Chapter 12
Analyzing Problems of Childhood and Adolescence

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ABSTRACT
The study presents the analysis of the results of a health survey that focuses on the health risk behaviors and attitudes in adolescents that result in teenage obesity. Predictive models are built and charts are plotted to map variations in childhood physical health with respect to their weight behavior and to compare the impact of each weight control plan. The analysis provides many useful observations and suggestions that can be helpful in developing child health policies. We also investigate another aspect of child health by examining the severity of immediate risk from disease versus the immediate risk from childhood vaccination by comparing mortality rates from the disease to the mortality rates from the vaccination. Results show that for some individuals, the risk from the vaccine can be higher than the risk from the disease. Therefore, individual risk should be taken into consideration rather than uniform risk across the population.

BACKGROUND
Obesity is a serious problem among teenage children. In fact one in every five children is obese. Children who are obese are at risk of developing high blood pressure, high cholesterol, diabetes, asthma, and other psychological problems. Overweight children are at high risk of becoming overweight adolescents and adults. Some of the main reasons for teenage obesity include overeating, reduced physical activity, sedentary lifestyles and increased TV viewing. (Anonymous-Teenage Obesity-ygoy, 2007) It can cause psychological distress, isolation, low self-esteem, and negative self-image. The current study details a Data Mining approach to analyze and uncover the likely causes and effective measures necessary to prevent teenage obesity.

Body Mass Index is the diagnostic tool to identify obesity problems. BMI is useful to estimate the overall health in comparison with the person’s...
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weight and height. BMI can be influenced by the different weight control behaviors such as exercise, drinking more water, eating low fat food, etc. The purpose of this project is to analyze various weight control measures tried by the students and their impact on their Body Mass Index.

Predictive analytics include a variety of techniques from data mining that analyze the statistical data to make predictions about future events. This paper has also utilized the key features of SAS® Enterprise Miner™ to choose the best predictive model for the study using the student health survey data that records children’s attitudes and experiences concerning a wide range of health related behaviors and lifestyle issues. This paper can be a working example to understand the various steps involved in the process of predictive modeling and model assessment.

Every medical treatment has risk that must be compared to the risk of the disease. It is important to calculate the actual risk rather than to make treatment recommendations based upon perceived risk. In addition, risk needs to be re-evaluated as it can change over time. Medical risk also is generally assumed to be uniform across the population; however, risk is individual and treatment must be considered in relationship to individual risk. In addition, only short term risks of treatment are known; long-term risks are not investigated and remain unknown.

There is some disagreement in the general community as to the safety of vaccines, resulting in lower rates of vaccination, particularly for MMR (measles, mumps, and rubella) vaccination under the belief that the vaccine is related to the development of autism. Prior to the start of vaccination, death and occurrence were much higher compared to 2000-2008. (O’Reilly, 2008) Pre-vaccine levels of death from pertussis, for example, were approximately 4000 per year. However, the vaccine has been available since the early 1940’s prior antibiotic use and the risk of death cannot be considered the same were the vaccine to be eliminated. Pre-vaccine deaths were few for measles (440), mumps (39), and rubella (17).

Various states are making personal exemptions from vaccinations easier, and in those states, individual opt-out is increasing. Twenty eight states have a religious exemption only, but another 20 have a personal belief exemption. Fifteen states require just one parental signature to opt out. Only West Virginia and Mississippi do not allow either a religious or personal exemption. Some states such as New York regulate the religious exemption, making it very difficult to acquire. There are calls to make the exemptions more difficult, or to eliminate them altogether for some diseases. (O’Reilly, 2008) However, such decisions should be made with respect to current rather than to historical risk.

SETTING THE STAGE

Childhood Obesity

The data set under study is taken from a survey that was conducted by the Health Behavior in School-Aged Children (HBSC). HSBC data are the result of the United States survey conducted on 11 to 15 year old school children, who are in early adolescence, during the 2001-2002 school years. This is a large collection of data on a wide range of health behaviors and health indicators, and factors that may influence them. A fraction of the data is used for the present study, which primarily concentrates on the students’ weight control attitudes.

As the first step to investigate obesity, the data have been cleaned and all the missing values are removed from the observations. The variables that are considered for the study are kept and listed below. A sample with 2000 observations is selected for the analysis.

The following series of variables related to the weight control behaviors are used to study their impact on BMI_COMP: