Poster Exhibit 1: Prostate Cancer

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UP-1

Predicting risk of disease progression during active surveillance for prostate cancer: Analysis comparison of patient clinical features with a machine learning algorithm to the CANARY risk calculator

Robert Paproski[1], Stephanie Garbowski[2], Tarek A Bismar[3], Catalina Vasquez[4], Perrin H Beatty[1], John D Lewis[4], M. Eric Hyndman[2,5]
[1]Research and Development, Nanostics, Inc., Edmonton, AB, Canada; [2]Prostate Cancer Centre, University of Calgary, Calgary, AB, Canada; [3]Pathology & Laboratory Medicine and Oncology, University of Calgary, Cumming School of Medicine, Calgary, AB, Canada; [4]Oncology, University of Alberta, Edmonton, AB, Canada; [5]Surgery, University of Calgary, Calgary, AB, Canada

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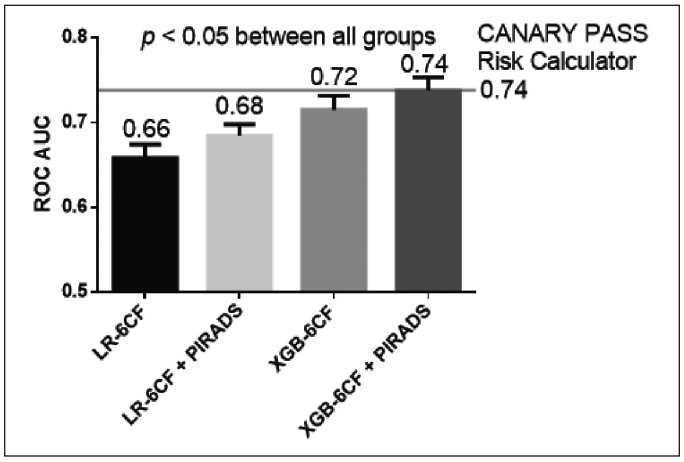
Introduction: Active surveillance (AS) is a common treatment for men with Gleason grade (GG) 1 prostate cancer. Having accurate tools to identify men at risk for disease progression may reduce the number of biopsies needed. The Canary Prostate Active Surveillance Study Risk Calculator (PASS-RC) predicts the risk of re-classification from a biopsy. Machine learning (ML) algorithms, such as XGBoost, often have improved predictive accuracy over logistic regression (LR). Our aim was to determine the value of XGBoost and magnetic resonance imaging (MRI) features for predicting the progression of GG1 to GG2 prostate cancer in AS.

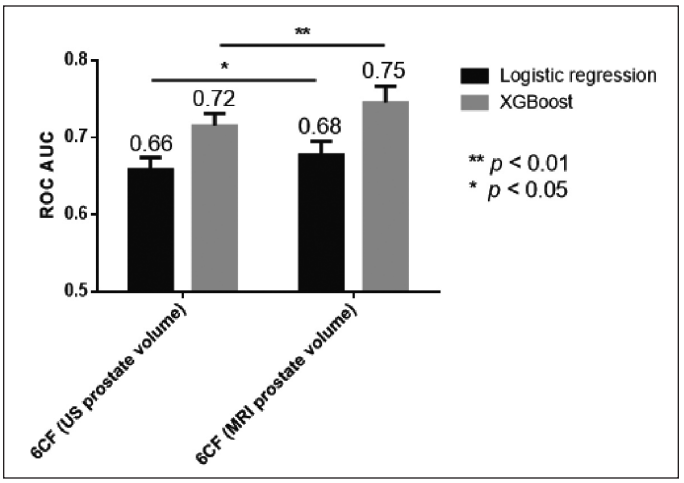
Methods: A selected cohort of 139 men on an AS program in were included, with 2–10-year followup. Patients underwent an annual prostate-specific antigen (PSA), digital rectal exam (DRE), MRI, and prostate biopsies at varying intervals depending on clinical risk. ML was performed using nested cross-validation and repeated 10 times with different patient randomization using LR, and XGBoost algorithms using six predictive features: age, PSA, years since prostate cancer diagnosis, the proportion of cores with prostate cancer, number of prostate cancer-free biopsies, and prostate volume. Additional MRI features were included in models and all models were compared to the Canary PASS-RC to predict progression to GG2 PCa.

Results: Using the six primary clinical features with ultrasound prostate volume, XGBoost outperformed LR (area under the receiver operating characteristic curve (AUC) values 0.66 vs. 0.72, $p<0.05$) (Fig. 1). XGBoost models were further improved using MRI prostate volume vs. ultrasound prostate volume (AUC 0.75 vs. 0.72, $p<0.05$) (Fig. 2). Incorporating Prostate Imaging Reporting and Data Scoring (PI-RADS) and PSA density further improved XGBoost models (AUC 0.76) (Fig. 3), which were higher than the Canary PASS model (AUC 0.74).

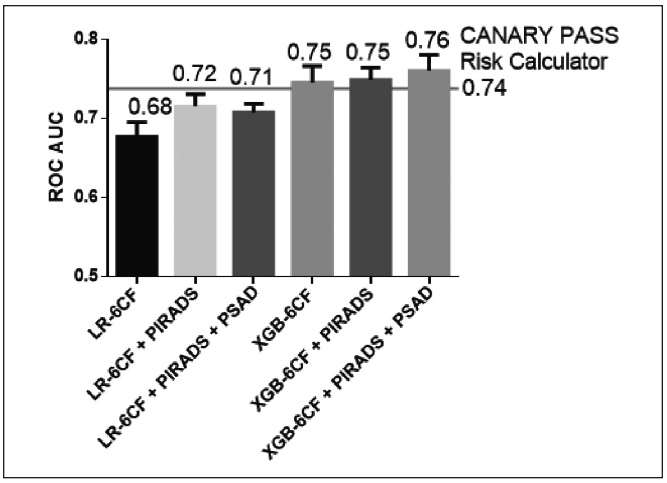
Conclusions: Clinical risk calculators are useful tools in predicting prostate cancer upgrading in AS, and our risk calculator provided highly accurate prediction and may help reduce the number of serial biopsies performed for men with GG1 disease.



UP-1. Fig. 1. Predicting biopsy Gleason grade group 2 and greater prostate cancer in 139 men in active surveillance with ultrasound (US)-measured prostate volume. LR-6CF: logical regression with 6 clinical features; LR-6CF + PI-RADS: LR-6CF plus Prostate Imaging-Reporting and Data Scoring System; XGB-6CF: XGBoost with 6 clinical features; XGB-6CF + PI-RADS: XGB-6CF plus Prostate Imaging-Reporting and Data Scoring System. The 6 clinical features were: age, PSA, years since prostate cancer diagnosis, proportion of cores with prostate cancer, number of prostate cancer-free biopsies, prostate volume by US. Bars represent mean and error bars standard deviation. P-values determined by one-way ANOVA.



UP-1. Fig. 2. XGBoost predicting biopsy Gleason grade group 2 and greater prostate cancer in 139 men in active surveillance with either ultrasound-derived prostate volume or MRI-derived prostate volume. Black bars are logistic regress, grey bars are XGBoost. The 6 clinical features were: age, PSA, years since prostate cancer diagnosis, proportion of cores with prostate cancer, number of prostate cancer-free biopsies, prostate volume by US. Bars represent mean and error bars standard deviation. P-values determined by two-way ANOVA.



UP-1. Fig. 3. Predicting biopsy Gleason grade group 2 and greater prostate cancer in 139 men in active surveillance with MRI-measured prostate volume. LR-6CF: logical regression with 6 clinical features; LR-6CF + PI-RADS: LR-6CF plus Prostate Imaging-Reporting and Data Scoring System; LR-6CF + PI-RADS + PSAD: LR-6CF plus PI-RADS plus PSA density; XGB-6CF: XGBoost with 6 clinical features; XGB-6CF + PI-RADS: XGB-6CF plus Prostate Imaging-Reporting and Data Scoring System; XGB-6CF + PI-RADS + PSAD: XGB-6CF + PI-RADS + PSA density. The 6 clinical features were: age, PSA, years since prostate cancer diagnosis, proportion of cores with prostate cancer, number of prostate cancer-free biopsies, prostate volume by US. Bars represent mean and error bars standard deviation.

UP-2

An examination of the role of socioeconomic status in the relationship between depression and prostate cancer survivorship

Gabriela Ilie[1,2], *Rob Rutledge*[2]

[1]Urology, Dalhousie University, Halifax, NS, Canada; [2]Radiation Oncology, Dalhousie University, Halifax, NS, Canada

Introduction: Prostate and skin cancer are among the most prevalent forms of cancer among men and have favorable survival rates compared to other, more aggressive forms of cancers. Recent studies have shown that the odds of depression among men with a lifetime history of prostate cancer are higher compared to men without a lifetime history of prostate cancer. Here, we extend previous findings and examine the role of socioeconomic status in the relationship between depression and cancer survivorship status in a population-based sample of men from Atlantic Canada.

Methods: A cross-sectional analysis was conducted on a subsample of 6585 male participants aged 49–69 from the 2009–2015 survey cycle of the Atlantic PATH study. The primary outcome was screening positive for mild, moderate, or severe depression using the Patient Health Questionnaire (PHQ-9). The main predictor variable was cancer survivorship status (the presence of a lifetime history of prostate, skin, other forms of cancer other than prostate or skin, or absence of a lifetime cancer diagnosis). Covariates included age, education, marital status, household income, province, ethnicity, comorbidity, and survivorship time.

Results: An estimated 14.7% of men in this sample screened positive for mild, moderate, or severe depression. Men with a history of prostate cancer were 2.60 (95% confidence interval [CI] 1.02, 6.65) times more likely to screen positive for depression compared to men with a history of any other form of cancer. Odds ratios were 10.23 (95% CI 2.82, 37.49) or 4.00 (95% CI 1.20, 13.34) times higher for survivors of prostate or skin cancer who reported low household income to screen positive for depression compared to men with a history of any other form of cancer and high household income.

UP-2. Table 1. Descriptive analyses predicting mild, moderate, or severe anxiety symptoms by demographics among male participants aged 49–69 in Atlantic Canada between 2009 and 2015 for original data (n=4379) and multiple imputation pooled data (n_{MI}=6585 for depression or anxiety symptoms)

	No anxiety[a] % OR (95% CI) n=3976	Mild, moderate, or severe anxiety symptoms[a] % OR (95% CI) n=403	No anxiety[b] % OR_{MI} (95% CI) n_{MI}=5924.1	Mild, moderate, or severe anxiety symptoms[b] % OR_{MI} (95% CI) n_{MI}=660.9
Age category		$X^2(1)=33.98$***		
49–59 yrs old	88.4% (Ref) 1.0 Reference n=2041	11.6% 1.9 (1.53, 2.36)*** n=269	88.1% (Ref) 1.0 Reference n=3017.7	11.9% 1.27 (1.27, 1.89)*** n=407.3
60–69 yrs old (Ref)	93.5% n=1935	6.5% n=134	92.0% n=2906.3	8.0% n=253.7
Relationship status		$X^2(1)=11.11$**		
Divorced, widowed, separated, or single/never married	86.6% 1.0 Reference n=413	13.4% 1.63 (1.22, 2.16)** n=64	85.3% 1.0 Reference n=701.7	14.7% 1.66 (1.25, 2.20)*** n=120.6
Married or living with partner (Ref)	13.4% n=3557	8.7% n=339	90.6% n=5222.3	9.4% n=540.3
Province of residence		$X^2(3)=1.32$		
Nova Scotia	90.4% 1.0 Reference n=2650	9.6% 1.07 (.77, 1.50) n=280	89.7% 1.0 Reference n=3272.4	10.3% 0.99 (0.71, 1.36) n=377.4
New Brunswick	91.6% 1.0 Reference n=793	8.4% 0.93 (0.63,1.38) n=73	90.7% 1.0 Reference n=1602.4	9.3% 0.87 (0.59, 1.29) n=164.2

*p<0.05; **p<0.01; ***p<0.001. [a]Original data. [b]Multiple imputations based on 73 imputations (pooled analysis).

