

Multimorbidity in people diagnosed and living with cancer: A cross-sectional study of four common cancers using primary care data

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Supplementary Table S1: Crude and age-sex standardised prevalence of individual long-term conditions in people newly diagnosed with cancer

| Incident Cancer Cases | | | | | | | | |
|--------------------------------|--------------------------|------------------|------------------|------------------|---|------------------|------------------|------------------|
| Comorbidity | Crude Prevalence (95%CI) | | | | Age-sex standardised Prevalence (95%CI) | | | |
| | Breast | Prostate | Colorectal | Lung | Breast | Prostate | Colorectal | Lung |
| Hypertension | 37.7 (36.7–38.7) | 56.2 (55.3–57.2) | 55.0 (53.8–56.1) | 60.3 (59.1–61.5) | 29.8 (27.1–32.5) | 32.8 (26.4–39.3) | 26.4 (25.0–27.8) | 28.0 (26.1–29.9) |
| Osteoarthritis | 30.0 (29.0–30.9) | 31.4 (30.5–32.3) | 34.0 (32.9–35.1) | 38.0 (36.8–39.2) | 17.7 (14.2–21.3) | 15.1 (13.8–16.4) | 14.4 (13.7–15.2) | 15.7 (14.9–16.6) |
| Anxiety | 22.2 (21.3–23.0) | 12.5 (11.9–13.2) | 17.5 (16.6–18.4) | 20.8 (19.8–21.8) | 21.0 (18.3–23.7) | 11.3 (9.2–13.3) | 17.8 (15.6–20.0) | 19.4 (16.3–22.5) |
| Depression | 21.9 (21.1–22.8) | 12.4 (11.8–13.1) | 17.3 (16.4–18.2) | 23.2 (22.2–24.2) | 13.9 (11.6–16.3) | 9.0 (7.6–10.4) | 17.2 (15.1–19.3) | 20.5 (17.5–23.6) |
| Asthma | 15.7 (15.0–16.4) | 13.3 (12.6–13.9) | 15.9 (15.0–16.7) | 19.7 (18.7–20.7) | 15.0 (11.4–18.5) | 16.6 (9.5–23.6) | 19.9 (15.9–24.0) | 21.2 (16.8–25.5) |
| Thyroid disease | 12.6 (11.9–13.3) | 4.6 (4.2–5.0) | 9.4 (8.7–10.1) | 11.1 (10.4–11.9) | 7.9 (5.3–10.5) | 2.1 (1.8–2.3) | 6.6 (4.5–8.8) | 5.7 (4.6–6.8) |
| Diabetes | 11.9 (11.3–12.6) | 17.8 (17.1–18.6) | 20.4 (19.4–21.3) | 22.4 (21.3–23.4) | 12.6 (9.1–16.1) | 9.1 (8.4–9.9) | 11.1 (10.0–12.2) | 11.2 (8.8–13.6) |
| Deafness | 11.4 (10.8–12.1) | 20.1 (19.3–20.9) | 17.3 (16.4–18.2) | 20.1 (19.1–21.1) | 10.1 (7.2–13.0) | 9.8 (8.5–11.0) | 8.5 (7.4–9.6) | 9.0 (7.7–10.3) |
| Osteoporosis | 9.1 (8.5–9.6) | 3.2 (2.8–3.5) | 8.9 (8.3–9.6) | 12.7 (11.9–13.6) | 4.4 (2.8–5.9) | 1.2 (1.1–1.3) | 3.3 (3.0–3.6) | 5.4 (4.5–6.2) |
| Coronary heart disease | 8.9 (8.3–9.5) | 20.4 (19.6–21.2) | 19.3 (18.4–20.2) | 26.2 (25.1–27.3) | 12.3 (7.7–16.8) | 8.5 (8.0–9.0) | 9.9 (7.2–12.7) | 10.2 (9.5–10.9) |
| Chronic kidney disease | 8.6 (8.0–9.1) | 12.9 (12.2–13.5) | 16.1 (15.2–16.9) | 17.5 (16.6–18.4) | 6.2 (3.4–9.0) | 4.7 (4.4–4.9) | 4.9 (4.5–5.2) | 5.7 (4.7–6.6) |
| Arrhythmia | 7.1 (6.6–7.6) | 13.0 (12.3–13.6) | 15.4 (14.6–16.2) | 17.2 (16.3–18.1) | 5.1 (3.2–7.0) | 5.2 (4.8–5.6) | 5.1 (4.7–5.5) | 6.4 (5.3–7.5) |
| COPD | 6.2 (5.7–6.7) | 9.7 (9.1–10.3) | 11.8 (11.0–12.5) | 39.1 (37.9–40.3) | 5.9 (3.0–8.7) | 4.0 (3.6–4.3) | 5.0 (4.6–5.5) | 19.2 (17.7–20.8) |
| Connective tissue disease | 5.0 (4.5–5.4) | 5.0 (4.6–5.4) | 5.9 (5.4–6.5) | 8.5 (7.8–9.2) | 2.9 (1.7–4.1) | 2.7 (2.2–3.2) | 3.4 (2.7–4.1) | 3.7 (3.3–4.2) |
| Alcohol misuse | 4.7 (4.3–5.1) | 7.6 (7.1–8.1) | 7.4 (6.8–8.0) | 11.1 (10.3–11.9) | 7.4 (4.4–10.4) | 9.8 (4.9–14.6) | 6.8 (5.8–7.9) | 9.4 (8.1–10.7) |
| Stroke or TIA | 4.6 (4.2–5.0) | 7.5 (7.0–8.0) | 8.2 (7.6–8.9) | 11.4 (10.6–12.1) | 3.8 (2.2–5.4) | 3.0 (2.7–3.2) | 3.5 (2.9–4.1) | 4.3 (3.9–4.8) |
| Peripheral neuropathy | 4.0 (3.6–4.3) | 5.6 (5.1–6.0) | 5.5 (5.0–6.0) | 7.2(6.6-7.9) | 5.1 (2.3-7.8) | 2.9 (2.5-3.4) | 3.0 (2.5-3.4) | 4.4 (3.6-5.2) |
| Venous thromboembolism | 3.9 (3.5–4.3) | 4.8 (4.3–5.2) | 5.9 (5.4–6.5) | 7.3 (6.7–8.0) | 1.8 (1.2–2.4) | 2.3 (1.9–2.7) | 3.5 (2.7–4.4) | 5.9 (3.4–8.5) |
| Endometriosis | 3.5 (3.2–3.9) | 0.0 (0.0–0.0) | 1.0 (0.7–1.2) | 1.1 (0.8–1.3) | 2.0 (1.6–2.4) | 0.0 (0.0–0.0) | 2.4 (0.9–3.9) | 2.0 (1.0–2.9) |
| Heart failure | 3.4 (3.0–3.8) | 6.5 (6.0–6.9) | 8.0 (7.3–8.6) | 11.4 (10.6–12.2) | 4.9 (2.2–7.6) | 7.0 (0.8–13.2) | 2.7 (2.4–3.1) | 4.2 (3.5–4.8) |
| Heart valve disorder | 3.2 (2.8–3.5) | 5.5 (5.0–5.9) | 6.4 (5.8–6.9) | 7.7 (7.0–8.4) | 3.0 (1.6–4.4) | 6.9 (0.7–13.1) | 2.3 (2.0–2.7) | 3.3 (2.4–4.2) |
| Post traumatic stress disorder | 2.9 (2.5–3.2) | 1.6 (1.4–1.9) | 2.2 (1.8–2.5) | 2.8 (2.4–3.2) | 1.2 (1.0–1.4) | 1.4 (1.0–1.9) | 2.6 (1.2–4.0) | 2.7 (1.5–3.8) |
| Peptic ulcer disease | 2.9 (2.5–3.2) | 6.4 (5.9–6.9) | 6.2 (5.7–6.8) | 9.6 (8.9–10.3) | 5.5 (2.6–8.3) | 2.8 (2.5–3.0) | 4.1 (2.0–6.1) | 8.9 (7.7–10.1) |
| Gout | 2.6 (2.3–3.0) | 12.7 (12.0–13.3) | 9.4 (8.7–10.1) | 8.9 (8.2–9.6) | 6.6 (3.4–9.9) | 6.5 (5.3–7.7) | 3.9 (3.5–4.4) | 3.9 (3.0–4.8) |
| Addisons disease | 2.4 (2.1–2.7) | 1.1 (0.9–1.3) | 1.9 (1.6–2.3) | 1.9 (1.6–2.3) | 0.8 (0.7–0.9) | 0.6 (0.3–0.8) | 0.9 (0.7–1.1) | 0.8 (0.6–0.9) |
| Dementia | 2.3 (2.0–2.6) | 2.4 (2.1–2.7) | 3.4 (3.0–3.8) | 4.7 (4.2–5.3) | 1.7 (1.1–2.4) | 0.9 (0.7–1.0) | 0.9 (0.8–1.0) | 1.3 (1.1–1.4) |

