

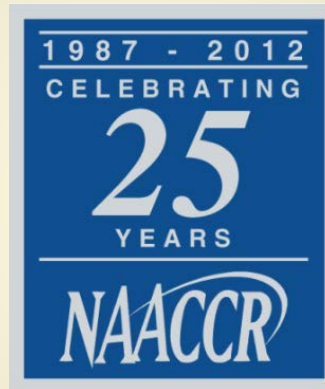
The Real Cancer Problem in Hinkley

John W. Morgan, DrPH, CPH^{1,2}

Mark E. Reeves, MD, PhD²

¹Loma Linda University (LLU) School of Public Health
Dept. Epidemiology, Biostatistics & Population Medicine

²Loma Linda University Cancer Center



Annual NAACCR Conference

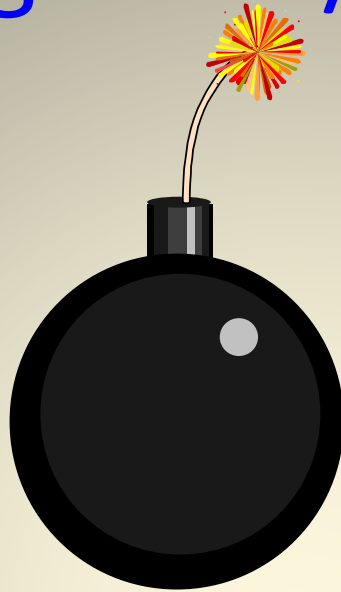
Portland, Oregon

Section D: Analytic Epidemiology II

10:45 – 12:15 am

June 6, 2012

Background/Problem:



Since the mid-1990s, staff in the Desert Sierra Cancer Surveillance Program (DSCSP) have monitored cancer occurrence in the Hinkley Census Tract of San Bernardino County in response to concerns about a potential cancer excess.

Findings released by the DSCSP in 1997 and in 2000 failed to identify an excess in the occurrence of cancer in the Hinkley Tract.

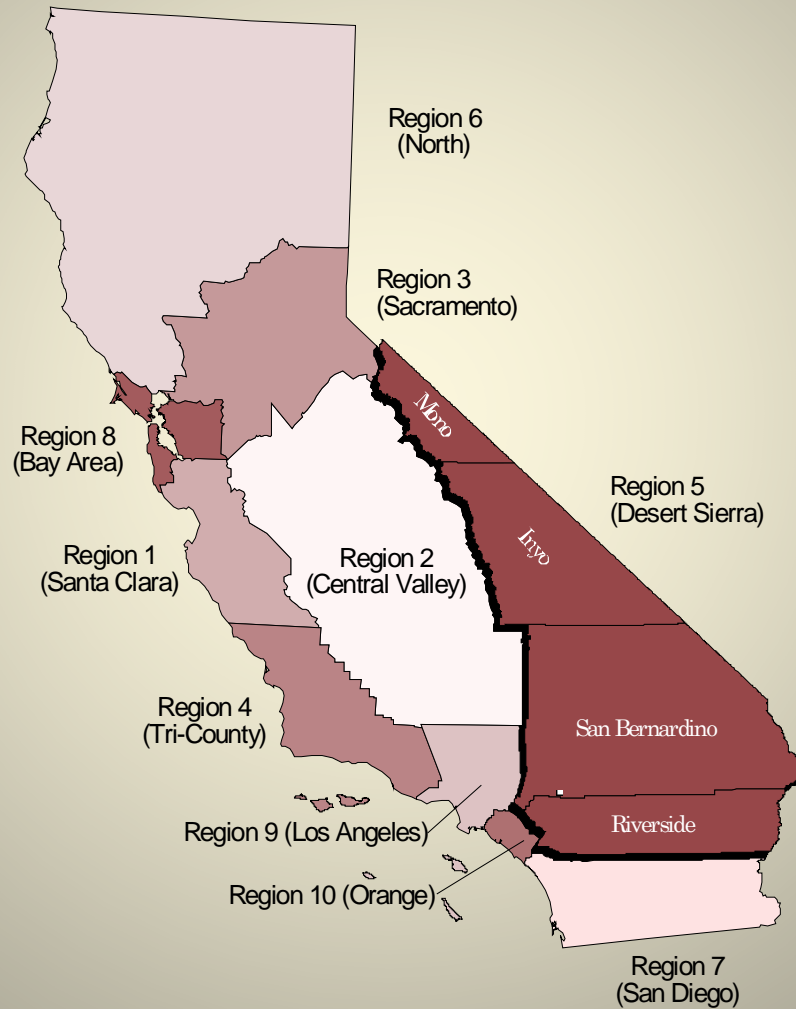
Background/Problem:

In spite of the absence of evidence of a cancer excess in Hinkley ...

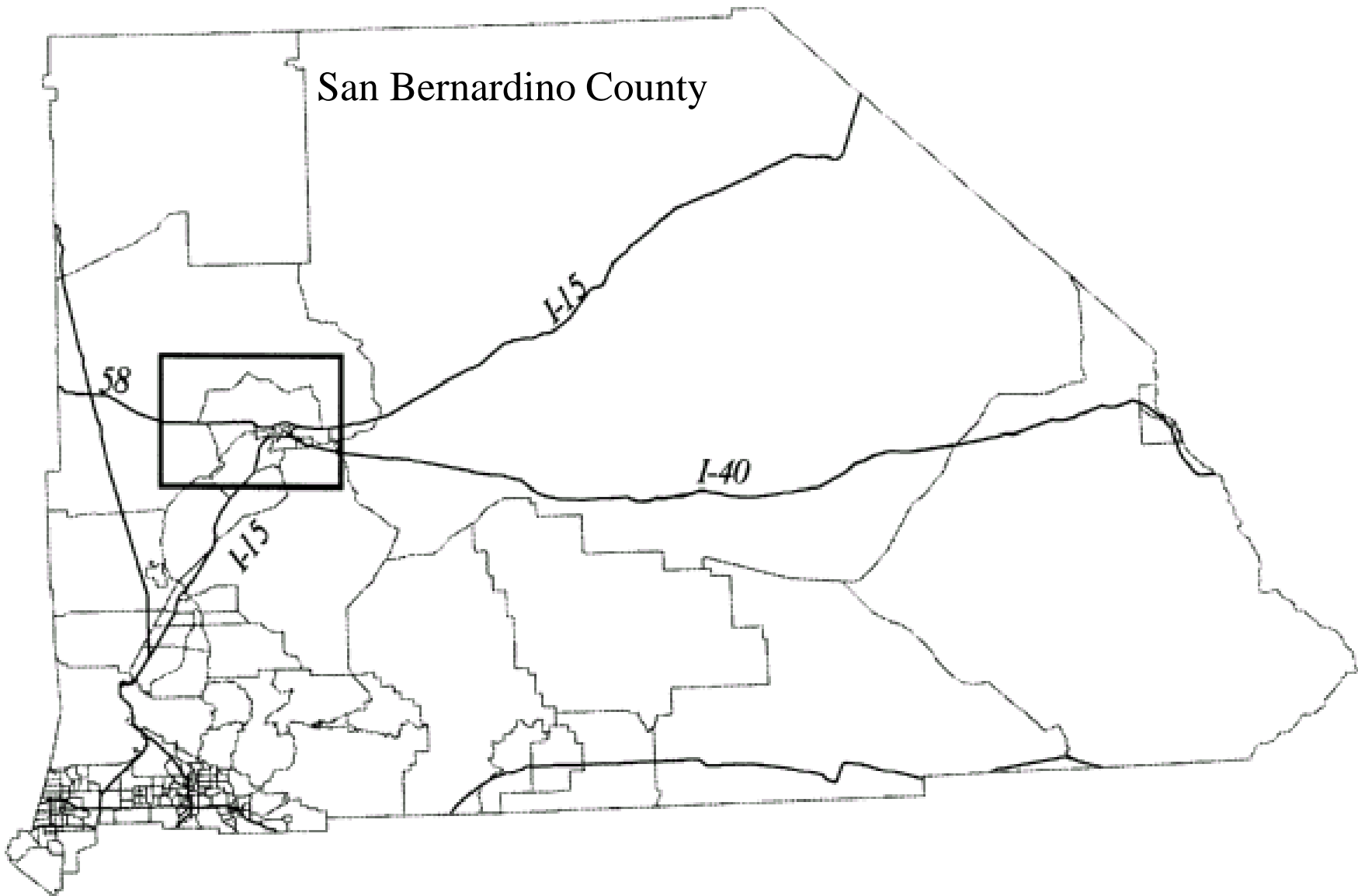


