

# Biostatistics: You Can Have It All

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# Outline

- ▶ Bio
- ▶ Research
- ▶ Career Options

# Education

- ▶ UNC-CH DrPH, Bios (2006-present)
- ▶ UNC-CH MS, Bios (1999-2001)
- ▶ Tenn. State Univ. BS, Math (1995-1999)

# Career

- ▶ Clinical Trials Biostatistician
- ▶ Contract Research Organization (CRO)
- ▶ Adjunct Professor

# Semi-Markov Multi-state Modeling of HPV

## Epidemiological natural history studies

- ▶ Various well defined states
- ▶ Fixed visits of time
- ▶ Incomplete longitudinal data

## Multi-state modeling (Cervical cancer example)

- ▶ Human papillomavirus (HPV) acquisition
- ▶ Cervical intraepithelial neoplasia (CIN)
- ▶ Invasive cervical cancer (ICC)

# Semi-Markov Multi-state Modeling of HPV

Dissertation Advisor: Dr. Michael G. Hudgens, Ph.D.

Purpose: To study multi-state modeling of HPV infection and cervical cancer disease progression

Objective: To develop methods for fitting such models to HPV data

- ▶ Under minimal assumptions
- ▶ Combine both incident and prevalent infections
- ▶ Type-specific infections and multiple HPV types

# Role of Genital HPV Infection

- ▶ A necessary but not a sufficient cause of ICC
- ▶ Most common STI reported today
- ▶ Types 16 and 18 found in approximately 70% ICC cases

# Role of Persistent HPV Infection

- ▶ Drives cervical cancer progression
- ▶ Type-specific persistence
- ▶ Clinical marker and endpoint



# Research

## Paper 1 (Two-state)

- ▶ Incidence only
- ▶ Simulation studies and analysis of HIV Epidemiology Research Study (HERS) data (Koshiol et. al)

## Paper 2 (Two-state)

- ▶ Unknown initial observation times (prevalent infections)
- ▶ Simulation studies and analysis of HERS data

## Paper 3 (Multi-state)

- ▶ Infection of multiple types
- ▶ More disease states (i.e., CIN, ICC)
- ▶ Simulation studies and analysis of placebo arm of vaccine trials

# What will I do when I grow up?

- ▶ Clinical Trials Biostatistician
- ▶ CRO, Pharmaceutical, Food and Drug Administration (FDA), Software Development
- ▶ Academia
- ▶ Hybrid