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To measure core temperature non-invasively the locations used should be within the core or close to fairly large blood vessels in areas that do not play a role in temperature control, so blood flow is unlikely to vary significantly. These include the mouth, rectum and tympanic membrane, each of which will normally reflect core temperature fairly closely if measured correctly (Dougherty and Lister, 2008).

The axillas are not normally exposed to the environment, so axillary temperature varies less than exposed skin temperature. However, most axillary skin and tissues are not close to major blood vessels, so axillary temperature is as much a reflection of skin temperature as of core temperature.

In addition, heat transfer from core to surface tissue is not instantaneous so, if core temperature increases, there will be a time lag before the axillary temperature increases.

The consequence is that axillary temperature will usually be lower than core temperature, but not by a fixed amount. When the body is trying to lose heat, axillary temperature may be close to core temperature. However, on cooler days, the body may be aiming to conserve heat and surface temperature may be significantly lower than core temperature. The exact magnitude of the difference depends on many factors such as environmental temperature, clothing or how much the axillas are exposed to external air flow.

Since the difference between core and axillary temperature is variable, we cannot simply measure axillary temperature and add a fixed amount to ascertain core temperature.

Reference


Digital thermometers obtain an accurate reading of body temperature.

Q Is it true that axillary temperature in adults is 1°C lower than oral and, if so, why?

A It is usually said that the normal adult temperature is around 37°C, but, in reality, there is no single body temperature.

The normal body core temperature – the temperature below the surface tissues – is 37°C. Unless the environment is very hot or the body well insulated, the peripheral or shell temperature – the temperature of the skin and subcutaneous tissues – will be lower than this.

This difference is used to help regulate core temperature. Surface vasodilation sends more warm core blood to the periphery, increasing heat loss, while vasoconstriction reduces this. Since heat is being lost, the body surface will be cooler than the core. The difference may be greatest at the extremities (hands and feet) but exists throughout the body outside the core (Dougherty and Lister, 2008).

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