



# What does the Future Hold for Prostate Cancer Treatment

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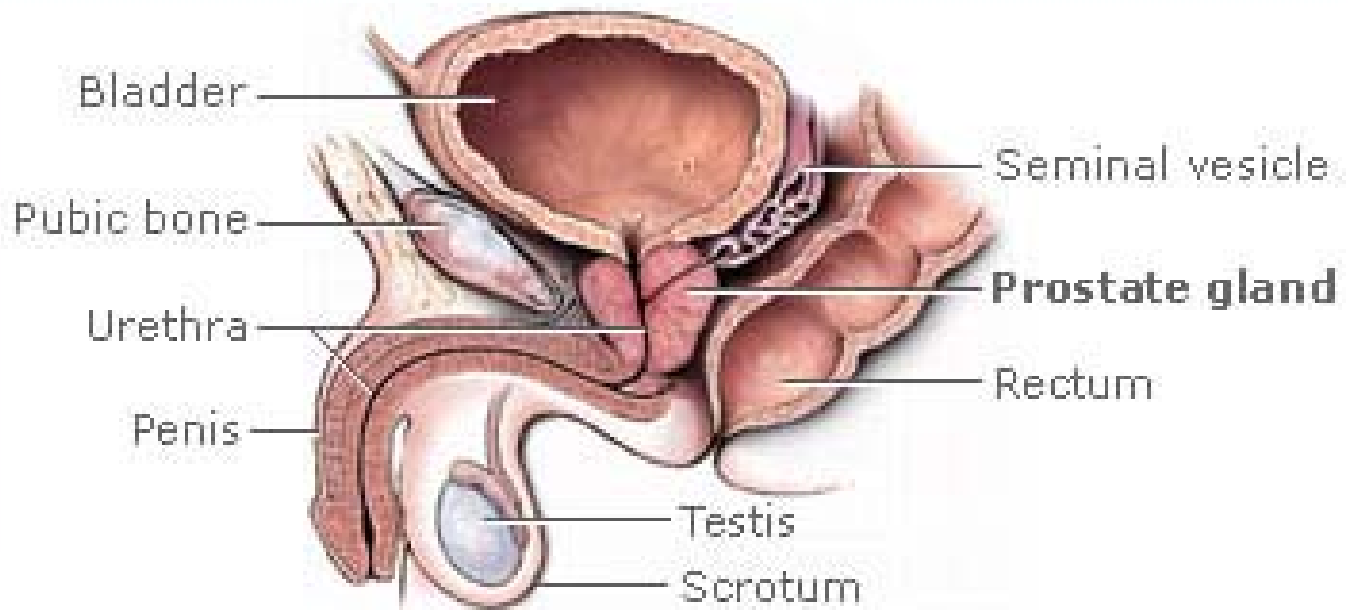
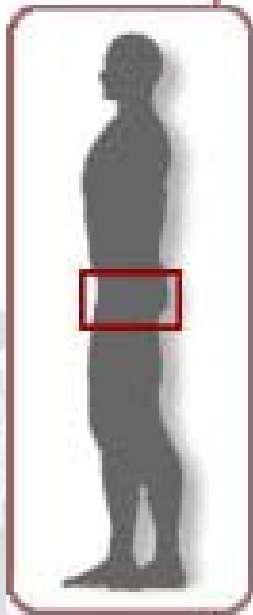
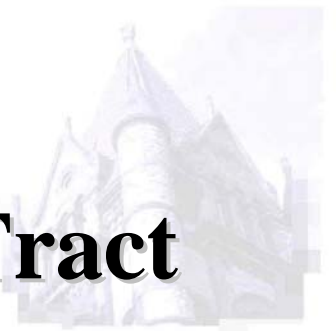
Princess Margaret Hospital, University Health  
Network



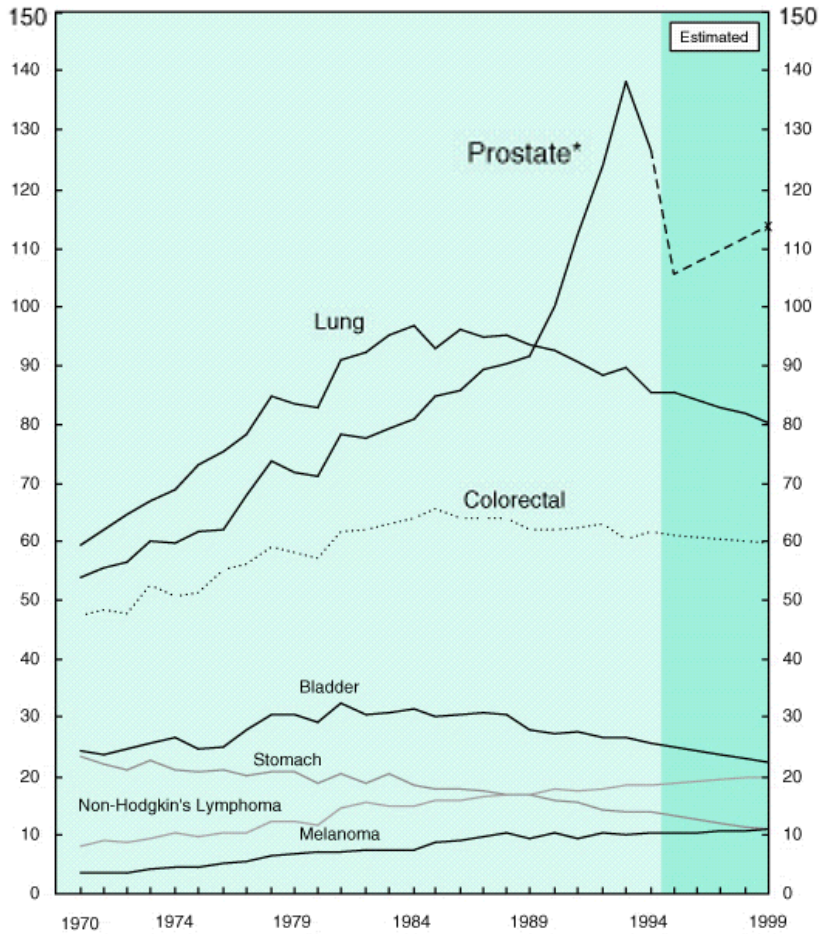
# Thoughts For Tonight

- Changing demographics of prostate cancer – higher incidence than we thought but do we need to treat everyone ?
- How do we diagnose prostate cancer ?
- Can we prevent prostate cancer ?
- How do we treat prostate cancer in 2008? What about the minimal access and minimally invasive treatments (laparoscopic and robotic prostatectomy, HIFU) ?

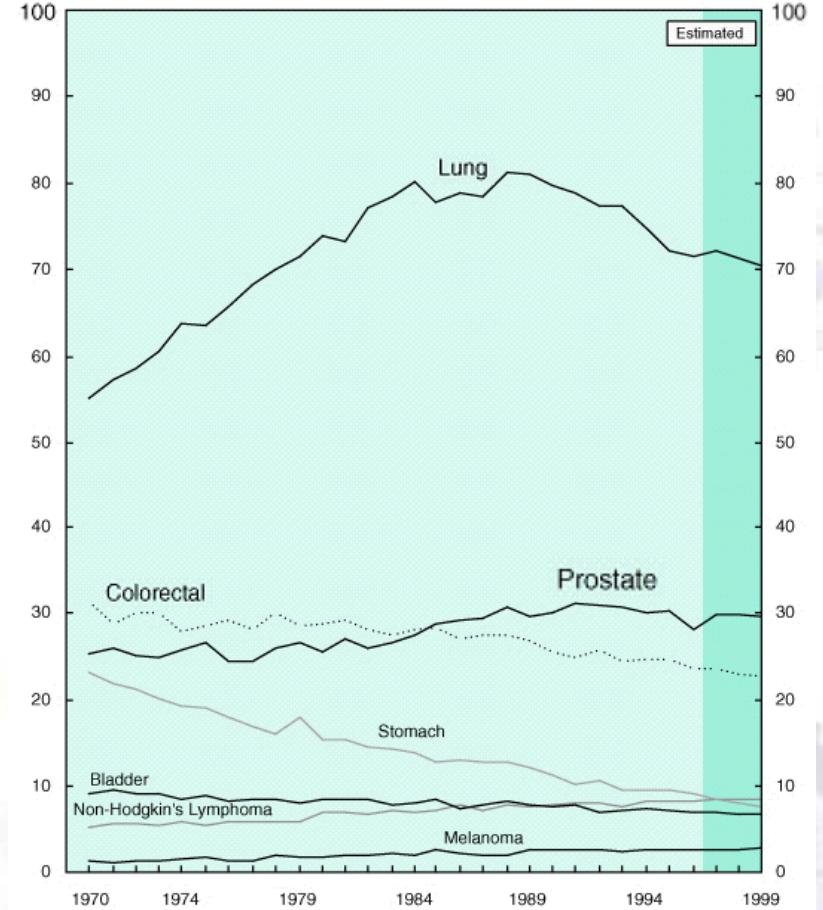
# Male Lower Genitourinary Tract Prostate Diseases



**Age-Standardized Incidence Rates per 100,000, Males, Canada  
1970-1999**

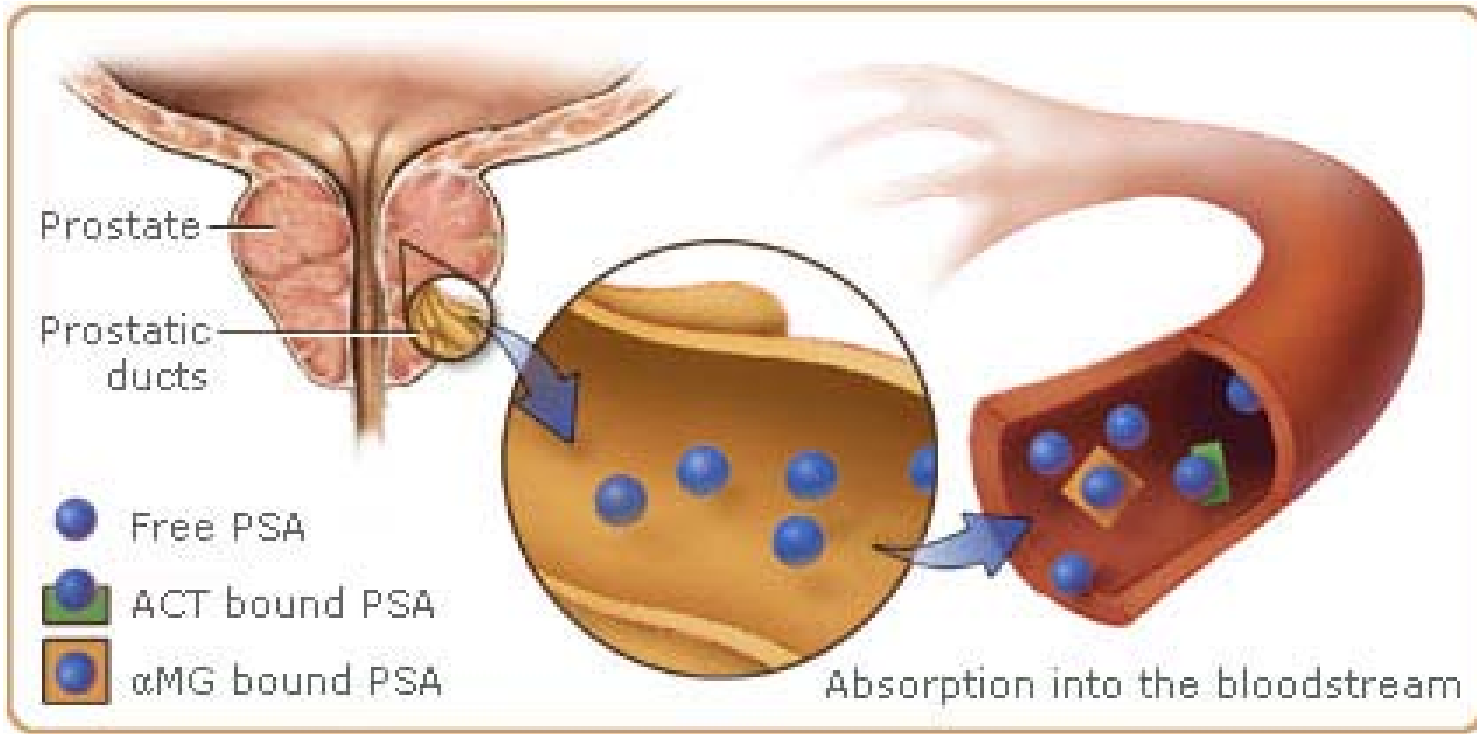
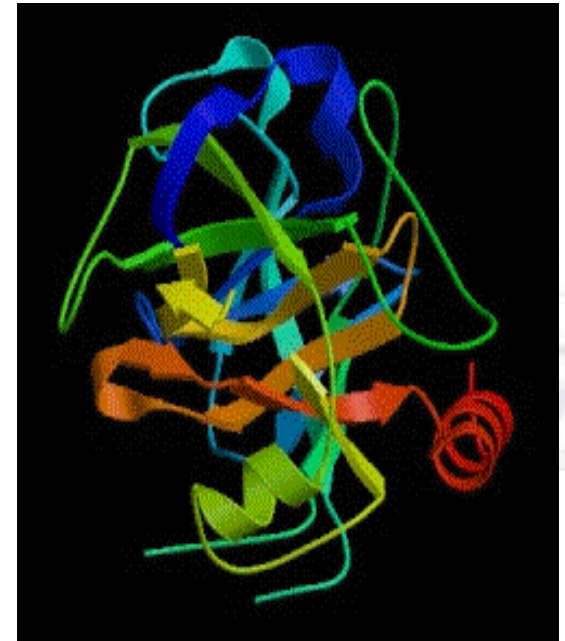


**Age-Standardized Mortality Rates per 100,000, Males, Canada  
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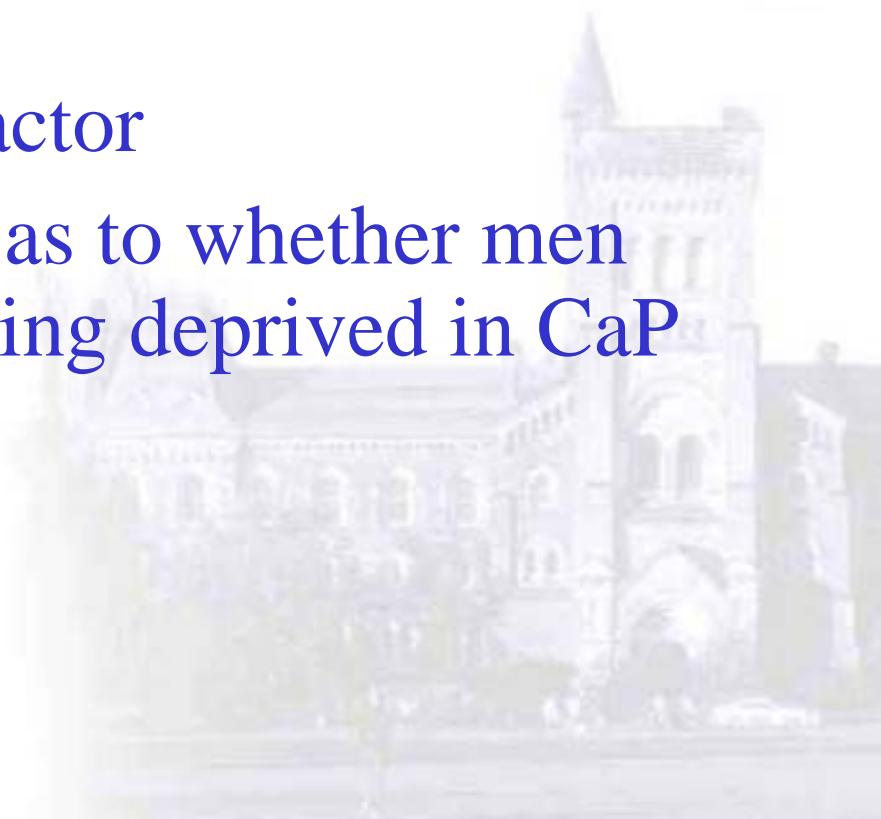
# WHAT IS PSA?

prostate-specific antigen  
protein structure

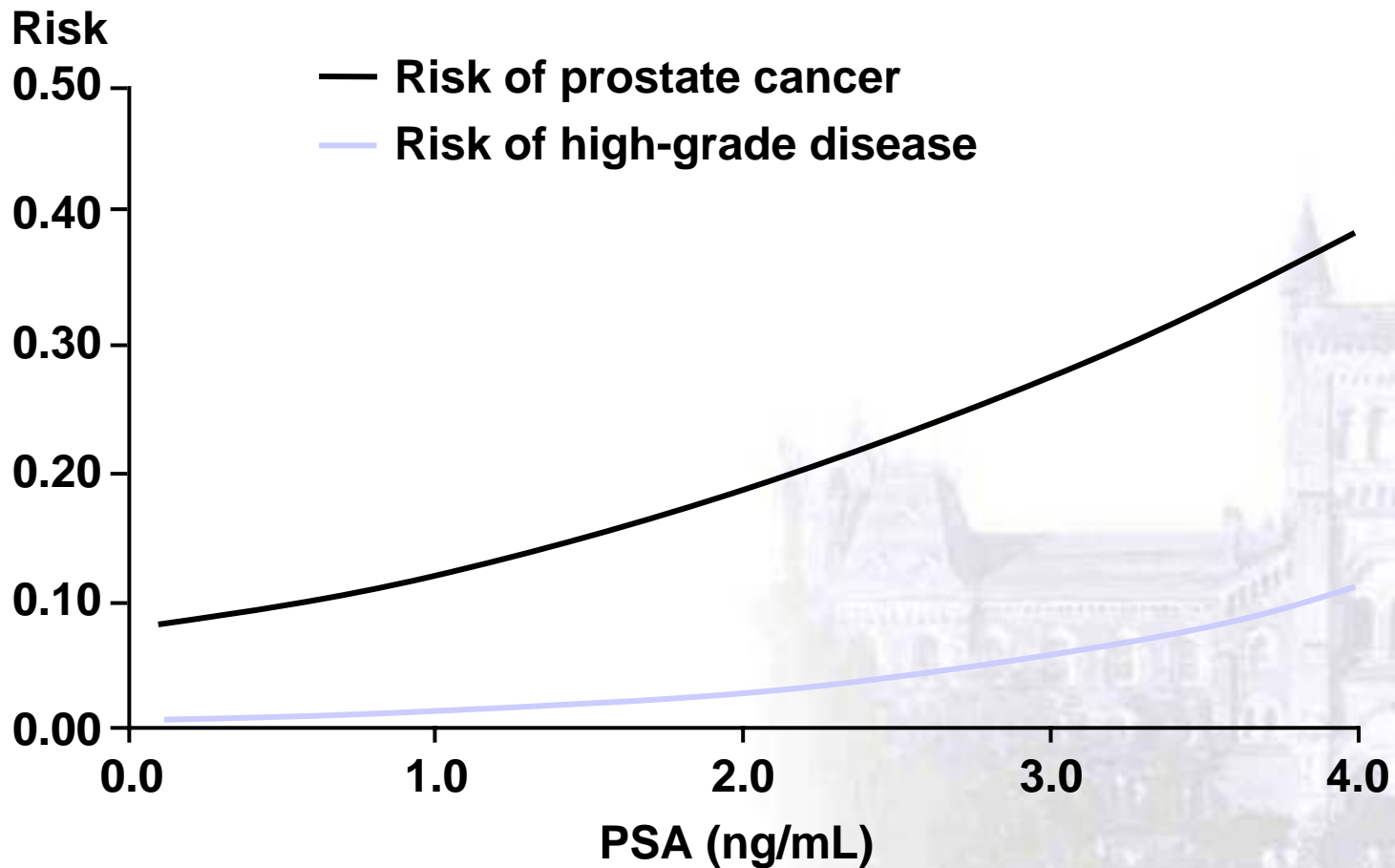


# PSA and Role of Benign Prostatic Hypertrophy (BPH)

- Stamey- detailed histology surgical specimens
- BPH determining factor
- Raises the question as to whether men without BPH are being deprived in CaP screening



# Population risk curves for PSA *versus* PCa from the PCPT



Thompson *et al.* NEJM 2004; 350: 2239–46

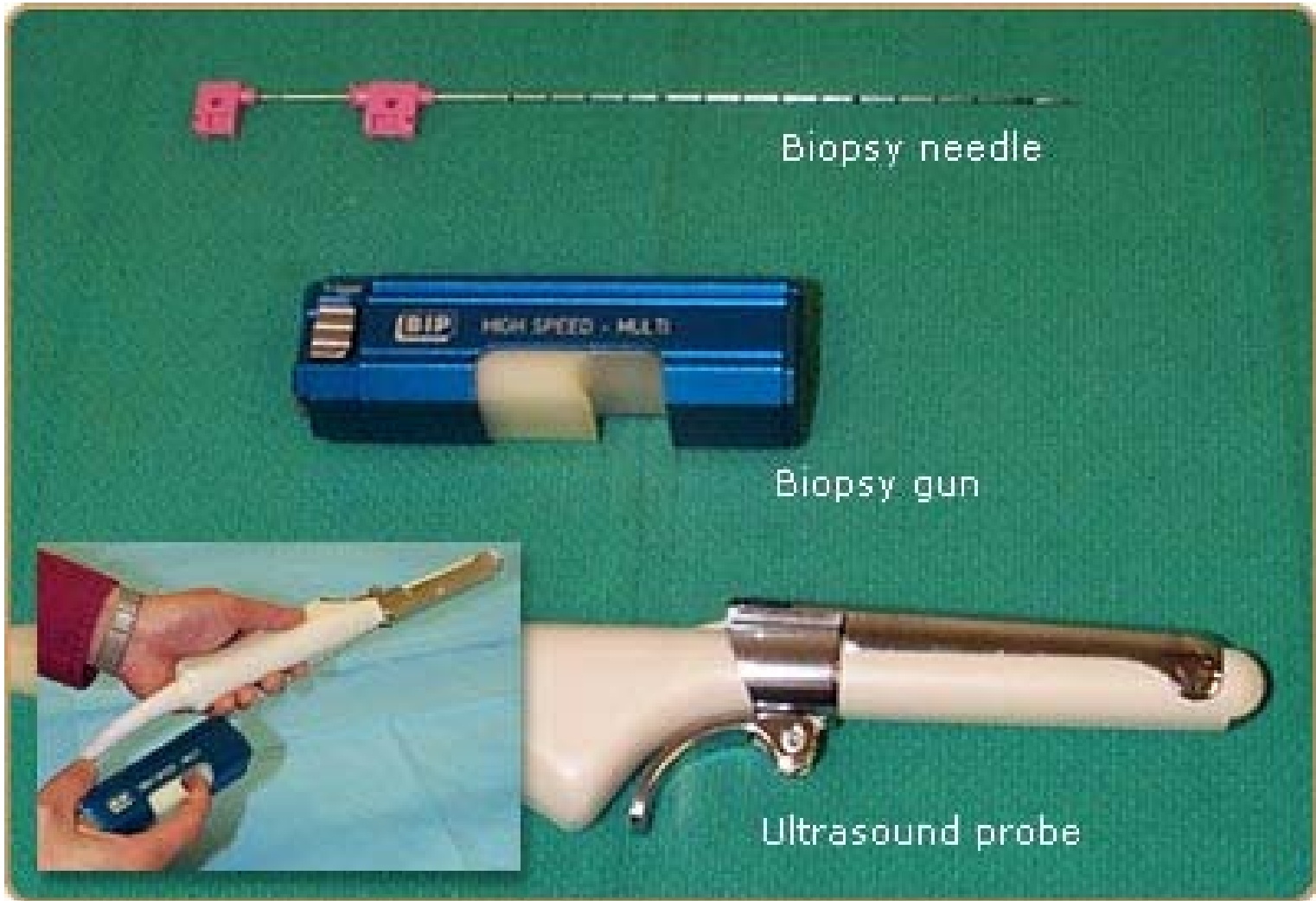
# Prevalence of “Pre-Clinical State”

- Prostate cancer is a disease of long latency
- 32% of men in 30's harbor Prostate Cancer
- Majority of newly diagnosed men in 2007 have a normal prostate on DRE (~10-20 years to the development of spread)

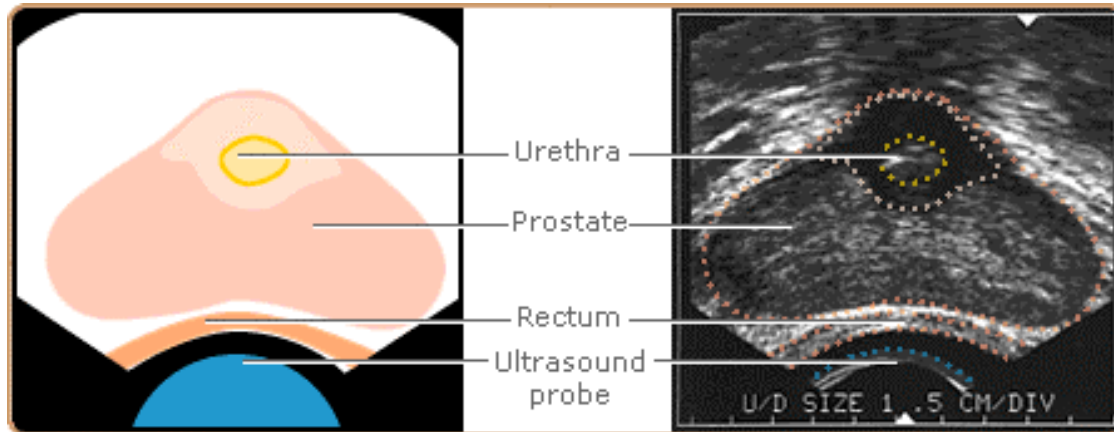




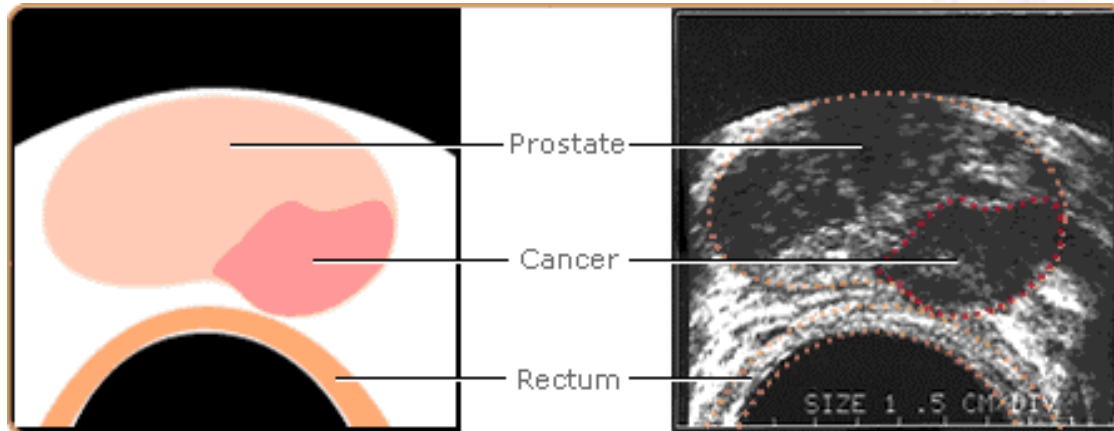
# TRUS (transrectal ultrasound) Guided Biopsy



# Transrectal Ultrasound (TRUS)



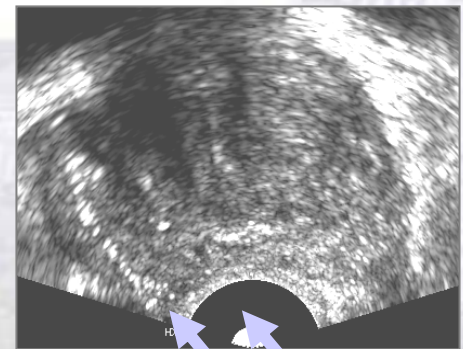
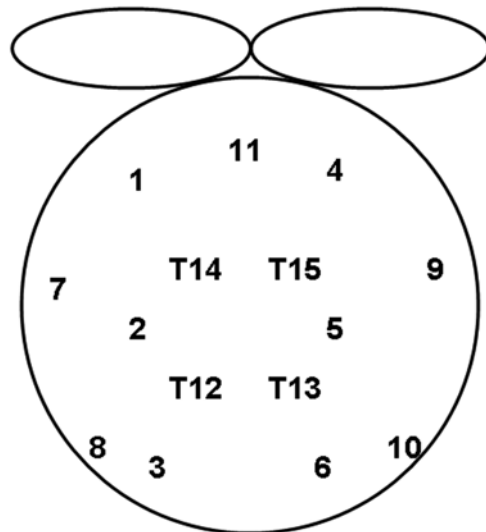
**TRUS Prostate:  
Normal**



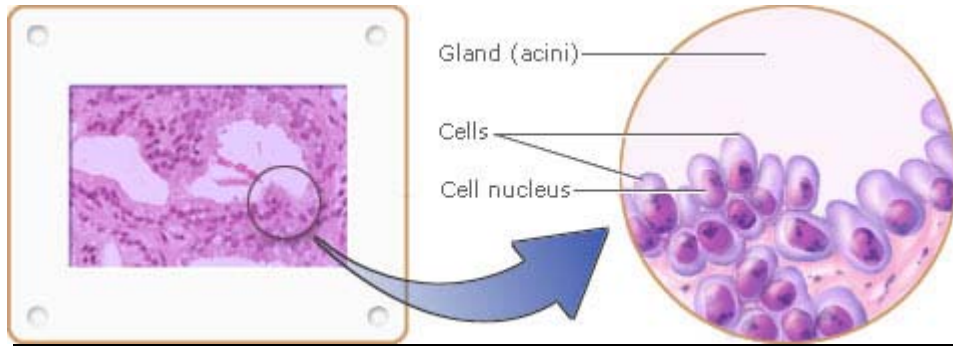
**TRUS Prostate:  
Cancer**

# Methods

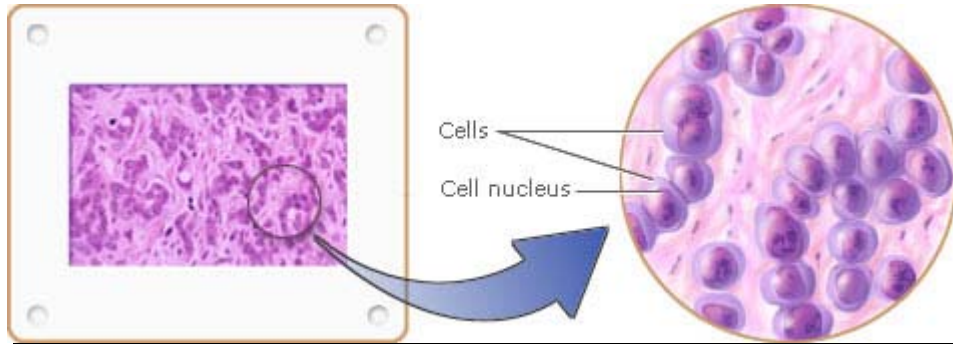
- Antibiotics, enema, local anaesthesia
- Sampling – all posterior except TZ + suspicious
  - .. Sextant 1-6: midline of each lobe
  - .. 10 Core: +4 from lateral horns
  - .. Extended for Repeats: adds 11-15 additional cores of lesions outside 10 core pattern



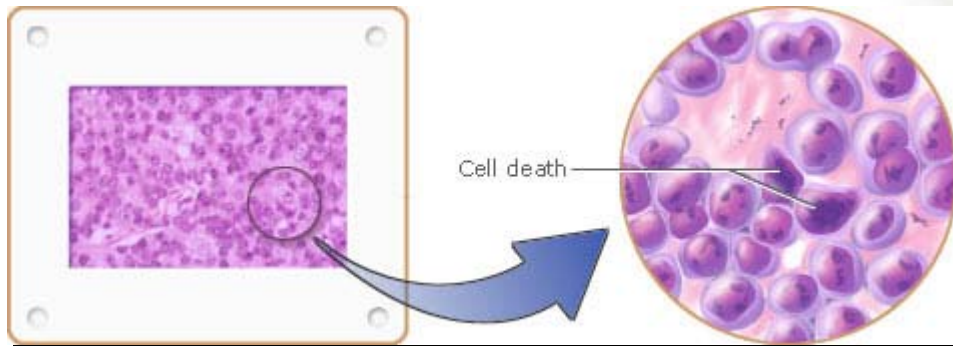
# **PATHOLOGY**



**Low Grade Tumour:  
Gleason 2 to 6 / 10**

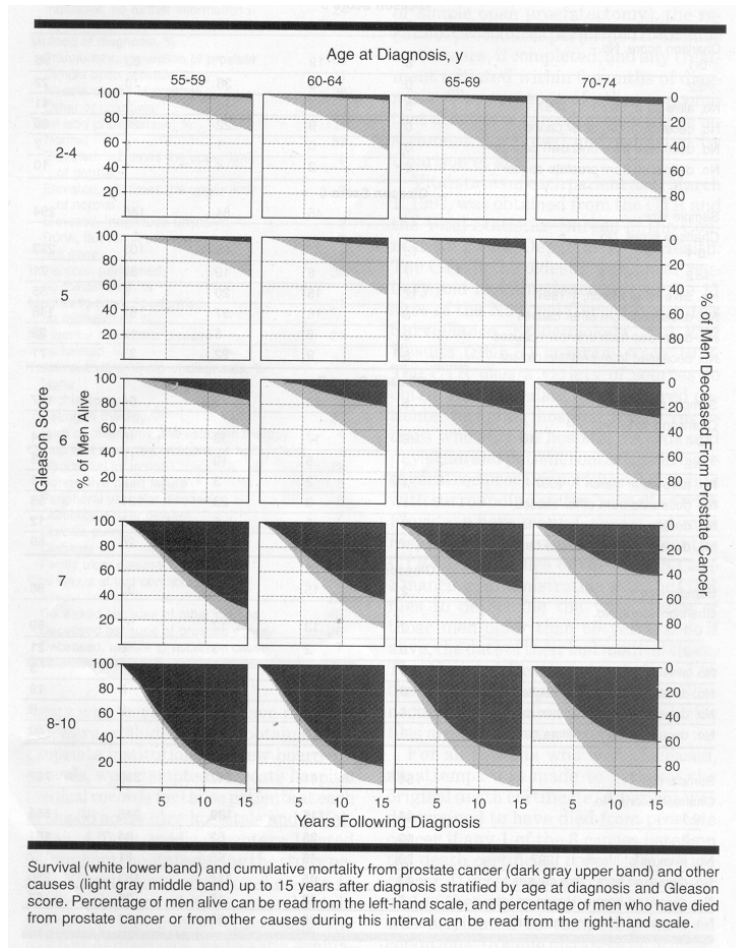


**Medium Grade Tumour:  
Gleason 7 / 10**



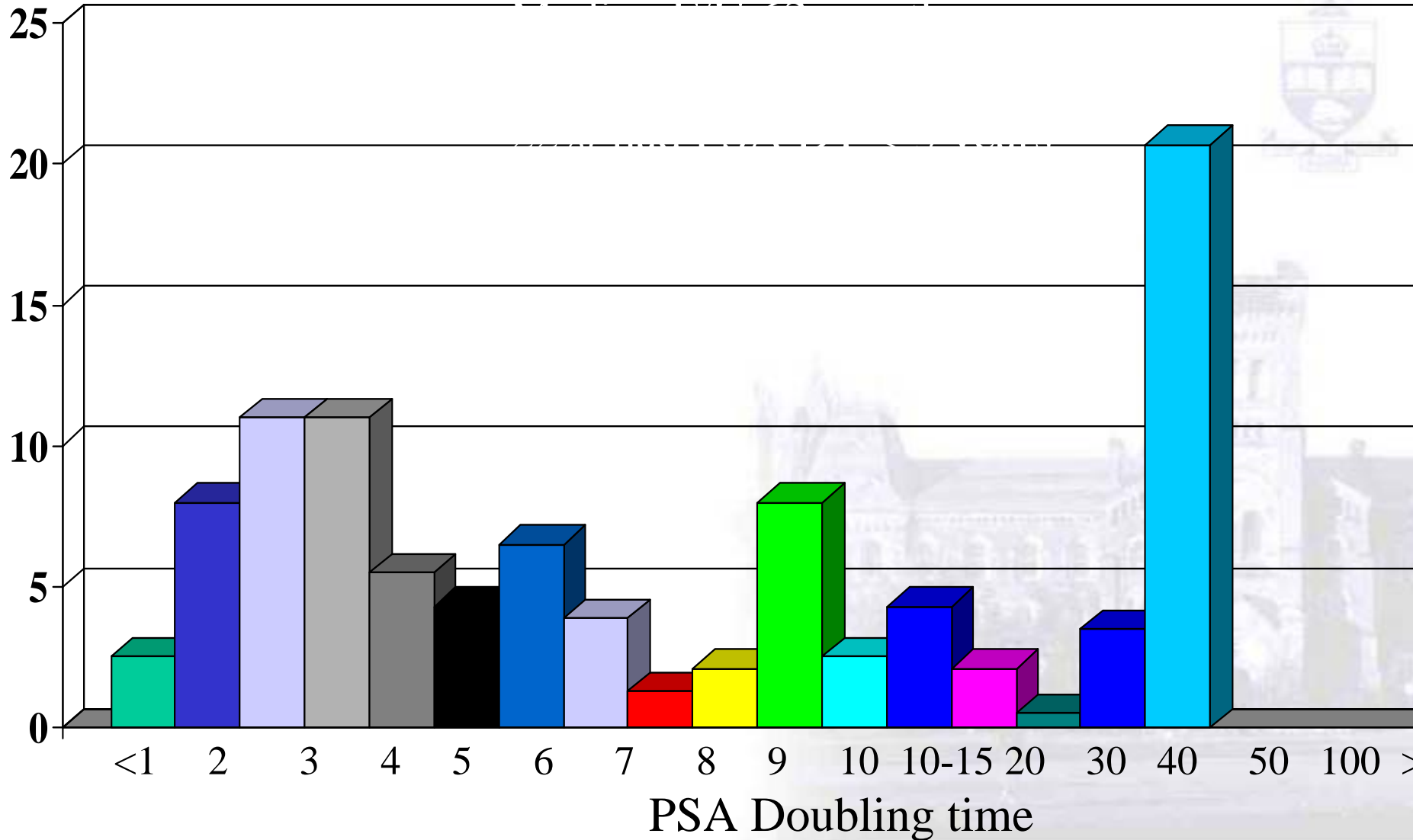
**High Grade Tumour:  
Gleason 8 to 10 / 10**

# Natural History of Conservatively Managed Prostate Cancer



**Albertsen *et al*, JAMA  
280(11): 975-980, 1998.**

# Distribution of PSA doubling times (%) in 299 patients. Klotz L, J Urol 2004





# Does Treatment of Early Stage Prostate Cancer Work?



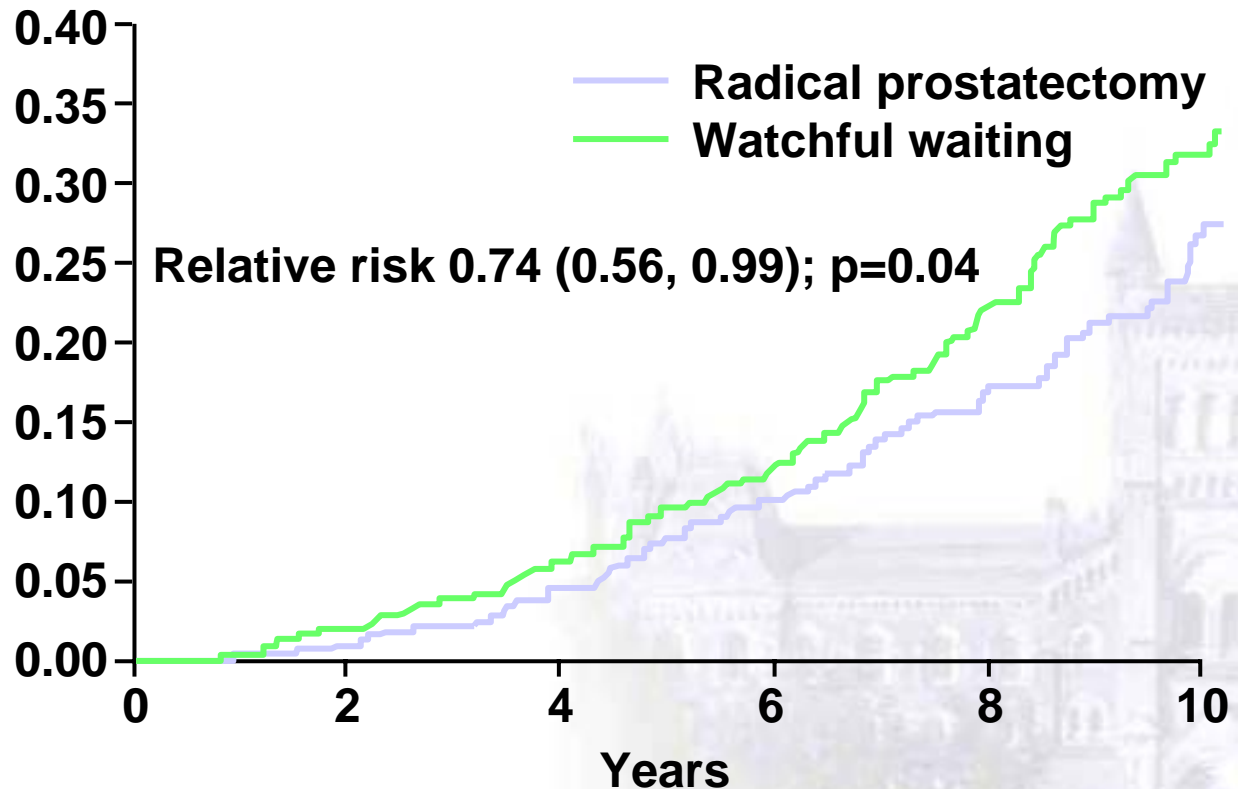
- Active surveillance
  - Radical Prostatectomy – various techniques
  - Radiation Therapy
    - Brachytherapy
    - External beam XRT
  - Hormonal therapy
  - Other
- 
- 

# Radical prostatectomy *versus* WW

Probability of death from any cause (n=695)

8.2 years follow-up

Cumulative incidence of death from any cause (%)



No. at risk  
Radical

prostatectomy	347	343	332	284	210	118
Watchful waiting	348	341	326	279	198	104

Bill-Axelsson *et al.* NEJM 2005; 352: 1977-84





# The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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## The Influence of Finasteride on the Development of Prostate Cancer

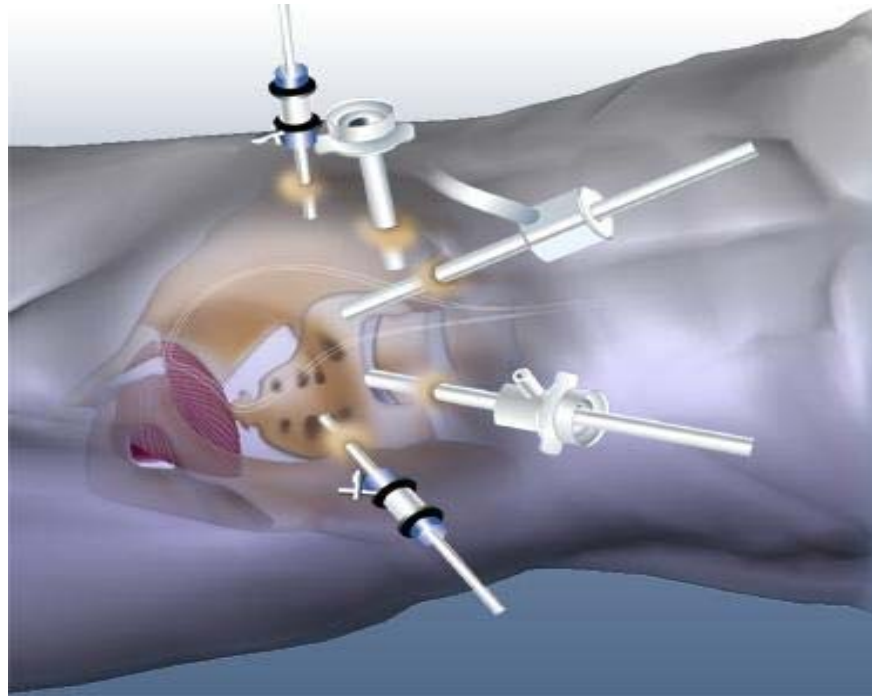
*Ian M. Thompson, M.D., Phyllis J. Goodman, M.S., Catherine M. Tangen, Dr.P.H., M. Scott Lucia, M.D., Gary J. Miller, M.D., Ph.D., Leslie G. Ford, M.D., Michael M. Lieber, M.D., R. Duane Cespedes, M.D., James N. Atkins, M.D., Scott M. Lippman, M.D., Susie M. Carlin, B.A., Anne Ryan, R.N., Connie M. Szczepanek, R.N., B.S.N., John J. Crowley, Ph.D., and Charles A. Coltman, Jr., M.D.*

# PCPT Results

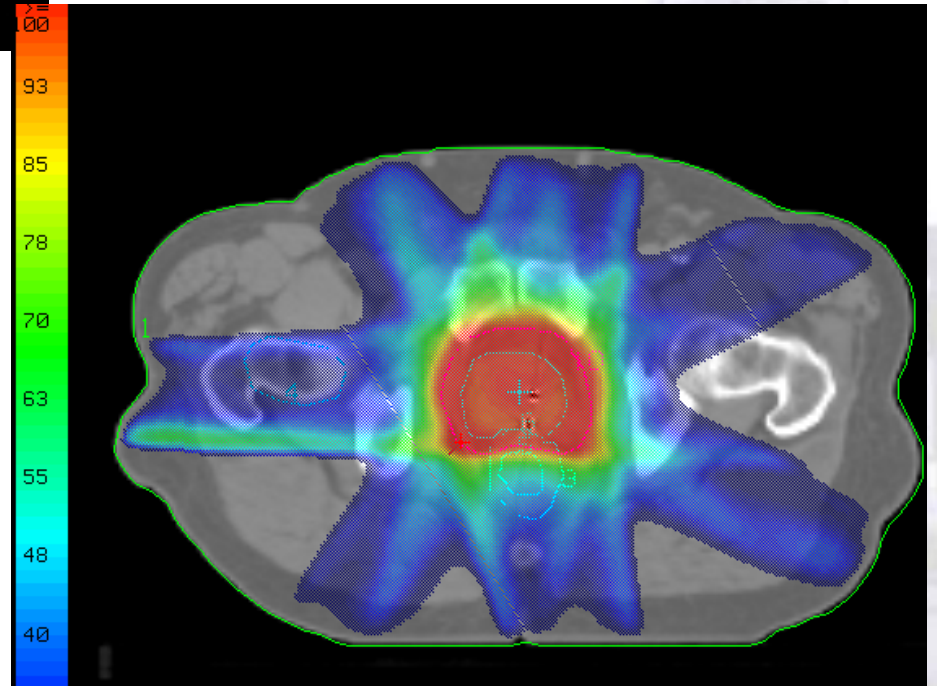
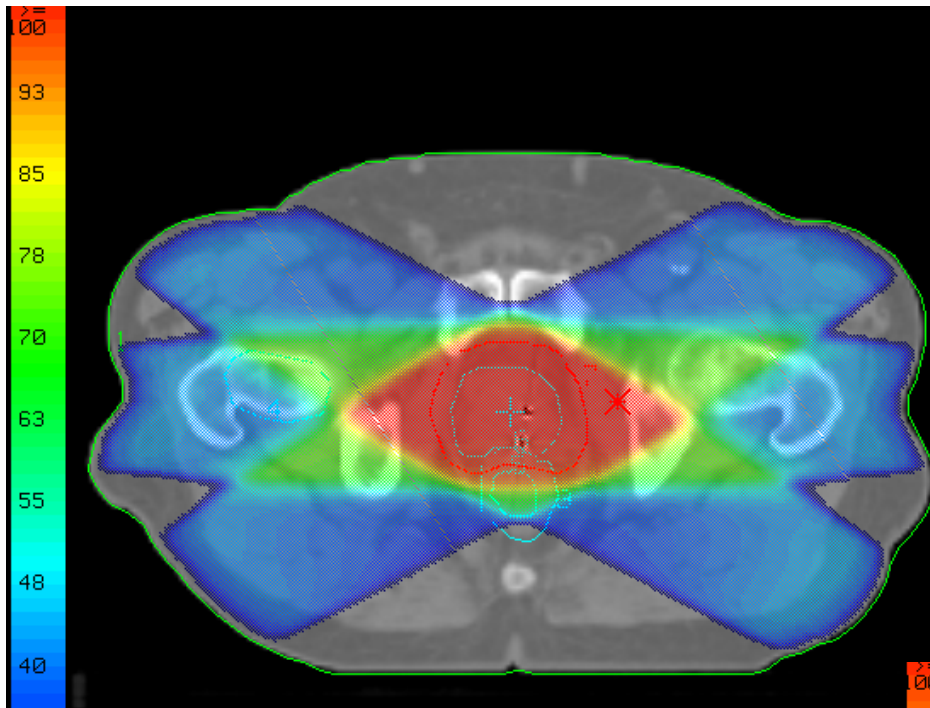
- **25% men being observed were found to have Cancer on exit biopsy**
- **But, 25% reduction in Cancer if on finasteride**
  - 24.4% vs. 18.4%
- **And, surprise finding, increase in higher grade cancer**
  - 6.4% vs. 5.1%
- **But, overall death equal**
- **98% clinically localized**



# What about alternatives to Open Radical Prostatectomy



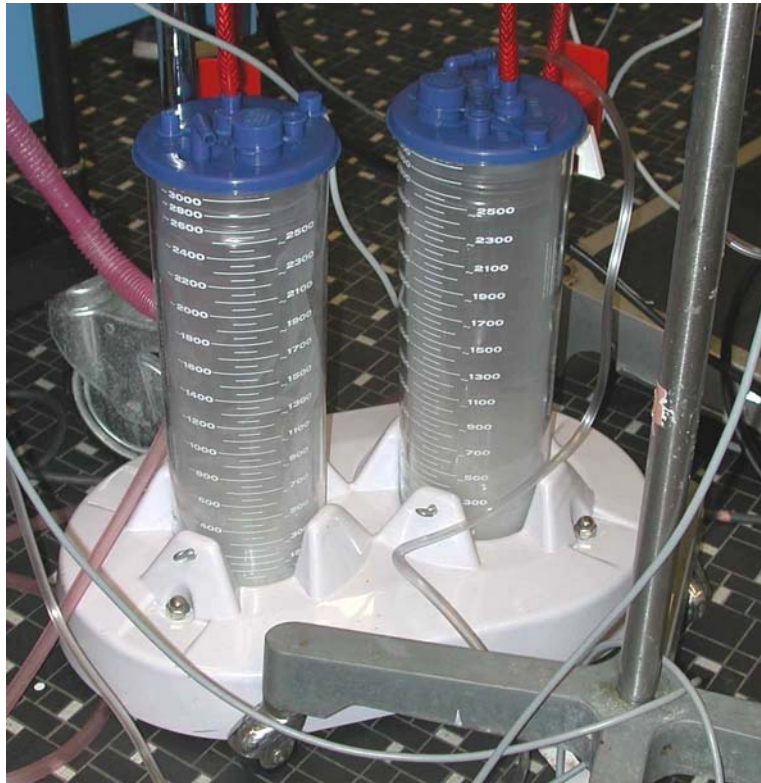
# Radiation Therapy



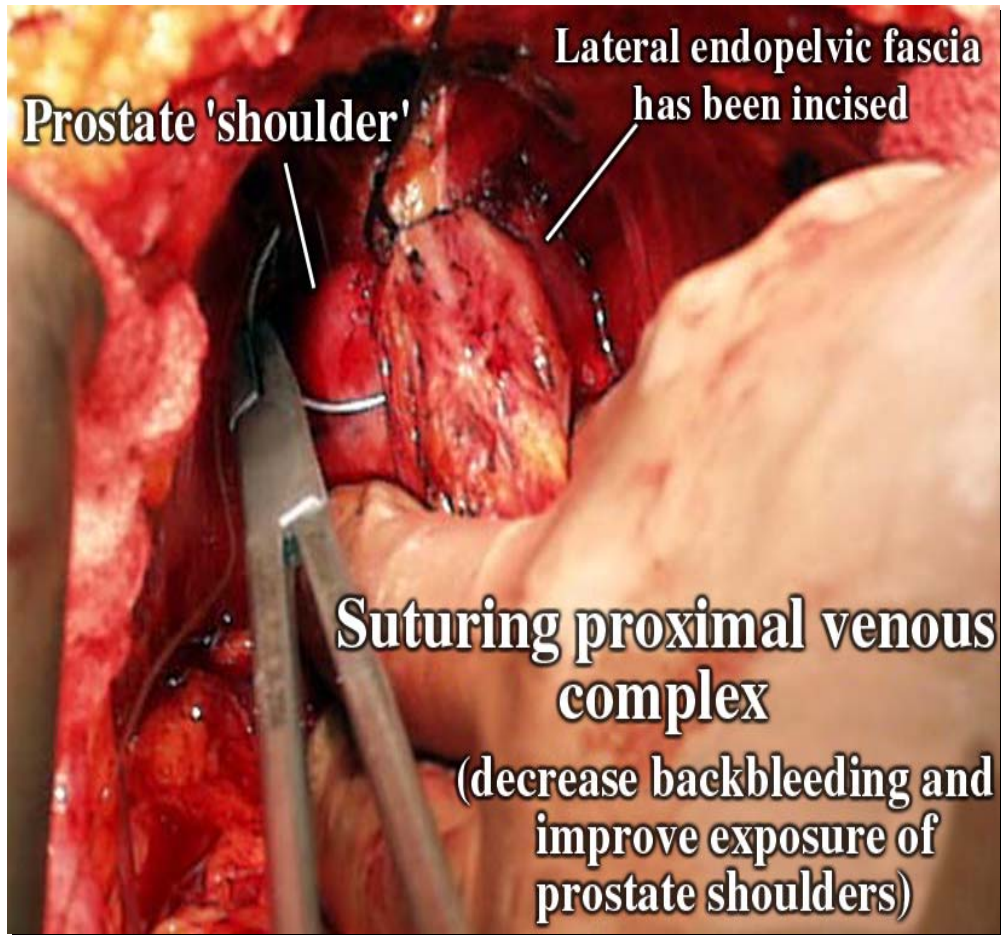
**Conformal**

**IMRT**

# Open Radical Prostatectomy Is Well Done in Ontario



# Radical Prostatectomy



# Laparoscopic Prostatectomy is a Minimal Access Approach for Radical Prostatectomy

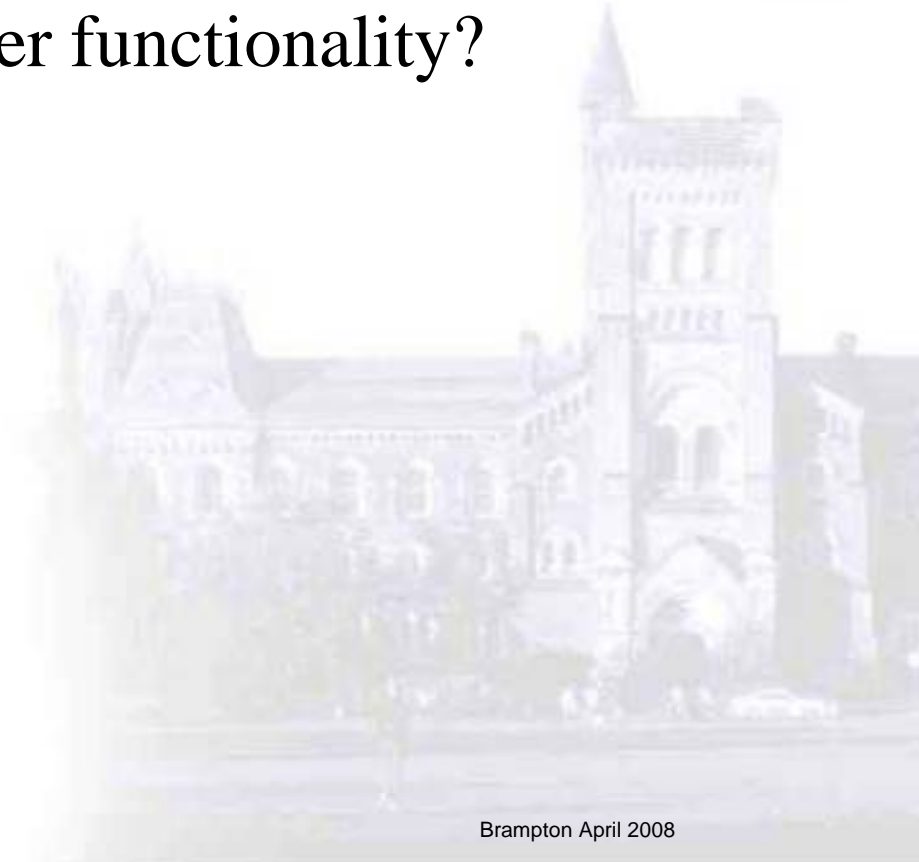
“the delayed fuse”

First case was in the USA in 1991 (reported at the AUA in 1992)

Schuessler WW, Kavoussi LR, Clayman RV, Vancaillie TH. Laparoscopic radical prostatectomy: initial case report. J Urol 1992;147:246A.

# Laparoscopic Prostatectomy

- Provides good cancer control
- Has equivalent or better functionality?
- Is safe
- Is efficient





# Oncological Outcomes

Guillonneau et al. (*J Urol* 169:1261, 2003)

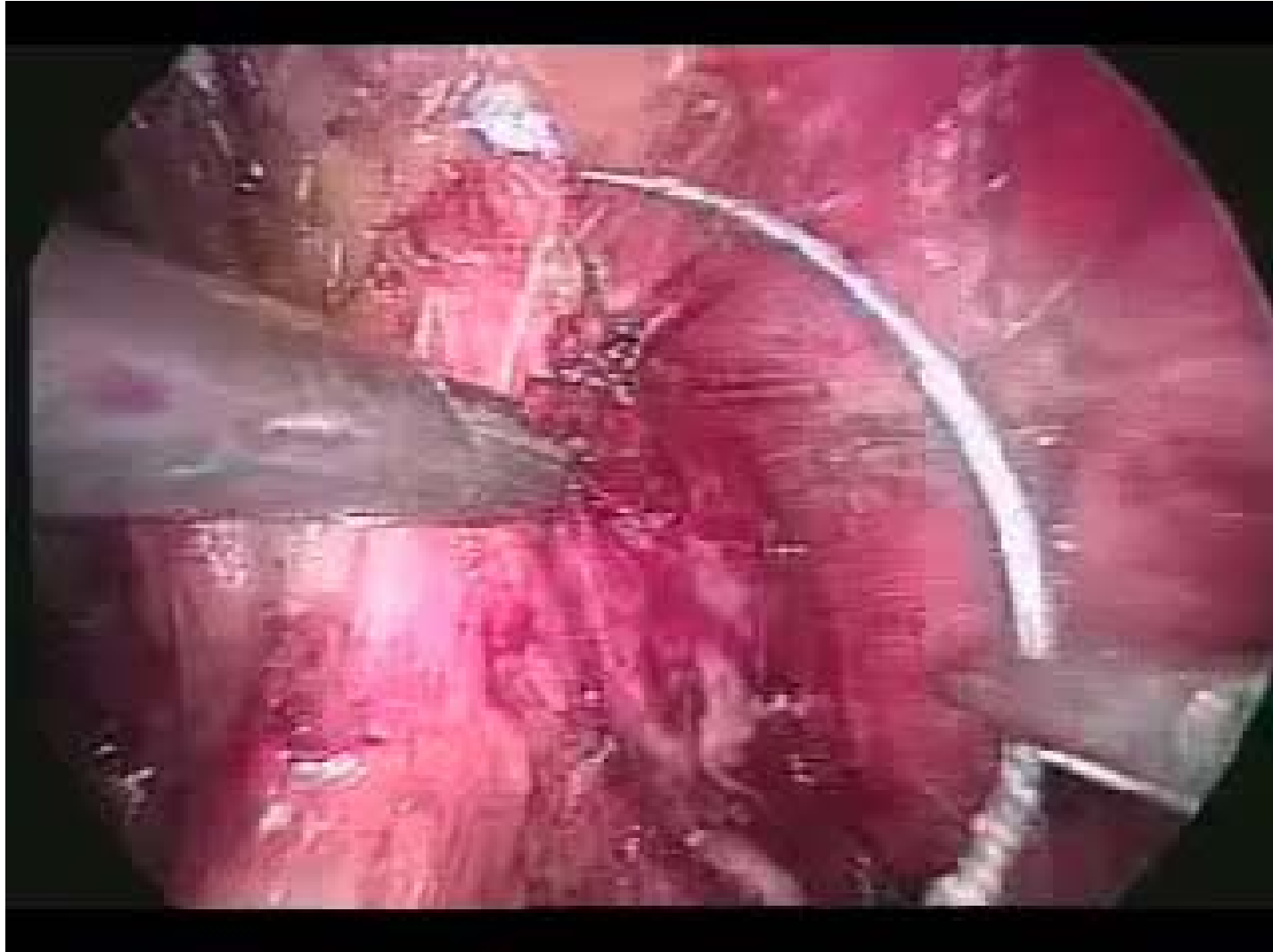
N = 1000



		pT2a	pT2b	pT3a	pT3b
Total					
+ve margins	4%	20%	30%	50%	17%
PSA free surv.	92%	91%	83%	75%	---
Time (mos)	39	39	36	30	

“ With mid-term follow-up, LRP provides pathologic and biologic results...(comparable to) retropubic approach”

**But let's see for ourselves!**

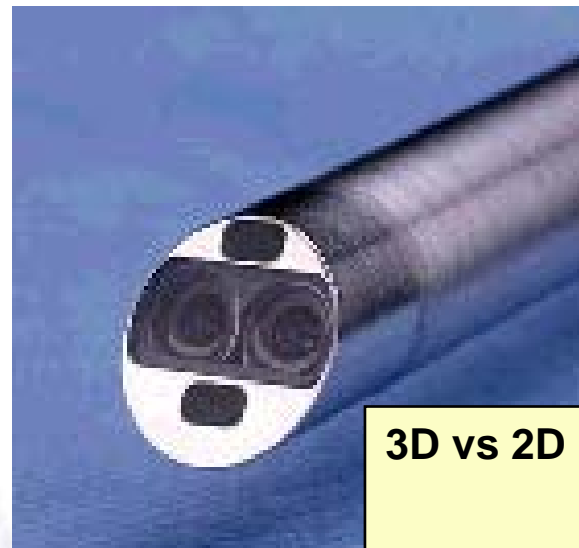


# Robotics To Facilitate Pelvic MIS

Intracorporeal  
“wrist”



Haptic Feedback



3D vs 2D Imaging



# HIFU High Intensity Focused Ultrasound



USHIFU  
High Intensity Focused Ultrasound

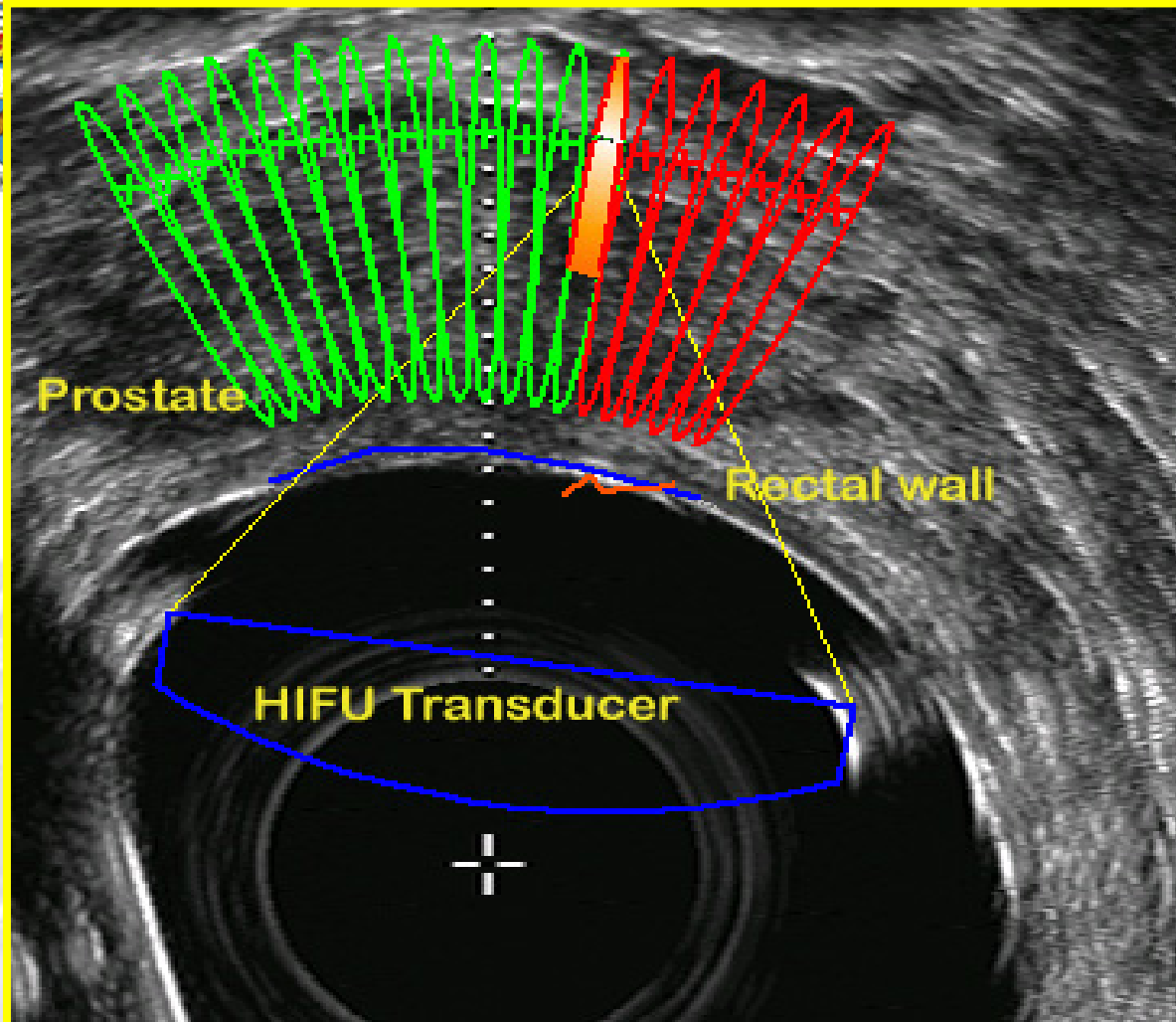
High Intensity Focused Ultrasound, or HIFU, is an investigational acoustic ablation technique for localized prostate cancer therapy. HIFU uses intersecting, precision-focused ultrasound waves to raise the temperature of the target tissue to more than 80 to 90 degrees Celsius in two to three seconds, destroying the tissue. The Sonablate® 500, approved in many countries outside the U.S., is an image-guided acoustic ablation device for prostate disease therapy.

A smaller image of the HIFU machine and its probe, set against a blue background with light rays.

# ABLATHERM®



# HIFU High Intensity Focused Ultrasound



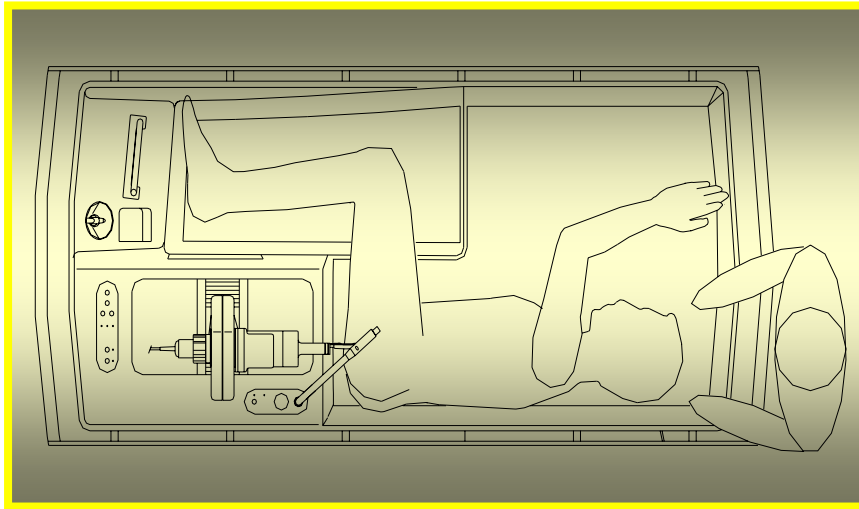
red =  
treated tissue

orange =  
active HIFU

green =  
untreated  
tissue

# Ablatherm

Patient treated in  
right side body position



rectal wall + ampulla dilatation  
no air / faeces interposition  
coupling + cooling





"If we are to achieve results never before accomplished, we must expect to employ methods never before attempted."

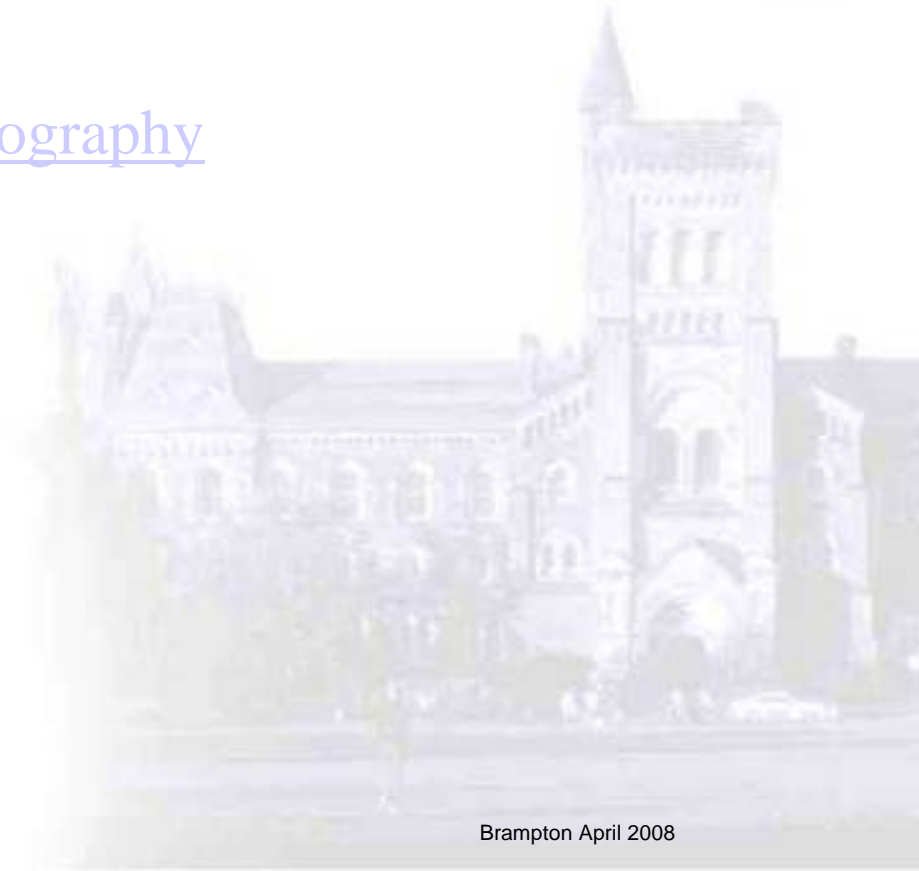
--Francis Bacon--



**But there are many “technologies in waiting”**



MRI thermography



# Is the Era of Open Radical Prostatectomy Over ?