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|-----------------------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|----------------|---------------|
| Liver disease | 2.1 (1.8–2.4) | 2.4 (2.1–2.7) | 3.0 (2.6–3.4) | 4.5 (4.0–5.0) | 2.8 (1.2–4.4) | 1.6 (1.2–2.0) | 2.7 (1.9–3.5) | 3.7 (2.4–5.0) |
| Epilepsy | 1.7 (1.4–1.9) | 2.0 (1.7–2.3) | 2.4 (2.1–2.8) | 3.0 (2.6–3.4) | 2.7 (0.5–4.9) | 5.9 (-0.8–12.6) | 2.6 (1.7–3.4) | 3.8 (1.5–6.2) |
| Peripheral arterial disease | 1.7 (1.4–1.9) | 3.9 (3.5–4.3) | 3.9 (3.4–4.3) | 10.5 (9.7–11.2) | 3.4 (1.0–5.7) | 1.5 (1.3–1.6) | 1.5 (1.2–1.7) | 4.3 (3.5–5.1) |
| Blindness | 1.5 (1.3–1.8) | 1.7 (1.5–2.0) | 2.0 (1.7–2.4) | 3.0 (2.6–3.5) | 1.3 (0.5–2.2) | 0.7 (0.6–0.8) | 0.8 (0.6–1.1) | 1.0 (0.8–1.2) |
| Inflammatory bowel disease | 1.4 (1.2–1.6) | 1.5 (1.3–1.8) | 2.5 (2.2–2.9) | 1.8 (1.5–2.1) | 3.2 (-0.2–6.6) | 0.9 (0.6–1.1) | 7.8 (4.0–11.6) | 1.0 (0.7–1.2) |
| Bronchiectasis | 1.3 (1.1–1.6) | 1.7 (1.4–1.9) | 2.4 (2.0–2.7) | 3.1 (2.7–3.5) | 0.6 (0.3–0.8) | 0.8 (0.5–1.0) | 1.2 (0.9–1.6) | 4.0 (1.1–6.8) |
| Haematological cancer | 1.2 (0.9–1.4) | 1.9 (1.6–2.2) | 2.5 (2.1–2.8) | 3.1 (2.6–3.5) | 0.9 (0.3–1.5) | 0.9 (0.7–1.2) | 1.6 (1.1–2.0) | 3.0 (0.7–5.3) |
| Substance misuse | 1.1 (0.9–1.3) | 1.0 (0.8–1.2) | 1.5 (1.2–1.7) | 2.6 (2.2–3.0) | 10.3 (6.2–14.5) | 1.1 (0.7–1.4) | 2.0 (1.3–2.7) | 5.0 (3.7–6.3) |
| Chronic pancreatitis | 1.0 (0.8–1.2) | 1.1 (0.9–1.3) | 1.3 (1.0–1.5) | 2.0 (1.7–2.3) | 1.0 (0.2–1.8) | 0.6 (0.3–0.8) | 0.7 (0.5–0.9) | 1.3 (0.9–1.6) |
| Tuberculosis | 1.0 (0.8–1.2) | 1.1 (0.9–1.3) | 1.4 (1.1–1.6) | 1.7 (1.4–2.0) | 0.5 (0.3–0.8) | 0.5 (0.4–0.7) | 0.7 (0.5–1.0) | 1.1 (0.7–1.5) |
| Bipolar affective disorder | 0.8 (0.6–0.9) | 0.3 (0.2–0.5) | 0.7 (0.5–0.9) | 0.9 (0.6–1.1) | 0.4 (0.2–0.5) | 0.1 (0.1–0.2) | 1.0 (0.4–1.6) | 1.4 (0.3–2.4) |
| Multiple sclerosis | 0.6 (0.4–0.7) | 0.2 (0.1–0.3) | 0.3 (0.2–0.5) | 0.4 (0.3–0.6) | 0.8 (-0.2–1.8) | 0.2 (0.1–0.2) | 1.5 (-0.6–3.5) | 0.3 (0.1–0.5) |
| Congenital disease | 0.5 (0.4–0.7) | 0.3 (0.2–0.5) | 0.8 (0.6–1.0) | 0.8 (0.6–1.0) | 0.9 (0.2–1.6) | 0.4 (0.1–0.6) | 1.3 (0.5–2.0) | 1.6 (0.5–2.7) |
| Parkinsons disease | 0.5 (0.4–0.7) | 0.9 (0.7–1.1) | 1.0 (0.8–1.2) | 0.8 (0.5–1.0) | 0.6 (-0.2–1.4) | 0.3 (0.3–0.4) | 0.3 (0.2–0.4) | 0.2 (0.2–0.3) |
| Schizophrenia | 0.5 (0.4–0.7) | 0.2 (0.1–0.3) | 0.4 (0.3–0.6) | 0.9 (0.7–1.1) | 0.8 (-0.3–1.8) | 0.1 (0.0–0.2) | 0.2 (0.1–0.4) | 1.3 (0.5–2.1) |
| Eating disorders | 0.5 (0.4–0.6) | 0.0 (0.0–0.1) | 0.1 (0.0–0.2) | 0.1 (0.0–0.2) | 0.4 (0.2–0.6) | 0.0 (0.0–0.0) | 0.2 (0.1–0.4) | 0.3 (0.0–0.6) |
| Aortic aneurysm | 0.4 (0.2–0.5) | 2.0 (1.7–2.2) | 1.5 (1.3–1.8) | 4.2 (3.7–4.7) | 0.9 (0.2–1.5) | 0.7 (0–0.8) | 0.5 (0.4–0.6) | 1.2 (1.0–1.3) |
| Autism | 0.1 (0.0–0.1) | 0.1 (0.0–0.1) | 0.1 (0.0–0.2) | 0.0 (0.0–0.0) | 4.2 (4.2–4.2) | 0.1 (0.0–0.1) | 0.2 (0.0–0.4) | 0.0 (0.0–0.0) |
| Cystic fibrosis | 0.0 (0.0–0.1) | 0.0 (0.0–0.0) | 0.0 (0.0–0.1) | 0.0 (0.0–0.1) | 0.0 (0.0–0.1) | 0.0 (0.0–0.0) | 0.1 (0.0–0.2) | 0.0 (0.0–0.1) |
| HIV | 0.0 (0.0–0.1) | 0.0 (0.0–0.1) | 0.1 (0.0–0.2) | 0.1 (0.0–0.1) | 2.5 (-0.9–5.8) | 0.0 (0.0–0.0) | 0.2 (0.0–0.5) | 0.1 (0.0–0.2) |

