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# Analysis of Metabolic Syndrome as a Modifiable Risk Factor for Prostate Cancer

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## Abstract


- Prostate cancer and metabolic syndrome are both prevalent among men in developed countries with peak incidence after age 50.
- Prostate cancer has no known modifiable risk factors.
- Most risk factors for metabolic syndrome are modifiable.
- If metabolic syndrome is identified as contributing to the risk of prostate cancer it would give an element of self determination to men at risk for prostate cancer.
- Past studies provide conflicting results in the correlation between these two conditions.
- A literature review was performed to evaluate consistencies in current literature.
- Metabolic syndrome or its components do not increase the risk of developing overall prostate cancer.
- Metabolic syndrome does increase mortality from prostate cancer.
- Men with metabolic syndrome are found to have higher grades of disease upon diagnosis of prostate cancer


## Introduction

- Risk factors for prostate cancer include only: age, race and family history.
- In the US 180,000 new cases of prostate cancer and 26,000 deaths per year.
- Low sensitivity of screening tests leads to unnecessary procedures and complications.
- Clinically insignificant cancer is often diagnosed on autopsy.
- Risk factors for metabolic syndrome include high fat low fiber diet and sedentary lifestyle among others.
- Metabolic syndrome is defined as having 3 oft of 5 abnormal: Triglycerides, serum glucose, HDL, blood pressure and weight.

## Statement of the Problem

- Both conditions are found in similar cohorts.
- Metabolic syndrome has been proven modifiable through lifestyle modification while Prostate Cancer is unavoidable.
- Past literature makes differing conclusions on the correlation between the two.

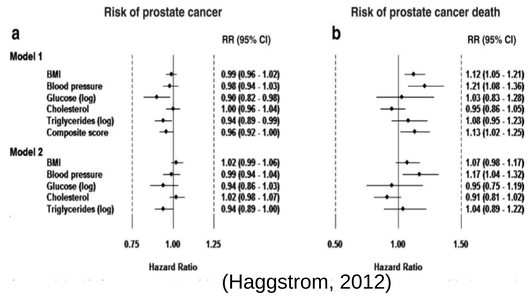
## Research Question

- Are men with a diagnosis of metabolic syndrome at increased risk for developing prostate cancer compared to men without.?
  - Prostate cancer is defined as overall cases.
  - No differentiation is made between high and low grade cancer based of Gleason score or presence of symptoms.
- Do any of the individual components of metabolic syndrome increase the risk for developing prostate cancer?
  - Metabolic syndrome components include
    - Above normal serum triglyceride levels
    - Above normal serum glucose levels
    - Below normal serum HDL
    - Elevated blood pressure
    - Above normal weight

## Literature Review

- Metabolic syndrome does not increase the risk of developing cancer. Diabetes may be protective against developing prostate cancer (Wallner, 2010).
- There is no significant correlation found between metabolic syndrome and prostate cancer (Lawrence,2012).
- No individual components of metabolic syndrome or any composite grouping of them increase the risk of prostate cancer, increased mortality found (Haggstrom, 2012).
- Metabolic syndrome specifically including hypertension increased the risk of prostate cancer. Hypertension alone does not increase risk, metabolic syndrome without hypertension does not increase risk (Radisauskas, 2016).
- Hypertension does increase the risk of overall prostate cancer (Liang, 2016).
- Men with metabolic syndrome have greater risk of high grade prostate cancer than those without (Zhang, 2015)
- No individual component of metabolic syndrome increases the risk of prostate cancer (Bhindi, 2014).
- Men with metabolic syndrome have higher grades of disease upon prostate biopsy (De Nunzio, 2011).
- One metabolic syndrome component was protective against prostate cancer, 2 or more components were associated with higher grades of cancer on diagnosis (Sourbeer, 2014).

## Results




(Haggstrom, 2012)

- This figure is a graphical representation of the relationship between metabolic syndrome components and both overall prostate cancer and death from prostate cancer.
- Model 1 Corrected for random error using the regression dilution ratio.
- Model 2 corrected for random error using regression calibration.
- Composite score is as compilation of the z scores calculated for each individual component.

