ASSOCIATION OF METABOLIC SYNDROME WITH PROSTATE CANCER MORTALITY

By: Jessika Douglas and Jesse Valasek

Mentors: Dr. Maxine Chen, Dr. Kathryn Penney, Mr. Sam Peisch and Dr. Meir Stampfer

INTRODUCTION TO PROSTATE CANCER

- First off, what is a prostate?

- What is prostate cancer?

- Why did we look at the association of metabolic syndrome with prostate cancer mortality?

- Sparse literature on metabolic syndrome leading to prostate cancer mortality

http://worldartsme.com/images/physical-exam-logo-clipart-1.jpg
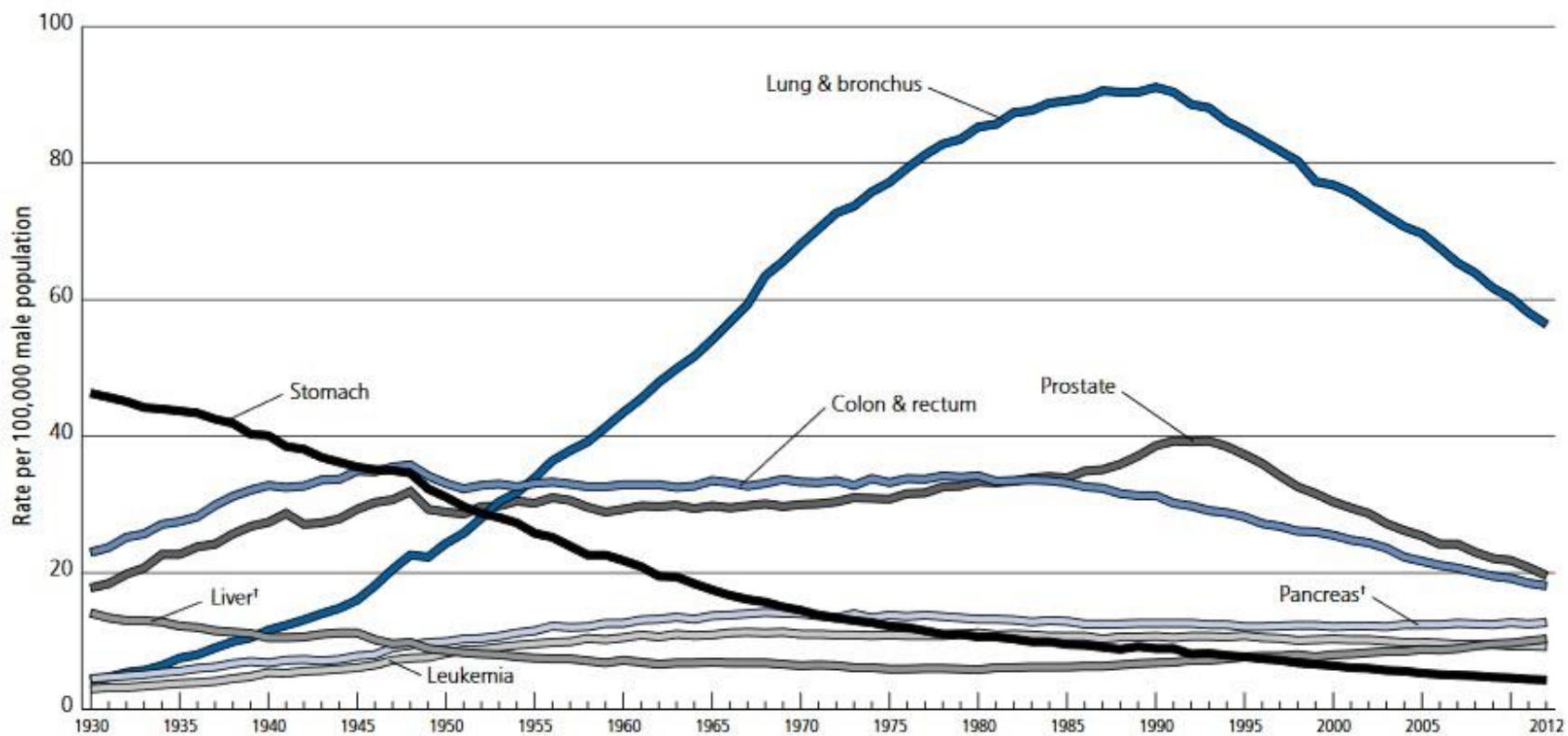
OVERVIEW OF PROSTATE CANCER

