HEALTH MEASUREMENTS

Medical professionals collect various data in order to measure the healthiness of individuals. Sometimes comparisons are made between individual measurements and healthy normal standards: e.g. blood pressure measurements give a direct indication of hypertension, temperature readings measure fever. Some information by itself does not give an indication of state of health, but can be useful when compared with other personal data: e.g. height by itself is not a health indicator, but height vs. weight does give medically helpful data.

Although many medical tests require invasive procedures, very useful data can be obtained without x-rays, blood tests or surgery. The following measurements, taken in class, are easily done and typical of data used in general or sports medicine.

**Pulse**

Pulse rate measures the number of heartbeats per minute. This varies considerably among individuals, but is typically lower when resting than when doing strenuous exercise. People who exercise regularly or are athletes have generally lower pulse rates than sedentary folk. There are several places on the body where a pulse can be felt; an easy one can be found by placing the first two fingers of one hand on the inside of the other wrist and experimenting with exact position until the pulse is found. The count is taken for 1 minute, under relaxed conditions, for a resting pulse rate. Typical results are between 60 and 100, with 72 being an average resting rate.

**Blood Pressure**

A blood pressure cuff wrapped around your upper arm at the height of your heart is the most common way of obtaining readings of systolic and diastolic blood pressure. These two readings correspond to different parts of the heart pumping cycle. With every heart beat blood pressure rises and falls in a cycle; the systolic pressure is the maximum and the diastolic is the minimum. The readings are given in millimeters of mercury, (mm Hg is the abbreviation), the same units by which atmospheric pressure is measured in a barometer.

High blood pressure is a medical condition called hypotension; it increases the risk of heart attacks and strokes, and may cause eye and kidney problems. For students in their late teens or twenties a systolic pressure over 140 or a diastolic over 90 would be considered overly high and reason to see a doctor. Hypertension or low pressure exists when the systolic pressure is below 90 mm of mercury. This may be normal or may represent a pathologic state depending on other symptoms such as lightheartedness, faintness or presence of fever. If possible a low or high blood pressure measurement should be compared to previous blood pressure measurements. A trained medical professional can use a blood pressure cuff, or readings can be obtained from home digital devices. An average healthy measurement might be 120 / 80 which is read as "120 over 80" and denotes the systolic, and then the diastolic reading.
Respirations

Respirations (rate of breathing, number of inhalations and expirations per minute) are an important indicator of essential body functions and consist primarily of carbon dioxide and oxygen exchange in the lungs. Without adequate functioning of the respiratory system none of the other body systems can perform effectively in maintaining a healthy body. The respiratory system includes many body organs and structures including the nose and throat, trachea and bronchi, lungs, diaphragm, intercostal muscles, brain and nerves. It depends heavily on the circulatory system for support of all functions.

Normally an individual is not aware of breathing during the usual activities of daily living and only notices increased respirations during strenuous exercise. This increase in rate and sometimes depth may be accomplished by mouth breathing, which is uncommon in healthy adults but normal for children under one year of age.

Individual differences in normal respiratory rates and capacity are influenced by body size and age. Generally breathing becomes slower and deeper as one ages through middle adulthood. Normal ranges are 20 to 30 respirations/minute for toddlers, 16 to 20 respirations/minute for adolescents and 12 to 20 respirations/minute for young and middle aged adults. Because of physiological changes due to aging, normal respiratory rates in the elderly may slightly decrease from their normal adult rate.

Assessing Respirations

To assess respirations count the rise (number of inspirations) of the chest for thirty seconds and multiply by two which is reported as respirations per minute. This is usually done as you finish assessing the pulse with fingers remaining in place on the wrist. The reason for this is to prevent the individual from consciously altering the rate of respirations which is sometimes done when he/she is aware that respirations are being counted.

Height/weight

Overweight or underweight for a given height and frame can be symptomatic of a variety of health problems. Insurance companies base premiums on extensive height/weight data; a majority of Americans are overweight by medical standards and they pay higher premiums because they are at greater risk, particularly for heart disease, the number one cause of death in the U.S.

Diet books and articles in the popular media discuss weight problems extensively, both from a cosmetic and a health perspective; although some promise painless weight loss with bizarre diets, others are more realistic and give accurate information about the health risks associated with weight gain or loss. Most books by physicians who specialize in weight control recommend low-fat eating habits combined with a regular program of safe exercise. Since muscle weighs more than fat, a previously sedentary person who starts an exercise program may gain weight initially as heavier muscle begins to replace lighter fat.
Flexibility

Lower back pain is a common complaint among adults. This problem is often related to lack of flexibility in the hips, lower back and hamstrings (back of the legs). A flexibility measurement requires a simple device constructed by mounting a yardstick on a foot high box so that the 0 to 14 inch part of the yardstick hangs off the edge of the box. The subject sits with legs flat to the floor underneath the yardstick, and feet flat against the edge of the box. The measurement is taken by reaching forward as far as possible, without bending the knees, and reading the farthest inch mark at the tip of the fingers. For typical college age students an average flexibility measurement is 14-18 inches.

Eye chart

Visual ability varies immensely among different people, and even in one person each eye may have very different vision. Younger people tend to have more flexibility in their range of focus; as they get older they become less able to accommodate their vision to different distances and start to wear bi-focal or tri-focal lenses. Some diseases of the eye are more commonly seen in the elderly, and as age increases the likelihood of needing glasses also increases. For many students, college is the place where they first discover a need for corrective lenses.

A rough measurement of visual ability in each eye can be made with a small eye chart held 14 inches from the eyes. The text on the chart is in progressively smaller sizes; as with a wall mounted eye chart you read down as far as you can go. The eye rating, such as 20/20 or 20/40, is shown at the right of each paragraph. 20/20 means that you can see at 20 feet what a normal healthy eye can see at 20 feet; 20/40 means you see at 20 feet what normal eyes see at 40 feet, in other words, you can't see as far. A person with 20/20 vision is supposed to be able to read characters 1/3 inch high twenty feet away.
Card is held in good light 14 inches from eye. Record vision for each eye separately with and without glasses. Presbyopic patients should read thru bifocal segment. Check myopes with glasses only.