Supplementary Table 1. General characteristics of 75,583 patients with D’Amico intermediate- or high-risk prostate cancer and general characteristics of 52,314 patients with D’Amico intermediate- and high-risk prostate cancer after the propensity score matching

|  |  |  |
| --- | --- | --- |
| Variables | All patients | Propensity-matched patients |
| No PLND | PLND | P value | No PLND | PLND | P value |
| No. (%) | No. (%) | No. (%) | No. (%) |
| Total | 26791 (35.4) | 48792 (64.6) |  | 26157(50.0) | 26157(50.0) |  |
| Age |  |  | <0.001 |  |  | 0.076 |
| <65 | 18141 (67.7) | 30082 (62.7) |  | 17635 (67.4) | 17847 (68.2) |  |
| ≥65 | 8650 (32.3) | 18710 (38.3) |  | 8522 (32.6) | 8310 (31.8) |  |
| Race |  |  | <0.001 |  |  | <0.001 |
| White | 21839 (81.5) | 38878 (79.7) |  | 21347 (81.6) | 20957 (80.1) |  |
| Black\* | 3681 (13.7) | 6860 (14.1) |  | 3542 (13.5) | 3654 (14.0) |  |
| Other\*\* | 1271 (4.7) | 3054 (6.3) |  | 1268 (4.8) | 1546 (5.9) |  |
| Marital status |  |  | <0.001 |  |  | <0.001 |
| Married | 21704 (81.0) | 38426 (78.8) |  | 21147 (80.8) | 21253 (81.3) |  |
| Non-married\*\*\* | 5087 (19.0) | 10366 (21.2) |  | 5010 (19.2) | 4904 (18.7) |  |
| Grade |  |  | <0.001 |  |  | <0.001 |
| Well, I | 2012 (7.5) | 1285 (2.6) |  | 1872 (7.2) | 1225 (4.7) |  |
| Moderately, II | 12668 (47.3) | 18800 (38.5) |  | 12193 (46.6) | 11130 (42.6) |  |
| Poorly, III | 12093 (45.1) | 28657 (58.7) |  | 12074 (46.2) | 13785 (52.7) |  |
| Undifferentiated, IV | 18 (0.1) | 50 (0.1) |  | 18 (0.1) | 17 (0.1) |  |
| Radiotherapy |  |  | <0.001 |  |  | 0.003 |
| Yes | 937 (3.5) | 4228 (8.7) |  | 934 (3.6) | 1565 (6.0) |  |
| No/Unknown | 25854 (96.5) | 44564 (91.3) |  | 25223 (96.4) | 24592 (94.0) |  |
| Chemotherapy |  |  | 0.001 |  |  | 0.879 |
| Yes | 21 (0.1) | 147 (0.3) |  | 21 (0.1) | 44 (0.2) |  |
| No/Unknown | 26770 (99.9) | 48645 (99.7) |  | 26136 (99.9) | 26113 (99.8) |  |
| PSA |  |  | <0.001 |  |  | 0.879 |
| <10ng/ml | 23646 (88.3) | 36263 (74.3) |  | 23016 (88.0) | 20768 (79.4) |  |
| 10-20ng/ml | 2598 (9.7) | 8822 (18.1) |  | 2594 (9.9) | 4094 (15.7) |  |
| >20ng/ml | 547 (2.0) | 3707 (7.6) |  | 547 (2.1) | 1295 (5.0) |  |
| Gleason score |  |  | <0.001 |  |  | 0.823 |
| ≤6 | 8526 (31.8) | 5908 (12.1) |  | 7896 (30.2) | 5554 (21.2) |  |
| 7 | 16907 (63.1) | 34217 (70.1) |  | 16903 (64.6) | 17709 (67.7) |  |
| 8-10 | 1358 (5.1) | 8667 (17.8) |  | 1358 (5.2) | 2894 (11.1) |  |
| T |  |  | <0.001 |  |  | 0.711 |
| cT1-2a | 1656 (6.2) | 2843 (5.8) |  | 1655 (6.3) | 2040 (7.8) |  |
| cT2b | 541 (2.0) | 996 (2.0) |  | 503 (1.9) | 599 (2.3) |  |
| cT2c | 19406 (72.4) | 26273 (53.8) |  | 18826 (72.0) | 15590 (59.6) |  |
| cT3-4 | 5188 (19.4) | 18680 (38.3) |  | 5173 (19.8) | 7928 (30.3) |  |
| N |  |  | <0.001 |  |  | 1.000 |
| N0 | 26771 (99.9) | 45537 (93.3) |  | 26137 (99.9) | 25826 (98.7) |  |
| N1 | 20 (0.1) | 3255 (6.7) |  | 20 (0.1) | 331 (1.3) |  |
| Disease stage |  |  | <0.001 |  |  | 0.582 |
| Intermediate-risk | 2004 (7.5) | 3139 (6.4) |  | 1965 (7.5) | 2318 (8.9) |  |
| High-risk\*\*\*\* | 19596 (73.1) | 26507 (54.3) |  | 19016 (72.7) | 15862 (60.6) |  |
| Locally advanced | 5191 (19.4) | 19146 (39.2) | 　 | 5176 (19.8) | 7977 (30.5) |  |

\*Black or African American.

\*\*Includes American Indian/Alaska Native, Asian, and Asian/Pacific Islander.

\*\*\* Includes widowed, never married, divorced, separated, unmarried, and domestic partner.

\*\*\*\*Specifically refers to the high-risk stage of localised prostate cancer in the table.

Abbreviations: PLND, pelvic lymph node dissection; PSA, prostate-specific antigen.

Supplementary Table 2. Univariable Cox regression models predicting overall mortality and cancer-specific mortality in 52,314 propensity-score-matched patients with D’Amico intermediate- or high-risk prostate cancer

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables | OM | P value | CSM | P value |
| HR (95% CI) | HR (95% CI) |
| Age |  | <0.001 |  | <0.001 |
| <65 | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| ≥65 | 2.30 (2.01-2.63) | <0.001 | 2.50 (1.86-3.36) | <0.001 |
| Race  |  | <0.001 |  | 0.095 |
| White | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| Black\* | 1.53 (1.28-1.82) | <0.001 | 1.51 (1.03-2.21) | 0.034 |
| Other\*\* | 0.97 (0.70-1.35) | 0.866 | 1.26 (0.66-2.39) | 0.488 |
| Marital status |  | <0.001 |  | 0.002 |
| Married | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| Non-married\*\*\* | 2.08 (1.80-2.41) | <0.001 | 1.70 (1.22-2.37) | 0.002 |
| Grade |  | <0.001 |  | <0.001 |
| Well, I | 1.00 (Ref.) |  |  |  |
| Moderately, II | 0.86 (0.55-1.36) | 0.528 | 2.50 (0.34-18.26) | 0.368 |
| Poorly, III | 1.27 (0.81-1.99) | 0.294 | 5.91 (0.82-42.41) | 0.077 |
| Undifferentiated, IV | - | 0.898 | - | 0.962 |
| Radiotherapy |  | 0.001 |  | <0.001 |
| Yes | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| No/Unknown | 0.61 (0.46-0.80) | 0.001 | 0.21 (0.14-0.31) | <0.001 |
| Chemotherapy |  | 0.008 |  | <0.001 |
| Yes | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| No/Unknown | 0.27 (0.10-0.71) | 0.008 | 0.06 (0.02-0.15) | <0.001 |
| PSA |  | <0.001 |  | <0.001 |
| <10ng/ml | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| 10-20ng/ml | 1.79 (1.50-2.13) | <0.001 | 2.73 (1.91-3.90) | <0.001 |
| >20ng/ml | 2.50 (1.86-3.34) | <0.001 | 7.20 (5.63-11.20) | <0.001 |
| Gleason score |  | <0.001 |  | <0.001 |
| ≤6 | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| 7 | 1.20 (1.02-1.42) | 0.029 | 1.57 (0.95-2.60) | 0.077 |
| 8-10 | 3.12 (2.52-3.87) | <0.001 | 18.34 (11.30-29.78) | <0.001 |
| T |  | <0.001 |  | <0.001 |
| cT1-2a | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| cT2b | 0.90 (0.53-1.54) | 0.699 | 0.35 (0.05-2.78) | 0.322 |
| cT2c | 0.86 (0.66-1.12) | 0.257 | 0.68 (0.34-1.37) | 0.276 |
| cT3-4 | 1.40 (1.06-1.85) | 0.020 | 3.79 (1.92-7.47) | <0.001 |
| N |  | 0.001 |  | <0.001 |
| N0 | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| N1 | 2.70 (1.53-4.77) | 0.001 | 8.90 (4.38-18.10) | <0.001 |
| Disease stage |  | <0.001 |  | <0.001 |
| Intermediate-risk | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| High-risk\*\*\*\* | 0.96 (0.74-1.25) | 0.770 | 1.27 (0.55-2.94) | 0.574 |
| Locally advanced | 1.55 (1.18-2.03) | 0.002 | 6.70 (2.95-15.25) | <0.001 |
| PLND |  | 0.010 |  | 0.039 |
| No | 1.00 (Ref.) |  | 1.00 (Ref.) |  |
| Yes | 1.19 (1.04-1.37) | 0.010 | 1.37 (1.02-1.84) | 0.039 |

\*Black or African American.

