hundred women, we found that an effective thickness of 24.5 cm occurs at a body weight of 90 kg. The regression was: THICKNESS (cm) = 0.182 + WEIGHT + 8 (r = 0.85; s.e.e. = 1.5 cm). The effective attenuation needed to achieve the low count rates seen by DaCosta et al. occurs at a water thickness of 28 cm with 13-mm collimation that is standard for the DP3 scanner. This would be seen in a patient weighing ~110 kg with an anatomical thickness of 31 cm (15 cm lean + 16 cm fat). It is inappropriate to use depleted sources on such obese subjects. On the other hand, studies by Dawson-Hughes et al. (*5*) have shown that accurate but not precise results can be obtained even with depleted sources on subjects of 28-cm thickness. Phantoms designed to test thickness response of DPA or DEXA scanners *cannot* consist of either water alone or plastics. Dual-energy systems begin to vary in response to soft-tissue composition at thicknesses >20 cm. Typically, scanners are calibrated at normal composition (25% fat) from 15–20 cm and produce accurate data at 25 cm only if the soft tissue is ~40% fat (15 cm of water + 10 cm of oil).

DaCosta et al. (*1*) imply that source activity is critical for precise determinations using DPA. The precision of DPA on the spine in many studies using the Lunar DP3 averaged 1.8% even when older software was used (*7*). The precision error reported by Dawson-Hughes et al. (*5*) was within 2%, and that reported by the researchers at Mt. Sinai was 2.5% (*8*). Correction for the small influence of source activity on typical patient results under usual conditions could reduce the precision error slightly. However, the major uncertainties in spinal determinations are (a) confusion of the L1-L3 sequence with the L2-L4 and (b) misplacement of edges and baselines. In a reanalysis of thousands of spine scans from many institutions, the above operator errors were several times greater than the uncertainty associated with source activity effects.

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REPLY TO DR. SORENSON: Dr. Sorenson's proposal to account for the increase in bone mineral density observed at low counting rates is appreciated. Although the 'statistical artifact' described is a potential explanation for the error observed by us, we are unable to evaluate the hypothesis further, since the actual count rate information is unavailable to DP3 users. Lunar DP3 software alters the raw count information during acquisition and stores calculated bone mineral values that cannot be converted back to raw data (i.e., high- and low-energy photon counts measured through bone and soft tissue). The software algorithms used are considered proprietary information and have not been available to users for review. This further highlights the problem of having to rely on software in which raw data are not retained and in which the basis of calculations is concealed from the users.

Dr. Sorenson's proposed correction for the statistical artifact on individual count data (Fig. 2) cannot be applied. We hope that the industry will evolve toward a standard which makes documentation of the algorithms, as well as raw count data, available to users.

Dr. Sorenson describes effects that he attributes to counts per pixel, and not source activity or attenuation; however, counts per pixel are indeed a function of source activity and attenuation.

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REPLY TO DR. MAZESS: We are pleased that Dr. Mazess, the manufacturer of the device used in our study, essentially acknowledges the validity of our observations (*1*). He incorrectly, however, implies that our findings are due to an 'unusual' scanning configuration.

Dr. Mazess suggests that our study used outmoded acquisition parameters. In fact, the manufacturer's original technical guidelines for collimation and scan speed specified the 'high resolution' parameters used in our study (8 mm and 2.5 mm/sec, respectively). In a February 11, 1985 correspondence to customers, Lunar announced an *optional* configuration of 13 mm collimation and 5 mm/sec speed as a mechanism "to allow shorter scan times and longer source life." The original configuration, which has been referred to as the 'high resolution scan,' or 'slow scan,' was still recommended "to achieve the best precision with older sources or with low bone values." Since our primary concern in the conduct of a longitudinal research study was precision (not economic considerations) and since we recognized that we might indeed be studying patients with low bone mineral values, we elected the more rigorous methodology.