1. **ALARA = As Low As Reasonably Achievable**
   - **ALARA**: The Guiding Principle of Clinical Radiation Use
   - **Purpose**: Balance the potential risk of radiation exposure with the clinical benefit.

2. **It’s not possible to measure true radiation dose to a patient, but there are some helpful guidelines.**
   - True radiation dose depends on many factors that cannot be easily quantified, such as the size and distribution of the patient’s anatomy.

3. **Three Dose Metrics Commonly Used in CT**
   - **CTDI, DLP, and Effective Dose**
   - These dose metrics are generally based on measurements in either a 16 cm or 32 cm diameter cylindrical phantom.

4. **CT Dose Index (CTDI)**
   - **CTDI** is a proxy for absorbed dose in a phantom at the center of the scan.
   - **CTDI** is useful for measuring scanner output.
   - **CTDI** does not account for scan length.
   - **CTDI** is measured in milligray (mGy).

5. **Dose Length Product (DLP)**
   - **DLP** is a proxy for the total absorbed dose in a phantom over the length of a scan.
   - **DLP** is useful for comparing exam doses if scan lengths are equivalent.
   - **DLP** is measured in milligray-centimeter (mGy-cm).

6. **CTDI and DLP are not patient dose.**
   - **CTDI** and **DLP** do not include patient specifics such as patient size, and organ radiosensitivity.

7. **Effective Dose is a parameter used to estimate biologic risk of a non-uniform exposure (like that of CT) compared with a whole body exposure.**
   - **Effective Dose** is based on population models and may not be applicable for risk comparisons of individual patients.
   - **Effective Dose** is calculated as the sum of dose absorbed by each organ weighted by the radiosensitivity of the organ.
   - **Common practice**: Effective Dose is generally estimated in CT using DLP and dose conversion coefficients:
     - **Effective Dose = DLP x dose conversion coefficient**
   - **Dose conversion coefficients (a.k.a. “k-factors”)** account for radiosensitivity of organs in the scan region and patient age for pediatrics.
   - **As it is estimated in CT, Effective Dose does not account for differences in patient size.**
   - **Effective dose** is reported in millisievert (mSv).

8. **All vendors can quote dose reductions.**
   - It is important to understand: dose reduction compared to what?
   - Also, what is the effect on image quality?

9. **Comparing the dose between different scanners is impossible without equalizing the image quality.**
   - Low contrast resolution is a good indicator of overall CT system dose efficiency because dose and image quality are combined in the same metric.

10. **The low dose goal is to achieve diagnostic image quality, not spectacular image quality.**
    - The dose used in a given exam must be enough to deliver sufficient image quality to answer the clinical question, but as low as possible to minimize the risk to the patient.
    - This is the fundamental concept behind the ALARA Principle (As Low As Reasonably Achievable).