

The Epidemiology of Myeloproliferative Neoplasms in New Zealand between 2010 and 2017: Insights from the New Zealand Cancer Registry

Chris Varghese, Tracey Immanuel, Anna Ruskova, Edward Theakston and Maggie L. Kalev-Zylinska

Table S1. The New Zealand Cancer Registry capture rates of patients with myeloproliferative neoplasms during 2010-2017.

| Numbers of patients registered per year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Average |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| All | 87 | 81 | 72 | 59 | 101 | 107 | 118 | 162 | 98 |
| PV | 45 | 42 | 24 | 33 | 28 | 32 | 28 | 43 | 34 |
| ET | 42 | 39 | 48 | 26 | 39 | 42 | 49 | 75 | 45 |
| PMF | - | - | - | - | 34 | 33 | 41 | 44 | 38 |
| New Zealand population | 4,351,000 | 4,384,000 | 4,408,000 | 4,442,000 | 4,510,000 | 4,596,000 | 4,693,000 | 4,794,000 | |
| Overall capture per 100,000 | 2 | 1.85 | 1.63 | 1.33 | 2.24 | 2.33 | 2.51 | 3.38 | 2.16 |
| PV capture per 100,000 | 1.03 | 0.96 | 0.54 | 0.74 | 0.62 | 0.70 | 0.60 | 0.90 | 0.76 |
| ET capture per 100,000 | 0.97 | 0.89 | 1.09 | 0.59 | 0.87 | 0.91 | 1.04 | 1.56 | 0.99 |
| PMF capture per 100,000 | - | - | - | - | 0.75 | 0.72 | 0.87 | 0.92 | 0.82 |

Table S2. Numbers of patients with myeloproliferative neoplasms reported to the New Zealand Cancer Registry from different New Zealand District Health Boards.

| | | Overall | % | PV | % | ET | % | PMF | % |
|------------|---------------------------------|----------------|----------|-----------|----------|-----------|----------|------------|----------|
| N | | 787 | | 275 | | 360 | | 152 | |
| DHB | Canterbury | 116 | 14.7 | 37 | 13.5 | 57 | 15.8 | 22 | 14.5 |
| | Counties Manu- kau | 88 | 11.2 | 26 | 9.5 | 41 | 11.4 | 21 | 13.8 |
| | Auckland | 78 | 9.9 | 35 | 12.7 | 34 | 9.4 | 9 | 5.9 |
| | Waitemata | 68 | 8.6 | 21 | 7.6 | 33 | 9.2 | 14 | 9.2 |
| | Southern | 61 | 7.8 | 24 | 8.7 | 30 | 8.3 | 7 | 4.6 |
| | Waikato | 60 | 7.6 | 16 | 5.8 | 27 | 7.5 | 17 | 11.2 |
| | MidCentral | 54 | 6.9 | 20 | 7.3 | 25 | 6.9 | 9 | 5.9 |
| | Capital and Coast | 46 | 5.8 | 21 | 7.6 | 13 | 3.6 | 12 | 7.9 |
| | Hawkes Bay | 37 | 4.7 | 11 | 4.0 | 22 | 6.1 | 4 | 2.6 |
| | Northland | 27 | 3.4 | 7 | 2.5 | 19 | 5.3 | 1 | 0.7 |
| | Taranaki | 27 | 3.4 | 14 | 5.1 | 12 | 3.3 | 1 | 0.7 |
| | Bay of Plenty | 26 | 3.3 | 5 | 1.8 | 11 | 3.1 | 10 | 6.6 |
| | Nelson Marlbor- ough | 20 | 2.5 | 13 | 4.7 | 3 | 0.8 | 4 | 2.6 |
| | South Canterbury | 17 | 2.2 | 5 | 1.8 | 6 | 1.7 | 6 | 3.9 |
| | Hutt Valley | 16 | 2.0 | 7 | 2.5 | 6 | 1.7 | 3 | 2.0 |
| | Lakes | 16 | 2.0 | 5 | 1.8 | 6 | 1.7 | 5 | 3.3 |
| | Other | 16 | 2.0 | 4 | 1.5 | 5 | 1.4 | 7 | 4.6 |
| | Whanganui | 14 | 1.8 | 4 | 1.5 | 10 | 2.8 | 0 | 0.0 |

DHB, District Health Board.