COPD: chronic obstructive pulmonary disease; TIA: transient ischaemic attack; HIV: Human Immunodeficiency Virus

Supplementary Table S2: Crude and age-sex standardised prevalence of individual long-term conditions in people living with and beyond cancer

| PLWBC | | | | | | | | |
|--------------------------------|--------------------------|------------------|------------------|------------------|---|------------------|------------------|------------------|
| Comorbidity | Crude Prevalence (95%CI) | | | | Age-sex standardised Prevalence (95%CI) | | | |
| | Breast | Prostate | Colorectal | Lung | Breast | Prostate | Colorectal | Lung |
| Hypertension | 41.9 (40.7–43.0) | 61.8 (60.5–63.1) | 59.1 (57.4–60.8) | 64.9 (61.5–68.4) | 34.4 (29.1–39.8) | 29.6 (28.0–31.2) | 27.7 (25.5–29.9) | 32.5 (29.4–35.5) |
| Osteoarthritis | 33.2 (32.2–34.3) | 37.6 (36.3–38.9) | 36.6 (34.9–38.3) | 41.3 (37.7–44.8) | 18.0 (13.4–22.5) | 16.9 (15.5–18.2) | 15.7 (14.4–16.9) | 19.3 (16.8–21.8) |
| Anxiety | 25.0 (24.0–26.0) | 14.0 (13.1–14.9) | 20.2 (18.8–21.6) | 22.8 (19.8–25.9) | 20.5 (18.0–23.1) | 14.8 (6.9–22.6) | 21.3 (18.2–24.5) | 21.7 (17.3–26.1) |
| Depression | 24.1 (23.1–25.1) | 13.8 (12.9–14.7) | 19.2 (17.9–20.6) | 26.1 (22.9–29.3) | 18.1 (14.4–21.8) | 22.6 (18.9–26.4) | 19.2 (16.2–22.3) | 20.6 (15.7–25.4) |
| Asthma | 16.9 (16.1–17.8) | 13.4 (12.5–14.3) | 16.4 (15.1–17.7) | 28.2 (24.9–31.5) | 16.3 (13.8–18.8) | 12.6 (5.3–20.0) | 17.5 (13.7–21.2) | 27.4 (21.9–32.9) |
| Osteoporosis | 16.0 (15.2–16.9) | 5.4 (4.8–6.0) | 10.8 (9.7–11.9) | 14.4 (11.9–17.0) | 6.1 (5.0–7.1) | 1.9 (1.6–2.2) | 4.4 (3.7–5.2) | 6.7 (5.1–8.3) |
| Thyroid disease | 14.1 (13.3–14.9) | 5.5 (4.9–6.1) | 9.8 (8.7–10.8) | 13.2 (10.7–15.7) | 7.7 (5.4–10.0) | 2.2 (1.9–2.6) | 6.3 (5.0–7.5) | 8.2 (5.7–10.7) |
| Diabetes | 13.0 (12.3–13.8) | 20.0 (18.9–21.0) | 22.2 (20.7–23.6) | 21.0 (18.1–24.0) | 12.6 (8.3–16.8) | 12.0 (9.0–15.0) | 11.7 (10.2–13.1) | 11.5 (9.1–13.9) |
| Deafness | 12.3 (11.5–13.0) | 22.7 (21.6–23.8) | 19.1 (17.8–20.5) | 19.8 (16.9–22.7) | 7.6 (5.1–10.1) | 14.4 (7.6–21.3) | 8.8 (7.1–10.6) | 8.8 (7.0–10.6) |
| Coronary heart disease | 9.6 (9.0–10.3) | 23.9 (22.8–25.0) | 21.7 (20.3–23.2) | 30.0 (26.7–33.3) | 7.6 (4.9–10.2) | 9.3 (8.6–10.0) | 11.2 (9.0–13.4) | 14.4 (12.2–16.6) |
| Chronic kidney disease | 9.4 (8.7–10.0) | 15.8 (14.8–16.7) | 18.0 (16.6–19.3) | 18.7 (15.9–21.5) | 5.0 (3.4–6.5) | 5.3 (4.8–5.9) | 5.8 (5.1–6.4) | 7.8 (6.2–9.4) |
