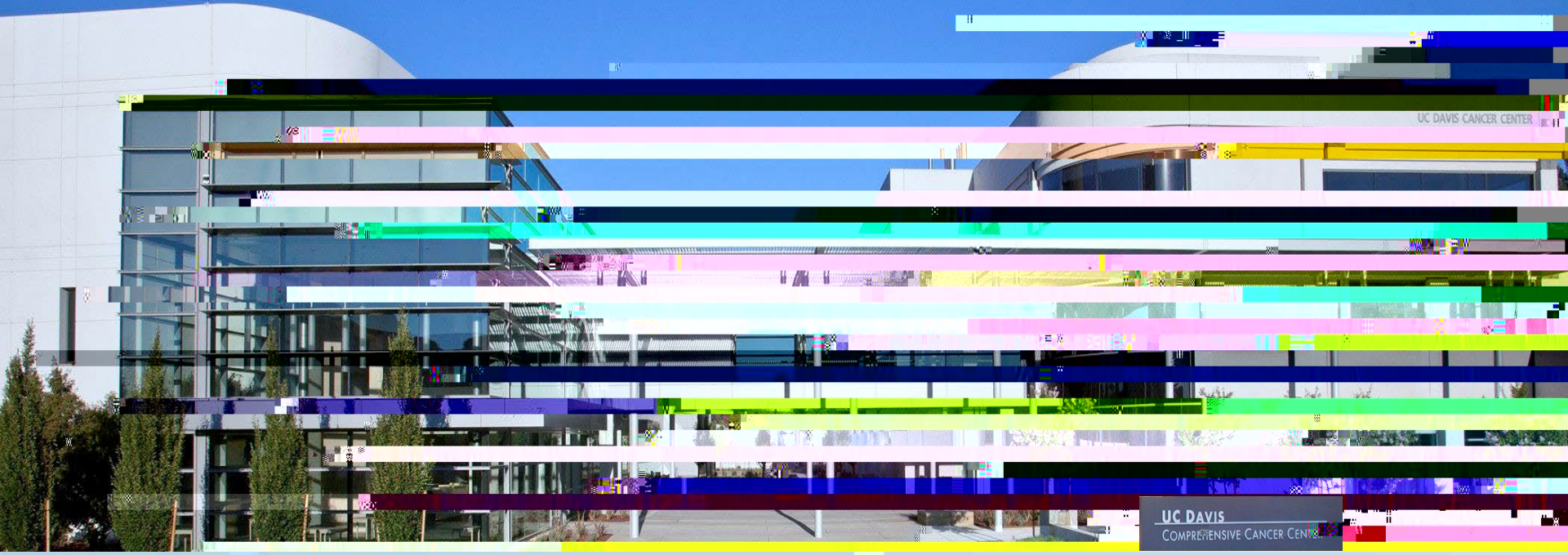


Environmental Factors and Hepatocellular Carcinoma

Brad H. Pollock, MPH, PhD, FACE
Professor of Epidemiology and Chairman, Department of Public Health Sciences
Associate Dean for Public Health Sciences
UC Davis School of Medicine
UC Davis Comprehensive Cancer Center

