Public Health Response to Reported Concerns About Cancer

Cyrus Rangan, M.D., F.A.A.P., F.A.C.M.T.

Marita Santos, R.N., M.S.N.

Investigating a Reported "Cluster"

1. Gather background information
2. Administer survey
3. Review scientific literature
4. Consult Cancer Registry
5. Determine whether true cluster exists

Malibu High School

33 COMPLETED SURVEYS

- 27 Current Staff + 6 Retired Staff
- Age Range: 30-75 years old
- Ethnicity: 91% Caucasian, 3% Latino &
  6% African American
- Few reports of a cancer diagnosis, consisting of different types of cancers

Cabrillo Elementary School

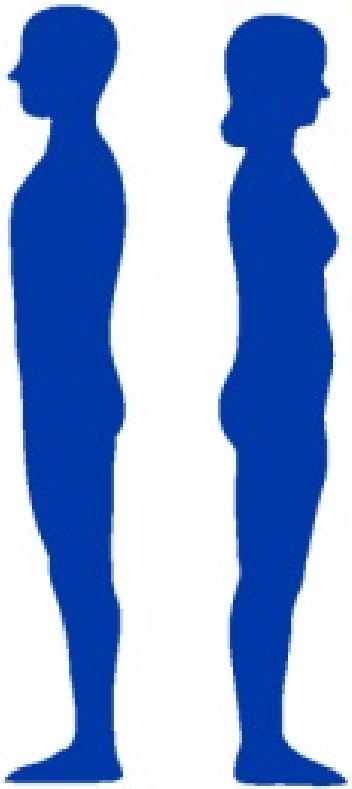
11 COMPLETED SURVEYS

- 10 Current Staff + 1 Retired Staff
- Age Range: 40-77 years old
- Ethnicity: 91% Caucasian and 9% Latino
- Few reports of a cancer diagnosis, consisting of different types of cancers

Thyroid Cancer

- 1% of all cancers in the U.S.
- Incidence rates 2 to 3 times higher in women. (45,000 out of 60,000 per year, and increasing)
- Within “thyroid cancer” there are many variants: (papillary, follicular, medullary, anaplastic)
- Higher rates seen in:
  - Iceland
  - Hawaii
  - Philippines (also Filipino immigrant population)