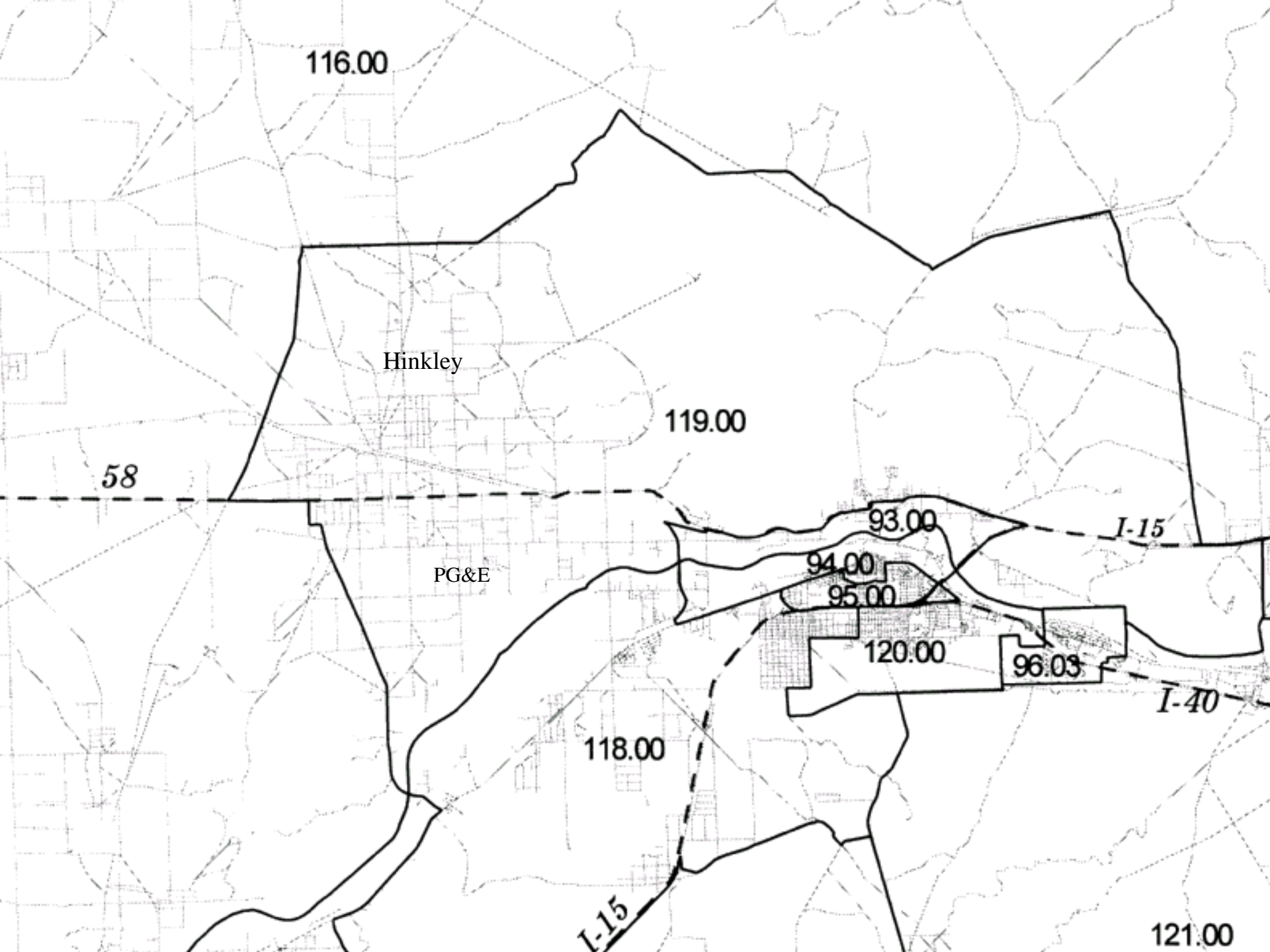
“I would like to thank the academy”

