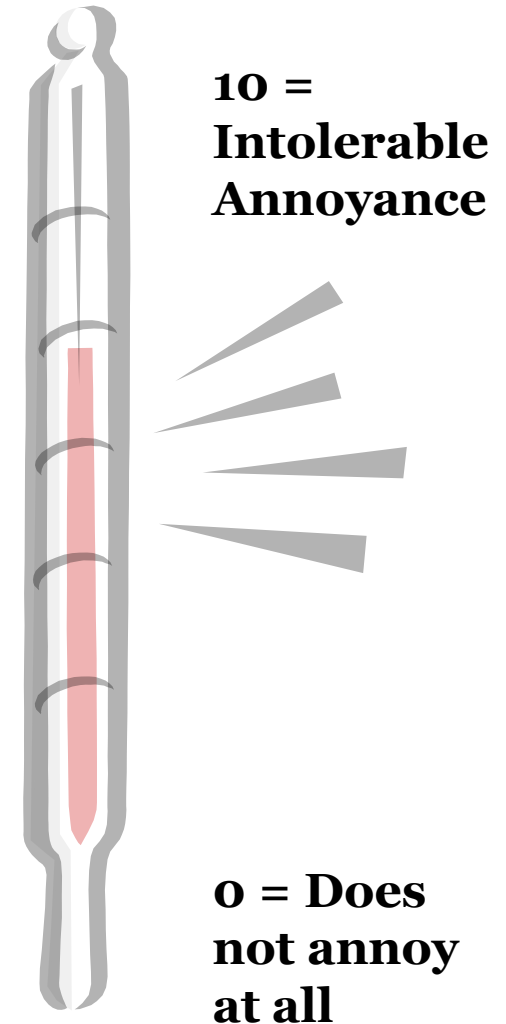
# Phase 1 - Air Pollution Annoyance

**How much are you annoyed by outdoor air pollution?**

	Estevan	Swift Current
0-5	17	26
6-10	11	2
Total	28	28

**How much are you annoyed by outdoor air pollution?**

Mean	4.07	2.29
SD	3.72	2.37
Minimum	0	0
Maximum	10	8



# Daily Symptom Disturbance and Environmental Measures (phase I)

## Swift Current Symptom Disturbance with Environmental