| Arrhythmia | 8.0 (7.4–8.7) | 17.4 (16.4–18.4) | 17.1 (15.8–18.5) | 22.0 (19.0–25.0) | 5.3 (3.8–6.8) | 6.0 (5.5–6.6) | 6.1 (5.3–6.9) | 10.6 (7.7–13.4) |
| COPD | 6.8 (6.2–7.4) | 11.7 (10.9–12.6) | 12.1 (11.0–13.3) | 51.7 (48.1–55.4) | 3.9 (1.2–6.6) | 4.7 (4.0–5.3) | 5.2 (4.5–6.0) | 29.9 (25.9–34.0) |
| Venous thromboembolism | 6.3 (5.8–6.9) | 5.9 (5.3–6.5) | 10.6 (9.5–11.7) | 13.5 (11.0–16.0) | 4.2 (2.9–5.5) | 2.9 (2.2–3.6) | 8.8 (5.8–11.8) | 10.6 (7.0–14.2) |
| Peripheral neuropathy | 5.4 (4.9–5.9) | 6.6 (5.9–7.2) | 9.1 (8.1–10.1) | 9.8 (7.6–11.9) | 6.1 (3.6–8.6) | 8.0 (1.2–14.8) | 8.5 (6.2–10.9) | 6.8 (4.0–9.6) |
| Connective tissue disease | 5.5 (5.0–6.0) | 6.0 (5.3–6.6) | 6.7 (5.8–7.5) | 9.6 (7.5–11.8) | 3.3 (2.1–4.6) | 2.6 (2.0–3.2) | 3.2 (2.5–3.9) | 5.5 (3.0–8.0) |
| Stroke or TIA | 4.5 (4.0–5.0) | 9.3 (8.6–10.1) | 8.3 (7.3–9.2) | 11.1 (8.9–13.4) | 4.4 (1.5–7.3) | 3.4 (3.0–3.8) | 3.0 (2.4–3.6) | 4.8 (3.3–6.3) |
| Alcohol misuse | 4.3 (3.8–4.7) | 6.9 (6.2–7.5) | 6.8 (5.9–7.7) | 12.2 (9.9–14.6) | 5.1 (2.1–8.1) | 11.2 (3.3–19.0) | 6.1 (4.2–7.9) | 7.8 (5.3–10.3) |
| Heart failure | 3.7 (3.3–4.2) | 8.3 (7.6–9.0) | 8.8 (7.8–9.7) | 10.7 (8.5–13.0) | 2.7 (1.4–4.1) | 3.0 (2.5–3.5) | 2.7 (2.2–3.3) | 4.6 (3.5–5.7) |
| Heart valve disorder | 3.7 (3.3–4.1) | 6.6 (6.0–7.3) | 7.4 (6.5–8.4) | 10.2 (8.0–12.4) | 1.8 (1.0–2.6) | 2.3 (2.0–2.6) | 2.2 (1.9–2.5) | 4.1 (3.1–5.2) |
| Endometriosis | 3.6 (3.2–4.1) | 0.0 (0.0–0.0) | 1.3 (0.9–1.7) | 1.0 (0.3–1.7) | 1.9 (1.6–2.2) | 0.0 (0.0–0.0) | 1.9 (1.0–2.8) | 4.9 (4.6–5.2) |
| Peptic ulcer disease | 3.3 (2.9–3.8) | 7.4 (6.7–8.1) | 7.6 (6.7–8.5) | 9.4 (7.2–11.5) | 2.5 (0.5–4.5) | 9.0 (1.6–16.3) | 4.4 (3.2–5.7) | 6.0 (3.9–8.1) |
| Gout | 3.0 (2.6–3.4) | 13.7 (12.8–14.6) | 9.7 (8.6–10.7) | 9.2 (7.1–11.3) | 2.2 (0.9–3.5) | 7.2 (6.1–8.3) | 4.5 (3.7–5.3) | 4.7 (3.0–6.4) |
| Post traumatic stress disorder | 2.8 (2.4–3.2) | 1.7 (1.4–2.0) | 2.1 (1.6–2.6) | 1.4 (0.5–2.2) | 3.0 (1.0–5.0) | 1.2 (0.6–1.8) | 1.5 (0.8–2.2) | 1.1 (0.2–2.0) |
| Chronic liver disease | 2.6 (2.2–2.9) | 2.7 (2.3–3.1) | 4.0 (3.3–4.7) | 5.1 (3.5–6.7) | 4.8 (2.0–7.7) | 2.3 (1.5–3.2) | 3.8 (2.5–5.0) | 4.6 (2.5–6.7) |
| Dementia | 2.3 (2.0–2.7) | 4.4 (3.9–5.0) | 4.0 (3.3–4.7) | 4.5 (3.0–6.1) | 1.6 (1.1–2.1) | 1.4 (1.2–1.6) | 1.1 (0.9–1.3) | 1.7 (1.1–2.3) |

