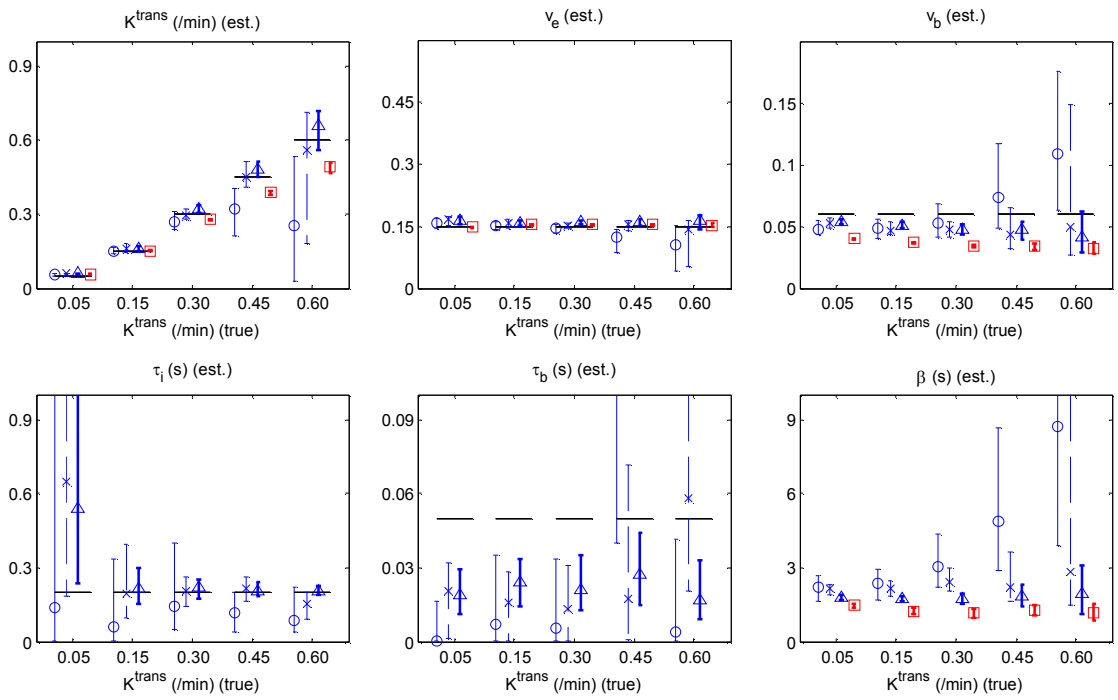
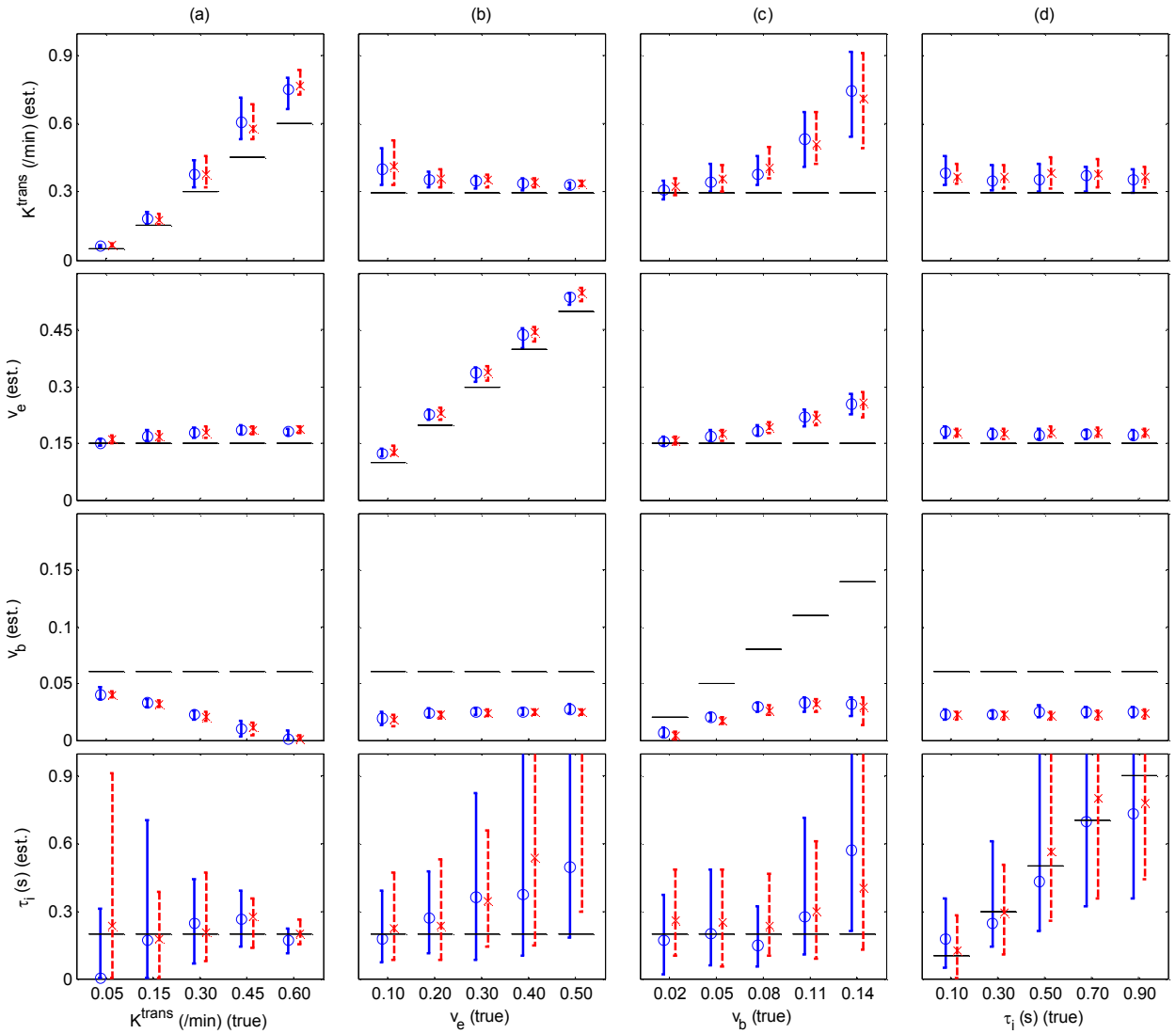
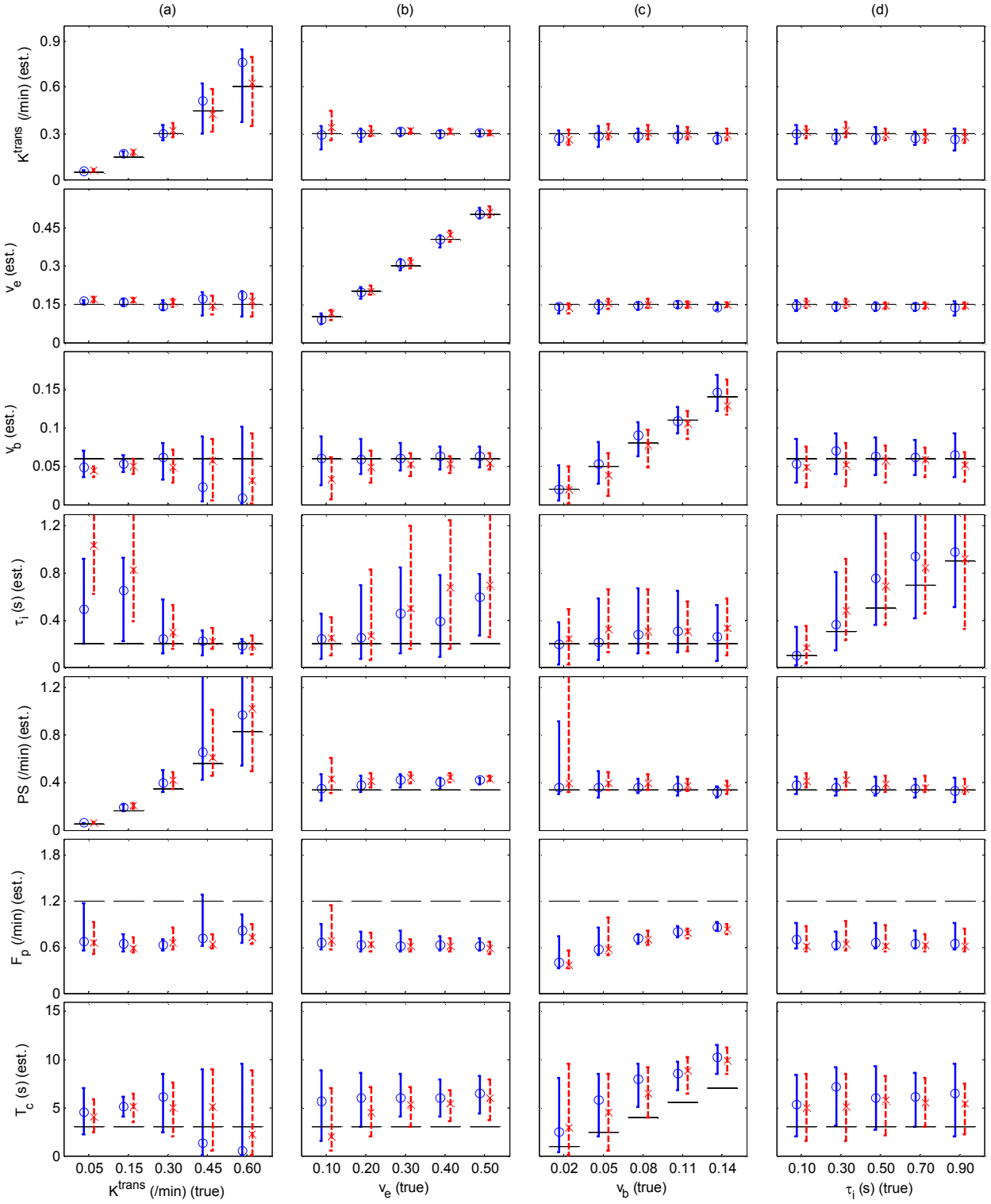


Supplemental Figure 1. The accuracy of SSM2 parameters was improved by including a vascular dispersion function $h(t)=\exp(-t/\beta)/\beta$ which was convolved with the arterial input function $C_b(t)$ and a higher temporal resolution. The dispersion factor β was an additional free parameter for estimation. The parameters used for the reference data are shown by the horizontal black solid lines; only K^{trans} was changed during the reference data generation while all the other parameters were fixed. SSM2 parameter estimation was performed with three different temporal resolutions: 5 s/frame (blue circles with thin solid lines), 1 s/frame (blue crosses with thin dashed lines) and 0.2 s/frame (blue