UP-2. Table 1 (cont'd). Descriptive analyses predicting mild, moderate, or severe anxiety symptoms by demographics among male participants aged 49–69 in Atlantic Canada between 2009 and 2015 for original data (n=4379) and multiple imputation pooled data (n_{MI}=6585 for depression or anxiety symptoms)

	No anxiety[a] % OR (95% CI) n=3976	Mild, moderate, or severe anxiety symptoms[a] % OR (95% CI) n=403	No anxiety[b] % OR_{MI} (95% CI) n_{MI}=5924.1	Mild, moderate, or severe anxiety symptoms[b] % OR_{MI} (95% CI) n_{MI}=660.9
Province of residence (cont'd)		**$X^2(3)=1.32$**		
Prince Edward Island	92.4% 1.0 Reference n=73	7.6% 0.83 (0.34, 2.03) n=6	91.0% 1.0 Reference n=208.5	9.0% 0.81 (0.36, 1.81) n=20.5
Newfoundland and Labrador (Ref)	91.0% n=446	9.0% n=44	89.5% n=840.8	10.5% n=98.9
Education		**$X^2(3)=8.81$***		
High school or less	89.8% 1.0 Reference n=909	10.2% 1.58 (1.12,2 .23)* n=103	88.9% 1.0 Reference n=1325.7	11.1% 1.66 (1.17, 2.36)** n=165.8
Community college, trade, or non-university certificate	89.8% 1.0 Reference n=1451	10.2% OR=1.57 (1.14, 2.17)** n=164	88.7% 1.0 Reference n=2203.4	11.3% ORMI=1.69 (1.22, 2.35)** n=280.1
Undergraduate degree	91.3% 1.0 Reference n=876	8.7% 1.34 (0.93,1.91) n=84	90.7% 1.0 Reference n=1273.9	9.3% 1.36 (0.95, 1.96) n=130.6
Graduate degree (Ref)	93.3% n=724	6.7% n=52	93.0% n=1121.1	7.0% n=84.5
Household Income		**$X^2(4)=13.32$***		
<$50 000	87.8% 1.0 Reference n=710	12.2% 1.85 (1.26, 2.72)** n=99	86.7% 1.0 Reference n=1183.7	13.3% 1.95 (1.33, 2.87)** n=180.9
$50 000–74 999	91.2% 1.0 Reference n=825	8.8% 1.29 (0.88,1.91) n=80	90.8% 1.0 Reference n=1361.2	9.2% 1.30 (0.88,1.94) n=138.8
$75 000–99 999	90.0% 1.0 Reference n=771	10.0% 1.48 (1.00, 2.19) n=86	89.6% 1.0 Reference n=1184.4	10.4% 1.49 (1.02, 2.17) n=137.7
$100 000–149 999	91.6% 1.0 Reference n=909	8.4 1.21 (0.82, 1.79) n=83	90.8% 1.0 Reference n=1395.4	9.2% 1.29 (0.89,1.87) n=140.9
$150 000 or more (Ref)	93.0% n=531	7.0% n=40	92.7% n=799.3	7.3% n=62.7
Ethnicity		$X^2(1)=0.368$		
Other	89.6% 1.0 Reference n=190	10.4% 1.15 (0.73,1.81) n=22	88.2% 1.0 Reference n=319.8	11.8% 1.20 (0.76,1.88) n=42.6
Caucasian (Ref)	90.9% n=3579	9.1% n=360	90.1% n=5604.2	9.9% n=618.4
History of prostate cancer diagnosis		$X^2(2)=1.93$		
Yes, lifetime	86.9% 1.0 Reference n=53	13.1% 1.72 (0.80, 3.68) n=8	83.9% 1.0 Reference n=194	16.1% 1.67 (0.76, 3.66) n=37.1
No, but other cancer	91.8% 1.0 Reference n=201	8.2% 1.02 (0.61, 1.70) n=18	91.0% 1.0 Reference n=700.4	9.0% 0.88 (0.54, 1.44) n=69.1
Not ever (Ref)	91.9% n=1650	8.1% n=145	90.1% n=5029.7	9.9% n=554.7

*p<0.05; **p<0.01; ***p<0.001. [a]Original data. [b]Multiple imputations based on 73 imputations (pooled analysis).

UP-2. Table 2. Descriptive analyses predicting mild, moderate, or severe depression symptoms by demographics among male participants aged 49–69 in Atlantic Canada between 2009 and 2015 for original data (n=4417) and multiple imputation pooled data (n_{MI}=6585 for depression or anxiety symptoms)

	No depression[a] % OR (95% CI) n=3766	Mild, moderate, or severe depressive symptoms[a] % OR (95% CI) n=651	No depression[b] % OR_{MI} (95% CI) n=5584.8	Mild, moderate, or severe depressive symptoms[b] % OR_{MI} (95% CI) n=1000.2
Age category		$X^2(1)=27.64$***		
49–59 yrs old	82.6% 1.0 Reference n=1921	17.4% 1.58 (1.33, 1.88)*** n=405	82.8% 1.0 Reference n=2836.8	17.2% 1.38 (1.17, 1.63)*** n=588.2
60–69 yrs old (Ref)	88.2% n=1845	11.8% n=246	87.0% n=2748.0	13.0% n=412.0
Relationship status		$X^2(1)=19.56$***		
Divorced, widowed, separated, or single/never married	78.5% 1.0 Reference n=375	21.5% 1.70 (1.35, 2.16)*** n=103	77.7% 1.0 Reference n=639.1	22.3% 1.73 (1.39, 2.17)*** n=4945.6
Married or living with partner (Ref)	86.1% n=3386	13.9% n=546	85.8% n=4945.6	14.2% n=817.0
Province of residence		$X^2(1)=1.60$		
Nova Scotia	85.1% 1.0 Reference n=2499	14.9% 0.96 (0.74, 1.25) n=439	84.4% 1.0 Reference n=3081.9	15.6% 0.98 (0.75,1.27) n=567.9
New Brunswick	86.6% 1.0 Reference n=761	13.4% 0.85 (0.62,1.15) n=118	86.0% 1.0 Reference n=1519.4	14.0% 0.86 (0.62, 1.19) n=247.2
Prince Edward Island	86.4% 1.0 Reference n=70	13.6% 0.86 (0.44, 1.69) n=11	84.4% 1.0 Reference n=193.2	15.6% 0.95 (0.47, 1.94) n=35.7
Newfoundland and Labrador (Ref)	84.5% n=426	15.5% n=78	84.1% n=790.2	15.9% n=149.4
Education		$X^2(3)=19.09$***		
High-school or less	82.7% 1.0 Reference n=848	17.3% 1.67 (1.27, 2.20)*** n=48	82.3% 1.0 Reference n=1227.8	17.7% 1.68 (1.28, 2.21)*** n=263.7
Community college, trade, or non-university certificate	83.9% 1.0 Reference n=1381	16.1% 1.53 (1.18, 1.98)** n=64	83.1% 1.0 Reference n=2064.4	16.9% 1.59 (1.22, 2.07)** n=419.0
Undergraduate degree	87.4% 1.0 Reference n=838	12.6% 1.15 (.86, 1.54) n=29	87.1% 1.0 Reference n=1223.8	12.9% 1.15 (0.86, 1.54) n=180.7
Graduate degree (Ref)	88.8% n=685	11.2% n=10	88.7% n=1068.8	11.3% n=136.8
Household Income		$X^2(4)=29.73$***		
<$50 000	79.9% 1.0 Reference n=657	20.1% 2.03 (1.49, 2.78)*** n=165	93.2% 1.0 Reference n=1086.4	6.8% 2.05 (1.51, 2.78)*** n=278.2
$50 000–74 999	83.7% 1.0 Reference n=770	16.3% 1.58 (1.15, 2.16)** n=150	97.1% 1.0 Reference n=1254.0	2.9% 1.57 (1.15, 2.14)** n=245.9
$75 000–99 99 9	85.9% 1.0 Reference n=739	14.1% 1.33 (0.96,1.83) n=121	96.8% 1.0 Reference n=1139.6	3.2% 1.18 (0.86,1.62) n=182.5

*p<0.05; **p<0.01; ***p<0.001. [a]Original data. [b]Multiple imputations based on 73 imputations (pooled analysis).

UP-2. Table 2 (cont'd). Descriptive analyses predicting mild, moderate, or severe depression symptoms by demographics among male participants aged 49–69 in Atlantic Canada between 2009 and 2015 for original data (n=4417) and multiple imputation pooled data (n_{MI}=6585 for depression or anxiety symptoms)

	No depression[a] % OR (95% CI) n=3766	Mild, moderate, or severe depressive symptoms[a] % OR (95% CI) n=651	No depression[b] % OR_{MI} (95% CI) n=5584.8	Mild, moderate, or severe depressive symptoms[b] % OR_{MI} (95% CI) n=1000.2
Household Income (cont'd)		**$X^2(4)=29.73$*** **		
$150 000 or more (Ref)	89.0% n=510	11.0% n=63	97% 1.0 Reference n=1338.7	3% 1.18 (0.86, 1.62) n=197.6
Ethnicity		**$X^2(1)=5.17$***		
Other	80.3% 1.0 Reference n=179	19.7% 1.49 (1.06, 2.09)* n=44	79.2% 1.0 Reference n=287	20.8% 1.50 (1.07, 2.11)* n=75.4
Caucasian (Ref)	85.8% n=3392	14.2% n=561	85.1% n=5297.8	14.9% n=924.8
History of prostate cancer diagnosis		**$X^2(2)=6.80$***		
Yes, lifetime	74.2% 1.0 Reference n=46	25.8% 2.17 (1.21, 3.89)** n=16	71.8% 1.0 Reference n=166.0	28.2% 2.24 (1.26, 3.99)** n=65.1
No, but other cancer	86.3% 1.0 Reference n=189	13.7% 0.99 (0.66, 1.49) n=30	85.4% 1.0 Reference n=657.0	14.6% 0.98 (0.65,1.48) n=112.5
Not ever (ref)	86.2% n=1583	13.8% n=254	85.3% n=4761.8	14.7% n=822.6

*p<0.05; **p<0.01; ***p<0.001. [a]Original data. [b]Multiple imputations based on 73 imputations (pooled analysis).

Conclusions: The findings highlight the importance of delivering mental health screening and support to prostate cancer survivors during the cancer journey, especially those with low household incomes.

UP-3

Prostate-specific membrane antigen positron emission tomography/computed tomography Registry for Recurrent Prostate Cancer (PREP): Initial findings from a single center

Bobby Shayegan[1], Katherine Zukotynski[2], Camilla Tajzler[1], Jen Hoogenes[1], Edward D. Matsumoto[1], Michael Uy[1], Ur Metser[3], Glenn Bauman[4], Antonio Finelli[5], Maylynn Ding[1], Anil Kapoor[1]

[1]Department of Surgery, Division of Urology, McMaster University, Hamilton, ON, Canada; [2]Department of Radiology, McMaster University, Hamilton, ON, Canada; [3]Department of Molecular Imaging, Princess Margaret Hospital, University of Toronto, Toronto, ON, Canada; [4]Department of Urology, London Health Sciences Centre, Western University, London, ON, Canada; [5]Department of Surgery, Division of Urology, Princess Margaret Hospital, University of Toronto, UHN, Toronto, ON, Canada

Support: Cancer Care Ontario.

Introduction: Several lesion-targeted therapies exist for locally recurrent or limited-stage metastatic prostate cancer (PCa) post-radiotherapy (RT) and radical prostatectomy (RP). However, detection of disease sites is

UP-3. Table 1. Change in management post- PSMA PET/CT and median (range) PSA by cohort allocation

Cohort	n (%)	Change in management n (%)*	Median PSA ng/mL (range)
1. Post-RP node + disease or persistently detectable PSA	4 (1.6)	2 (50%)	2.0 (0.22–4.1)
2. BF post-RP	59 (23.3)	28 (47.5)	0.27 (0.11–9.7)
3. BF post-RP followed by adjuvant or salvage prostate bed RT	52 (20.6)	29 (55.8)	1.5 (0.11–32.7)
4. BF post-RP or RT while on hormone therapy	43 (17)	27 (62.8)	3.5 (0.04–42.6)
5. BF post-RP following lesion-directed treatment of oligometastatic disease	7 (2.8)	3 (42.9)	3.5 (1.2–8.0)
6. BF post-primary RT	51 (20.2)	31 (60.8)	4.9 (0.18–31.5)
7. PET access cohort (independent adjudication process determines PSMA PET/CT could provide clinically meaningful information)	37 (14.6)	17 (45.9)	6.4 (0.13–134.0)
Missing data	0 (0)	51 (20)	
Total (%)	253	137/202 (67.8)	2.7 (0.04–134.0)

*Note: Total N=253. Missing data (n=51) for change in management variable, so the data reflect the n (%) out of 202 patients.

limited using conventional imaging (CI), including computed tomography (CT) and bone scan. Prostate-specific membrane antigen (PSMA) targeting positron emission tomography (PET) radiopharmaceuticals, like 18F-DCFPyL, may help detect disease not seen on CI. Our objective was to assess the ability of PSMA-targeted PET/CT to detect sites of disease recurrence and impact on patient management.
Methods: This multicenter, prospective registry study included six Ontario centers. Eligible patients in one of seven clinical cohorts (Table 1) were identified and approved by Cancer Care Ontario (CCO) to have re-staging with PSMA-targeted PET/CT. Referring physicians were asked to complete a form indicating whether a change in management strategy would occur based on the PET/CT results. At six months post-PET/CT, actual patient management will be confirmed via provincial registries. These interim results are from a single center.
Results: A total of 253 patients were enrolled and had a PSMA-targeted PET/CT. At baseline, median age was 71 years (range 50–102) and median prostate-specific antigen (PSA) was 2.7 ng/mL (range 0.04–134.0). Most patients (n=59; 23.3%) were in cohort 2 (biochemical failure post-RP). Overall detection rate was 68.5% (170/248) in patients with negative CI, resulting in a change in management for 67.8% (137/202) overall, and 72.1% and 64.3% post-RT and -RP, respectively.
Conclusions: PSMA-targeted PET/CT detected occult lesions on CI in the majority of patients enrolled, leading to a high rate of change in management. Our institutional results are in keeping with preliminary results reported for the provincial cohort.