Regions forming the California Cancer Registry



San Bernardino County





116.00

Hinkley

119.00

58

PG&E

93.00

I-15

94.00

95.00

120.00

96.03

I-40

118.00

I-15

121.00



PIPELINE OPERATIONS

HINKLEY DISTRICT



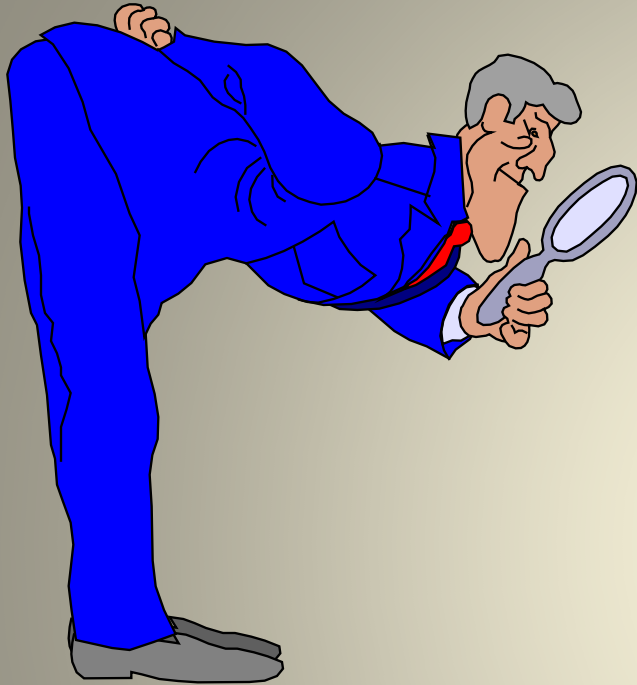




Inhaled Cr[VI] powder is accepted as a carcinogen, while the role of aqueous Cr[VI] as a human carcinogen has been challenged. Aqueous Cr[VI]_{aq} exists in equilibrium with Cr[III]_{aq}, with the valence state determined by pH and other dissolved minerals.

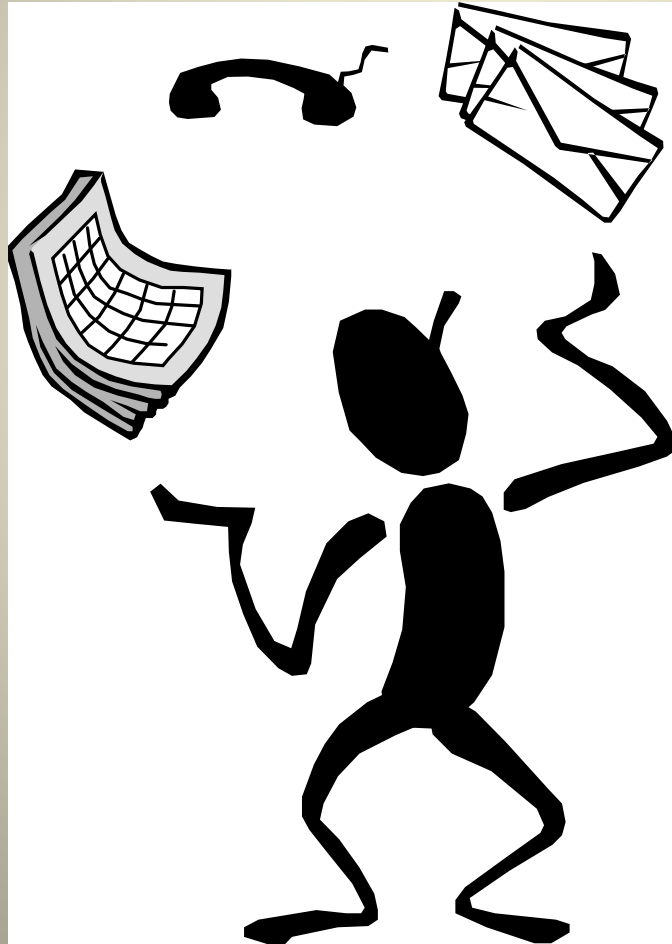
Ingested Cr[VI] is reduced to Cr[III] in saliva, blood, and the stomach; Cr[III] is essential for glucose metabolism and is an ingredient in multiple vitamin supplements that include minerals