- New Cases:
  - Estimated 180,890

- Incidence Trends:
  - Significant prostate cancer spike

- Deaths:
  - 26,160 – 2nd leading cause
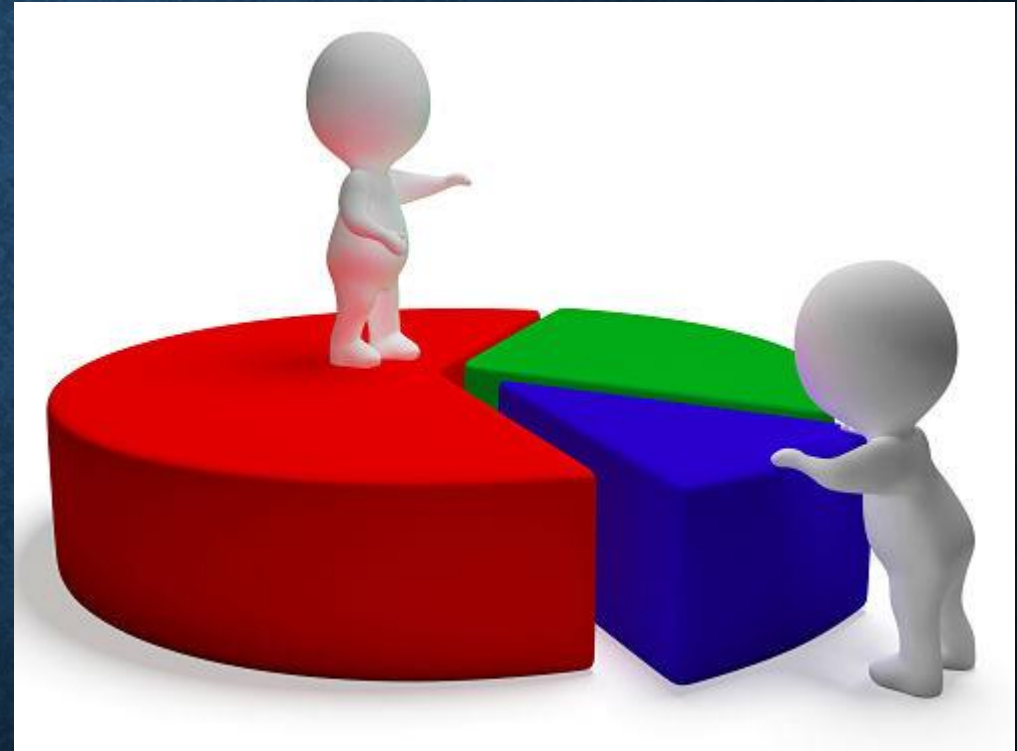
http://datascienceslab.net/wp-content/uploads/2015/11/datasciences5_opt.jpg

OVERVIEW OF PROSTATE CANCER

Figure 1. Trends in Age-adjusted Cancer Death Rates* by Site, Males, US, 1930-2012