UP-4
Self-reported health literacy as a modifier for prostate cancer screening

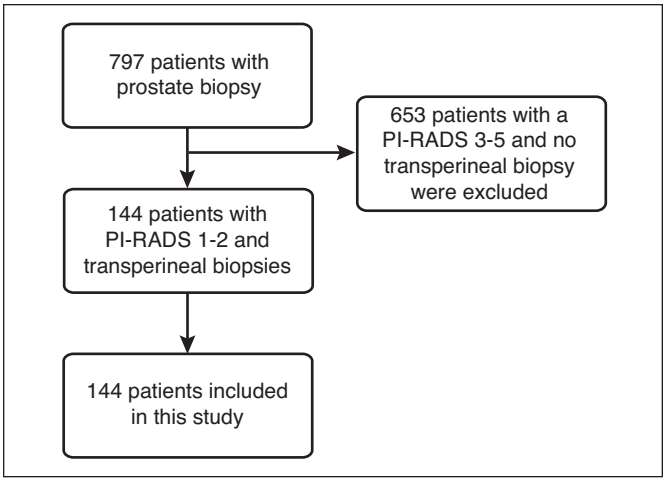
Scott Jamieson[1], Chase Mallory[1], Dhaval Jivanji[1], Alejandra Perez[2], Grettel Castro[1], Noel Barengo[1,3,4], Jorge Pereira[2], Alan Nieder[2]
[1]Translational Research, Florida International University Herbert Wertheim College of Medicine, Miami, FL, United States; [2]Division of Urology, Mt. Sinai Medical Center Columbia University, Miami Beach, FL, United States; [3]Faculty of Medicine, Riga Stradins University, Riga, Latvia; [4]Departmend of Public Health, Faculty of Medicine, University of Helsinki, Helsinki, Finland
Introduction: Prostate cancer remains the most common cancer diagnosed in males. The prostate-specific antigen (PSA) test is the most common screening tool for this cancer. Little scientific evidence is available regarding health literacy and its association with prostate cancer screening rates. We sought to determine whether an association exists.
Methods: This retrospective, cross-sectional study used 2016 Behavioral Risk Factor Surveillance System (BRFSS) data. Our primary exposure was self-reported health literacy and primary outcome was whether patients underwent PSA tests. Males 55–69 years old were included. Participants were excluded if they had missing data for the exposure or outcome. Health literacy was measured by aggregating scores of three survey questions assessing patients' ability to gain access to health information, as well as understand written and verbal health information. Potential confounders included age, race, ethnicity, smoking history, body mass index (BMI), health insurance, education, exercise, income, alcohol use, and marriage. Unadjusted and adjusted logistic regression analysis were used to calculate odds ratios (OR) and 95% confidence intervals (CI).
Results: Final analysis included 12 149 men, of which 5% reported low, 54% moderate, and 41% reported high health literacy levels. Compared with participants with high levels of health literacy, odds of a PSA test were 59% lower for men with low health literacy (OR 0.41, 95% CI 0.28, 0.64). The corresponding OR for those with moderate health literacy was 0.70 (95% CI 0.60, 0.83). Increased age, Black/African American race, Hispanic ethnicity, smoking history, elevated BMI, health insurance, high school education or greater, annual income over $50 000, and marriage were positively associated with PSA testing.
Conclusions: Our research demonstrates a strong positive association between health literacy and the likelihood of PSA screening. Future studies examining how health literacy affects other urological conditions are necessary.

UP-5
Identifying prostate cancer in men with non-suspicious, multiparametric magnetic resonance imaging of the prostate

Paul Doan[1,2], John Lahoud[1], Lawrence H Kim[1,2], Manish I Patel[1,2]
[1]Urology, Westmead Hospital, Sydney, Australia; [2]Surgery, The University of Sydney, Sydney, Australia
Introduction: We aimed to formulate clinical pathways for identifying clinically significant prostate cancer (csPCa) and avoiding insignificant prostate cancer (isPCa) in those without suspicious regions of interest on multiparametric magnetic resonance imaging (mpMRI) of the prostate.
Methods: A retrospective review identified patients with negative mpMRI who underwent subsequent transperineal prostate biopsy across two centers. Patient characteristics and association with biopsy results were evaluated using univariate and multivariate regression analyses.
Results: A total of 144 patients were identified as having negative mpMRI and undergoing subsequent transperineal prostate biopsy; 18% (25/144) of the cohort were found to have csPCa. Logistic regression analysis failed to identify statistically significant predictive factors. In this cohort, if all patients with prostate-specific antigen (PSA) >3.0 were biopsied, the least amount of csPCa is missed, at 20% (5/25); however, all isPCa would be diagnosed. The least amount of isPCa is diagnosed with a biopsy threshold of >15% from the ERSPC calculator, with 20% (5/25) of isPCa diagnoses made; however, only 10.5% (2/19) csPCa would be diagnosed. Using PSA density threshold of >0.10 ng/ml/ml, an intermediate pathway is found where 52% (13/25) of csPCa is diagnosed and 36% (9/26) of isPCa is missed, while 46% (66/144) would avoid biopsy.
Conclusions: False-negative rates of prostate MRI for csPCa are significant within our cohort, at 18%. The decision to biopsy should be made in conjunction with a risk profile acceptable by the patient and clinician. The current study demonstrates that there is a need to balance the risk of missing csPCa and harm of diagnosing isPCa.

UP-6
Clinical outcomes and detection rates of transperineal magnetic resonance imaging/ultrasound fusion targeted prostate biopsy

Nathan C. Wong[1], Vincent Wong[1], Michael King[1], Mitchell Fraiman[1], Ross Bauer[1], Muhammad Choudhury[1], John Phillips[1], Christopher Dixon[1]
[1]Urology, New York Medical College, Valhalla, NY, United States
Introduction: Transperineal (TP) multiparametric magnetic resonance imaging (mpMRI) targeted prostate biopsy may offer advantages over transrectal approaches by minimizing infectious risks without compromising the detection of clinically significant prostate cancer. We report our initial experience of men undergoing transperineal fusion MRI targeted prostate biopsy using a fixed arm (Steady Pro™) ultrasound platform and 3 mm interval perineal grid (Koelis Trinity®).



UP-5. Fig. 1. Number of participants recruited in the study.

UP-5. Table 1. Patient characteristics of 144 patients with MRI PI-RADS 1 and 2

	Negative biopsy (n=93)	Insignificant prostate cancer (n=26)	Significant prostate cancer (n=25)	p (negative vs. significant)
Age in years (mean ± SD)	62.5±8.72	61.5±8.86	62.6±8.35	**0.910**
Digital rectal examination (DRE)				
Benign	33 (64.7)	17 (65.4)	16 (64.0)	
Abnormal	18 (35.3)	9 (34.6)	9 (36.0)	
Family history of prostate cancer	0.478			
Yes	6 (11.8)	5 (19.2)	1 (4.0)	
No	45 (88.2)	21 (80.8)	24 (96.0)	
Prostate size (cc) (mean ± SD)	55.7±26.3	48.9±17.2	49.8±29.1	0.339
Prostate-specific antigen (PSA) (mean ± SD)	5.71±2.98	6.80±4.79	5.90±5.56	0.204
PSA density (mean ± SD)	0.11±0.07	0.14±0.07	0.13±0.10	0.841
PI-RADS total				
1	14 (15.1)	2 (7.7)	3 (12.0)	
2	79 (84.9)	24 (92.3)	22 (88.0)	
Number of systematic biopsies (mean ± SD)	22.4±5.5	25.3±4.83	23.6±6.10	0.274

Methods: We performed a retrospective review of the initial 200 consecutive subjects who fulfilled the criteria for TP MRI/ultrasound fusion targeted biopsy, including subjects with an elevated prostate-specific antigen and lesion on mpMRI. In addition to demographic variables, we assessed indications for biopsy, Prostate Imaging Reporting and Data System (PI-RADS) v2 findings and the criteria for a 'dominant lesion,' cancer detection rates of the MRI-dominant lesion, clinically significant cancers (defined as Gleason grade group [GGG] ≥2), procedure-related complications, and clinical outcomes of biopsy results.
Results: We assessed 200 subjects to represent the initial cohort. There was no patient who underwent biopsy for a normal MRI (PI-RADS 1). There were 13/200 (6.5%), 59/200 (29.5%), 82/200 (41.0%), and 46/200 (23.0%) men who had PI-RADS 2, 3, 4, and 5 lesions, respectively (Fig. 1). Overall, 113/200 (56.5%) subjects had a positive targeted biopsy for prostate cancer of a dominant PI-RADS lesion, including 71 men (35.5%) with GGG ≥2. The median number of cores taken from the dominant lesion was six (interquartile range [IQR] 4–8). The detection of both overall (23%, 52%, 54%, and 76%) and clinically significant cancers (15%, 22%, 35%, and 59%) increased from PI-RADS 2–5. No patient developed sepsis.
Conclusions: TP MRI targeted prostate biopsy offers a safe and accurate method for the detection of prostate cancer, while mitigating the risk of life-threatening sepsis.

UP-5. Table 2. Multivariate analysis of patient characteristics and diagnosis of significant cancer

Characteristic	OR (95% CI)	p
Age	1.046 (0.972–1.127)	0.231
PSA	0.865 (0.593–1.261)	0.450
PSA density	2.333 (0–10.81)	0.899
Prostate size	0.974 (0.931–1.019)	0.247
Number of systematic biopsies	1.040 (0.949–1.139)	0.402
DRE	0.476 (0.157–1.448)	0.191
Family history	5.077 (0.601–42.884)	0.136

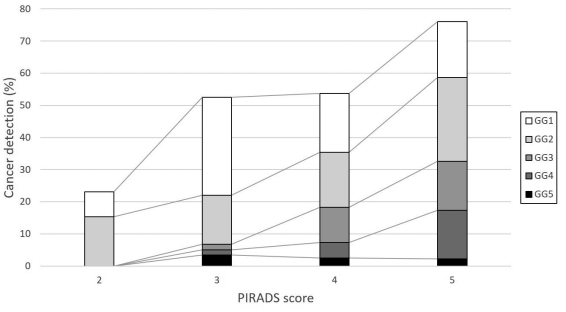
UP-7

A Canadian consensus forum on the management of patients with prostate cancer

Fred Saad[1], Bobby Shayegan[2], Tamim Niazi[3], Krista Noonan[4], Shawn Malone[5], Antonio Finelli[6], Alan I. So[7], Brita Danielson[8], Kim Chi[9], Sebastien J. Hotte[10], Naveen S. Basappa[8], Ilias Cagiannos[5], Christina Canil[5], Guila Delouya[1], Ricardo Fernandes[11], Cristiano Ferrario[3], Geoffrey T. Gotto[12], Robert J. Hamilton[6], Jason P. Izard[13], Anil Kapoor[2], Daniel Khalaf[9], Michael Kolinsky[8], Aly-Khan Lalani[10], Luke T. Lavallée[5], Christopher Morash[5], Scott C Morgan[5], Michael Ong[5], Frédéric Pouliot[14], Ricardo A. Rendon[15], Steven Yip[16], Anousheh Zardan[17], Laura Park-Wyllie[17], Huong Hew[17]
[1]Centre Hospitalier de l'Université de Montréal, University of Montreal, Montreal, QC, Canada; [2]St. Joseph's Healthcare, McMaster University,

UP-5. Table 3. Number of csPC and isPC diagnosed and biopsies avoided with predetermined clinical characteristic cutoffs

Criteria	Significant cancer diagnosed n (%)	Significant cancer missed n (%)	Insignificant cancer diagnosed n (%)	Insignificant cancer missed n (%)	Biopsies avoided n (%)
PSA >3.0 ng/ml	20 (14)	5 (3)	26 (18)	0 (0)	15 (10)
PSA >5.5 ng/ml	7 (5)	18 (13)	13 (9)	13(9)	88 (61)
PSAD >0.10 ng/ml/ml	13 (9)	12 (8)	17 (12)	9 (6)	66 (46)
PSAD >0.15 ng/ml/ml	10 (7)	15(10)	10(7)	16 (11)	105 (73)
ERSPC >5% significant cancer risk	12 (9.2)	7 (5.3)	13 (9.9)	11 (8.4)	52 (40)
ERSPC >10% significant cancer risk	7 (5.3)	12 (9.2)	8 (6.1)	16 (12.2)	92 (70)
ERSPC >15% significant cancer risk	2 (1.5)	17 (13.0)	**5 (3.8)**	19 (14.5)	111 (85)



PIRADS score	2	3	4	5
No.	13	59	82	46
Cancer	3	31	44	35
GG1	1	18	15	8
GG2	2	9	14	12
GG3		1	9	7
GG4		1	4	7
GG5		2	2	1

UP-6. Fig. 1.

Hamilton, ON, Canada; [3]Jewish General Hospital, McGill University, Montreal, QC, Canada; [4]BC Cancer Agency, University of British Columbia, Surrey, BC, Canada; [5]The Ottawa Hospital, University of Ottawa, Ottawa, ON, Canada; [6]Princess Margaret Cancer Centre, University of Toronto, Toronto, ON, Canada; [7]Prostate Centre at Vancouver General Hospital, University of British Columbia, Vancouver, BC, Canada; [8]Cross Cancer Institute, University of Alberta, Edmonton, AB, Canada; [9]BC Cancer Agency, University of British Columbia, Vancouver, BC, Canada; [10]Juravinski Cancer Centre, McMaster University, Hamilton, ON, Canada; [11]London Health Science Centre, Western University, Toronto, ON, Canada; [12]Southern Alberta Institute of Urology, University of Calgary, Calgary, AB, Canada; [13]Kingston Health Sciences Centre, Queen's University, Kingston, ON; [14]Quebec City University Hospital Center & Centre de Recherche of Quebec City University Hospital Center, University of Laval, QC, Canada; [15]Queen Elizabeth II Health Sciences Centre, Dalhousie University, Halifax, NS, Canada; [16]Tom Baker Cancer Centre, University of Calgary, Calgary, AB, Canada; [17]Medical Affairs, Janssen Inc, Toronto, ON, Canada

Support: Janssen.

Introduction: The management of prostate cancer (PCa) continues to evolve with the emergence of new diagnostic and therapeutic strategies, resulting in areas that lack high-level evidence to guide practice. Consensus initiatives can establish practice guidance where evidence is unclear. The Genitourinary Research Consortium (GURC) recently conducted a second Canadian consensus forum to address controversial topics in the management of prostate cancer.

Methods: A core planning group of multidisciplinary physicians (n=8) identified topics for discussion and developed questions for the forum, which included a voting panel of physicians from academic institutions across Canada. Questions spanned across the disease continuum, with

UP-7. Table 1. Top 10 areas of consensus

Practice scenario questions	Consensus agreement	
Which patient population do you recommend for use of apalutamide in addition to ADT in patients with castration-sensitive/naive prostate cancer (CSPC/CNPC)? (q7)	100%	Use in all-comer population
Which patient population do you recommend for use of enzalutamide in addition to ADT in patients with metastatic castration-sensitive/naive prostate cancer (CSPC/CNPC)? (q8)	100%	Use in all-comer population
What is your preferred treatment in addition to ADT in patients with de novo low-volume metastatic (M1) castration-sensitive/naive prostate cancer (CSPC/CNPC) without symptoms from the primary? (q11)	97%	AR pathway inhibitor (e.g., apalutamide or enzalutamide) + treatment of the primary
What is your preferred treatment in addition to ADT in patients with low-volume metastatic (M1) castration-sensitive/naive prostate cancer (CSPC/CNPC) relapsing after local treatment of the primary? (q13)	100%	AR pathway inhibitor (e.g., apalutamide or enzalutamide)
For the majority of patients with newly diagnosed low-volume metastatic (M1) castration-sensitive/naive prostate cancer (CSPC/CNPC) based on conventional imaging, what additional imaging modalities do you use to guide the decision to treat the primary? (q16)	97%	No further imaging, CT and bone scintigraphy are sufficient
What is your preferred AR pathway inhibitor to AR pathway inhibitor sequencing strategy for patients who progress from nmCRPC to mCRPC? (q46)	93%	I do not prefer AR pathway inhibitor to AR pathway inhibitor sequencing
What imaging do you use for the majority of patients to guide treatment decisions for the majority of patients with recent onset of CRPC and rising PSA in order to determine if patient is nmCRPC or mCRPC? (q48)	100%	CT and/or bone scintigraphy
Is there a role for AR pathway inhibitor to AR pathway inhibitor (back-to-back) sequencing within the mCRPC setting, assuming no regulatory or access limitations? (q49)	93%	Yes but, in a minority of patients (i.e., who are ineligible, refuse other options, etc.)
Do you recommend that the majority of metastatic prostate cancer patients with a deleterious germline BRCA1/2 mutation receive a PARP inhibitor during their disease course outside of a clinical trial if none is available? (q60)	97%	Yes, recommend that majority of metastatic prostate cancer patients with a deleterious germline BRCA1/2 mutation receive a PARP inhibitor during their disease course outside of a clinical trial if none is available
For patients with cN1, cM0 prostate cancer who are receiving radiation therapy as radical loco-regional treatment, do you recommend approximately 24 months duration of ADT for the majority of your patients? (qS1)	100%	Yes, recommend approximately 24 months duration of ADT for the majority of patients

a focus on management of oligometastatic/metastatic disease, novel imaging, and genomic testing. The threshold for consensus agreement was set at 75%, and disagreement was <50%. The forum was conducted in two parts: 51 questions were voted upon prior to the live forum and 75 questions were discussed during the live forum.
Results: The voting panel of 29 physicians included urologists/uro-oncologists (n=12), medical oncologists (n=12), and radiation oncologists (n=5). Of the 75 live questions, 37 reached consensus agreement and 12 were areas of disagreement. Of the 51 online questions administered prior to the live forum, 18 questions reached consensus. Consensus was seen in the use of ARAT and docetaxel in metastatic castration-sensitive prostate cancer, imaging modalities for staging, and use of genomic testing to manage metastatic disease. The top 10 areas of consensus from the live forum are shown in Table 1. Additional areas of agreement and disagreement will be reported.
Conclusions: A Canadian consensus forum in prostate cancer identified consensus agreement across 44% of questions. Areas of variability represent opportunities for further research, education, and sharing of best practices. These findings reinforce the value of multidisciplinary consensus initiatives to optimize patient care.

UP-8

Comparison of the cardiotoxicity of abiraterone and enzalutamide in metastatic castration-resistant prostate cancer using real-world data

Dhanika Samaranakaye[1], Jason Hu[1], Armen-G. Aprikian[1,2,3], Marie Vanhuyse[2,4], Alice Dragomir[1]
[1]Urology, McGill University, Montreal, QC, Canada; [2]Oncology, McGill University, Montreal, QC, Canada; [3]Division of Urology, McGill University Health Centre, Montreal, QC, Canada; [4]Division of Medical Oncology, McGill University Health Centre, Montreal, QC, Canada
Introduction: Novel hormonal agents (NHAs), such abiraterone acetate (ABI) and enzalutamide (ENZ), are frequently used in metastatic castration-resistant prostate cancer (mCRPC). Despite their overall tolerable risk profiles, some cardiotoxicity signals were reported for these agents in clinical trials, but little is known about their incidence in clinical practice. The objective was to assess the comparative cardiovascular safety of ABI and ENZ in patients with mCRPC in the real-world.
Methods: A retrospective, population-based cohort was extracted from Quebec public healthcare administrative databases. Patients were selected on the basis of having initiated an NHA (ABI or ENZ) between 2012 and 2016. The primary outcome of interest was cardiovascular-related hospitalization (composite outcome of acute coronary syndrome, cerebrovascular stroke, heart failure, arrhythmia, and others). Inverse probability of treatment weighting (IPTW) with the propensity score was used to adjust for baseline characteristics.
Results: The cohort comprises 2183 patients, with 1773 (81.2%) in the ABI group and 410 (18.8%) in the ENZ group. Crude incidence rates of cardiovascular-related hospitalization were 9.8 events per 100 person-years (PYs) and 7.1 events per 100 PYs for the ABI and ENZ groups, respectively. After applying IPTW, the ABI group was at greater risk of cardiovascular-related hospitalization compared to the ENZ group (hazard ratio [HR] 1.82, 95% confidence interval [CI] 1.09–3.05). The risk of hospitalization for heart failure was greater in ABI (HR 2.88, 95% CI 1.09–7.63).
Conclusions: In our study population, there was a greater risk of cardiovascular-related hospitalizations for ABI users relative to ENZ users, particularly for hospitalization for heart failure. These results provide clinicians with additional insight on the cardiovascular risks of mCRPC patients treated with NHAs in the real-world. Further large studies are required to corroborate these findings.

UP-9

A machine learning approach to predicting progression on active surveillance for prostate cancer

Madhur Nayan[1], Keyan Salari[1,2], Anthony Bozzo[3], Wolfgang Ganglberger[4], Gordon Lu[1], Filipe Carvalho[1], Andrew Gusev[1], Brandon Westover[4], Adam S Feldman[1]
[1]Department of Urology, Massachusetts General Hospital, Boston, MA, United States; [2]Broad Institute of Harvard and MIT, Cambridge, MA, United States; [3]Division of Orthopaedic Surgery, Department of Surgery, McMaster University, Hamilton, MA, United States; [4]Department of Neurology, Massachusetts General Hospital, Boston, MA, United States
Introduction: To date, studies that have developed models to predict progression on active surveillance (AS) for prostate cancer have invariably used traditional statistical approaches. We evaluated whether a machine learning approach could improve prediction of progression on AS.
Methods: We performed a retrospective, institutional cohort study of 790 very low- or low-risk prostate cancer patients managed with AS. The sample was split into a training and test set (ratio 80%/20%). In the training set, we developed a traditional logistic regression classifier (LRC) and alternate machine learning classifiers (MLCs) (support vector machine, random forest, and a full connected artificial neural network) to predict grade progression. Features considered for inclusion were clinical and biopsy characteristics measured at diagnosis, as well as time between diagnostic biopsy and last biopsy and number of biopsies on surveillance. We used backward elimination to select features for the multivariable LRC. For the MLCs, all features were included in model development. We tuned the hyperparameters of the MLCs. Model performance was evaluated in the test set. The primary performance metric was the F1 score. Other performance metrics included sensitivity, specificity, positive predictive value, and negative predictive value.
Results: With a median followup of 6.3 years, 234 developed grade progression. In descending order, the F1 scores were: support vector machine 0.600 (95% confidence interval [CI] 0.593–0.605), artificial neural network 0.507 (95% CI 0.500–0.511), random forest 0.413 (95% CI 0.400–0.418), and traditional LRC 0.182 (95% CI 0.151–0.185). All MLCs had a significantly higher F1 score than the traditional LRC (all $p<0.001$). Compared to the MLCs, the traditional LRC had relatively lower sensitivity and negative predictive value, but higher specificity and positive predictive value.
Conclusions: Alternative MLCs significantly outperformed a traditional LRC in predicting progression on AS for prostate cancer.

UP-10

Nerve size as marker of neurovascular bundle excision during radical prostatectomy

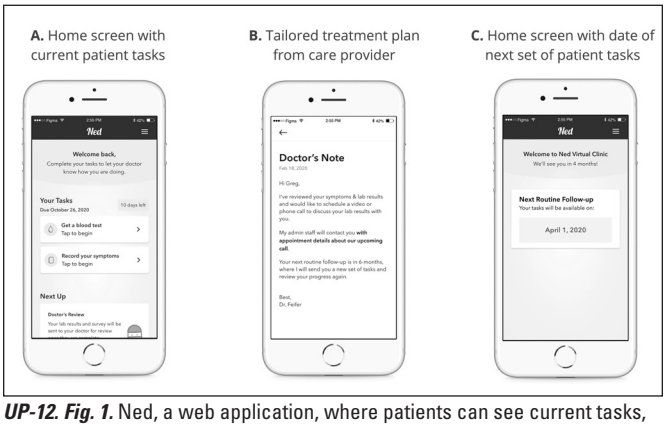
Venetia Hoe[1], Diana Moir[2], Maneka Britto[3], Catriona McLean[2], Peter Royce[3,4], Henry Yao[3,4]
[1]Surgery, University of Melbourne, Melbourne, Australia; [2]Pathology, Alfred Health, Melbourne, Australia; [3]Urology, Alfred Health, Melbourne, Australia; [4]Monash University, Melbourne, Australia
Introduction: Preservation of the neurovascular bundle (NVB) during nerve-sparing (NS) radical prostatectomy (RP) has been established as an important predictor of erectile function recovery. Defining the NVB on pathological specimens will provide an objective marker for evaluating the quality of NS status. This study aims to examine the differences in pathological characteristics of NVB tissue between men who underwent NS surgery vs. non-nerve sparing (NNS) surgery to establish pathological markers of NS surgery.
Methods: Between October 2014 and June 2017, all consecutive patients with clinically localized prostate cancer who underwent RP at a single institution were included. Data collected included demographics, intraoperative NS status, and pathological results. All pathological specimens were prospectively re-reviewed in a blinded fashion by a single pathologist.
Results: A total of 70 patients were included, equating to 140 sides of NVB specimens analyzed. The absence of nerve size >200 um and amount of extra-prostatic tissue in the mid-gland and base of gland were found to be a markers of NS surgery. In the mid-gland and base of gland,

80.4% and 76.5%, respectively, of NS surgery was associated with a maximum nerve size of <200 um, compared with 56.2% and 55% for NNS (p<0.012). Approximately 60% of NS surgery was found to be associated with an extra-prostatic tissue width at mid-gland of 2 mm and an extra-prostatic tissue width at base of gland of 4 mm.
Conclusions: This study demonstrates that maximum nerve size and amount of extra-prostatic tissue at mid-gland and base of prostate are pathological markers of NS surgery.