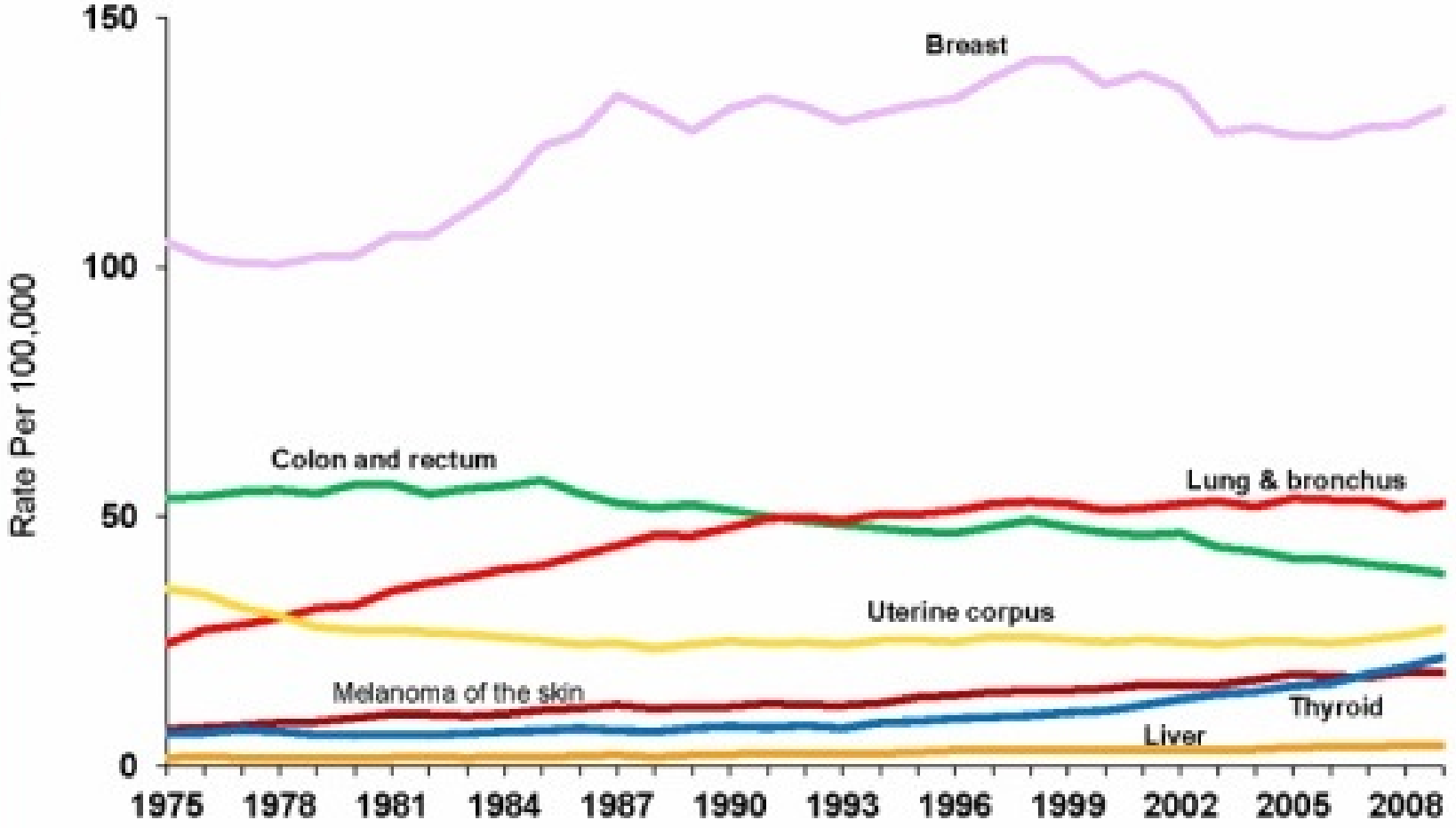
Estimated New Cancer Cases* in the US in 2013

		Men 854,790	Women 805,500		
Prostate	28%			29%	Breast
Lung & bronchus	14%			14%	Lung & bronchus
Colon & rectum	9%			9%	Colon & rectum
Urinary bladder	6%			6%	Uterine corpus
Melanoma of skin	5%			6%	Thyroid
Kidney & renal pelvis	5%			4%	Non-Hodgkin lymphoma
Non-Hodgkin lymphoma	4%			4%	Melanoma of skin
Oral cavity	3%			3%	Kidney & renal pelvis
Leukemia	3%			3%	Pancreas
Pancreas	3%			3%	Ovary
All Other Sites	20%			19%	All Other Sites

*Excludes basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder.

Source: American Cancer Society, Cancer Facts & Figures "Cancer Statistics 2013"
http://www.cancer.org/research/cancerfactsstatistics/cancerfactsfigures2013/index

Cancer Incidence Rates* Among Women, US, 1975-2009



*Age-adjusted to the 2000 US standard population and adjusted for delays in reporting.
Source: Surveillance, Epidemiology, and End Results Program, Delay-adjusted Incidence database: SEER Incidence Delay-adjusted Rates, 9 Registries, 1975-2009, National Cancer Institute, 2012.

Risk Factors for Thyroid Cancer

- High-dose exposure to ionizing radiation:
  - Radiation treatment for medical conditions or dental work
- Iodine Deficiency
- Obesity
- Family history

Risk Factors for Thyroid Cancer

- History of thyroid conditions:
  - Goiter
  - Benign thyroid nodules/adenomas
  - Thyroiditis/Hashimoto's Thyroiditis
  - Cowden Disease

California Teachers Study

- Cohort of active and retired female teachers and administrators, 1995-2008 (n=117,646)

- Increased risk of thyroid cancer for:
  - Later menses (≥14 years)
  - Longer menstrual cycles (>30 days)
  - Recent pregnancy (within past 5 years)