*Per 100,000, age adjusted to the 2000 US standard population. †Mortality rates for pancreatic and liver cancers are increasing.
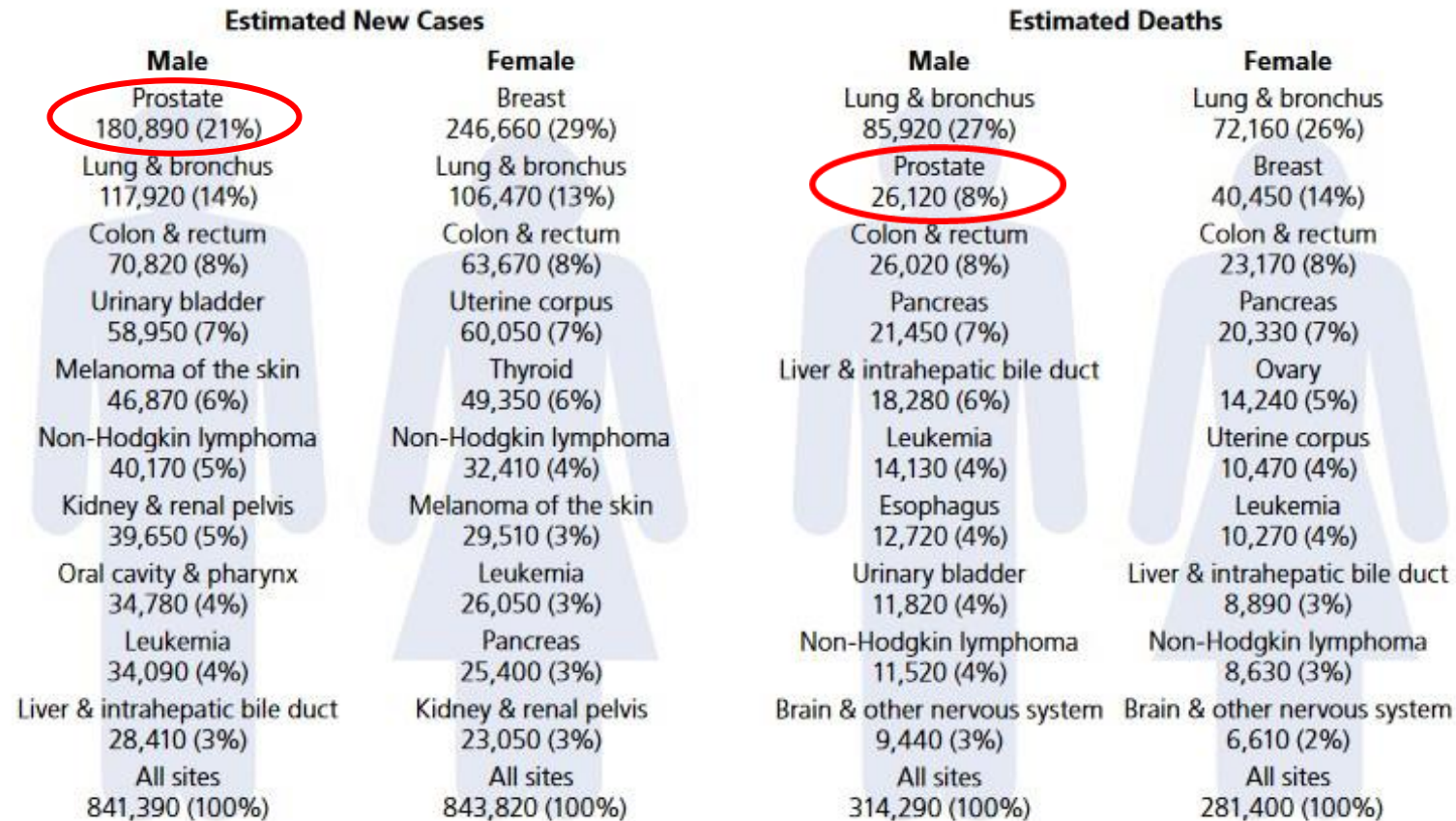
Note: Due to changes in ICD coding, numerator information has changed over time. Rates for cancers of the liver, lung and bronchus, and colon and rectum are affected by these coding changes.

Source: US Mortality Volumes 1930 to 1959 and US Mortality Data 1960 to 2012, National Center for Health Statistics, Centers for Disease Control and Prevention.