## Discussion

- Due to inconsistencies in the definition of metabolic syndrome, cross study comparisons must be qualitative which leads to inaccuracies.
  - For example one study will classify hypertension by blood pressure measurement while others use a prescription of antihypertensive medication to define it.
- The strongest evidence available indicates no positive correlation between metabolic syndrome as a whole and overall prostate cancer.
- Studies indicating individual components of metabolic syndrome increase the risk of prostate cancer have weaknesses which undermine their results, coupled with weak statistical correlations.
- Good quality evidence supports a correlation between the number of metabolic components a man has and the grade of prostate cancer he has upon diagnosis.
  - This is further supported by strong evidence for increased mortality from prostate cancer among men with metabolic syndrome or components.
- Further analysis is needed to investigate the degree to which diabetes is protective against prostate cancer.

## Applicability to Clinical Practice

- Practitioners should not alter their practice from established guidelines to screen for prostate cancer in the presence of metabolic conditions.
- Current prostate cancer screening guidelines.
  - American College of Physicians
    - Shared decision making age 50-60 with >15 years of life expectancy.
  - American Cancer Society
    - Shared Decision Making at age 50 for men of average risk.
- Providers should be mindful that men with metabolic disorders will likely have more advanced prostate cancer when diagnosed than men without.
- Be mindful of the of the importance of preventative medicine when caring for patients with complex medical histories.
- Prostate cancer screening requires shared decision making. Knowledge of advanced disease should be part of the conversation about screening.

## References


- Wallner, L. P., Morgenstern, H., McGree, M. E., Jacobson, D. J., St. Sauver, J. L., Jacobsen, S. J., & Sarma, A. V. (2011). The effects of metabolic conditions on prostate cancer incidence over 15 years of follow-up: Results from the olmsted county study. *BJU International, 107*(6), 929-935. doi:10.1111/j.1464-410X.2010.09703.x
- Lawrence, Y. R., Morag, O., Benderly, M., Boyko, V., Novikov, I., Dicker, A. P., . . . Wolf, I. (2013). Association between metabolic syndrome, diabetes mellitus and prostate cancer risk. *Prostate Cancer & Prostatic Diseases, 16*(2), 181-186. doi:10.1038/pcan.2012.54
- Häggström, C., Stocks, T., Ulmert, D., Bjørge, T., Ulmer, H., Hallmans, G., . . . Stattin, P. (2012). Prospective study on metabolic factors and risk of prostate cancer. *Cancer, 118*(24), 6199-6206. doi:10.1002/cncr.27677
- Radisauskas R., Kuzmickiene I., Milinaviciene E., Everatt R. (2016) Hypertension, serum lipids and cancer risk: A review of epidemiological evidence. *Medicina 52(2016)* 89-98. doi: 10.1016/j.medici.2016.03.002
- Liang Z., Xie B., Li J., Wang X., Wang S., Meng S., Ji A., Zhu A., Xu X., Zheng X. (2016) Hypertension and risk of prostate cancer: A systematic review and meta-analysis. *Scientific Reports 6(2016)* 31358 doi: 10.1038/srep31358
- Zhang J. Q., Geng H., Ma M., Nan X. Y., Sheng B. W. (2015) Metabolic syndrome components are associated with increased prostate cancer risk. *Medicine Science Monitor 21(2015) 2387-2396 doi: 10.12659/MSM.893442*
- Bhindi, B., Locke, J., Alibhai, S. M. H., Kulkarni, G. S., Margel, D. S., Hamilton, R. J., . . . Fleshner, N. E. (2015). Dissecting the association between metabolic syndrome and prostate cancer risk: Analysis of a large clinical cohort. *European Urology, 67*(1), 64-70. doi: /10.1016/j.eururo.2014.01.040
- De Nunzio, C., Freedland, S. J., Miano, R., Trucchi, A., Cantiani, A., Carluccini, A., & Tubaro, A. (2011). Metabolic syndrome is associated with high grade Gleason score when prostate cancer is diagnosed on biopsy. *The Prostate, 71*(14), 1492-1498. doi:10.1002/pros.21364
- Sourbeer, K. N., Howard, L. E., Andriole, G. L., Moreira, D. M., Castro-Santamaria, R., Freedland S. J., & Vidal, A. C. (2015). Metabolic syndrome-like components and prostate cancer risk: Results from the Reduction by Dutasteride of Prostate Cancer Events (REDUCE) study. *BJU International, 115(5),* 736-743. doi:10.1111/bju.12843