Defining *Cancer*

Context with other diseases

- Different infections have different causes and different courses of treatment

- Different types of cancer diagnoses have:
  - Different causes
  - Different courses of treatment
  - Different rates of occurrence
  - Different chances for survival

Facts About Cancers

- Cancers are a group of more than 100 diseases characterized by uncontrolled growth and spread of abnormal cells

- The term *cancer* has been used to describe all of these diseases, leading to the viewpoint of cancer as a single disease

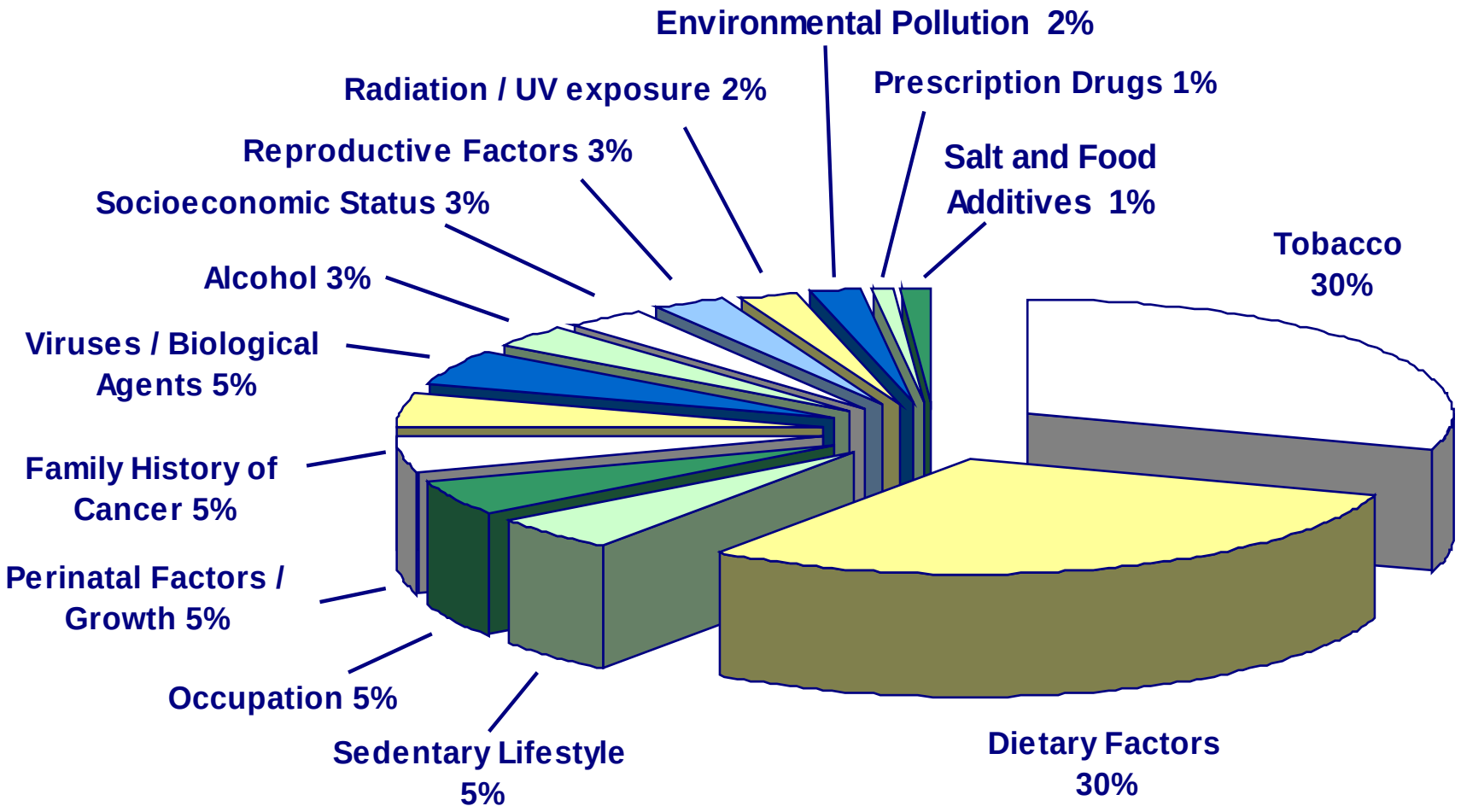
Facts About Cancers

- Cancers are more common than most people realize
  - Cancers are now the leading cause of death in the U.S. in people under age 80
  - Approx. 30-40% of Americans will get a cancer at some point in their lives
  - Cancers will strike 3 out of 4 families

