et al. generates null data that preserve average background spatial correlation better than the wavelet resampling method. Activated regions are determined by testing observed data against these null distributions. Instead of resampling axial slices first and then across axial slices, a newly developed method resamples three dimensions of the brain using a 3D wavelet packet decomposition. A new statistic that measures spatial decorrelation is investigated for determining an orthogonal basis for wavelet packet decomposition. In addition, a resampling method that generates the null distribution for comparison of control versus treatment is examined.

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6f. DIRICHLET PROCESS MODELS FOR CHANGES IN fMRI VISUAL FIELD

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The Visual Field Map (VFM) is a circular region that maps the visual cortex to a virtual retina. The relationship between the dynamic image presented to the eye and the virtual retina can be used to identify changes in the visual system. These changes could be a result of surgery near the components of the visual system or result from progression of a chronic disease. The visual field map is a nonisotropic, nonhomogeneous set of points that represent the activation of voxels in the visual cortex assessed in an fMRI scanner. A wedge shaped mask (18 to 90 degrees of arc) of the image is used to simulate the effect of surgical damage. A Bayesian non-parametric mixture model, a Dependent Dirichlet Process, uses a Dirichlet prior on a space of 2D density functions G to model the intensity of the stochastic process that generates the points in the VFM, an inverse gamma on the precision of the distribution and a gamma prior on the mixing parameter for the number of the distributions needed to model the DDP. The posterior probability of the DDP model on the disk quantifies the probable location of the wedge-shaped mask compared to a reference scan.

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7. POSTERS: SURVIVAL ANALYSIS

7a. ANALYZING PATIENT SURVIVAL AFTER DECEASED-DONOR KIDNEY TRANSPLANTS: THE NOVEL USE OF TIME-VARYING COVARIATES

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Peter P. Reese, University of Pennsylvania
Justine Shults, University of Pennsylvania

Analysis of patient survival after deceased-donor kidney transplantation has typically focused on kidneys received from standard criteria donors. However, due to the limited availability of high-quality organs, clinicians have become increasingly interested in the outcomes associated with potentially less-desirable organs. In

particular, there is a focus on kidneys from donors with an increased risk of HIV infection, from donors who experienced cardiac death, and from donors with other undesirable health characteristics. In this presentation we describe the statistical methods used in analysis of a retrospective cohort study using data from the Organ Procurement and Transplantation Network. In particular, we focus on the use of logistic regression and non-proportional Cox regression for a comparison of rates of transplant rejection and patient survival for the different donor types. In addition, we demonstrate the application of quasi-least squares regression for multiple correlated binary outcomes to analyze absolute two-year allograft survival and delayed graft function.

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7b. SURVOMATIC: A USER-FRIENDLY PACKAGE FOR ANALYSIS OF SURVIVAL AND MORTALITY DATA

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The log-rank test is widely used in biomedical research for determining whether two distributions of survival times are significantly different from one another. However, the log-rank test can fail to detect even a large difference between survival curves if they cross or if one group dies at younger or older ages than the other only during a certain segment of the overall lifespan for that population. This is particularly problematic in the field of aging and longevity research, where the focus is on survival at extreme ages rather than just mean or median survival. Quantile regression and fitting of mortality models (such as the Gompertz model) to the data are both alternative approaches which are more sensitive and more robust to complex differences between survivorship functions. Here we present an open source, cross-platform, R-based software package that incorporates two quantile regression tests as well as maximum likelihood estimation of best-fit mortality parameters. This package comes with an optional graphical interface that makes it possible for researchers to use without having to know the R statistical language. Download site: http://rmodest.r-forge.r-project.org/.

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7c. ASSOCIATION BETWEEN PROGRESSION-FREE AND OVERALL SURVIVAL IN RANDOMIZED CLINICAL TRIALS

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Overall survival (OS) is the gold standard endpoint for new drug development in oncology. Progression-free survival (PFS) is a more subjective endpoint, but is assessed prior to OS, allowing for perhaps smaller and faster studies. There is debate over whether PFS can be considered a surrogate marker for OS and whether PFS is a measure