Hypothesis:



H_A : The number of new invasive cancer cases in Census Tract 119.00 (Hinkley) will exceed the number of cases expected for the demographic configuration of the tract during 1996-2008.

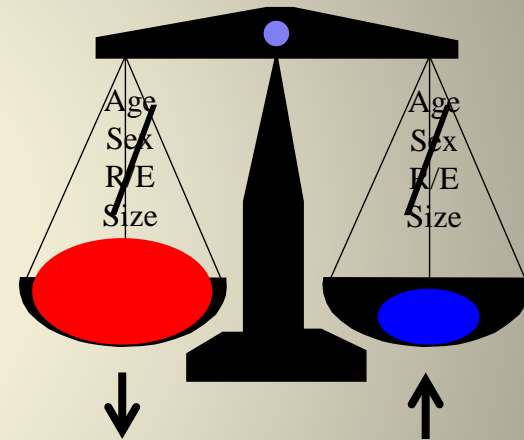
Methods:



The *Standardized Incidence Ratio (SIR)* was used to evaluate the ratio of *Observed* to *Expected* new cancer cases in census tract 119.00 for 1996-2008, balancing the effects of age, sex, race/ethnicity, and population size.

$$SIR = \frac{\text{Unique (Hinkley) Observed Cases}}{\text{Expected Cases Average (DSCSP)}}$$

Age Sex R/E Size	Tract 119.00 measured in 2000 Census
Age Sex R/E Size	DSCSP 1996-2008



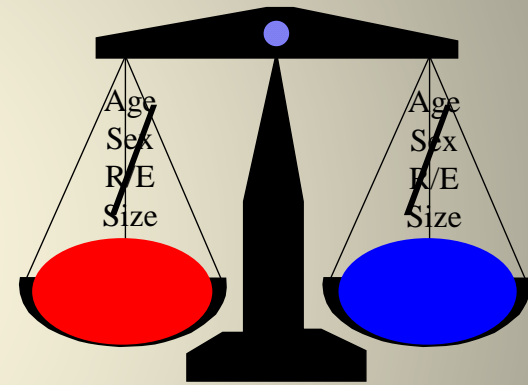
SIR > 1: Observed Count Greater Than Expected Count

The *Standardized Incidence Ratio (SIR)* was used to evaluate the ratio of *Observed* to *Expected* new cancer cases in census tract 119.00 for 1996-2008, balancing the effects of age, sex, race/ethnicity, and population size.

$$SIR = \frac{\text{Observed Cases}}{\text{Expected Cases}}$$

Unique (Hinkley)
Observed Cases
Expected Cases
Average (DSCSP)

Age	Tract 119.00
Sex	measured in
R/E	2000 Census
Size	
Age	DSCSP
Sex	1996-2008
R/E	
Size	



