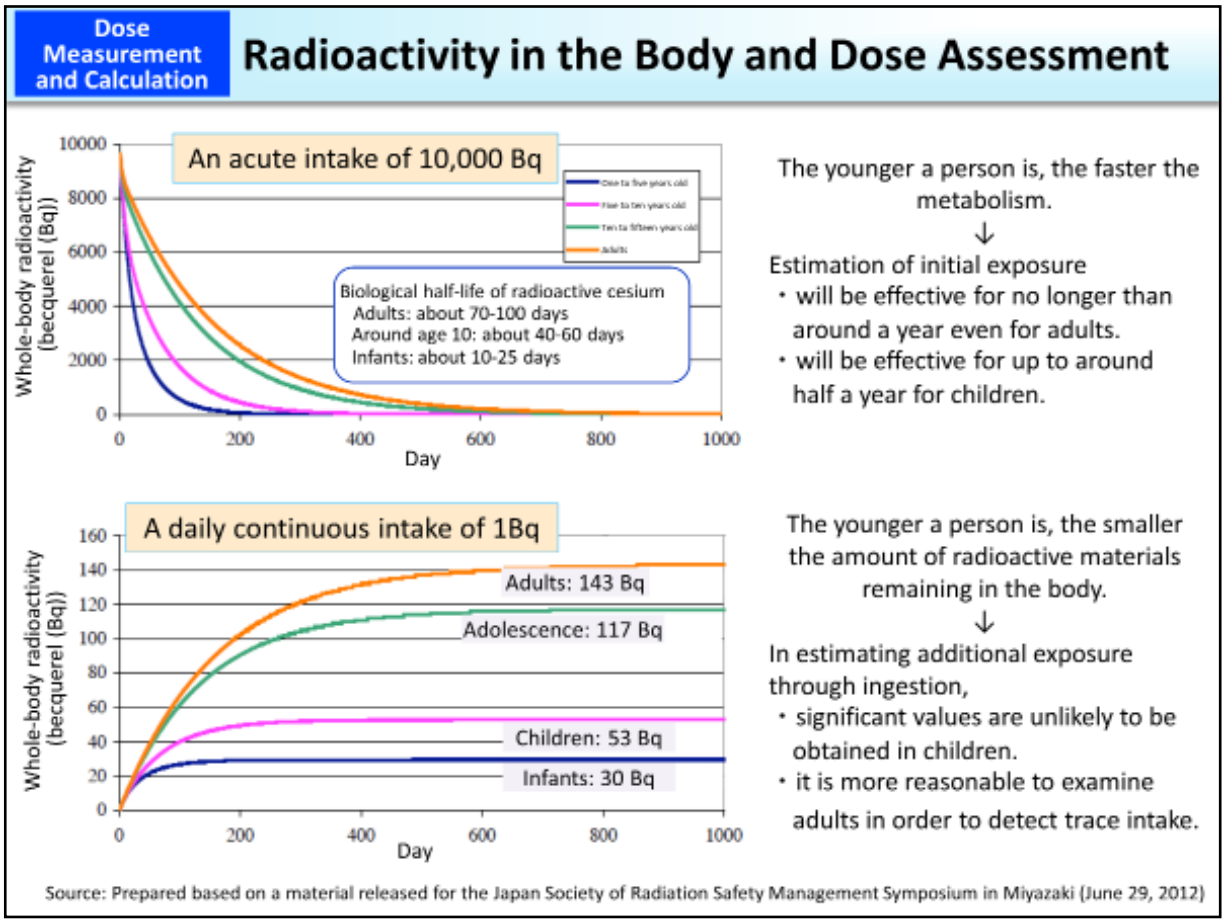

Whole-body counters (WBCs) can measure the radioactivity content in a body on the day of measurement. Similar to other radiation measuring devices, WBCs have a detection limit depending on their performance and counting time.

Given that radioactive cesium has a biological half-life of 70-100 days for adults (p.11 of Vol. 1, “Half-lives and Radioactive Decay”), around one year after the accident would be the time limit for estimation of the initial body burden (in the case of a single intake event at the beginning). As shown in the upper figure, the radioactivity of cesium incorporated into the body decreases in around a year to nearly zero, namely the level before the intake. Subsequent whole-body counting is performed for the purpose of estimating chronic exposure, mainly from foods (p.61 of Vol. 1, “Data on Internal Exposure Measured by Direct Counting”).

In contrast, whole-body counting for children is likely to yield values lower than the detection limit because trace amounts of the initial intake can be observed for a period of about half a year, and the residual radioactivity accumulated in the body by chronic intake is also minimal in children. In such cases, it would be more reasonable to examine adults and estimate their internal doses in terms of understanding the internal exposure situation in details, taking into account the fact that the committed effective dose coefficients are similar for both children and adults, despite the notable difference in their metabolism rates.

In order to estimate the committed effective dose from the measurement result for the radioactivity in the body, it is necessary to use an appropriate intake scenario and an appropriate model aligned with the exposure circumstances, such as acute or chronic intake, inhalation or ingestion as a dominant route of intake, the time when the intake started, and so on.

Regarding radionuclides with short effective half-lives, such as I-131, the radioactivity in the body diminishes rapidly, making it difficult to detect such radionuclides as time progresses. Additionally, pure beta-emitters lacking γ-ray emission, such as Sr-90, also cannot be detected by a whole-body counter (WBC).

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