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Nuclear medicine

Week 2; Lecture 4; Section 4: SPECT: scattering correction

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Section 4

Scattering correction

Scatter correction

Primarily due to Compton scattering

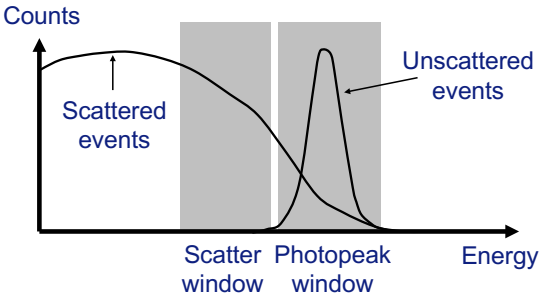
Effect is smaller in magnitude than attenuation

Ratio of scattered to non-scattered photons may be as high as 40%, even when using a narrow energy window

Scatter reduces image contrast as events are put in the "wrong place" and leads to an overestimation of radioactivity in a pixel

Loss of contrast may obscure clinically relevant details

Scatter correction



Weighting factor must be determined experimentally, it depends on:

- Choice of energy detection window (photopeak window)
- Size of object being scanned
- Energy resolution of gamma camera

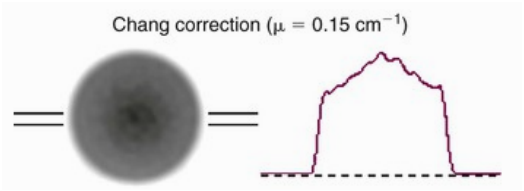
Estimate contribution of scattering events in "photopeak window" by calculating a weighting factor, w_f

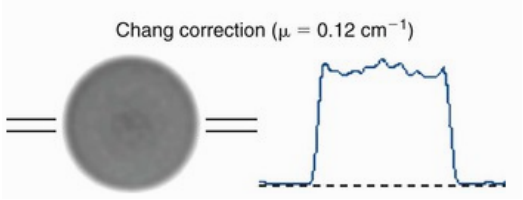
Number of events subtracted from photopeak is w_f times number of events in scatter window

Scatter-correction method limited by differences in spatial distribution of scatter and photopeak

Example of impact of scatter correction

20 cm diameter cylinder with uniform concentration of ^{99m}Tc.





"Over correction" noted above removed by scatter correction

Summary of section 4

Weighting factor calculated by "extrapolating" contribution from Compton-scattered photons in region of "photo-peak window"