\*\*Includes American Indian/Alaska Native, Asian, and Asian/Pacific Islander.

\*\*\* Includes widowed, never married, divorced, separated, unmarried, and domestic partner.

\*\*\*\*Specifically refers to the high-risk stage of localised prostate cancer in the table.

Abbreviations: PLND, pelvic lymph node dissection; PSA, prostate-specific antigen; OM, overall mortality; CSM, cancer-specific mortality; HR, hazard ratio; CI, confidence interval; Ref, reference.

Supplementary Table 3. Multivariable Cox regression models predicting overall mortality in 75,583 patients with D’Amico intermediate- or high-risk prostate cancer stratified by lymph node dissection

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | No PLND | Limited PLND | Extended PLND |
| HR (95%CI) | HR (95%CI) | HR (95%CI) |
| Total | 1.00 (Ref.) | 1.55 (1.34-1.79) # | 1.50 (1.32-1.69) # |
| Age |  |  |  |
| <65 | 1.00 (Ref.) | 1.87 (1.52-2.29) | 1.68 (1.41-2.01) # |
| ≥65 | 1.00 (Ref.) | 1.21 (0.98-1.49) | 1.22 (1.03-1.45) ‡ |
| Race |  |  |  |
| White | 1.00 (Ref.) | 1.69 (1.43-2.00) # | 1.58 (1.37-1.82) # |
| Black\* | 1.00 (Ref.) | 1.08 (0.76-1.53) | 1.16 (0.88-1.55) |
| Other\*\* | 1.00 (Ref.) | 1.41 (0.70-2.83) | 1.61 (0.91-2.84) |
| Marital status |  |  |  |
| Married | 1.00 (Ref.) | 1.58 (1.33-1.89) # | 1.58 (1.36-1.84) # |
| Non-married\*\*\* | 1.00 (Ref.) | 1.44 (1.11-1.86) ‡ | 1.25 (1.01-1.56) ‡ |
| Grade |  |  |  |
| Well, I | 1.00 (Ref.) | 0.38 (0.09-1.65) | 0.48 (0.14-1.63) |
| Moderately, II | 1.00 (Ref.) | 1.23 (0.90-1.67) | 1.20 (0.92-1.55) |
| Poorly, III | 1.00 (Ref.) | 1.61 (1.35-1.91) # | 1.47 (1.27-1.71) # |
| Undifferentiated, IV | 1.00 (Ref.) | - | - |
| Radiotherapy |  |  |  |
| Yes | 1.00 (Ref.) | 1.95 (1.16-3.27) ‡ | 2.05 (1.28-3.28) ‡ |
| No/Unknown | 1.00 (Ref.) | 1.46 (1.25-1.70) # | 1.38 (1.21-1.57) # |
| Chemotherapy |  |  |  |
| Yes | 1.00 (Ref.) | - | - |
| No/Unknown | 1.00 (Ref.) | 1.54 (1.33-1.79) # | 1.48 (1.31-1.68) # |
| PSA |  |  |  |
| <10ng/ml | 1.00 (Ref.) | 1.49 (1.26-1.77) # | 1.33 (1.15-1.53) # |
| 10-20ng/ml | 1.00 (Ref.) | 1.25 (0.89-1.77) | 1.29 (0.96-1.73) |
| >20ng/ml | 1.00 (Ref.) | 1.15 (0.63-2.11) | 1.22 (0.72-2.08) |
| Gleason score |  |  |  |
| ≤6 | 1.00 (Ref.) | 0.97 (0.66-1.42) | 1.02 (0.74-1.41) |
| 7 | 1.00 (Ref.) | 1.30 (1.07-1.59) ‡ | 1.14 (0.97-1.35) ‡ |
| 8-10 | 1.00 (Ref.) | 1.61 (1.14-2.27) ‡ | 1.42 (1.04-1.94) ‡ |
| T |  |  |  |
| cT1-2a | 1.00 (Ref.) | 1.36 (0.74-2.47) | 0.97 (0.56-1.68) |
| cT2b | 1.00 (Ref.) | 1.74 (0.59-5.19) | 1.55 (0.60-4.01) |
| cT2c | 1.00 (Ref.) | 1.22 (0.99-1.50) | 1.11 (0.94-1.32) |
| cT3-4 | 1.00 (Ref.) | 1.80 (1.40-2.31) # | 1.64 (1.32-2.03) # |
| N |  |  |  |
| N0 | 1.00 (Ref.) | 1.45 (1.25-1.69) # | 1.30 (1.14-1.48) # |
| N1 | 1.00 (Ref.) | - | - |
| Disease stage |  |  |  |
| Intermediate-risk | 1.00 (Ref.) | 1.88 (1.05-3.38) ‡ | 1.29 (0.75-2.22) |
| High-risk\*\*\*\* | 1.00 (Ref.) | 1.18 (0.96-1.44) | 1.09 (0.92-1.29) |
| Locally advanced | 1.00 (Ref.) | 1.81 (1.41-2.32) # | 1.62 (1.31-2.02) # |

\*Black or African American.

