Wireless Vital Signs Monitoring

Background
The ability to monitor patients and manage their medications has become increasingly important. The complexities of medication protocol have increased, and clinician staffing per patient has decreased. This clinic project addresses ways for extracting the vital signs data from the patient. Although the technology exists to read patient vital signs such as temperature, pulse rate, SpO2, blood pressure, ECG, EEG, end-tidal CO2, etc., it is not always convenient to attach additional sensors to the patient. The bedside has already become complex and confusing with a wide variety of equipment clustered around and attached to the patient. Wireless sensors capable of measuring vital signs and transmitting data to a nearby receiver would greatly alleviate the complexity and increase the comfort for the patient.

Tasks
Explore, investigate, and analyze the feasibility of using wireless sensors to monitor vital signs. Knowing that some approaches are feasible, and some are not, one of the goals of this study will be to determine which vital signs are appropriate for wireless sensing. Items to consider include (but are not limited to) temperature, pulse rate, SpO2, blood pressure, ECG, EEG, end-tidal CO2. If the sensor is disposable, (e.g., an adhesive backed temperature patch) then methods should be considered to make it inexpensive. Other sensors (e.g., SpO2) may be reusable, but we should still explore the possibility of low cost disposables.

Wireless sensors should have a read range of about two meters, so that a reader mounted near the patient can detect the signal. If possible, the sensor should be passive (no battery), getting its power from the radiated energy from the reader. The two-meter range and the low-cost, passive technology may be mutually exclusive, and part of the analysis will address which approach should prevail.

A working prototype of a wireless sensor would be highly desirable.