Facts About Cancers

- Diagnosis of a cancer increases with age and medical care advances
  - More Americans are leading longer and healthier lives, and surviving into their later years, so we expect to see more cancers in our rapidly aging population
  - Increased awareness, screening, and development of diagnostic techniques contribute to increased incidence and prevalence of some cancers

Causes of Cancer in the U.S.



Source: Harvard Report on Cancer Prevention, 1996

What is a Cancer Cluster?

- A *cancer cluster* is the occurrence of a greater than expected number of cases of cancer within a group of people, a geographic area, or a period of time

Source: National Cancer Institute

Perceived Cancer Cluster

- What the public *perceives* is a cluster of cancer is different from how scientists define it

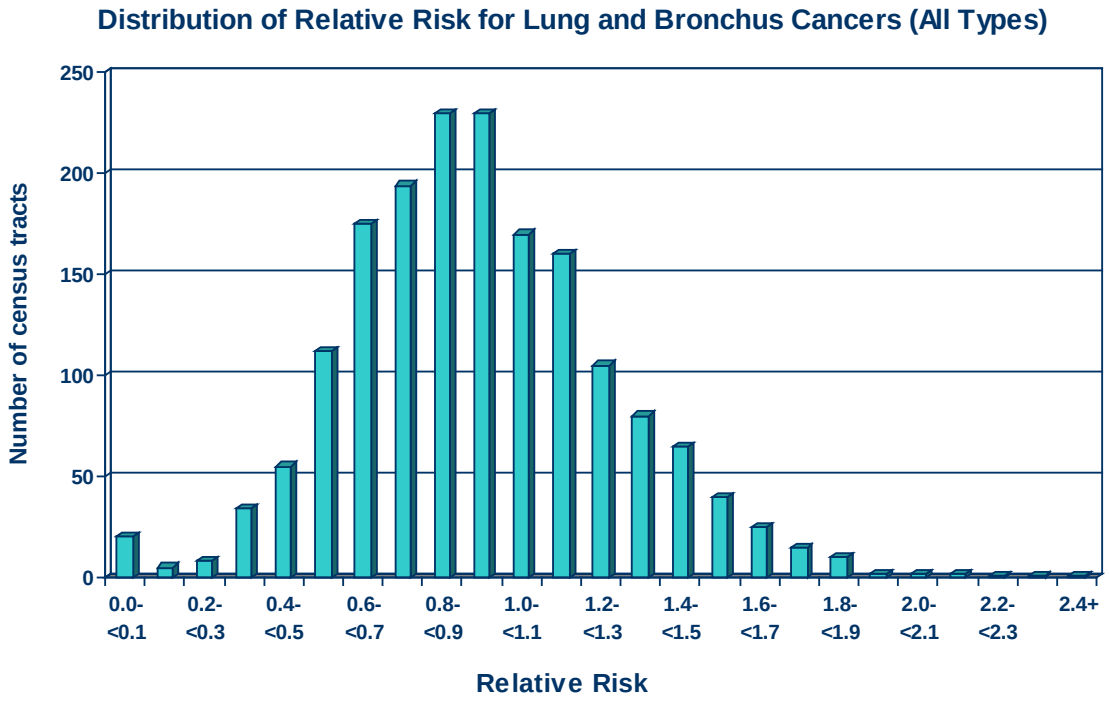
- A community's perception may reflect an elevated rate of cancer, or it may not

Cluster Characteristics

- People living in the same area may have commonalities based on where they live.