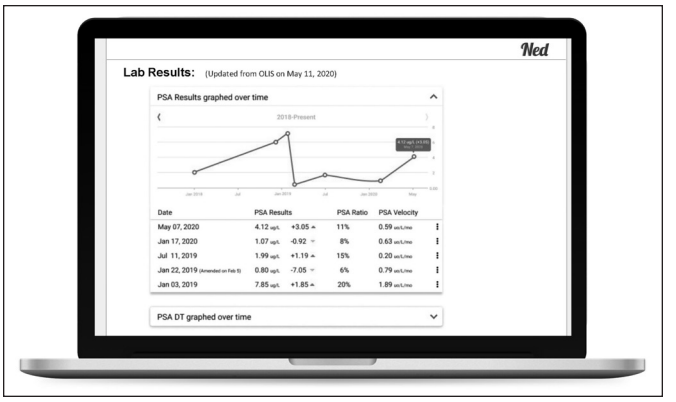
UP-11

Diagnostic Assessment Program for prostate cancer: Lessons learned after two years and degree of compliance to Canadian guidelines

Waleed Shabana[1], Hazem Elmansy[1], Ahmed Kotb[1], Owen Prowse[1], Daniel Tesolin[1], Walid Shahrour[1]
[1]Urology Department, Northern Ontario School of Medicine, Thunder Bay, ON, Canada
Introduction: In 2018, our institute launched the Diagnostic Assessment Program (DAP) for prostate cancer. It enabled quick access to a urologist for patients presenting to a family physician with elevated prostate-specific antigen (PSA) and allowed fast, multidisciplinary patient care. We aim to document our data over two years in comparison to data before implementation of DAP, and its impact on the degree of adherence to Canadian guidelines.
Methods: From April 2016 to April 2020, 880 patients who were evaluated for prostate cancer at Thunder Bay Regional Health Sciences Centre (TBRHSC) were included in this study. Patient characteristics, clinical data, waiting times, and line of treatment before and after implementation of DAP were calculated and statistically analyzed.
Results: The median waiting time to urology consultation was significantly reduced from 68 days (interquartile range [IQR] 27–168, 95% confidence interval [CI] 43–83) to 34 days (IQR 23–44, 95% CI 31–35) (p<0.001). The time from patient referral to prostate biopsy decreased substantially from 34 days (IQR 20–66) to 18 days (IQR 11–25) after DAP (p<0.001). After DAP, the percentage of Gleason 6 detected prostate cancers were significantly increased (19.7% to 30%) (p=0.02). After DAP, there was an increase in intermediate-risk patients electing for external beam radiotherapy increased (57.9% vs. 53.5%, p=0.53) and radical prostatectomy (39.4% vs. 34.5%, p=0.47). A significant increase in the use of hormonal therapy was observed in high-risk patients (67.5% vs. 53.4%, p=0.04). More compliance to Canadian guidelines was observed in intermediate-risk patients (97.3% vs.88%, p=0.008).
Conclusions: Implementation of DAP has led to a notable reduction of waiting time to urology consult and prostate biopsy. There is significant increase in Gleason 6 detected prostate cancer. Increased compliance to Canadian guidelines was detected in intermediate-risk patients.



UP-12. Fig. 1. Ned, a web application, where patients can see current tasks, access their PSA, and report quality of life using EPIC-26.



UP-12. Fig. 2. Screenshot of PSA kinetics as seen in the Ned clinician dashboard.

UP-12

Patient acceptance of a preliminary asynchronous care model for prostate cancer survivors: A pilot study

Jason Hearn[1,2], Quynh Pham[2,3], Joseph A. Cafazzo[2,3], Alejandro Berlin[4,5], Ian R. Brown[6,7], Antonio Finelli[8], Robert J. Hamilton[9], Andrew H. Feifer[10,11]
[1]Faculty of Medicine, Memorial University of Newfoundland, St. John's, NL, Canada; [2]Centre for Global eHealth Innovation, Techna Institute, University Health Network, Toronto, ON, Canada; [3]Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada; [4]Department of Radiation Oncology, University of Toronto, Toronto, ON, Canada; [5]Radiation Medicine Program, Princess Margaret Cancer Centre, Toronto, ON, Canada; [6]Division of Urology, Niagara Health, Niagara, ON, Canada; [7]Faculty of Health Sciences, McMaster University, Hamilton, ON, Canada; [8]Division of Urology, Department of Surgery, Princess Margaret Cancer Centre, Toronto, ON, Canada; [9]Department of Surgical Oncology, Princess Margaret Cancer Centre, Toronto, ON, Canada; [10]Institute for Better Health, Trillium Health Partners, Mississauga, ON, Canada; [11]Division of Urology, Department of Surgery, University of Toronto, Toronto, ON, Canada
Introduction: The potential for virtual care has never been greater. One attractive model is asynchronous care — a sequential process involving: 1) patient-completed tasks (e.g., laboratory tests, imaging, surveys); 2) a review by a provider; and 3) a treatment plan sent to the patient *or* a virtual visit to investigate ongoing issues. One area likely to benefit from such care models is prostate cancer (PCa) survivorship. Asynchronous care has been effective for PCa survivors internationally but has yet to be adequately investigated in Canada.
Methods: A user-centered design process was used to develop *Ned*. *Ned* comprises a web application where patients can see current tasks, access their prostate-specific antigen (PSA), and report quality of life using the expanded PCa index composite (EPIC-26) (Fig. 1). Clinicians can visualize PSA kinetics, be alerted of worrisome EPIC-26 results, and send treatment plans to patients (Fig. 2). To assess patient interactions with *Ned*, a pilot study was completed among PCa survivors in Mississauga, ON. Participants were provided with access to *Ned* and asked to complete the EPIC-26 each month.
Results: A total of 38 PCa survivors (aged 68±10 years) were enrolled between October 2017 and June 2019. Mean enrolment duration was 21 months (range 1–34). Mean compliance with the monthly EPIC-26 was 85±20%. A total of 536 alerts (0.67 per patient-month on *Ned*) were triggered, most commonly in the domains of hormonal function (150), bowel function (148), and urinary incontinence (132). Number of alerts was positively correlated with status post-surgery (R^2=0.35, N=3) and negatively correlated with status post-radiation (R^2=-0.16, N=18).

Conclusions: An asynchronous care model was well-adopted by a group of Canadian PCa survivors and effective in exposing important quality-of-life issues. *Ned* may enable prompt intervention upon identified patient issues, as well as reduce unnecessary clinic visits for stable PCa survivors. Further work to validate and iterate the design of *Ned* is ongoing.

UP-14

Surgical decision-making rules and pattern recognition for error avoidance: Task analysis of a robotic prostatectomy

Avril J. Lusty[1], *Rodney H. Breau*[1]
[1]Urology, The Ottawa Hospital, Ottawa, ON, Canada

Introduction: Robotic surgery is at the forefront of surgical innovation and a robotic prostatectomy presents novel challenges for both postgraduate learners and seasoned specialists alike. At this time, robotic curricula have yet to be formalized, and as such, we aimed to determine the surgical decision-making rules and patterns used by experienced urologic oncologists to complete a robotic prostatectomy.

Methods: A cognitive task analysis (CTA) method was used to perform a series of semi-structured interviews in which incident-probing questions allowed urologic oncologists to describe visual cues and pattern recognition, and the surgical decision-making processes used during a robotic prostatectomy. Four urologic oncologists from The Ottawa Hospital experienced in robotic prostatectomy underwent five CTA interviews, each lasting 1–2 hours. Each interview was transcribed, reviewed by two authors, and subsequent thematic analysis and coding grids were performed for the 20 interviews. A single CTA grid was then formulated.

Results: The final CTA grid describes a map of a robotic prostatectomy, including the steps and goals of the procedure, landmarks for steps of the procedure, key visual cues for each step, complications or difficulties that could be encountered for each step and complication prevention and management. Specific content not yet described in the literature also includes how the lack of haptic feedback is compensated by the expert robotic surgeons.

Conclusions: The CTA of a robotic prostatectomy documented the surgical decision-making rules, patterns, and visual cues urologic oncologists use to avoid errors, compensate for difficult patient anatomy and/or disease, and to manage intraoperative surgical complications. This data can be used to produce robust robotic educational curricula.

UP-15

Identifying clinician-related barriers to active surveillance for prostate cancer: A qualitative study

Dhanika Samaranakaye[1], *Trent Pattenden*[1], *Isaac Thangasamy*[1], *Stacy Loeb*[2,3,4], *Elizabeth Pritchard*[5,6]
[1]Urology Department, Ipswich Hospital, Ipswich, Australia; [2]Department of Urology, New York University, New York, NY, United States; [3]Department of Population Health, New York University, New York, NY, United States; [4]Manhattan Veterans Affairs, New York, NY, United States; [5]Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia; [6]Department of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

Introduction: Many men with low-risk prostate cancer continue to receive radical treatment despite the safety of active surveillance (AS). Recent data suggests that global rates of AS in eligible patients range from 39–67%. Patient-related barriers to AS have been reported extensively. However, there is limited data exploring clinician-related barriers to AS. This study aims to identify these barriers.

Methods: Urologists and radiation oncologists in Australia and New Zealand were purposively sampled for a cross-section on gender and practice setting (metropolitan/regional; public/private). Using a grounded theory-methodology, semi-structed interviews were conducted with participants and typed verbatim. Transcripts were coded independently by two researchers using open, axial, and selective coding using NVivo software. A constant comparative approach was used to analyze data as it was collected. Thematic saturation was reached after 18 interviews, and a detailed model of clinician-associated barriers to AS for prostate cancer was developed.

UP-15. Table 1. Example of quotes from identified themes

Theme	Quotes
Access to multidisciplinary meeting	"…there's so many [cases]. The MDT is going over time just with the complex cases. My regional center is limited...because there's just not enough resource, everyone is so busy that you can't meet so many times a month to discuss all these cases."
Financial drivers	"Some people would offer surgery because it's financially beneficial for them [as a surgeon]." "I think from the surgeon's point of view, active surveillance potentially will be quite lucrative… patients do come back for regular biopsies and 50% of them will still require surgery down the track." "…the cost of radical, curative therapy varies from absolutely nothing to $35 000 out of pocket for the same cancer outcome. And I think that is a really massive problem which affects active surveillance."
Reduced patient acceptance	"…I honestly believe that if a man understands the risks, and it's wrecking their quality of life worrying about this cancer or they're phobic about biopsies… then I don't think it's wrong to move towards active treatment." "I think you have to take responsibility for the mental health of the patient as well. I think torturing them about that, 'Well we think surveillance but of course we can't give any guarantees. It might get worse. You would be cured now if you had surgery almost certainly'."
Fear of future litigation	"But clinicians are fearful of the repercussions of getting active surveillance wrong… It's a pretty sickening feeling when this person has ISUP 1 cancer this year and has Gleason 8 cancer next year… so I think there's a defensive aspect to it."

Results: Nine urologists and nine radiation oncologists accepted that AS is an evidence-based management strategy for low-risk prostate cancer, with some key themes emerging when considering physician-related barriers to AS. These included access to multidisciplinary team meetings, financial drivers, reduced patient acceptance, and fear of future litigation (see Table 1 for examples of quotes). In particular, radiation oncologists advocated that patients receive a formal opinion regarding radiation therapy to improve patient awareness and education. Interestingly, most clinicians overestimated the rates of AS in their region when compared to the published rates.

Conclusions: We identified physician-related barriers to AS for prostate cancer. Some of these barriers may inform future interventions, including implementation of physician decision aids and improved patient support programs, to improve rates of AS in our region and globally.

