

Surveillance Research Program

V 5.0 – Default Settings Changes

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Joinpoint 5.0 is a major upgrade to the Joinpoint software. The look and feel of the application has been changed to provide a more modern user experience. New default settings have been chosen for the Model Selection Method, Confidence Interval calculations, and the Maximum Number of Joinpoints. Please take a moment to read about these changes.

Model Selection Method – *New Default Setting!*

Joinpoint now uses the Weighted Bayesian Information Criterion (WBIC) for the Model Selection Method (i.e., to determine the number of joinpoints). Previously Joinpoint used a computationally intensive permutation test, and through simulations it has been shown to produce reasonable results, (i.e., predicts the correct number of joinpoints), when the effect size, a function of the size of APC changes in adjacent segments adjusted for the variability in data, is moderate to large. The Bayesian Information Criteria (BIC3) (which is the sum of model fit error minus a penalty term for the number of parameters in the model – the 3 indicates the specific

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form of this penalty), is a closed form formula which is significantly less computationally intensive and performs similarly to the permutation test. When the effect size is smaller the traditional Bayesian Information Criterion (BIC) with a smaller penalty performs better. However, unlike in simulations, the analyst does not know the true effect sizes in practice, and data driven methods were developed to examine the data prior to processing. The WBIC combines the BIC and BIC3 using a weighted penalty term based on the data characteristics. This method has the dual advantages of performing better than the permutation test in certain situations and is significantly less computationally intensive. All of the BIC methods estimate a statistic for each possible number of joinpoints (the user specifies the minimum and maximum number of joinpoints in the user interface), and the model with the smallest value is selected.

Confidence Intervals – *New Default Setting!*

The Confidence Intervals are now calculated using the Empirical Quantile Method. The confidence intervals for the APC, AAPC, and locations of the joinpoints used to be estimated using a “parametric” method. While they were computed using a simple closed form formula, through simulations the confidence intervals were found to be conservative in certain situations (i.e., the confidence intervals were larger than they needed to be). The empirical quantile method, a somewhat computationally intensive method (although much less computationally intensive than the permutation method for model selection) was found to have better coverage characteristics (i.e., the right length confidence interval given its purported coverage – e.g. , 95% coverage).

Maximum Number of Joinpoints – *New Default Setting!*

Previously, Joinpoint set the default maximum number of Joinpoints to 5 for sessions that had 27 or more data points. Settings beyond 5, while allowed, were not usually tenable given the lengthy computation time. With the increased processing speed provided by the Weighted BIC

method, Joinpoint now allows default settings of 6 or 7 maximum number of Joinpoints depending on the number of data points. This is especially important given that the long terms trends in cancer incidence and mortality start in 1975, and may be relevant to your data series. To see how Joinpoint determines the maximum number of Joinpoints, [click here](#).

For a full list of changes in Joinpoint 5.0, see the [Revision History](#).