- Examples:
  - Non-Hodgkin's lymphoma in West Hollywood
  - Breast cancer in Beverly Hills
  - Stomach cancer in East Los Angeles, Koreatown and Chinatown

Comparing Cancer Rates



Addressing Concerns

- Cancer clusters are a real phenomenon.
- However, 85% of reported *cancer clusters* show no actual elevations in cancer rates
- They only appear to be clusters because of common misconceptions about cancers

Misconceptions

- People have a tendency to see patterns in random events
- Truly random patterns often don’t appear random to us
- “Law of Small Numbers”
- “Texas Sharpshooter Fallacy”

Criteria for a Cancer Cluster

- 10-1,000 times higher rate of cancer
  - E.g. Leukemia & radiation from Chernobyl
- Rare type of cancer
  - E.g. Mesothelioma & asbestos
- Cancer seen in new age group
  - E.g. Cervical cancer & diethylstilbestrol (DES)

What does this mean for Malibu?

- Common cancers
- Common age groups
- No evidence of meaningful cluster in Malibu vicinity

Papillary Carcinoma of the Thyroid

Figure 9: Map of census tracts at high risk.

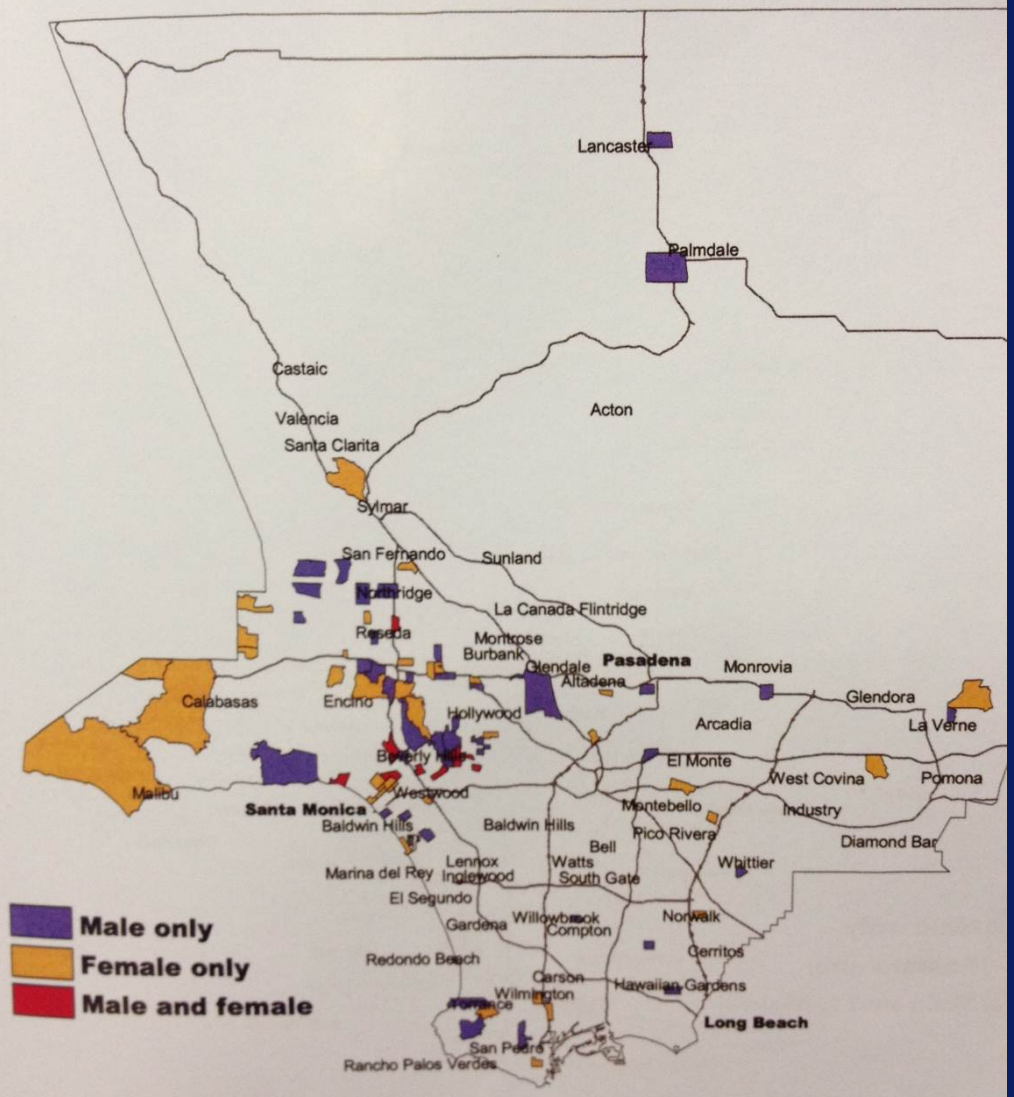
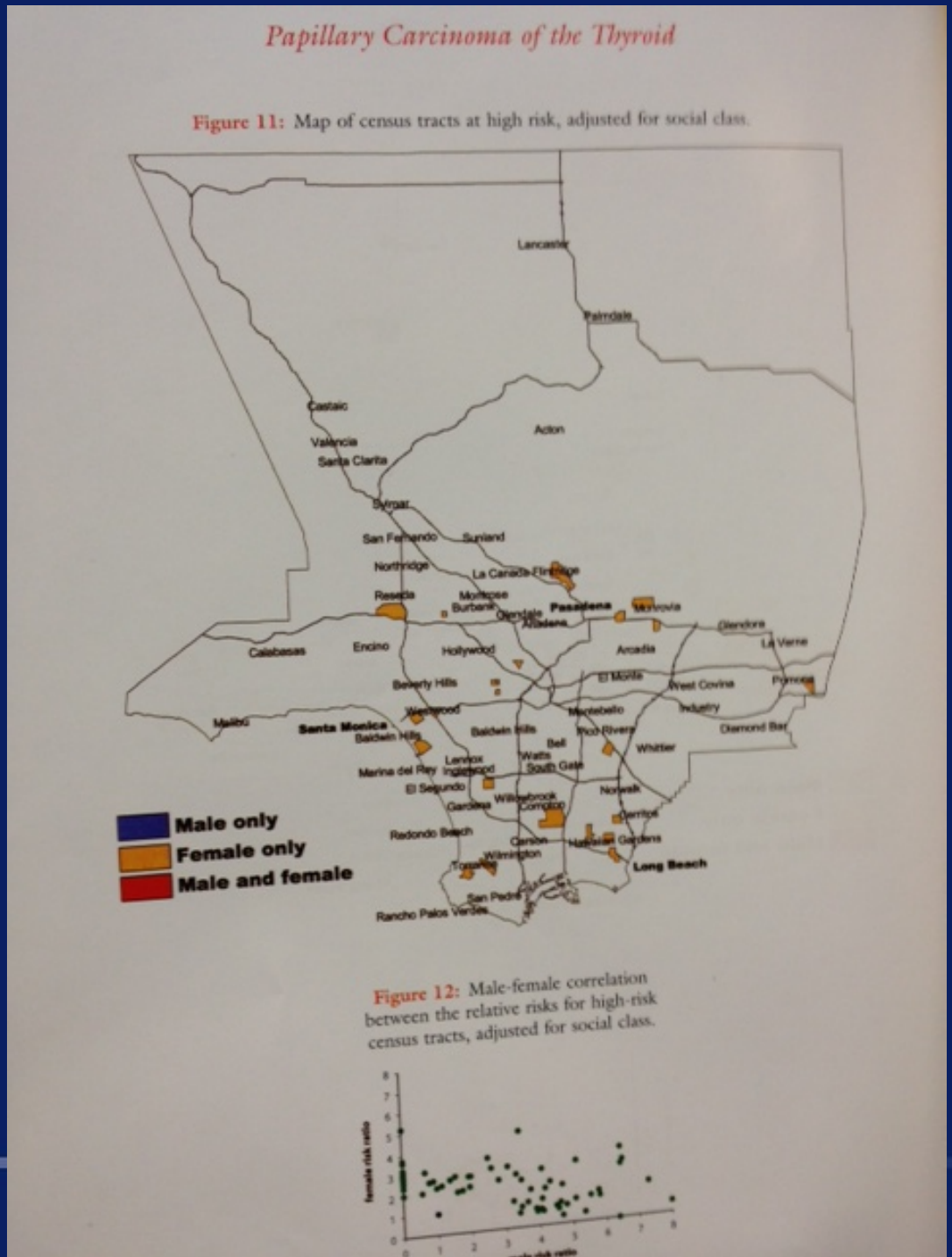