UP-16

Comparison of luteinizing hormone-releasing hormone agonist and antagonist agents' efficacy to suppress testosterone levels in prostate cancer patients using mass spectrometry

Jérémie Beck[1], Mélanie Rouleau[1], Bertrand Neveu[1], Francis Lemire[1], Michel Déry[2], Benoît Thériault[1], Gabriel Dubois[1], Dominique Guérette[2], Frédéric Pouliot[1]

[1]Division of Urology, Department of Surgery and Cancer Research Center, Centre Hospitalier Universitaire (CHU) de Québec-Université Laval, Quebec, QC, Canada; [2]Biochemistry Service, Medical Laboratory Department, Centre Hospitalier Universitaire (CHU) de Québec-Université Laval, Quebec, QC, Canada

Introduction: Mass spectrometry (MS) is the gold-standard measurement method for steroid levels. Luteinizing hormone-releasing hormone (LHRH) agonists and antagonists are effective for castrate prostate cancer (PCa) patients but comparison between agents has not been performed using MS. The objective of this study is to compare the castration efficacity of LHRH agonists, antagonists, and bilateral orchiectomy by measuring testosterone levels with MS in prostate cancer patients.

Method: This is a retrospective analysis of 191 prostate cancer patients undergoing non-curative androgen deprivation therapy (ADT) between 2015 and 2019. Patients received at least one injection before testosterone measurement and never received abiraterone acetate or chemotherapy. Patients either received subcutaneous (SC) goserelin, SC leuprolide (Eligard®), intramuscular (IM) leuprolide (Lupron®), SC degarelix (Firmagon®), or bilateral orchiectomy as part of their PCa treatment. Testosterone was measured using MS measurement method. Testosterone values below the limit of quantification were substituted with half of the lower limit of quantification value (LLOQ; MS: 0.1 nM).

Results: The mean testosterone levels of degarelix (22 patients), goserelin (56 patients), leuprolide SC (89 patients), leuprolide IM (16 patients), and bilateral orchiectomy (six patients) were all below the significant threshold of 0.7 nM, being measured at respectively 0.334, 0.243, 0.256, 0.272, and 0.343 nM (p=0.599). Only two patients using degarelix (9.09%) and two patients using leuprolide SC (2.25%) had testosterone levels above 0.7 nM thresholds. No significant difference was identified for the percentage of testosterone breakthrough between ADT agents.

Conclusions: No significant difference in testosterone levels determined by MS was shown between several ADT agents or surgical castration. The average testosterone levels after castration are much below the recommended 0.7 nM and should prompt redefinition of optimal testosterone levels to target after castration.

UP-17

National consensus quality indicators to assess quality of care for active surveillance in low-risk prostate cancer: A modified Delphi survey of Canadian urologists/radiation oncologists

Narhari Timilshina[1,2,3], Antonio Finelli[1,2,4], George Tomlinson[5], Anna Gagliardi[3], Beate Sander[5], Shabbir M. Alibhai[2,3]

[1]Division of Urology, University Health Network, Toronto, ON, Canada; [2]Institute of Health Policy, Management, and Evaluation, University of Toronto, Toronto, ON, Canada; [3]Department of Medicine, University Health Network, Toronto, ON, Canada; [4]Department of Surgical Oncology, University Health Network, Toronto, ON, Canada; [5]Toronto Health Economics and Technology Assessment (THETA), University Health Network, Toronto, ON, Canada; The Princess Margaret Cancer Centre Quality of Care Initiative on Active Surveillance

Introduction: Despite the large proportion of low-risk prostate cancer (PCa) patients worldwide who currently receive active surveillance (AS), adherence to clinical guidelines on AS and variations in care at the population level remain poorly understood. We sought to develop system-level quality indicators (QIs) and performance measures for benchmarking the quality of care during AS.

Methods: We identified candidates for an expert panel among urologists and radiation oncologists currently practicing across Canada. Potential QIs were identified from a literature search and expert consultation. Potential indicators were ranked and refined through a modified Delphi process during which each panelist independently rated each indicator based on clinical importance. QI items were chosen if they met prespecified criteria (disagreement index <1 and median importance of 7 or greater on a nine-point scale).

Results: Among 42 invited expert panel members, the response rate was 48% (n=19). Expert panel members were well-represented by type of physician (84% urologists, 16% radiation oncologists) and practice setting (67% academic, 33% non-academic). The expert panel endorsed 20 of 27 potential indicators. The final set includes indicators covering structure of care (n=1), process of AS care (n=13), and outcomes (n=6).

Conclusions: We developed a set of QIs to measure AS care using published guidelines and clinical experts. Use of the indicators will be assessed for feasibility in healthcare databases. Reporting quality of care with these AS indicators may enhance adherence, reduce variation in care, and improve patients' outcomes among low-risk PCa patients on AS.

UP-18

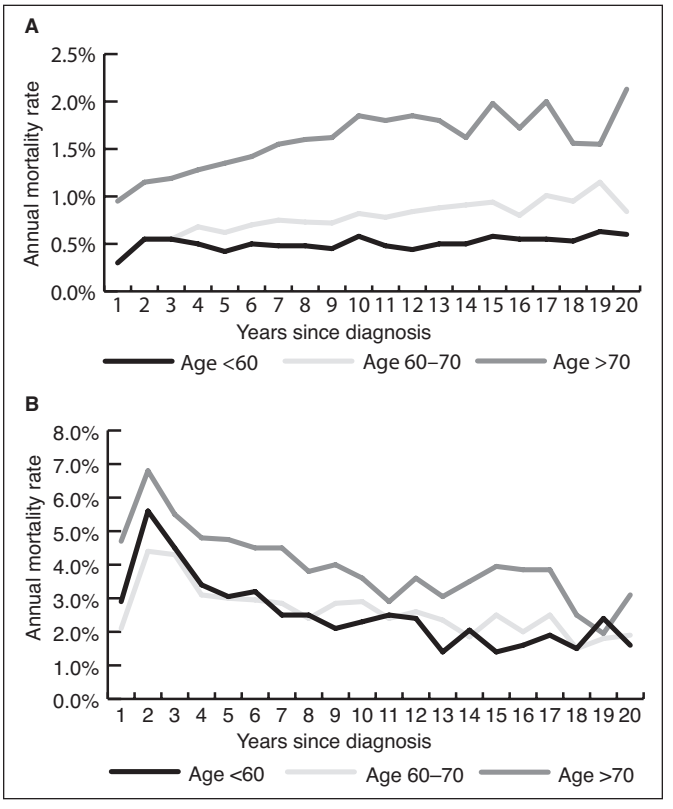
Patterns of mortality after prostate cancer: A SEER-based analysis

Roderick Clark[1,2], Steven A Narod[2,3]

[1]Department of Surgery, University of Toronto, Toronto, ON, Canada; [2]Familial Breast Cancer Research Unit, Women's College Research Institute, Toronto, ON, Canada; [3]Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada

Introduction: Low-grade prostate cancer is widely considered to be an indolent disease, based on excellent short-term survival rates. To obtain an accurate representation of prostate cancer mortality, it is important to follow patients for sufficient time to capture most prostate cancer-related deaths. The objective of our study was to analyze prostate cancer mortality rates up to 25 years from diagnosis using a large, population-based cohort of unselected prostate cancer patients.

Methods: We conducted a population-based, cohort study using data from the Surveillance, Epidemiology and End-Results (SEER) program. We



UP-18. Fig. 1. Annual prostate-specific mortality rate by age for men with ***(A)*** Gleason score ≤6; and ***(B)*** Gleason score ≥7.

UP-18. Table 1. Demographic information for entire cohort

Group	Frequency (%)	Number of deaths from prostate cancer (%)	Annual all-cause mortality rate (%)	Annual prostate-specific mortality rate (%)	10-year prostate cancer specific survival rate	20-year prostate cancer specific survival rate	Median years to prostate specific death (IQR)	% of prostate cancer deaths years 1–10	% of prostate cancer deaths years 10–20
Overall	116796	21896 (18.7%)	6.5%	1.5%	84.6%	74.5%	6.5 (2.5–12)	69.3%	25.6%
Age									
<60	16 930 (14.4%)	2622 (15.4%)	2.3%	0.9%	90.2%	83.7%	7.5 (2.9–10)	60.3%	33.1%
60–70	43 566 (37.3%)	7371 (16.9%)	5.2%	1.2%	88.5%	78.7%	7.8 (3.3–13.6)	60.5%	33.6%
70+	56 300 (48.2%)	11 903 (21.1%)	11.7%	2.1%	78.7%	63.9%	4.8 (1.9–9.5)	76.7%	19.1%
Ethnicity									
White	94 823 (81.1%)	17 185 (18.1%)	6.4%	1.4%	85.4%	75.6%	6.2 (2.5–11.6)	68.6%	26.2%
Black	14 545 (12.4%)	3469 (23.8%)	7.1%	1.9%	79.6%	67.3%	5.5 (2.1–10.9)	72.1%	23.3%
Other[1]	6317 (5.4%)	1138 (18.0%)	6.5%	1.4%	85.0%	74.8%	6.0 (2.3–11.4)	69.5%	25.9%
Unknown	1111 (0.9%)	104 (9.3%)	6.1%	1.1%	87.2%	82.5%	4.3 (2.0–7.4)	83.6%	15.4%
Gleason score									
≤6	81 056 (69.3%)	10 020 (12.3%)	5.8%	0.9%	91.1%	82.2%	8.3 (4.2–13.4)	59%	36.1%
≥7	23 285 (19.1%)	7995 (34.3%)	8.5%	3.1%	67.1%	52.6%	4.4 (1.9–8.8)	79.2%	19%
Missing	775 (0.6%)	330 (42.5%)	10.7%	5.5%	55.7%	44.4%	2.7 (1.2–6.8)	86.9%	11.2%
Unknown	11 680 (10%)	3551 (30.4%)	10.0%	3.4%	72.4%	62.2%	3.7 (1.2–10.4)	56.4%	30.6%
Metastases									
No metastases	94 934 (81.2%)	13 468 (14.1%)	6.0%	1.1%	89.5%	79.5%	8.2 (4.3–13.2)	60.5%	35%
Metastases present	7416 (6.3%)	4822 (65.0%)	17.8%	9.1%	22.1%	13.2%	1.8 (0.9-3.8)	95.6%	4.1%
Unknown	14 446 (12.3%)	3606 (24.9%)	7.8%	2.0%	78.2%	65.6%	6.0 (2.5–12.5)	66.9%	19.8%
Treatment									
No surgery	60 148 (51.4%)	13 650 (22.6%)	9.2%	2.1%	79.1%	63.8%	5.3 (6.1–15.6)	51.2%	46.4%
Radical prostatectomy	38 885 (33.2%)	4112 (10.5%)	3.6%	0.6%	94.4%	87.6%	10.4 (6.1–15.6)	47.7%	44.3%
Other surgery[2]	17 763 (15.2%)	4134 (23.2%)	8.7%	1.8%	77.3%	68.6%	4.3 (1.8–9.5)	76.1%	13.1%

[1]Includes individuals who identify as American Indian, Alaskan native and Asian heritage. [2]Includes individuals who underwent unknown surgery, TURP or cryo, subtotal/simple prostatectomy, and cystoprostatectomy.

identified 116 796 prostate cancer cases diagnosed from 1992–1997 and followed them until 2017. Our primary outcome was prostate cancer-specific survival. We calculated annual prostate cancer mortality rates and actuarial survival rates using by age of diagnosis, tumor grade, and race. **Results:** The annual prostate cancer mortality rate was 1.5%. The rate was higher than this for older men (2.1%), Black men (1.9%), and for men with cancer of Gleason score 7 and above (3.1%) (Fig. 1). There were 21 896 deaths from prostate cancer (23% of all deaths). Most deaths (55.6%%) occurred in men with low-grade disease. Among men with high-grade cancers, most deaths (54.3%) occurred in the first five years. Among men with low-grade cancers, most deaths (70.1%) occurred after five years. **Conclusions:** In this large cohort study, the annual prostate-specific mortality for men with low- grade disease increased with time since diagnosis. Most deaths from prostate cancer in the U.S. occur in men with low-grade disease.

UP-19

Qualitative and quantitative evaluation of a prostate cancer patient empowerment program

Gabriela Ilie[1,2,3], Robert Rutledge[2], Ross Mason[1], Ricardo A. Rendon[1], Greg Bailley[1], David Bell[1], David Bowes[2], Nikhilesh Patil[2], Derik Wilke[2], Cody MacDonald[3]

[1]Urology, Dalhousie University, Halifax, NS, Canada; [2]Radiation Oncology, Dalhousie University, Halifax, NS, Canada; [3]Community Health and Epidemiology, Dalhousie University, Halifax, NS, Canada

Support: Dalhousie Research Medical Foundation.

Introduction: While prostate cancer patients have some of the longest survivorship rates among all forms of cancer, literature in recent years has pointed out to an increased crisis among these survivors who are battling mental health issues long after their treatments have been completed, especially depression. Yet little is being done to address the mental health issues that are co-occurring with the prostate cancer diagnosis or survivorship. Here we report a qualitative assessment resulting from three focus group interviews following a 28-days Prostate Cancer Patient Empowerment Program (PC-PEP) pilot study delivered to 30 men in Halifax, Canada.

