

Chapter 38. Vital Sign Measures: Temperature, Respiratory Rate, Oximetry, Blood Pressure, and Pulse

38.1 Introduction

The many extraneous factors influencing the vital signs are controlled by standardizing the measurement technique and the environment in which the measurement is made.

38.2 Preparation for Measure of Vital Signs

Participants should abstain from caffeine, smoking, and exercise at least one-half hour prior to and until completion of all vital signs measurements. Vital signs should take place in a separate, quiet room where no other activity is taking place, and where temperature fluctuations are minimal. Scheduling procedures should try to establish consistent appointment times to minimize as much as possible the impact of daily variations in pulse, temperature, respiratory rate and blood pressure.

Equipment (including Form 120-Vital Signs, digital oral thermometer, oximeter, sphygmomanometer, appropriate-sized cuffs, etc.) should be checked and waiting for the participant.

38.3 Temperature Measure

PVDOMICS requires oral measurements to be made at all sites. Oral temperatures are influenced by drinking, chewing, smoking, and breathing with the mouth open. For the oral temperature measures in PVDOMICS to be accurate, the participant must not have eaten, drunk, or smoked anything in the last 30 minutes, as the temperature of food, drink, or smoke can dramatically affect readings. Wearing overly warm outer garments can also affect temperatures. All participants should be sitting in a comfortable room temperature area without bulky jackets or heavy coats for at least 15 minutes prior to measure.

The manufacturer of the temperature device you use will provide information on how to use it. Be sure to read and follow the instructions to obtain an accurate temperature.

38.4 Respiratory Rate Measure

The respiratory rate is the number of breaths that a participant takes each minute. The rate should be taken when the participant is at rest in a quiet room for at least 15 minutes, and it is assessed by counting the number of times the chest rises in one minute.

38.5 Pulse and Oxygen Saturation Measure

The manufacturer of the oximetry device you use will provide information on how to use it. Be sure to read and follow the instructions to obtain an accurate oxygen saturation measurement.

In order for the pulse oximeter to function, the probe must be placed where a pulse can be detected. Temperature will affect the ability to detect a signal. Be sure the room and patient are comfortably warm.

Probes are designed for use on the finger, ear lobe or forehead. An ear lobe or forehead probe should be used in patients with a history of scleroderma, Raynaud's phenomenon or in those cases when oximetry cannot be performed using the digits. The type of probe used will be recorded on Form 120.

1. Turn the pulse oximeter on: it will go through internal calibration and checks.
2. Select the appropriate probe with particular attention to correct sizing and where it will go (2nd or 3rd finger, ear or forehead). Make sure the site is clean. Remove any nail varnish if the finger is used.
3. Connect the probe to the pulse oximeter.
4. Position the probe carefully; make sure it fits easily without being too loose or too tight.
5. Do not use a finger on the arm being used for blood pressure monitoring as cuff inflation will interrupt the pulse oximeter signal.
6. Allow several seconds for the pulse oximeter to detect the pulse and calculate the oxygen saturation.
7. Look for the displayed pulse indicator that shows that the machine has detected a pulse. Without a pulse signal, any readings are meaningless.
8. Once the unit has detected a good pulse, the oxygen saturation and pulse rate will be displayed. Allow at least 1 minute prior to recording the saturation number.
9. Oximeters may occasionally give a false reading - if in doubt, function of the oximeter probe can be checked by placing it on your own finger. If no signal is obtained after the probe has been placed on a finger, and you have checked that the probe functions on yourself, then try another finger on the same hand. If there is still no pulse detectable, the other hand may be tried after measure of BP and the cuff has been removed from the arm. Ultimately if the digits still cannot provide pulse and oximetry (such as in participants with scleroderma) oximetry and pulse can be obtained from the earlobe or forehead.

38.6 Blood Pressure Measure

An appropriate size cuff should be used. This is defined as a blood pressure cuff containing a bladder, which covers at least 2/3 of the distance from the acromion to the olecranon. If there is any doubt about cuff size, then a larger rather than an inappropriately small cuff should be used. In overweight adults, it may be necessary to use a large adult or thigh cuff to obtain an accurate measurement.

1. The participant should be seated with arm extended at **heart level** for approximately 15 minutes prior to making the measurement. The participant should be relaxed, seated with back supported with legs uncrossed and feet comfortably flat on the floor and not dangling..
2. The right arm is to be used consistently for measurement of blood pressure. If this is not possible, use the left arm. Indicate which arm is used to measure pulse and blood pressure on the case report form.
3. Fold the cuff bladder in half mating each corner of the bladder to find and mark the midpoint on the cuff cover. Do not use a permanent marking on the bladder because it may become dislocated and off-center.
4. The brachial artery is located by palpation. Place the appropriately sized cuff around the upper right arm so that the midpoint of the length of the bladder lies over the brachial artery and the mid-height of the cuff is at heart level.
5. The lower edge of the cuff, with its tubing connections, should be placed about 1 inch above the natural crease across the inner aspect of the elbow.
6. The cuff is wrapped snugly around the bare arm, with the palm of the participant's hand turned upward.
7. Blood pressure can be measured using standard auscultatory methods or using an oscillometric device such as the *Dinamapp*. The manufacturer of the blood pressure device you use will provide information on how to use it. Be sure to read and follow the instructions to obtain an accurate blood pressure measure.
8. Try to use the same method throughout the study. The method of measuring blood pressure should be recorded in the CRF.

38.7 Pulse Measure

This measurement serves two purposes: (1) to document the resting heart rate at the time of examination, and (2) to permit detection of gross irregularities of heart rhythm which may affect the interpretation of the blood pressure readings.

1. The measurement of pulse is performed only after the participant has been seated quietly, with feet flat on the floor, in an erect but comfortable posture, for at least fifteen minutes.
2. The right arm is to be used consistently for measurement of the pulse. If this is not possible, use the left arm.
3. Pulse can be measured by palpation of the radial artery at the wrist. This is done for 30 seconds. Alternatively, an oscillometric device such as the *Dinamapp* may be used. The manufacturer of the device you use will provide information on how to use it. Be sure to read and follow the instructions to obtain an accurate pulse.
4. Try to use the same method throughout the study.
5. Any marked irregularity observed during this period should be called to the attention of the Principal Investigator.