Purpose: A properly designed projection radiography technique chart enables adherence to maximum Entrance Skin Exposure (ESE) standards, avoidance of improper exposures, and optimization of image quality across devices and patient sizes. The goal of this project was to develop and "field test" a technique chart designed to accomplish these tasks.

Methods: All radiographic anatomical examinations at our institution were characterized in terms of average body-part thickness, kVp, grid use, and field size, across a group of eight patient sizes ranging from neonates to bariatric adults. Wide-angle transmission fractions (TFs) were measured across a range of thickness, field sizes, and kVp, from which multi-dimensional fits enabled TF to be estimated for any examination type. For each examination type, target ESE values necessary to deliver manufacturer-specified detector exposure were determined. The maximum and target ESE values for patients other than average adults were propagated from the average adult values to those for each of the patient size groups using the estimated TFs. For a given x-ray system, the maximum and the target mAs values were then estimated from the measured mR/mAs for that system for each of the anatomical examinations and patient sizes.

Results: Generated mAs values compared reasonably well with empiric values used by technologists for average adult. However, there were notable discrepancies across devices and patient sizes. For large patients, the generated values were in general substantially larger than empiric values. The new technique chart is currently implemented across our institution.

Conclusions: Using a universal technique chart enables a reduction in variability of acquisition across the imaging operation at a large medical center. This can substantially aid in improving the consistency of medical imaging and provide important guidance as how image quality and dose can be optimized across patient sizes and age groups.