# SUPPLEMENTARY MATERIAL



Figure S1 Soft tissue thickness versus Compton scattering signal.



Figure S2 Net counts rate of Pb Lversus Compton scattering signal with 100ppm Pb Bone phantom analyzed by the peak fitting.



*Figure S3a. K/coherent versus the Pb concentration in bone equivalent phantom.*



*Figure S3b. K/coherent versus the Pb concentration in bone equivalent phantom.*

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*Figure S4 Detection limit of the portable XRF versus the Lucite plate thickness.*

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*Figure S5a. Association of bone Pb measured by the portable XRF and KXRF for all participants, excluding the one with the highest bone Pb concentration*

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*Figure S5b. Correlation of bone Pb measured by the portable XRF and KXRF for the participants with soft tissue thinner than 5 mm, excluding the one with the higest bone Pb concentration*

*Table S1. Comparison between portable XRF and KXRF*

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|  | Portable XRF | Conventional KXRF | Cloverleaf KXRF |
| Measurement time  | 3 - 5 minutes | 30 minutes | 30 minutes |
| Limit of detection  | 7 - 10 ppm on averagea | 6-10 ppm | 2-3 ppm |
| Sensitive factors  | Soft tissue thickness | Very thick skin | Very thick skin |
| Bone type | Cortical | Cortical and trabecular  | Cortical and trabecular |
| Preferred population | Adult population | All | All, especially pediatric population |
| Radiation dose | 3.6 - 6 μSv | 38 nSv | 0.56 μSv |
| [a]. This is for people with average soft tissue thickness. The DL is significantly affected by soft tissue thickness. |