\*\*Includes American Indian/Alaska Native, Asian, and Asian/Pacific Islander.

\*\*\* Includes widowed, never married, divorced, separated, unmarried, and domestic partner.

\*\*\*\*Specifically refers to the high-risk stage of localised prostate cancer in the table.

‡ P<0.05. # P<0.001.

Abbreviations: PLND, pelvic lymph node dissection; PSA, prostate-specific antigen; HR, hazard ratio; CI, confidence interval; Ref, reference.

Supplementary Table 4. Baseline demographic and tumor characteristics of patients between with and without pathological lymph node involvement

|  |  |
| --- | --- |
| Variables | Lymph node involvement |
| Yes | No | P value |
| No. (%) | No. (%) |
| Total | 29939 (39.6) | 45644 (60.4) |  |
| Age |  |  | <0.001 |
| <65 | 19994 (66.8) | 28229 (61.8) |  |
| ≥65 | 9945 (33.2) | 17415 (38.2) |  |
| Race‡ |  |  | <0.001 |
| White | 34375 (81.4) | 36342 (79.6) |  |
| Black\* | 4115 (13.7) | 6426 (14.1) |  |
| Other\*\* | 1449 (4.8) | 2876 (6.3) |  |
| Marital status |  |  | <0.001 |
| Married | 24022 (80.2) | 36108 (79.1) |  |
| Non-married\*\*\* | 5917 (19.8) | 9536 (20.9) |  |
| Grade |  |  | <0.001 |
| Well, I | 2007 (6.7) | 1290 (2.8) |  |
| Moderately, II | 13210 (44.1) | 18258 (40.0) |  |
| Poorly, III | 14700 (49.1) | 26050 (57.1) |  |
| Undifferentiated, IV | 22 (0.1) | 46 (0.1) |  |
| Radiotherapy |  |  | <0.001 |
| Yes | 1859 (6.2) | 3306 (7.2) |  |
| No/Unknown | 28080 (93.8) | 42338 (92.8) |  |
| Chemotherapy |  |  | 0.004 |
| Yes | 85 (0.3) | 83 (0.2) |  |
| No/Unknown | 29854 (99.7) | 45561 (99.8) |  |
| PSA |  |  | <0.001 |
| <10ng/ml | 25082 (83.8) | 34827 (76.3) |  |
| 10-20ng/ml | 3545 (11.8) | 7875 (17.3) |  |
| >20ng/ml | 1312 (4.4) | 2942 (6.4) |  |
| Gleason score |  |  | <0.001 |
| ≤6 | 8536 (28.5) | 5898 (12.9) |  |
| 7 | 18348 (61.3) | 32776 (71.8) |  |
| 8-10 | 3055 (10.2) | 6970 (15.3) |  |
| T |  |  | <0.001 |
| cT1-2a | 1713 (5.7) | 2786 (6.1) |  |
| cT2b | 580 (1.9) | 957 (2.1) |  |
| cT2c | 19741 (65.9) | 25938 (56.8) |  |
| cT3-4 | 7905 (26.4) | 15963 (35.0) |  |
| N |  |  | <0.001 |
| N0 | 26678 (89.1) | 45630 (99.9) |  |
| N1 | 3261 (10.9) | 14 (0.1) |  |
| Disease stage |  |  | <0.001 |
| Intermediate-risk | 2033 (6.8) | 3110 (6.8) |  |
| High-risk\*\*\*\* | 19539 (65.3) | 26564 (58.2) |  |
| Locally advanced | 8367 (27.9) | 15970 (35.0) |  |
| PLND |  |  | <0.001 |
| No | 26275 (87.8) | 516 (1.1) |  |
| Yes | 3664 (12.2) | 45128 (98.9) | 　 |

\*Black or African American.

\*\*Includes American Indian/Alaska Native, Asian, and Asian/Pacific Islander.

\*\*\* Includes widowed, never married, divorced, separated, unmarried, and domestic partner.

\*\*\*\*Specifically refers to the high-risk stage of localised prostate cancer in the table.

Abbreviations: PLND, pelvic lymph node dissection; PSA, prostate-specific antigen.