Abstract:
In health studies, the outcome is often a count or zero-inflated (ZI) count such as the number of decayed, missing and filled teeth (dmft) or surfaces (dmfs); many subjects have zeros because they have not had any cavities. To aid in understanding the underlying mechanisms of diseases and treatments, we developed a series of statistical methods for mediation analyses specifically for count or ZI count outcomes. Existing mediation analysis approaches for count and ZI count data often assume sequential ignorability of the mediator, which is often not plausible in health research because the mediator is not randomized by researchers. We defined relevant direct and mediation effects for count and ZI count data, and developed causal mediation methods based on an instrumental variable (IV) approach. The new method does not require a parametric distribution assumption on the outcome variable or ignorability of the mediator. Sensitivity analyses were developed to see how results will change if assumptions of the method are violated. Our method was applied to a randomized dental caries prevention trial.

Biography:
Dr. Cheng is currently a Professor within the UCSF Division of Oral Epidemiology & Dental Public Health and Division of Epidemiology and Biostatistics, and an investigator in the UCSF Center to Address Disparities in Children’s Oral Health. Dr. Cheng received her MD at West China University of Medical Sciences, MS in Nutrition at Cornell University and PhD in Biostatistics at the University of Pennsylvania. Dr. Cheng’s primary research interest is causal inference to better understand the effect of a treatment/program in randomized trials and observational studies with complicated issues, e.g., noncompliance, missing data, measured and unmeasured confounding, mediation through intermediate variables (such as knowledge, behavior and biomarkers) on health outcomes.