Figure 10: Male-female correlation between the relative risks for high-risk census tracts.

Map of Census Tracts at High Risk in L.A. County

Source: Cancers in the Urban Environment, Mack, T., 2004



Map of Census Tracts at High Risk in L.A. County, adjusted for Social Class

Source: Cancers in the Urban Environment, Mack, T., 2004

Environmental Link to Cancer?

- Numerous substances have been identified by scientific agencies as potential carcinogens
- May be responsible for any individual's cancer
- Despite lack of a cluster, it is still difficult to tie any individual's cancer diagnosis to an environmental source

Environmental Link to Cancer?

- If you have mesothelioma, there is virtually a 100% chance that asbestos is the cause
- If you have cervical cancer, there is a very high chance that HPV is the major cause
- For most other cancers, the causes are multifactorial

Environmental Link to Cancer?

- Known human carcinogens: asbestos, arsenic, benzene, ionizing radiation, inhaled hexavalent chromium, vinyl chloride
- Circumstances of exposure influence the contribution of these factors

Environmental Link to Cancer?

- Known: *sufficient evidence of carcinogenicity* in humans
- Probable: *limited evidence of carcinogenicity* in humans and *sufficient evidence of carcinogenicity* in experimental animals
- Possible: *limited evidence of carcinogenicity* in humans and less than *sufficient evidence of carcinogenicity* in experimental animals, or *inadequate evidence of carcinogenicity* in humans but there is *sufficient evidence of carcinogenicity* in experimental animals

What about PCBs?

- PCBs “upgraded” from probable to known in March 2013
- Based on epidemiological association between PCB exposure and increased risk of melanoma in humans. Limited evidence from small studies suggesting increased risks of non-Hodgkin lymphoma and breast cancer
- Liver cancer in rats

What about PCBs?

- Most consistent human disease finding with PCB exposure is chloracne
- More research is needed on PCBs to determine potential human impact

Should I be worried about PCBs at Malibu?

- Studies are based on plausible mechanisms of exposure (ingestion) and potential accumulation of PCBs over time

- Chronic inhalation in workers associated with respiratory tract symptoms, such as cough and tightness of the chest, gastrointestinal effects including anorexia, weight loss, nausea, vomiting, and abdominal pain, mild liver effects, and effects on the skin and eyes, such as chloracne, skin rashes, and eye irritation

Should I be worried about PCBs at Malibu?

- Environmental testing at Malibu has revealed the presence of PCBs in caulking
- Lack of data to determine contribution to overall PCB exposure

Should I be worried about PCBs at Malibu?

- Link between PCB exposure to human disease at Malibu can not and should not be determined by environmental testing

- Testing begets testing. Good scientific methods suggest the need for endpoints

Should I be worried about PCBs at Malibu?

- DPH does not find evidence of unusual cancer rates or occurrences at Malibu

- DPH does not recommend further testing of the school environment to establish correlations with human disease

Contact Information

Los Angeles County Department of Public Health

Environmental Health

Toxics Epidemiology Program

Phone: (213) 738-3220

Email: tox@ph.lacounty.gov

Website:

http://publichealth.lacounty.gov/eh/TEA/ToxicEpi/index_ToxicsEpi.htm

References

- USC Cancer Registry/Los Angeles Cancer Surveillance Program http://uscnorriscancer.usc.edu/about/programs/la_county.html
- National Cancer Institute http://www.cancer.gov/
- California Teachers Study http://calteachersstudy.org/

Q & A

Causes of Cancer in the U.S.