triangles with thick solid lines). The results demonstrate that the accuracy of SSM2 can be improved by using the vascular dispersion function and a higher temporal resolution. Also shown are the results of GKM2 with the same vascular dispersion function and a high temporal resolution of 0.2 s/frame (red squares with thick solid lines) which show high precisions in all parameters, but lower accuracy for the K^{trans} and v_b.



Supplemental Figure 2. Comparison of SSM2 parameters estimated when τ_b was a free parameter (blue circles, same as shown in Supplemental Figure 3) and when τ_b was fixed to 1 ms (red crosses). Each column represents a case where all model parameters were held constant except one parameter; K^{trans} (a), v_e (b) , v_b (c) and τ_i (d). In each column, the parameter varied for generation of reference data is shown on the x-axis. Plotted are the median and inter-quartile ranges of the estimated parameters from 100 noisy data for each case. Horizontal dashed lines represent true values of the parameters.



Supplemental Figure 3. Comparison of ATHX parameters estimated when τ_b was a free parameter (blue circles, same as shown in Supplemental Figure 2) and when τ_b was fixed to 1 ms (red crosses). Each column represents a case where all model parameters were held constant except one parameter; K^{trans} (a),

v_e (b) , v_b (c) and τ_i (d). In each column, the parameter varied for generation of reference data is shown on the x-axis. Plotted are the median and inter-quartile ranges of the estimated parameters from 100 noisy data for each case. Horizontal dashed lines represent the true values used for the reference data.