Methods: Thirty patients and survivors of prostate cancer in Halifax, Canada (Mean age=68.93) participated in a 28-days PC-PEP intervention. Patients demographics listed in Table 1. Paper administered questionnaires assessed participants' interest in the program, specific aspects of

UP-19. Table 1. Demographic characteristics of the PC-PEP feasibility study sample, n=30

Age	Mean: 68.93 years, range: 56–83
Ethnicity	White/Caucasian: n=28 (93.3%) Black/African: n=1 (3.3%) Middle Eastern/Arab/Indian: n=1 (3.3%)
Education	Secondary/some college or a trade school degree: n=10 (33.3%) University: n=20 (66.7%)
Relationship status	Married: n=27 (90%) Living with a partner: n=2 (6.7%) Dating: n=1 (3.3%)
Employment status	Retired: n=20 (66.7%) Unemployed: n=1 (3.3%) Part- or full-time employment: n=9 (30%)
Household income	30K–79K: n=8 (26.7%) 80K–100K: n=9 (30%) >100K: n=12 (40%) Prefer not to say: n=1 (3.3%)
Time between diagnosis and survey	Less than 7 months: n=4 (13.3%) 7–12 months: n=4 (12.3) 25–166 months: n=22 (73.3)
Type of treatment for PCa	Active surveillance: n=4 (13.3%) Radical prostatectomy: n=10 (33.3%) Radiation (beam, brachy, or seed): n=1 (3.3%) Hormonal manipulation: n=2 (6.7%) Radiation and hormones: n=5 (16.7%) Radical prostatectomy and hormones: n=4 (13.3%) Radical prostatectomy, radiation and hormones: n=4 (13.3%)
Level of physical activity at work or leisure	Not very active (less than 30 min of moderate aerobic or strength exercise a week): n=10 (33.3%) Moderately active (30 min up to 150 minutes of moderate aerobic or strength exercise a week): n=13 (43.3%) Very active (150 minutes or more of moderate aerobic or strength exercise a week): n=7 (23.3%)
Attendance to support groups	No: n=20 (66.67%) Yes: n=10 (33.2%)
Weight (pre and post)	Pre-intervention: mean: 91.52 kg, range: 59–154 Post-intervention: mean: 89.86 kg, range: 59–152
Body mass index	Pre-intervention: mean: 29.51, range: 20.40–49.20 Post-intervention: mean: 28.96, range: 20.40–48.80

the program and its education/training, competence of the team delivering the program, perceived importance/usefulness of PC-PEP for participants, importance/uselfulness of the program if it were to be administered to patients from day one of diagnosis, and likelihood to recommend the program to other men diagnosed with prostate cancer at pre- and post-intervention.

Results: The program received high endorsement from the patients and was reported to have been extremely useful for the participating men. Participants reported unmet needs including emotional vulnerability; difficulty to communicate emotions and relate to other people; perceived lack of agency over health care; emotional fragility; and reticence to talk about PCa issues.

Conclusions: Integration of patient education and empowerment programs in patient and survivorship care are warranted. Such programs have the potential to provide better quality of life and support patients during survivorship.

UP-20

The oncological and pathological outcomes of prostate cancer patients undergoing delayed robotic-assisted radical prostatectomy after initial management by active surveillance

Ali Abdullah[1], Ahmed Zakaria[1], David-Dan Nguyen[2], Iman Sadri[2], Adel Arzeki[2], Joelle Vincelli[1], Assaad El-Hakim[3], Kevin Zorn[1]

[1]Department of Surgery Division of Urology, Centre Hospitalier de l'université de Montréal, Montreal, QC, Canada; [2]Faculty of Medicine, McGill University, Montreal, QC, Canada; [3]Department of Robotic Surgery, Hôpital Sacré Coeur de Montréal, Montreal, QC, Canada

Introduction: Active surveillance (AS) is a widely accepted management option for prostate cancer (PCa) patients with low-risk and for selected cases of intermediate-risk disease. However, it is estimated that around 30% of these patients tend to progress during their followup, of which around 50% experience biochemical recurrence after definitive treatment. The aim of this study was to describe the oncological and pathological outcomes in patients undergoing deferred robotic-assisted radical prostatectomy (RARP) after AS.

Methods: We conducted a retrospective chart review on a RARP database of 1737 patients who underwent RARP for localized prostate cancer between 2007 and 2019 and identified patients under AS before RARP (Table 1). Final pathology with adverse findings, including pT3 or more, ISUP grade 3 or more, positive surgical margin (PSM), and positive lymph node, were collected. Other outcomes included are overall survival (OS), cancer-specific survival (CSS), and biochemical recurrence (BCR).

Results: Two hundred and eight patients with a mean age of 61.4 years (standard deviation [SD] 6.1) were included. D'Amico risk stratification was as following: low (41%), intermediate (72%), and high (7%). The median time spent in AS was 24.6 months (range 2.9–173.8). The total PT3 disease, ISUP grade 3 and greater, and PSM were 38.6%, 17.2%, and 25.2%, respectively. Thirty patients underwent lymph node dissection, three of which were found positive (1.5%). The median followup time after RARP was 24.7 months (interquartile range [IQR] 9–53.3). The OS was 99.5% and CSS was 100%. Only 7% of the cohort had BCR and the mean time for a detectable prostate-specific antigen was 41.2 months (SD 20.3) (Table 2).

Conclusions: When comparing our results with similar cohorts, the short-term pathological and oncological outcomes of men previously managed with AS do not seem to be adversely affected when treated with RARP.

UP-21

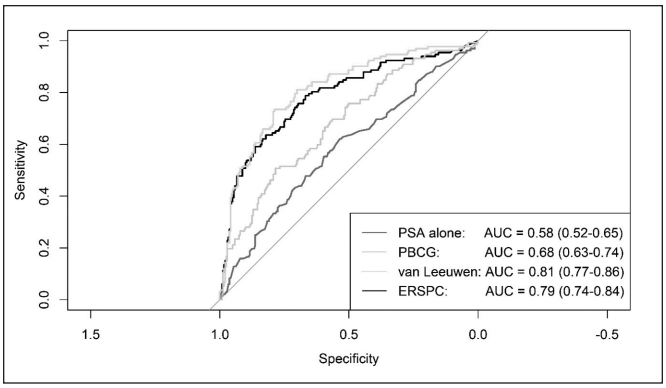
A direct comparison of prostate cancer prediction models in a population undergoing multiparametric magnetic resonance imaging and only transperineal prostate biopsy

Paul Doan[1,2], John Lahoud[1], Lawrence H Kim[1,2], Manish I Patel[1,2]

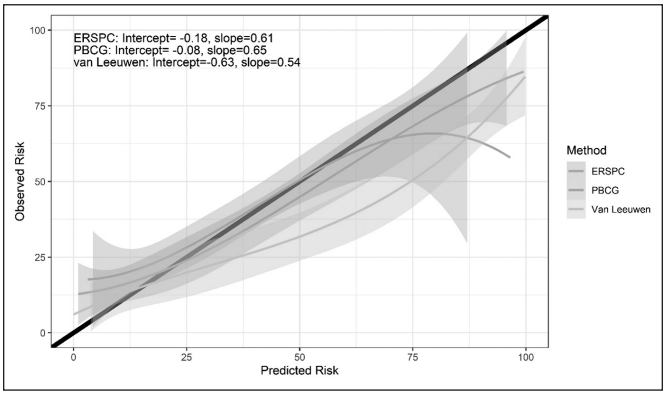
[1]Urology, Westmead Hospital, Sydney, Australia; [2]Surgery, The University of Sydney, Sydney, Australia

Introduction: We aimed to externally validate and compare the performance of the European Randomized Study of Screening for Prostate cancer risk calculator 3/4 (ERSPC-RC3/4), the Prostate Biopsy Collaborative Group risk calculator (PBCG RC) and the van Leeuwen model to determine which prediction model would perform the best in a contemporary Australian cohort undergoing only transperineal biopsy.

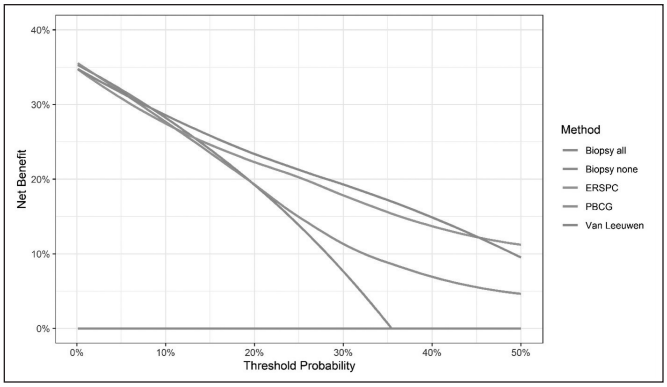
Methods: A retrospective review identified all patients undergoing transperineal biopsy across two centers. Of the 797 men identified, 373 had the data required to test all three risk calculators. The probability of clinically significant prostate cancer (csPCa), defined as ISUPGG>1, was calculated for each patient. For each prediction model discrimination



UP-21. Fig. 1.



UP-21. Fig. 2.



UP-21. Fig. 3.

was assessed by area under the curve (AUC), calibration by numerical and graphical summaries, and net benefit by decision curve analysis.
Results: Discrimination for detecting csPCa showed the AUC of the ERSPC-RC3/4 to be 0.79 (95% confidence interval [CI] 0.74–0.84), van Leeuwen to be 0.810.81 (95% CI 0.77–0.86) and the PBCG RC to be 0.68 (95% CI 0.63–0.74) compared to prostate-specific antigen (PSA) alone, which was 0.58 (95% CI 0.52–0.65). The ERSPC-RC3/4 was the best calibrated in the clinically relevant range of 12.5–50%, while the van Leeuwen model was the best calibrated in the lower risk range of 0–25%. The van Leeuwen model demonstrated the greatest net benefit from 10% risk onwards, followed closely by the ERSPC-RC3/4 and then the PBCG model.
Conclusions: The ERPSC-RC3/4 demonstrated good performance and was comparable to the van Leeuwen model in all domains of discrimination, calibration, and net benefit for an Australian population undergoing transperineal prostate biopsy. It is one of the most accessible risk calculators, with an easy-to-use online platform, thus we recommend the use of the ERSPC-RC3/4 to predict risk in the clinical setting.

UP-22. Table 1. Patient characteristics

Variable	Statistic
T stage: T1/T2/T3/T4 (%)	11/30/32/9
N1, n (%)	162 (22.4)
M1, n (%)	344 (47.5)
Opioids, n (%)	357 (49.3)
Bone health agent, n (%)	70 (9.7)
Prior treatment (surgery or radiation), n (%)	397 (54.8)
CCI 0–1/2–3/4–6/≥7 (%)	3/47/38/12
Use at any time of abiraterone acetate/enzalutamide	84.9/60.4
Use at any time of docetaxel/cabazitaxel	80.4/29.8

UP-22

Characteristics and outcomes of real-world patients with metastatic castrate-resistant prostate cancer (mCRPC) in Alberta, Canada

Lawrence Mbuagbaw[1], Winson Y. Cheung[2,3], Shiying Kong[3], Jennifer Lowther[4], Richard M. Lee-Ying[2,3]
[1]Biostatistics, McMaster University, Hamilton, ON, Canada; [2]Medical Oncology, Tom Baker Cancer Centre, Calgary, AB, Canada; [3]University of Calgary, Calgary, AB, Canada; [4]Bayer Inc, Mississauga, ON, Canada
Introduction: The purpose of this real-world study was to describe the clinical characteristics and outcomes for metastatic castrate-resistant prostate cancer (mCRPC) patients who received at least two lines of life-prolonging therapy (LPT) for mCRPC in the province of Alberta.
Methods: We used administrative databases in Alberta (2011–2020) to collect and describe patient characteristics (age, use of opioids, Charlson comorbidity index [CCI], lines of therapy, and use of bone health agents) and clinical outcomes (overall survival [OS] from start of second-line LPT, event-free survival [EFS1: time from second-line LPT to third-line LPT or death; EFS2: time from second-line LPT to fourth-line LPT or death]; and time to external beam radiation therapy [EBRT]). Cox regression models were used to analyze time to event outcomes.
Results: Data from 724 men with a mean age of 65.4 years (standard deviation [SD] 8.8) in Alberta were included. Patients received a mean of 2.7 (SD 0.8) lines of therapy and were mostly treated at an urban center (71.7%). Additional patient characteristics are described in Table 1. Use of opioids had an association with worse outcomes on all clinical endpoints, increasing age with OS alone, and the use of bone health agents with EFS1 alone. In the cohort, 69.1% have died and of the patients who died, 427 (85.4%) died of their cancer. The median OS was 14.9 months (interquartile range [IQR] 7–27.3). The median EFS1 (n=617/85.2%) was 7.1 months (IQR 3.8–13.3), while median EFS2 (n=539/74.4%) was 12.7 months (IQR 6.7–21). In the cohort, 353 (48.8%) required EBRT and the median time to first EBRT was 13.6 months (IQR 1–10)
Conclusions: These findings describe mCRPC patients receiving at least two lines of LPT and their outcomes in a real-world setting. These data can be used to inform the design of future pragmatic trials that better represent real-world patients. These data will also be used in future research combining population-based data from three additional Canadian provinces. (REACTIVATE NCT04281147).