| | | | | | | | | |
|-----------------------------|---------------|---------------|---------------|-----------------|----------------|-----------------|----------------|----------------|
| Addisons disease | 2.2 (1.8–2.5) | 1.0 (0.7–1.3) | 2.2 (1.7–2.7) | 3.2 (1.9–4.4) | 0.8 (0.6–0.9) | 0.4 (0.2–0.5) | 1.1 (0.6–1.5) | 1.1 (0.7–1.6) |
| Epilepsy | 1.8 (1.5–2.1) | 2.3 (1.9–2.7) | 2.2 (1.7–2.7) | 2.9 (1.7–4.1) | 1.0 (0.6–1.4) | 1.2 (0.7–1.6) | 2.7 (1.1–4.4) | 1.7 (0.6–2.8) |
| Peripheral arterial disease | 1.8 (1.5–2.1) | 4.4 (3.9–5.0) | 4.8 (4.1–5.6) | 10.6 (8.4–12.8) | 2.2 (0.1–4.4) | 1.6 (1.4–1.8) | 1.7 (1.3–2.0) | 4.2 (3.3–5.2) |
| Blindness | 1.6 (1.3–1.9) | 1.7 (1.3–2.0) | 2.0 (1.5–2.5) | 3.2 (1.9–4.4) | 2.2 (0.4–4.1) | 0.5 (0.4–0.7) | 1.4 (0.1–2.8) | 1.7 (0.4–2.9) |
| Inflammatory bowel disease | 1.4 (1.1–1.7) | 1.7 (1.4–2.0) | 3.1 (2.5–3.7) | 1.9 (0.9–2.9) | 1.0 (0.4–1.5) | 0.9 (0.5–1.3) | 4.7 (2.7–6.6) | 1.3 (0.3–2.3) |
| Bronchiectasis | 1.2 (0.9–1.4) | 1.8 (1.4–2.1) | 2.5 (1.9–3.0) | 5.9 (4.2–7.6) | 0.4 (0.3–0.4) | 0.6 (0.5–0.8) | 0.9 (0.6–1.2) | 3.0 (1.9–4.0) |
| Haematological cancer | 1.2 (0.9–1.4) | 2.3 (1.9–2.7) | 2.9 (2.4–3.5) | 3.6 (2.2–4.9) | 0.6 (0.4–0.8) | 1.1 (0.7–1.5) | 3.2 (1.4–5.0) | 2.0 (1.0–3.1) |
| Substance misuse | 1.1 (0.9–1.3) | 0.9 (0.7–1.1) | 1.4 (1.0–1.8) | 1.9 (0.9–2.9) | 0.5 (0.4–0.7) | 6.2 (-1.1–13.5) | 2.2 (0.9–3.6) | 2.4 (0.5–4.4) |
| Tuberculosis | 1.1 (0.8–1.3) | 1.4 (1.1–1.7) | 1.2 (0.8–1.6) | 2.5 (1.3–3.6) | 0.4 (0.3–0.4) | 0.6 (0.4–0.8) | 0.8 (0.3–1.4) | 3.9 (0.1–7.7) |
| Chronic pancreatitis | 1.0 (0.8–1.3) | 1.4 (1.1–1.7) | 1.4 (1.0–1.9) | 2.1 (1.0–3.1) | 2.1 (-0.6–4.8) | 0.9 (0.4–1.5) | 1.4 (0.5–2.2) | 2.9 (0.3–5.5) |
| Bipolar affective disorder | 0.8 (0.6–1.0) | 0.3 (0.2–0.4) | 0.5 (0.3–0.7) | 1.0 (0.3–1.7) | 1.3 (-0.4–2.9) | 0.2 (0.0–0.3) | 0.4 (0.1–0.6) | 0.8 (0.0–1.5) |
| Congenital disease | 0.6 (0.4–0.8) | 0.4 (0.2–0.5) | 0.6 (0.4–0.9) | 0.1 (-0.1–0.4) | 0.3 (0.2–0.4) | 1.7 (-1.0–4.4) | 1.4 (-0.1–2.8) | 0.0 (0.0–0.1) |
| Eating disorders | 0.5 (0.4–0.7) | 0.0 (0.0–0.1) | 0.1 (0.0–0.1) | 0.4 (-0.1–0.9) | 0.4 (0.2–0.6) | 0.1 (-0.1–0.2) | 0.4 (-0.2–0.9) | 0.3 (0.0–0.6) |
| Schizophrenia | 0.5 (0.3–0.7) | 0.2 (0.1–0.4) | 0.4 (0.2–0.6) | 0.3 (-0.1–0.7) | 0.2 (0.1–0.4) | 0.3 (-0.1–0.7) | 0.2 (0.1–0.4) | 0.3 (-0.1–0.8) |
| Multiple sclerosis | 0.5 (0.3–0.6) | 0.2 (0.1–0.4) | 0.3 (0.1–0.4) | 0.1 (-0.1–0.4) | 0.3 (0.1–0.4) | 0.1 (0.0–0.2) | 0.4 (-0.1–0.9) | 0.5 (-0.4–1.4) |
| Parkinsons disease | 0.5 (0.3–0.6) | 1.5 (1.2–1.8) | 1.1 (0.7–1.4) | 1.4 (0.5–2.2) | 1.0 (0.1–2.0) | 0.5 (0.4–0.6) | 0.3 (0.2–0.4) | 0.7 (0.0–1.5) |
| Aortic aneurysm | 0.3 (0.2–0.5) | 2.4 (2.0–2.8) | 1.6 (1.1–2.0) | 4.3 (2.8–5.7) | 0.4 (0.3–0.9) | 0.8 (0.7–1.0) | 0.4 (0.3–0.6) | 1.9 (1.0–2.8) |
| Autism | 0.1 (0.0–0.1) | 0.0 (0.0–0.1) | 0.1 (0.0–0.2) | 0.0 (0.0–0.0) | 0.1 (0.0–0.1) | 0.0 (0.0–0.0) | 0.4 (-0.1–0.9) | 0.0 (0.0–0.0) |
| Cystic fibrosis | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) |
| HIV | 0.0 (0.0–0.0) | 0.1 (0.0–0.1) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) | 0.0 (0.0–0.1) | 0.0 (0.0–0.0) | 0.0 (0.0–0.0) |

