

Abstract Submitted
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Structures in secondary flow under simple harmonic inflow in a 180 degree curved pipe model of an artery¹ AUTUMN L. GLENN, SARAH L. SEAGRAVE, KARTIK V. BULUSU, MICHAEL W. PLESNIAK, The George Washington University — Inward centrifuging of fluid in a 180 degree curved pipe leads to development of secondary flow vortical structures. These Dean's vortices have been widely studied in steady flows. Complex secondary flow structures were observed under (unsteady) physiological flow forcing associated with the cardiac cycle, as well as simple harmonic forcing. These structures were investigated under several simple harmonic inflow conditions with phase-locked 2-D PIV measurements to examine the formation of coherent structures in the secondary flow. Experimental velocity field data were acquired at various cross-sectional planes along the bend. Multiple vortex pairs were observed at 90 degrees into the bend for all waveforms investigated. The overarching goal of this study is to understand the effect of driving waveform characteristics, i.e. period, flow acceleration, etc. on secondary flow morphologies and to characterize these morphologies in terms of dimensionless parameters describing the flow.

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