UP-23

Management of castrate-resistant prostate cancer: Real-world evidence in a regional cancer center

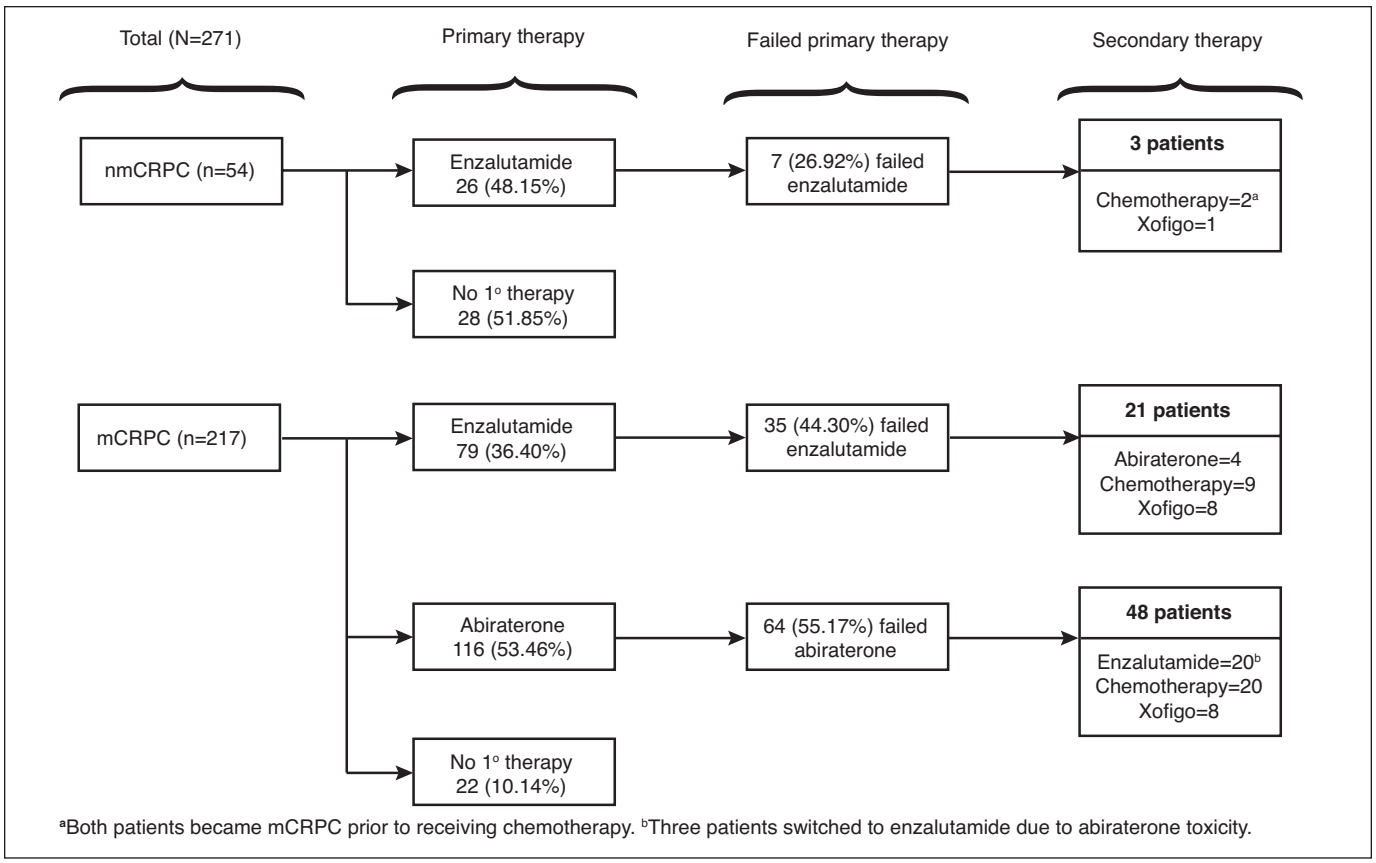
Emily Evans[1], Christopher Tran[1], Adree Khondker[1], Jethro CC Kwong[2], Amna Ali[3], Andrew H. Feifer[2,3,4]
[1]Temerty Faculty of Medicine, University of Toronto, Toronto, ON, Canada; [2]Division of Urology, Department of Surgery, University of Toronto, Toronto, ON, Canada; [3]Institute for Better Health, Trillium Health Partners, Mississauga, ON, Canada; [4]Carlo Fidani Regional Cancer Center, Trillium Health Partners, Mississauga, ON, Canada

Introduction: In 2013, the Advanced Prostate Cancer Clinic at Trillium Health Partners was founded to support a growing population of castrate-resistant prostate cancer (CRPC) patients managed in the community setting. Herein, we provide our preliminary real-world experience with evidenced-based CRPC management in a regional cancer center setting.
Methods: We conducted a retrospective review of institutional CRPC patients from 2012–2019. Both metastatic (mCRPC) and non-metastatic (nmCRPC) patients were included. Descriptive analyses, management patterns, and cohort survival characteristics are presented.
Results: We identified 271 patients, 217 (80.0%) mCRPC, with a median duration of followup of 16 months. Median time from initiation of androgen deprivation therapy (ADT) to CRPC was 27 months. Median prostate-specific antigen (PSA) and Eastern Cooperative Oncology Group (ECOG) at CRPC were 15.1 ng/mL and 2, respectively. Enzalutamide was used as primary therapy in nmCRPC and mCRPC patients in 48.15% (n=26) and 36.40% (n=79) of patients, respectively. Abiraterone was the primary treatment used in 116 mCRPC patients (53.46%). Second-line therapies are listed in Fig. 1. In the nmCRPC cohort, median overall survival (OS) was 63 months (95% confidence interval [CI] 18.0–108.0), and median radiographic progression-free survival (rPFS) was 41 months (95% CI 31.1–50.9). Median time from nmCRPC to mCRPC (n=15) was 13 months (95% CI 6–31). Median OS and rPFS for the mCRPC patients were 48.0 (95% CI 37.5–58.5) and 14 months (95% CI 10.9–17.1), respectively.
Conclusions: There is an emergent need for regionalized models of care in advanced prostate cancer because of earlier introduction of androgen receptor axis therapies to routine patient therapy. Our experience validates that comprehensive, evidenced-based care is possible in the regional community cancer center setting. Our data further supports the development of regionalized solutions for advanced prostate cancer management, tailored to the plurality of treatment settings across Canada.

UP-25

Focal low dose rate brachytherapy for low to intermediate prostate cancer: Preliminary experience at an Australian institution

Elliot Anderson[1], Lloyd Smyth[2], Richard O'Sullivan[3,4], Andrew Ryan[5], Nathan Lawrentshuk[6,7,8,9], Jeremy Grummet[1,10], Andrew See[2]
[1]Department of Surgery, Monash University, Melbourne, Australia; [2]Icon Cancer Centre, Richmond, Australia; [3]Healthcare Imaging Services, Richmond, Australia; [4]Department of Medicine, Monash University, Melbourne, Australia; [5]TissuPath Specialist Pathology Services, Mont Waverley, Australia; [6]Division of Cancer Surgery, Peter MacCallum Cancer Centre, Melbourne, Australia; [7]Department of Urology, Royal Melbourne Hospital, Melbourne, Australia; [8]Department of Surgery, University of Melbourne, Melbourne, Australia; [9]EJ Whitten Centre for Prostate Cancer Research , Epworth Healthcare, Melbourne, Australia; [10]Epworth Healthcare, Melbourne, Australia



[a]Both patients became mCRPC prior to receiving chemotherapy. [b]Three patients switched to enzalutamide due to abiraterone toxicity.

UP-23. Fig. 1.

Introduction: Focal therapy for patients with low-intermediate risk features is an emerging modality aimed at reducing treatment-related toxicity. With more accurate diagnostic imaging using magnetic resonance imaging (MRI), focal treatment with low dose rate (LDR) brachytherapy has become a viable ablation option. Our objective was to evaluate the dosimetry, toxicity, and oncological outcomes of men receiving lesion-targeted focal LDR brachytherapy for low- to intermediate-risk prostate cancer (PCa).
Methods: This is a retrospective study of 26 men with unifocal, low- to intermediate-grade PCa diagnosed on a combination of multiparametric (mp)MRI and targeted plus template transperineal (TP) biopsy, who received focal LDR brachytherapy at a single institution. Brachytherapy involved a single monotherapy implant using iodine-125 seeds to deliver a prescribed dose of 145 Gy to the index lesion.
Results: The mean planning target volume as a percentage of the prostate volume was 24.5%. Good post-implant dosimetry outcomes (British Columbia Cancer Agency criteria) were achieved in 22 (84.6%) patients. The median followup for toxicity and biochemical control outcomes was 19.0 (interquartile range [IQR] 12.4–30.5) and 18.1 (IQR 14.2–27.6) months, respectively. Grade 2 urinary and erectile toxicities were reported by 29.2% and 37.5% of patients, respectively, with resolution of urinary symptoms to baseline by last followup. There were no grade ≥3 urinary or erectile toxicities or grade ≥2 rectal toxicity. All 15 patients who underwent a repeat mpMRI and/or TP biopsy at 12–18 months post-treatment were negative for clinically significant disease and 25 (96.2%) patients were free from biochemical failure.
Conclusions: Focal LDR brachytherapy is associated with a favorable toxicity profile and a high rate of successful ablation of significant PCa. We have commenced the LIBERATE prospective registry in focal LDR brachytherapy based on the highly encouraging outcomes of this initial experience.

UP-26

An analysis of incidental prostate cancer diagnosed at radical cystoprostatectomy: Does neoadjuvant chemotherapy have an impact?

Louise McLoughlin[1], Cheung Douglas[1], Katherine Lajkosz[1], Kathy Li[1], Srikala Sridhar[2], Girish S. Kulkarni[1]
[1]Department of Surgical Oncology (Urology), University Health Network-Princess Margaret Hospital, Toronto, ON, Canada; [2]Department of Medical Oncology, University Health Network-Princess Margaret Hospital, Toronto, ON, Canada

Introduction: The clinical significance of incidental prostate cancer (PCa) diagnosed at radical cystoprostatectomy (RC) for bladder cancer is undetermined and presents an opportunity to assess the impact of concurrent bladder cancer therapy on PCa stage and grade. The antitumor effects of platinum-based chemotherapy is previously reported in unselected advanced PCa patients with variable response rates. In this study, we analyze the outcomes of patients with incidental PCa at RC, and compare the stage and grade of incidental PCa in patients treated with neoadjuvant chemotherapy (NAC) and primary RC.
Methods: A retrospective analysis of 168 patients who underwent RC for non-metastatic urothelial carcinoma from 2001–2019 was performed. Patients with incidental PCa were included. Univariate analysis was performed to determine the effect of NAC on the stage and grade of incidentally diagnosed PCa.
Results: Low-risk, organ-confined (T2) PCa was most commonly seen (Grade group 1 [GG1]: n=125 [76%]; GG2-3: n=36 [22%]; ≥GG4: n=4 [2%]; T2: n=148 [89%]). Median overall survival (OS) was reduced in patients with ≥GG 4 vs. GG2-3 and GG1 PCa (0.9 years vs. 9.3 years vs. 7.2 years, p=0.08). Median bladder cancer-specific recurrence-free survival (DSS) was also significantly reduced in patients with high- vs. low-risk PCa (6.9 years vs. 0.5 years, p=0.01). Thirty-eight (23%) and 130 (77%) patients received NAC and primary RC, respectively. Within the NAC group, 34 (97%) received platinum-based NAC and 30 (81%) received ≥4 cycles. T2 PCa was more commonly seen in the NAC group (92% vs. 88%, p=0.8), while in the primary RC group, >T2 disease was more commonly seen (8% vs. 12%, p=0.8). However, the incidence of GG1, GG2-3, and ≥GG4 disease was similar in both groups.
Conclusions: Most patients with incidental PCa in this cohort had low-risk disease. OS and DSS were worse among patients with incidental high-risk PCa. Platinum-based chemotherapy did not significantly impact PCa stage or grade in this patient cohort.