Table S3. Demographic factors of patients with myeloproliferative neoplasms reported to the New Zealand Cancer Registry.

| | Overall | Polycythaemia Vera | Essential Thrombo- cythaemia | Primary Myelofi- brosis* | P val- ue |
|-----------------------------------|-------------------|-----------------------|---------------------------------|-----------------------------|------------------|
| N | 787 | 275 (34.9%) | 360 (45.7%) | 152 (19.3%) | |
| Age at diagnosis, mean (SD) | 67.3 (15.2) | 68.6 (15.0) | 65.5 (16.0) | 69.2 (12.7) | 0.008 |
| Age at diagnosis, median (IQR) | 70.0 (59.0, 80.0) | 68.0 (55.0, 77.0) | 69.5 (60.0, 78.0) | 70.0 (59.0, 80.0) | |
| Gender (%) | | | | | |
| Female | 386 (49.0) | 132 (48) | 201 (55.8) | 53 (34.9) | <0.001 |
| Male | 401 (51.0) | 143 (52) | 159 (44.2) | 99 (65.1) | |
| Ethnicity (%) | | | | | |
| European | 602 (76.5) | 202 (73.5) | 282 (78.3) | 118 (77.6) | 0.149 |
| Maori | 107 (13.6) | 47 (17.1) | 45 (12.5) | 15 (9.9) | |
| Pacific Islanders | 37 (4.7) | 16 (5.8) | 11 (3.1) | 10 (6.6) | |
| Asian | 27 (3.4) | 7 (2.5) | 13 (3.6) | 7 (4.6) | |
| Other | 14 (1.8) | 3 (1.1) | 9 (2.5) | 2 (1.3) | |
| Numbers of patients that died (%) | 318 (40.4) | 141 (51.3) | 109 (30.3) | 68 (44.7) | 0.001 |
| Age at death, mean (SD) | 77.9 (11.1) | 77.7 (11.2) | 80.2 (9.8) | 74.8 (12.0) | 0.007 |
| Age at death, median (IQR) | 79.0 (71.0, 86.0) | 81.0 (74.4, 87.2) | 74.6 (66.4, 84.7) | 79.0 (71.0, 86.0) | |

*PMF diagnosis includes patients from different time periods.

Table S4. Comparison of baseline demographics for patients with myeloproliferative neoplasms according to their survival status.

| | Overall | Alive* | Dead* | P value |
|---------------------------------------|-------------------|-------------------|-------------------|------------------|
| N (%) | 787 | 469 (59.6%) | 318 (40.4%) | |
| Age at diagnosis, mean (SD) | 67.3 (15.2) | 61.2 (14.4) | 76.3 (11.3) | <0.001 |
| Age at diagnosis, median (IQR) | 70.0 (59.0, 80.0) | 63.0 (53.0, 72.0) | 77.0 (69.0, 84.0) | |
| Age at death, mean (SD) | - | - | 77.9 (11.1) | |
| Age at death, median (IQR) | - | - | 79.0 (71.5, 86.5) | |
| MPN type (%) | | | | |
| Polycythaemia vera | 275 | 134 (48.7) | 141 (51.3) | <0.001 |
| Essential thrombocythaemia | 360 | 251 (69.7) | 109 (30.3) | |
| Primary myelofibrosis | 152 | 84 (55.3) | 68 (44.7) | |
| Gender (%) | | | | |
| Female | 386 | 247 (64.0) | 139 (36.0) | 0.017 |
| Male | 401 | 222 (55.4) | 179 (44.6) | |
| Ethnicity (%) | | | | |
| European | 602 | 343 (73.1) | 259 (81.5) | 0.002 |
| Maori | 107 | 64 (13.6) | 43 (13.5) | |
| Pacific Islanders | 37 | 27 (5.8) | 10 (3.1) | |
| Asian | 27 | 23 (4.9) | 4 (1.3) | |
| Other | 14 | 12 (2.6) | 2 (0.6) | |

* As of 14 June 2019.

Table S5. The New Zealand Cancer Registry death rates for patients with myeloproliferative neoplasms.

| Numbers of patients that died per year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Average |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------|
| All | 48 | 37 | 38 | 35 | 59 | 34 | 39 | 28 | 40 |
| PV | 30 | 24 | 18 | 22 | 20 | 14 | 8 | 5 | 18 |
| ET | 18 | 13 | 20 | 13 | 18 | 5 | 11 | 11 | 14 |
| PMF | - | - | - | - | 21 | 15 | 20 | 12 | 17 |
| New Zealand population | 4,351,000 | 4,384,000 | 4,408,000 | 4,442,000 | 4,510,000 | 4,596,000 | 4,693,000 | 4,794,000 | |
| Overall deaths per 100,000 | 1.10 | 0.84 | 0.86 | 0.79 | 1.31 | 0.74 | 0.83 | 0.58 | 0.88 |
| PV deaths per 100,000 | 0.69 | 0.55 | 0.41 | 0.50 | 0.44 | 0.31 | 0.17 | 0.10 | 0.40 |
| ET deaths per 100,000 | 0.41 | 0.30 | 0.45 | 0.29 | 0.40 | 0.11 | 0.23 | 0.23 | 0.30 |
| PMF deaths per 100,000 | - | - | - | - | 0.47 | 0.33 | 0.43 | 0.25 | 0.37 |