COPD: chronic obstructive pulmonary disease; TIA: transient ischaemic attack; HIV: Human Immunodeficiency Virus

Supplementary Table S3: Condition counts in people with incident breast cancer by patient demographics

| | | Condition count | | | | | | | P* |
|-------------------|-----------|-----------------|-------------|-------------|-------------|------------|------------|-------------|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6+ | |
| Age category | 18-44 | 335 (44.0) | 200 (26.3) | 118 (15.5) | 63 (8.3) | 31 (4.1) | 6 (0.8) | 8 (1.1) | <0.001 |
| | 45-59 | 1032 (32.4) | 840 (26.4) | 608 (19.1) | 352 (11.1) | 175 (5.5) | 100 (3.1) | 76 (2.4) | |
| | 60-74 | 454 (13.7) | 709 (21.4) | 629 (18.9) | 520 (15.7) | 386 (11.6) | 238 (7.2) | 384 (11.6) | |
| | 75+ | 61 (2.8) | 165 (7.5) | 260 (11.9) | 338 (15.4) | 308 (14.1) | 296 (13.5) | 760 (34.7) | |
| Sex | Female | 1877 (20.0) | 1899 (20.3) | 1602 (17.1) | 1264 (13.5) | 888 (9.5) | 633 (6.8) | 1203 (12.8) | <0.001 |
| | Male | 5 (5.8) | 15 (17.4) | 13 (15.1) | 9 (10.5) | 12 (14.0) | 7 (8.1) | 25 (29.1) | |
| Ethnicity | White | 1601 (18.9) | 1710 (20.2) | 1445 (17.0) | 1174 (13.8) | 820 (9.7) | 586 (6.9) | 1142 (13.5) | <0.001 |
| | Asian | 111 (27.8) | 77 (19.3) | 61 (15.3) | 42 (10.5) | 38 (9.5) | 26 (6.5) | 44 (11.0) | |
| | Black | 59 (24.0) | 50 (20.3) | 47 (19.1) | 27 (11.0) | 25 (10.2) | 15 (6.1) | 23 (9.3) | |
| | Other | 61 (28.6) | 46 (21.6) | 45 (21.1) | 21 (9.9) | 11 (5.2) | 12 (5.6) | 17 (8.0) | |
| Deprivation level | 1 (least) | 542 (23.0) | 520 (22.0) | 408 (17.3) | 304 (12.9) | 210 (8.9) | 140 (5.9) | 235 (10.0) | <0.001 |
| | 2 | 448 (20.5) | 476 (21.8) | 389 (17.8) | 299 (13.7) | 192 (8.8) | 133 (6.1) | 249 (11.4) | |
| | 3 | 369 (19.9) | 374 (20.2) | 324 (17.5) | 253 (13.7) | 192 (10.4) | 121 (6.5) | 219 (11.8) | |
| | 4 | 296 (18.1) | 308 (18.9) | 263 (16.1) | 230 (14.1) | 155 (9.5) | 132 (8.1) | 249 (15.2) | |
| | 5 (most) | 225 (16.0) | 233 (16.5) | 230 (16.3) | 186 (13.2) | 151 (10.7) | 111 (7.9) | 274 (19.4) | |

*p values derived from Chi-squared test

Supplementary Table S4: Condition counts in men with incident prostate cancer by patient demographics

| | | Condition count | | | | | | | P* |
|-------------------|-----------|-----------------|-------------|-------------|-------------|-------------|------------|-------------|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6+ | |
| Age category | 18-44 | 10 (41.7) | 8 (33.3) | - | - | - | 0 (0) | 0 (0) | <0.001 |
| | 45-59 | 341 (27.9) | 348 (28.5) | - | - | - | 34 (2.8) | 43 (3.5) | |
| | 60-74 | 690 (13.3) | 1055 (20.3) | 1127 (21.7) | 870 (16.7) | 578 (11.1) | 343 (6.6) | 532 (10.2) | |
| | 75+ | 139 (3.7) | 379 (10.0) | 539 (14.2) | 589 (15.5) | 573 (15.1) | 464 (12.2) | 1107 (29.2) | |
| Ethnicity | White | 1042 (11.2) | 1592 (17.1) | 1745 (18.7) | 1463 (15.7) | 1139 (12.2) | 759 (8.2) | 1570 (16.9) | <0.001 |
| | Asian | 16 (7.0) | 32 (14.1) | 36 (15.9) | 28 (12.3) | 27 (11.9) | 33 (14.5) | 55 (24.2) | |
| | Black | 59 (14.3) | 89 (21.6) | 78 (18.9) | 79 (19.2) | 38 (9.2) | 32 (7.8) | 37 (9.0) | |
| | Other | 31 (21.2) | 33 (22.6) | 18 (12.3) | 22 (15.1) | 14 (9.6) | 10 (6.8) | 18 (12.3) | |
| Deprivation level | 1 (least) | 377 (13.6) | 527 (19.0) | 546 (19.6) | 421 (15.1) | 332 (11.9) | 183 (6.6) | 393 (14.1) | <0.001 |
| | 2 | 295 (12.1) | 434 (17.8) | 482 (19.8) | 371 (15.3) | 284 (11.7) | 190 (7.8) | 376 (15.5) | |
| | 3 | 214 (10.9) | 344 (17.5) | 384 (19.5) | 300 (15.3) | 229 (11.6) | 166 (8.4) | 329 (16.7) | |
| | 4 | 198 (11.4) | 293 (16.9) | 308 (17.7) | 281 (16.2) | 219 (12.6) | 162 (9.3) | 276 (15.9) | |
| | 5 (most) | 95 (7.3) | 189 (14.5) | 187 (14.3) | 229 (17.5) | 161 (12.3) | 138 (10.6) | 307 (23.5) | |