SIR > 1: Observed Count Greater Than Expected Count

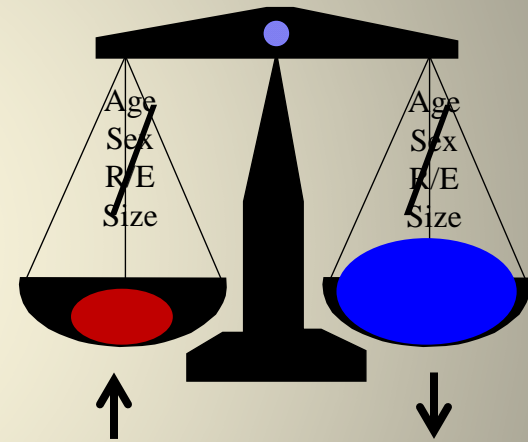
SIR = 1: Observed Count Same As Expected Count

The *Standardized Incidence Ratio (SIR)* was used to evaluate the ratio of *Observed* to *Expected* new cancer cases in census tract 119.00 for 1996-2008, balancing the effects of age, sex, race/ethnicity, and population size.

$$SIR = \frac{\text{Observed Cases}}{\text{Expected Cases}}$$

Unique (Hinkley)
Observed Cases
Expected Cases
Average (DSCSP)

Age	Tract 119.00
Sex	measured in
R/E	2000 Census
Size	
Age	DSCSP
Sex	1996-2008
R/E	
Size	



SIR > 1: Observed Count Greater Than Expected Count

SIR = 1: Observed Count Same As Expected Count

SIR < 1: Observed Count Less Than Expected Count

Results:

Table 3. Numbers of observed and adjusted expected new invasive cancers, SIRs, and 95 percent confidence interval limits for SIRs for all cancers and for selected cancer types - Hinkley Tract 1996-2008.

Cancer Site	Observed	Adjusted Expected	SIR	95% CI for SIR
All cancer Sites (combined)	196	216.42	0.91	0.78, 1.04
Nasopharynx (nasopharyngeal ca)	0	0.21	<1	undefined
Respiratory	38	32.97	1.15	0.82, 1.72
Lung & bronchus	34	30.12	1.13	0.78, 1.58
Digestive	29	40.55	0.72	0.48, 1.03
Pancreas	0	5.00	<1	undefined *
Prostate gland	22	34.11	0.65	0.40, 0.98 *
Cervix uteri	7	2.48	2.83	1.12, 5.86 *
Childhood cancer (age <20)	5	2.44	2.05	0.65, 4.82
Esophagus & stomach	7	5.21	1.34	0.53, 2.79
Hematopoietic system	20	16.86	1.19	0.72, 2.04
Thyroid gland	<5	<5	0.34	<0.10, 1.97
Oral cavity & oropharynx	<5	>5	0.38	<0.10, 1.38
Urinary bladder	5	9.25	0.54	0.17, 1.27
Cutaneous melanoma	6	9.81	0.61	0.22, 1.34
Brain & other nervous system	<5	<5	0.68	<0.10, 2.49
Liver & intrahepatic bile ducts	<5	<5	0.74	<0.10, 2.73
Breast	27	34.52	0.78	0.51, 1.14
Intestine (SI, CRC, & R/S JX)	18	22.71	0.79	0.47, 1.26
Kidney & renal pelvis	5	5.30	0.94	0.30, 2.22

Results continued:

The SIR for colorectal cancer (CRC) cases was **0.87**, although **33%** of the cases in the Hinkley Tract were diagnosed at advanced stage, compared to **18%** in the county, region, and statewide

Conclusions/Discussion:

No evidence of a generalized cancer excess was detected in the Hinkley Tract for 1996-2008. This is consistent with three previous cancer assessments extending back to 1988 and is now enlarged to include childhood cancer and 18 cancer site groups

Evidence of deficits in the number of:

- A. digestive system cancers**, including **pancreatic cancer**, and of
- B. prostate cancer**

Evidence of the need to promote screening for prevention and early detection of cancer of the:

- A. *Cervix uteri***
- B. Colon and Rectum**

in remote desert communities like Hinkley

*Thank You
For Your Attention*



NAACCR

I would like to thank ~~the academy~~
for the opportunity to present these findings.