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**Correlation between vortices and wall shear stress in a curved artery model under pulsatile flow conditions**[1] CHRISTOPHER COX, MICHAEL W. PLESNIAK, George Washington University — One of the most physiologically relevant factors within the cardiovascular system is the wall shear stress. The wall shear stress affects endothelial cells via mechanotransduction and atherosclerotic regions are strongly correlated with curvature and branching in the human vasculature, where the shear stress is both oscillatory and multidirectional. Also, the combined effect of curvature and pulsatility in cardiovascular flows produces unsteady vortices. In this work, our goal is to assess the correlation between multiple vortex pairs and wall shear stress. To accomplish this, we use an in-house high-order flux reconstruction Navier-Stokes solver to simulate pulsatile flow of a Newtonian blood-analog fluid through a rigid 180° curved artery model. We use a physiologically relevant flow rate and generate results using both fully developed and uniform entrance conditions, the latter motivated by the fact that flow upstream to a curved artery may not be fully developed. Under these two inflow conditions, we characterize the evolution of various vortex pairs and their subsequent effect on several wall shear stress metrics.

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