Economics and Epizootics: Effects of the Foreclosure Crisis on Spatial Distribution of West Nile Virus Activity in Contra Costa County

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ABSTRACT: Contra Costa County was hit particularly hard during the mortgage foreclosure crisis of 2007-2008, with over 8,000 properties reported to be in foreclosure as of December 2008. Within the county, communities that had experienced the most rapid growth in prior years were disproportionately harder hit. One result was a large increase in abandoned or un-maintained swimming pools. Between 2006 and 2008 the number of pools inspected by our technicians increased nearly sevenfold, and the percentage of those pools found to be breeding mosquitoes increased from 7% to 40%. As hypothesized by other authors, this increase may provide abundant habitat for *Culex tarsalis,* a primary vector of West Nile virus, in urban and suburban residential areas where it was previously uncommon. In order to examine spatial relationships between foreclosure rates, vector abundance and West Nile virus activity, we used GIS and spatial analysis software to calculate and map the density of foreclosed properties with pools using addresses obtained from www.foreclosureradar.com and overlaid data on EVS trap counts, larval dip counts, dead bird reports, WNV positive dead birds and mosquito pools from our own surveillance database. As expected, the density of foreclosed properties with pools was highest in communities like Antioch and Brentwood that had experienced high growth rates prior to the mortgage crisis. We saw a strong spatial correspondence between all indicators of WNV activity, *Culex tarsalis* adult and larval abundance and foreclosure density, indicating that economic conditions are having a strong impact on the distribution of both the vector and the pathogen within our county. In addition, all four reported human WNV cases during 2008 occurred in or adjacent to areas with high foreclosure rates. We conclude that the foreclosure crisis is indeed enabling *Culex tarsalis* to invade residential areas and that residents of those areas are at greater risk of contracting West Nile virus. This problem is likely to continue until economic conditions improve.