For sensor data to drive better decisions, faster, in healthcare and research, sensor generated data must be accessible, relevant, and trustworthy (ART). The following criteria have critical impact on the delivery of ART sensor data suitable for clinical decision making.

Data collection

Beginning with data acquisition – the process of measuring physical world conditions and phenomena such as electricity, sound, temperature and pressure – data collection is the ongoing process of accumulating sensor data and metadata at each step of the data lifecycle. Data collection is critical to ensuring that the necessary contextual information about the data and its management over time is available to use the sensor data for clinical decision making.

Data transmission

For sensor data and its accompanying metadata to contribute to a data ecosystem driving clinical decision making, the processes by which these data are transmitted must be considered.

Data processing

Sensor generated data is not clinically interpretable at the point of collection. For example, the electric currents on the skin captured by an ECG must be processed into heart rate before a person can understand the clinical relevance of the data. Substantial *data processing* is required to transform the signals captured by sensors and the high velocity flows of data they generate into information suitable for clinical decision making.

Data privacy

The protection of personal, sensor generated data from those who should not have access to it and the ability of individuals to determine who can access their personal information is not only required by laws and regulations in some instances, but also fundamental to establishing trust in a health data ecosystem that relies on sensor generated data for clinical decision making.

Data security

The practice of protecting sensor generated data, and the systems that store and process these data, from unauthorized access, corruption, or theft throughout its

entire lifecycle is an essential component of establishing sensor generated data as a viable source of information to support clinical decision making.

Data quality

The [Institute of Medicine](#) defines *high quality data* as data strong enough to support conclusions and interpretations equivalent to those derived from error-free data ([IOM](#)). Sensor generated data must be high quality to be useful for clinical decision making, noting that this bar will vary with the nature of the decision. Sensor data quality is determined by the completeness, validity, uniqueness, consistency, timeliness, and accuracy of the data.