CHAPTER TWO

2.1 METHODS

2.1.1 Hypothesis

The hypothesis will be tested that treatment rates (as evidenced by the amount of prescriptions) are associated with meteorological determinants, namely temperature, rainfall, humidity, barometric pressure, and wind speed.

Due to constraints in measurement of certain confounders (e.g. air pollution and pollen counts), these factors will not be adjusted for in the analysis.

2.1.2 Identifying Variables

(a) Domain:

Medical prescriptions as received by GPNet (a general practitioner organization representing up to 40% of all General Practitioners countrywide) are used. A duplicate copy of the prescription given to the patient is sent to the organization for documentation and statistical purposes. Prescriptions identified by the International Statistical Classification of Diseases (ICD) code J45 ("Asthma"), and code J30 ("Allergic rhinitis") are used. Medications by name are not used, due to possible overlap in usage for certain diseases (see also: possible bias). Only those doctors who were present and participated both within the start and end of study dates' data were used for compilation of data. A group of 22 medical practices were thus identified, and their data used in the study. A geographical area encompassing certain Eastern Suburbs in Pretoria was used in order to correlate data within a 2.5 km. radius from a nearby weather station.

(b) Determinants:

Meteorological parameters, including temperature, rainfall, humidity, barometric pressure, and wind speed are used. These are documented and measured at the Botanic Gardens Weather Station, and verified by the Agricultural Research Council (ARC) (Institute for soil, climate and water research).

Temperature and relative humidity are measured at height 1.2 to 1.4 meters within a Stevenson screen, where a free flow of air, and shade are assured. Arma Therm thermometers are used, and replaced if inaccurate.

Temperature readings are measured with a maximum and minimum thermometer, and controlled by a Thies thermohydrograph, where readings are constantly monitored and recorded graphically. These instruments are calibrated twice yearly.

Rainfall is measured at height 1.2 meters in a standard 127mm SA Weather Bureau rain meter.

Wind speed is measured at height 2m, with a wind totalisator, manufactured by Casella of London.

2.2 STUDY DESIGN

The study is a cross-sectional, ecological study, which examines the relationship between the above- mentioned meteorological data, and frequency of prescriptions in a defined population. Data given by the Agricultural Research Council and the Weather Bureau are compared with the number of prescriptions for allergies as evidenced by allergic rhinitis and asthma, as documented by GP Net in a specific geographical area. To take cognizance of seasonal influences, a period of one year is analyzed.

2.3 ETHICAL CONSIDERATIONS

The project has been submitted and approved by the Ethical Committee of the Faculty of Medicine, University of Pretoria.

Consent was given by the General Practitioner Association (GPNet) for use of their prescription data, which was extracted on an anonymous basis.

No patient or animal was in any way harmed during the execution of this study.

2.4 DATA COLLECTION

1. AGRICULTURAL RESEARCH COUNCIL: A time period of more than 365 days (or one year) was determined from March 2002 to April 2003, to collect the following data on a daily basis:

    (A) Rainfall (quantity) in mm.

    (B) Wind speed in meters / second (m/s).

    (C) Temperature (Maximum – Minimum) in ^{0}C.

    (D) Humidity (Maximum – Minimum), as a percentage (%)

2. GPNet: Over the same time period as above, data was collected by GPNet on a daily basis as mentioned before

Number of prescriptions for allergic rhinitis: > 170 cases could be identified (see analysis later)

Number of prescriptions for asthma: > 400 cases could be identified (see analysis later)

The two databases were then matched for dates and analyzed.