*p values derived from Chi-squared test, - primary suppression of cells for any cell with <5 people and corresponding secondary suppression

Supplementary Table S5: Condition counts in people with incident colorectal cancer by patient demographics

| | | Condition count | | | | | | | P* |
|-------------------|-----------|-----------------|------------|-------------|------------|------------|------------|-------------|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6+ | |
| Age category | 18-44 | 89 (35.3) | 83 (32.9) | 35 (13.9) | 23 (9.1) | 12 (4.8) | 5 (2.0) | 5 (2.0) | <0.001 |
| | 45-59 | 303 (27.9) | 255 (23.5) | 221 (20.3) | 141 (13.0) | 65 (6.0) | 41 (3.8) | 61 (5.6) | |
| | 60-74 | 332 (12.5) | 485 (18.2) | 517 (19.4) | 389 (14.6) | 311 (11.7) | 245 (9.2) | 385 (14.5) | |
| | 75+ | 101 (3.1) | 234 (7.3) | 378 (11.8) | 494 (15.4) | 454 (14.1) | 391 (12.2) | 1161 (36.1) | |
| Sex | Female | 357 (11.0) | 464 (14.2) | 509 (15.6) | 481 (14.8) | 376 (11.5) | 319 (9.8) | 754 (23.1) | 0.540 |
| | Male | 468 (11.8) | 593 (15.0) | 642 (16.2) | 566 (14.3) | 466 (11.8) | 363 (9.2) | 858 (21.7) | |
| Ethnicity | White | 734 (10.9) | 953 (14.2) | 1074 (16.0) | 976 (14.5) | 792 (11.8) | 643 (9.6) | 1536 (22.9) | <0.001 |
| | Asian | 24 (15.0) | 21 (13.1) | 22 (13.8) | 30 (18.8) | 18 (11.2) | 10 (6.2) | 35 (21.9) | |
| | Black | 22 (14.6) | 37 (24.5) | 24 (15.9) | 20 (13.2) | 17 (11.3) | 14 (9.3) | 17 (11.3) | |
| | Other | 22 (19.8) | 22 (19.8) | 19 (17.1) | 9 (8.1) | 7 (6.3) | 12 (10.8) | 20 (18.0) | |
| Deprivation level | 1 (least) | 235 (13.6) | 285 (16.4) | 292 (16.8) | 231 (13.3) | 207 (11.9) | 156 (9.0) | 327 (18.9) | <0.001 |
| | 2 | 172 (10.8) | 251 (15.7) | 268 (16.8) | 225 (14.1) | 176 (11.0) | 184 (11.5) | 319 (20.0) | |
| | 3 | 150 (10.8) | 204 (14.7) | 220 (15.8) | 205 (14.7) | 171 (12.3) | 119 (8.6) | 322 (23.1) | |
| | 4 | 162 (12.3) | 178 (13.5) | 206 (15.6) | 207 (15.7) | 151 (11.4) | 107 (8.1) | 311 (23.5) | |
| | 5 (most) | 106 (9.1) | 136 (11.6) | 164 (14.0) | 179 (15.3) | 137 (11.7) | 115 (9.8) | 333 (28.5) | |

*p values derived from Chi-squared test

Supplementary Table S6: Condition counts in people with incident lung cancer by patient demographics

| | | Condition count | | | | | | | P* |
|-------------------|-----------|-----------------|------------|------------|------------|------------|------------|-------------|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6+ | |
| Age category | 18-44 | 26 (37.1) | 20 (28.6) | 10 (14.3) | 8 (11.4) | - | 0 (0) | - | <0.001 |
| | 45-59 | 101 (15.3) | 121 (18.3) | 128 (19.3) | 80 (12.1) | - | 64 (9.7) | - | |
| | 60-74 | 168 (6.3) | 297 (11.2) | 404 (15.2) | 416 (15.6) | 360 (13.5) | 300 (11.3) | 714 (26.9) | |
| | 75+ | 43 (1.4) | 123 (4.1) | 246 (8.3) | 367 (12.4) | 393 (13.2) | 369 (12.4) | 1428 (48.1) | |
| Sex | Female | 141 (4.6) | 247 (8.1) | 386 (12.7) | 412 (13.5) | 390 (12.8) | 357 (11.7) | 1116 (36.6) | 0.036 |
| | Male | 197 (5.9) | 314 (9.5) | 402 (12.1) | 459 (13.9) | 445 (13.4) | 376 (11.4) | 1118 (33.8) | |
| Ethnicity | White | 298 (5.0) | 500 (8.4) | 720 (12.1) | 819 (13.7) | 790 (13.2) | 696 (11.7) | 2150 (36.0) | <0.001 |
| | Asian | 10 (7.1) | 11 (7.9) | 17 (12.1) | 21 (15.0) | 19 (13.6) | 16 (11.4) | 46 (32.9) | |
| | Black | 13 (12.4) | 19 (18.1) | 20 (19.0) | - | 7 (6.7) | - | 18 (17.1) | |
| | Other | 8 (10.4) | 16 (20.8) | 15 (19.5) | - | 11 (14.3) | - | 17 (22.1) | |
| Deprivation level | 1 (least) | 68 (6.5) | 87 (8.3) | 157 (14.9) | 157 (14.9) | 140 (13.3) | 124 (11.8) | 321 (30.5) | <0.001 |
| | 2 | 77 (6.5) | 123 (10.4) | 143 (12.1) | 155 (13.2) | 165 (14.0) | 136 (11.5) | 379 (32.2) | |
| | 3 | 73 (6.3) | 109 (9.5) | 133 (11.6) | 168 (14.6) | 145 (12.6) | 144 (12.5) | 379 (32.9) | |
| | 4 | 58 (4.2) | 121 (8.9) | 168 (12.3) | 187 (13.7) | 178 (13.0) | 146 (10.7) | 508 (37.2) | |
| | 5 (most) | 62 (3.9) | 121 (7.5) | 187 (11.6) | 203 (12.6) | 206 (12.8) | 183 (11.4) | 645 (40.1) | |

