

The Following projects are funded by internal funds from St. Jude Children's Research Hospital

- **Feasibility: Diminished Bone Mineral Density in Survivors of Childhood ALL (BONE II)**
This project is primarily designed to investigate potential risk factors for the development of diminished Bone Mineral Density (BMD) in patients treated with contemporary protocol-based therapy for childhood ALL. Long-term follow-up (36 months), large cohort (>400 patients), professional design, and data collection provide profound information on treatment associated problems which may affect ALL patients' quality of life. One mega paper is under preparation, which is a comprehensive assessment of protocol-based therapy, effects of vitamin D and calcium supplementations on BMD based on longitudinal data. Two papers related with baseline study have already been submitted. I took charge of statistical modeling, analyses results interpretation, and reporting.
- **Efficacy of BCXs against hPIV-3**
This project investigated two compounds which have potential to treat hPIV-3 infection. Experiments on mice were carefully designed to determine both treatment and pathological efficacy of two compounds. Based on data collected from an experimental trial, I designed further experiments and created mixed models to analyze longitudinal data sets. One paper has already been published by Antimicrobial Agents and Chemotherapy.
- **Virus Load Survey**
This project investigates virus load measurement error and factors which may lead to measurement error using survey data. Virus load measurement is the key and fundamental issue in quantifying pathological baseline observations. Raw data are messy and variances are much larger than expected, leading to questions about the reliability of viral measurements from a lab, and major reasons causing the large variation. I am working on a model to test heterogeneous variance and unequal means simultaneously.
- **Radiofrequency Ablation of Tumors**
This project is a Phase I clinical trial operated in St. Jude Children's Research Hospital, the goal of the trial is to investigate radiofrequency ablation treatment effect on late-stage cancer, especially for tumor shrinkage and pain reduce. I worked on statistical data analysis and tests to compare the outcomes of this innovative treatment with traditional high dose radiation therapy. One paper has been published in *Cancer*.
- **Comparison between bone mineral density determined prospectively by QCT-PRO and retrospectively using QCT-PRO-BIT**
The project is a collaboration with Mindways Software company (Austin, TX) to test consistency of new QCT measurement from historical diagnostic CT images (QCT-BIT) with standard lumbar spine QCT measurement (QCT-PRO). We compared Bone Mineral Density read by new QCT measurement and by traditional QCT, by controlling observers' variance to test reliability of new readings and proposed model to correct bias arising from new method. We also tested the consistency of the new measurement method on its ability of measuring soft tissue density from historical diagnostic CT images.
- **Longitudinal changes of volumes of white matter, gray matter, and central nerve fluid for patients treated with RT1 protocol for brain tumors**
This project investigates the effect of radiation therapy on brain function for brain tumor patients, especially on brain development for pediatric brain tumor patients. We have developed a longitudinal statistical model to join gray matter and white matter together to check overall brain development after radiation therapy.