©2016, American Cancer Society, Inc., Surveillance Research

American Cancer Society

OVERVIEW OF PROSTATE CANCER

Figure 3. Leading Sites of New Cancer Cases and Deaths – 2016 Estimates

INTRODUCTION TO METABOLIC SYNDROME
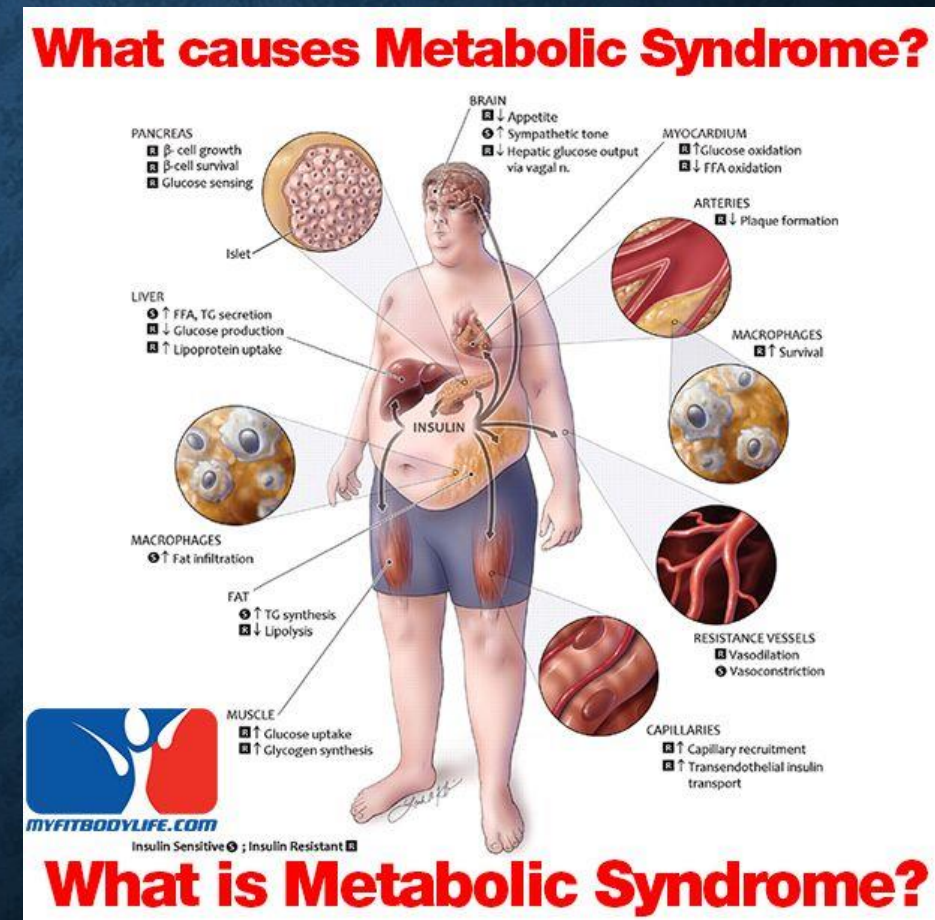
- What is metabolic syndrome?

- How is it related to prostate cancer?

SEARCH TERMS USED AND PAPER REQUIREMENTS

- Metabolic syndrome and lethal prostate cancer

- Metabolic syndrome + advanced prostate cancer

- Metabolic syndrome + high Gleason score

- Metabolic syndrome + metastatic prostate cancer

- Prostate cancer mortality and risk of prostate cancer

- Papers after year 2000

http://fscomps.fotosearch.com/compc/CSP/CSP992/k12516401.jpg

HAZARD RATIO AND GLEASON SCORE

- Hazard Ratio:
  - < 1 is positive or increased association
  - > 1 is negative or decreased association
  - If = 1, result is null
  - CI values must be on same side of 1
  - Ex. HR 1.4 CI (95%): 1.2-1.4 **significance**
  - Ex. HR 0.8 CI (95%):0.7-1.2 **no significance**
- Gleason Score:
  - Best predictor of prostate cancer outcomes

https://openclipart.org/download/237767/evaluatie-score.svg

STUDY #1

- Title: Waist circumference, waist-hip ratio, body mass index, and prostate cancer risk: Results from the North-American case-control study Prostate Cancer & Environment Study