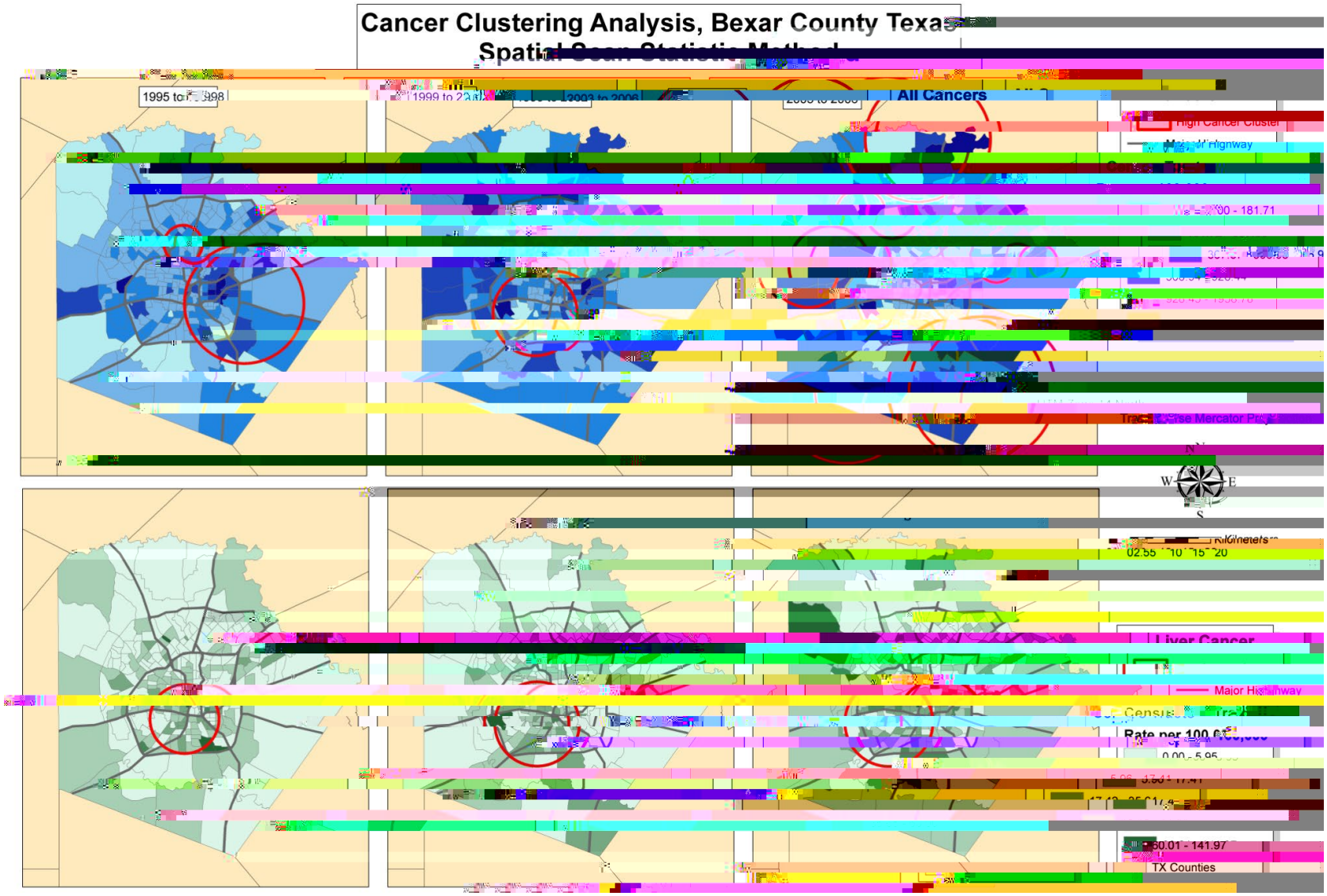
Lawrence Livermore National Laboratory

NCI Cancer Center

UC DAVIS COMPREHENSIVE CANCER CENTER

Protests At Kelly Air Force Base

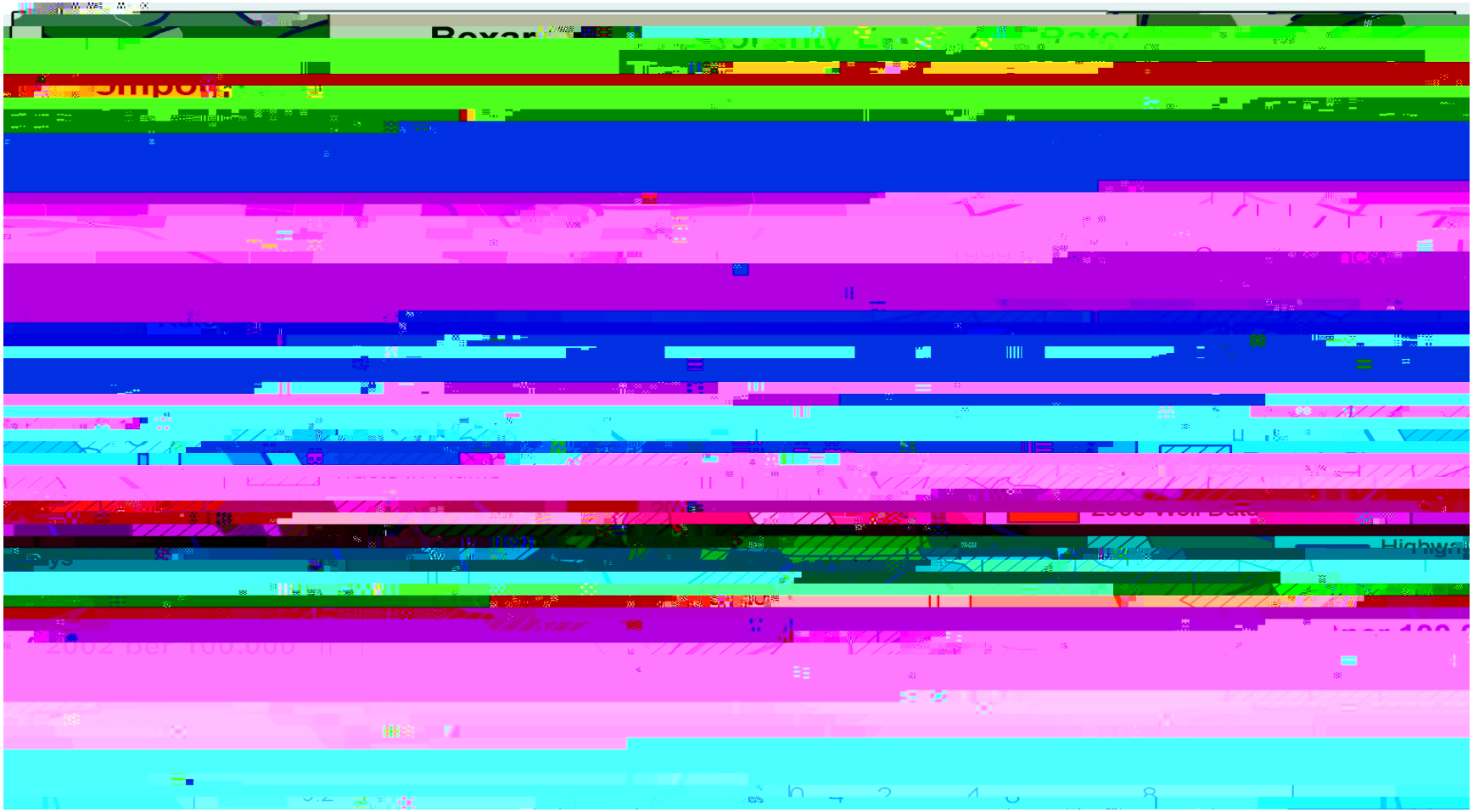
Spatial Cluster Analysis: Spatial Scan



U.S. Air Force Environmental Analysis

1999–2000 Total Volatile Compounds (PCE, TCE, 1,2 DCE and Vinyl Chloride) plume map

Mapped Exposure to Groundwater Contamination Near Kelly AFB to Census Tracts



Environmental Determinants of Hepatocellular Carcinoma in South Texas

Cancer Prevention and Research Institute of Texas (CPRIT): RP120462,
Individual Investigator Research Award

Brad Pollock, PI, UTHSCSA

Case-Control Study

- Incident HCC cases

  No prior systematic treatment (chemo or radiation)

- Eligibility:

  No concurrent cancers or cancer history within the past 5 years

  Ó 1 8 y e a r s o l d

  Resident of Texas counties of Bexar,

Subject Recruitment

- Cases:

  University Hospital (Transplant, Interventional Radiology Clinics), the Cancer Therapy and Research Center (CTRC), and UTHSCSA clinics, San Antonio, TX.

- Controls:

  Healthy consented subjects screened for NCI-2012-02452

  - Community organization events, physician groups, and public media outlets

  Randomly selected representative sample from the general population

  - Residential parcels from the Counties' Tax Appraisal Districts

Laboratory Assays

- HBV and HCV serologies/antigens
- Hepatic function panel
- Chem-20 panel
- Hemoglobin A1c
- Serum AFB_1, AFM_1 and AFB_1-lysine adduct assays
- Urinary AFM_1

Study Questionnaire

