Patient scans are often sparse and collected at irregular intervals. In the context of PBPK modelling, these scans are used to glean information about model parameters and the Area Under the Curve (AUC) of different compartments to calculate them from their associated Time Activity Curve (TAC) to estimate the radiation dose delivered to them. But fitting the model parameters to AUC curves versus TACs are two different problems - and the set of optimal parameters required to estimate one within a desired uncertainty threshold may be different from that of the other. Furthermore, the relative importance of scans taken at some particular time points may be more important to estimating the optimal parameters to generate the AUCs within a desired uncertainty range than scans taken at other time points – and optimal time points for a good fit to TACs may be different than that for a good fit to AUC curves, and we attempt to quantify the relative importance of scans taken at different times when the aim is to estimate the AUCs of different compartments.