- Study type: Case Control

- Methods: Men who are obese/higher BMI with PCa were compared to obese men w/o PCa

- Controls:1994

- Cases:1933

- Results: Excess risk of high-grade PCa (Gleason≥7) was associated with a WC ≥102 cm (OR = 1.47 [1.22–1.78]) and with a waist-hip ratio >1.0 (OR = 1.20 [1.01–1.43]). Men with a BMI≥30 kg/m^2 had a lower risk of PCa, regardless of grade. Restricting to subjects recently screened for PCa did not alter findings.

- Main Conclusion: Jesse will expand more on this at a layer point.

STUDY #2

- Title: Metabolic syndrome increases the risk of aggressive prostate cancer detection

- Study Type: Prospective Cohort

- Characteristics/Methods: Men with PSA (a prostate protein in the blood) level above 0.4mg and/or abnormal digital rectal exam were scheduled for a prostate biopsy. MetS defined from National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment for High Blood Cholesterol in Adults, Adult Treatment Panel 3 Definition. Tumor aggressiveness evaluated by biopsy Gleason score, clinical stage, and biochemical reoccurrence after primary treatment

- Cohort: 2408 men

- Cases with Pca:1552

- Cases with Pca that have MetS:856

- Results: High grade Pca rates (Gleason score 8-10) were 35.9% for men with MetS and Pca and 29.3% in men who only had Pca

HEALTH PROFESSIONAL FOLLOW UP STUDY

- **What is it?**

- An ongoing prospective cohort study of the causes of cancer and heart disease among 51,529 male US health professionals age 40-75 years at baseline.

- **How was it related to our research?**

- Study participants are sent a survey every 2 years to list any new medical diagnoses. Between 1993 and 1995, 18,018 HPFS participants provided a blood specimen prior to cancer diagnosis. Whole blood specimens were collected in tubes containing sodium EDTA and shipped by overnight courier while chilled.

DATA FROM HEALTH PROFESSIONAL STUDY 2016

- Methods: men from the Health Professional Follow-up Study were examined for having MetS and Prostate Cancer and subsequently compared.

- Total cases with Pca: 6993

- Lethal Cases of Pca:829

- Lethal Cases of Pca with MetS:218

- Main result: Men with Pca and MetS have a 22% decreased risk association from dying of prostate cancer compared to men without MetS, but have Pca.