- In-person, trained interviewer administered questionnaire (~45 minutes)
- Survey domains:

Results

Accrual

51 cases and 104 controls

42 pairs post hoc matched by:

- Sex
- Ethnicity (Hispanic, Non-Hispanic)*
- Age (18–HDUV•HDUV

*67% of the study population self-identified as Hispanic

[redacted]t

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Positive Associations

- Lower socioeconomic status
-

Inverse Associations

- Hypercholesterolemia [0.11 (0.02–@
- Aspirin use [0.31 (0.11–@
- Statin use [0.03 (0–@
- Omega-3/fish oil use [0.10 (0.01–@
- Peanut butter consumption [0.88 (0.79–@

Conclusions

- Aflatoxin serum markers and evidence of HCV infection were strongly associated with increased risk
- Lower SES , and increased

Conclusions (continued)

- Strengths

  Incident HCC cases (pre-systemic treatment)

  In-person in-depth interviews by trained observers

  Highly sensitive aflatoxin biomarker assessment

- Limitations

  Very crude dietary assessment (12-month recall)

  Potential selection bias:

  - Clinical convenience sample of cases (UTHSCSA referrals)

  Relatively small sample size

This study provided strong evidence that aflatoxin exposure is a risk factor in the U.S.

Aflatoxins

Global Differences in HCC Risk Factors

- Developing countries:
  - Hepatitis B virus (HBV) infection
  - Environmental factors:
    - Dietary exposure to mycotoxins
- Developed countries:
  - Hepatitis C virus (HCV) infection
  - Obesity
  - Diabetes
  - Environmental factors
    - Excessive alcohol consumption
    - Mycotoxins?

Thank you