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Dear Editor,

Çetin *et al*'s paper on the absorption properties of Pb-free garments [(1)] is missing some important context. They state that Sample 4 materials assessed "were lighter than a 0.5-mm lead garment and provided superior radiation protection", which is arguably not supported by their results.

The most obvious criticism is that the Sample 4 materials were shown to have similar attenuation properties to a 0.36 mm thick Pb material at 100 kVp, which means it provides inferior, not superior, protection when compared to 0.5mm thick Pb aprons.

Perhaps the authors mean the Sample 4 material was superior because it provided slightly more protection than the minimum required thickness of 0.35 mm Pb at 100 kVp and were "30 % lighter" than the 0.5 mm Pb material. Also 30 % lighter than 0.5 mm Pb aprons are 0.35 mm Pb aprons, as discussed by Jones & Wagner [(2)]. Comparing the mass of material equivalent to 0.36 mm Pb thickness with 0.5 mm thick Pb is hardly a fair comparison. For the Sample 4 material to be superior with this metric, these samples would need to weigh less than 0.36 mm thick Pb material. Pure Pb has a density of 11.34 g cm^{-3}, so a 0.36 mm Pb shield of 1 m^2 size would have a mass of 4.0824 kg m^{-2}, compared to the Sample 4's mass of 4.0081 kg m^{-2}. Using these numbers, the weight reduction of the Sample 4 material is 2 %, instead of the 30 % stated in the

paper. While still a reduction, it is not a drastic reduction. Also of note is that these measurements were taken using the primary beam geometry, as recommended by Jones & Wagner [(2)]. However, Jones & Wagner also provided a caution about beam qualities used in the measurements, and warn against specifying Pb equivalency at one kVp since "A garment may provide a high degree of protection at the specified beam quality, but underperform at others". [(2)] Furthermore, in a follow-up study, Pasciak et al [(3)] defined and used scatter mimicking primary beams for protective apron assessment. The reader is left to wonder, would the Sample 4 material still be 0.36 mm Pb equivalent using a scatter mimicking primary beam, or scattered radiation. With only a 2 % weight savings, the assessment procedure is relevant to assure the claim of superiority holds true.

Thorarin A Bjarnason, BEng, MASc, PhD, MCCPM, PEng[1,2,3]
[1]Diagnostic Imaging Services, Interior Health, Kelowna, Canada
[2]Department of Radiology, University of British Columbia, Vancouver, Canada
[3]Department of Physics, University of British Columbia Okanagan, Kelowna, Canada
2268 Pandosy Street, Kelowna, BC V1Y 1T2
T: 250-980-6157 / F:250-862-3736
thor.bjarnason@coolth.ca

For Publication

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