http://images.clipartpanda.com/data-clipart-63637-basic-cmyk.jpg
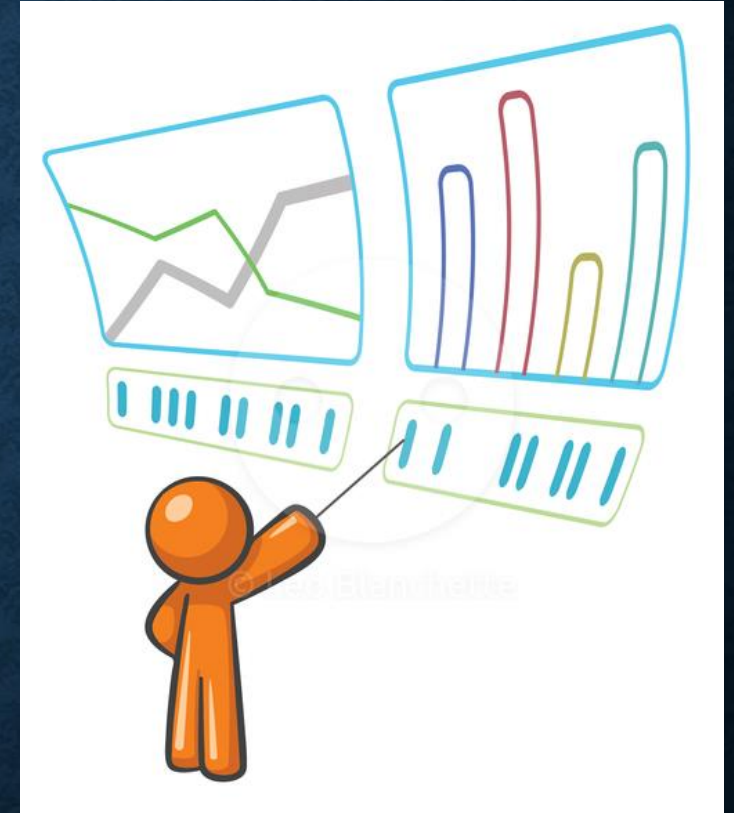
PERCENTAGE COMPARISON FROM HEALTH PROFESSIONAL FOLLOW-UP STUDY DATA 2016
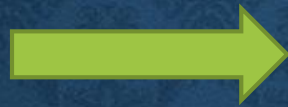
- 218/829=.263 or *26.3%* men who had MetS and died from Pca

- 611/829=.7370 or *73.70%* men who died only from Pca

- 6993-829=6164 men who did not die from Pca with or without having Pca

- Relative risk: 22%, less than 1 so is a decreased association

WHAT WE FOUND

Title of Study

- "Metabolic syndrome increases the risk of aggressive prostate cancer detection"

- "Waist circumference, waist-hip ratio, body mass index, and prostate cancer risk: Results from the North-American case-control study Prostate Cancer & Environment Study"

Findings

- Metabolic syndrome not associated with increased risk of prostate cancer detection but associated with risk of aggressive tumors.

- Elevated BMI associated with lower risk of prostate cancer, but reverse effect occurred when abdominal obesity was adjusted for BMI.

WHAT WE FOUND

- Metabolic Syndrome does not directly associate to prostate cancer mortality

- Metabolic syndrome and metabolic indicators can be associated with an increased risk of prostate cancer.

© Can Stock Photo

http://cdn.xl.thumbs.canstockphoto.com/canstock12835792.jpg

OUR TAKEAWAY

- More data needed for true confirmation

- A surprising find of MetS as an association with lower risk of death for men with prostate cancer

http://cliparts.co/cliparts/8iz/rMo/8izrMoerT.jpg

CONCLUSION

- Men with MetS are less likely to develop prostate cancer than those without, but having MetS can lead to an increased risk of prostate cancer.

- Men with MetS have a **22% decreased** risk of association for dying from prostate cancer than men without MetS

http://worldartsme.com/images/presentation-man-clipart-1.jpg

REFERENCES

American Cancer Society. (2014, October 10th). Understanding Your Pathology Report: Prostate Cancer. Retrieved from http://www.cancer.org/treatment/understandingyourdiagnosis/understandingyourpathologyreport/prostate pathology/prostate-cancer-pathology

Boehm, K., Sun, M., Larcher, A., Blanc-Lapierre, A., Schiffmann, J., Graefen, M., & ... Karakiewicz, P. (n.d). Waist circumference, waist-hip ratio, body mass index, and prostate cancer risk: Results from the North-American case-control study Prostate Cancer & Environment Study. Urologic Oncology-Seminars And Original Investigations, 33(11) http://dx.doi.org.proxy-remote.galib.uga.edu/10.1016/j.urolonc.2015.07.006

Morote J, Ropero J, Planas J, Bastarós JM, Delgado G, et al. (2012). Metabolic syndrome increases the risk of aggressive prostate cancer detection. *Urological Oncology.* 111(7).1031-6. doi: 10.1111/j.1464-410X.2012.11406.x.