*p values derived from Chi-squared test, - primary suppression of cells for any cell with <5 people and corresponding secondary suppression

Supplementary Table S7: Condition counts in people living with and beyond breast cancer by patient demographics

| | | Condition count | | | | | | | |
|-------------------|-----------|-----------------|-------------|-------------|------------|------------|------------|-------------|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6+ | P* |
| Age category | 18-44 | 116 (35.2) | 86 (26.1) | 75 (22.7) | 28 (8.5) | 11 (3.3) | - | - | <0.001 |
| | 45-59 | 602 (25.2) | 642 (26.9) | 452 (18.9) | 304 (12.7) | 191 (8.0) | - | - | |
| | 60-74 | 282 (9.8) | 533 (18.4) | 599 (20.7) | 472 (16.3) | 363 (12.6) | 233 (8.1) | 407 (14.1) | |
| | 75+ | 31 (1.9) | 94 (5.9) | 166 (10.4) | 242 (15.2) | 235 (14.7) | 213 (13.4) | 613 (38.5) | |
| Sex | Female | - | 1348 (18.8) | 1285 (17.9) | - | 793 (11.1) | - | 1113 (15.5) | 0.590 |
| | Male | - | 7 (17.5) | 7 (17.5) | - | 7 (17.5) | - | 9 (22.5) | |
| Ethnicity | White | 898 (13.8) | 1231 (18.9) | 1174 (18.0) | 944 (14.5) | 711 (10.9) | 508 (7.8) | 1056 (16.2) | 0.002 |
| | Asian | 61 (18.0) | 53 (15.7) | 62 (18.3) | 53 (15.7) | 55 (16.3) | 20 (5.9) | 34 (10.1) | |
| | Black | 24 (14.3) | 29 (17.3) | 29 (17.3) | 31 (18.5) | 21 (12.5) | 16 (9.5) | 18 (10.7) | |
| | Other | 27 (23.3) | 24 (20.7) | 21 (18.1) | 13 (11.2) | 11 (9.5) | 8 (6.9) | 12 (10.3) | |
| Deprivation level | 1 (least) | 324 (17.2) | 409 (21.8) | 339 (18.0) | 252 (13.4) | 189 (10.1) | 119 (6.3) | 247 (13.1) | <0.001 |
| | 2 | 237 (13.9) | 351 (20.6) | 300 (17.6) | 242 (14.2) | 186 (10.9) | 141 (8.3) | 246 (14.4) | |
| | 3 | 224 (15.9) | 259 (18.4) | 278 (19.8) | 201 (14.3) | 154 (11.0) | 95 (6.8) | 195 (13.9) | |
| | 4 | 154 (12.7) | 198 (16.3) | 209 (17.2) | 205 (16.9) | 142 (11.7) | 98 (8.1) | 210 (17.3) | |
| | 5 (most) | 91 (9.2) | 137 (13.8) | 166 (16.8) | 145 (14.6) | 129 (13.0) | 100 (10.1) | 222 (22.4) | |

*p values derived from Chi-squared test, - primary suppression of cells for any cell with <5 people and corresponding secondary suppression

Supplementary Table S8: Condition counts in people living with and beyond prostate cancer by patient demographics

| | | Condition count | | | | | | | |
|-------------------|-----------|-----------------|------------|------------|------------|------------|------------|-------------|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6+ | P* |
| Age category | 18-44 | - | - | - | 0 (0.0) | - | 0 (0.0) | 0 (0.0) | <0.001 |
| | 45-59 | - | - | - | 27 (10.9) | - | 5 (2.0) | 12 (4.9) | |
| | 60-74 | 251 (9.5) | 517 (19.5) | 541 (20.4) | 454 (17.1) | 304 (11.5) | 220 (8.3) | 364 (13.7) | |
| | 75+ | 100 (3.6) | 260 (9.3) | 349 (12.5) | 447 (16.1) | 412 (14.8) | 346 (12.4) | 867 (31.2) | |
| Ethnicity | White | 368 (7.1) | 762 (14.6) | 857 (16.5) | 842 (16.2) | 680 (13.1) | 531 (10.2) | 1167 (22.4) | 0.552 |
| | Asian | 7 (6.1) | 14 (12.2) | 22 (19.1) | 24 (20.9) | 15 (13.0) | 13 (11.3) | 20 (17.4) | |
| | Black | 16 (6.9) | 40 (17.3) | 48 (20.8) | 43 (18.6) | 25 (10.8) | 18 (7.8) | 41 (17.7) | |
| | Other | 8 (10.7) | 11 (14.7) | 15 (20.0) | 12 (16.0) | 9 (12.0) | 9 (12.0) | 11 (14.7) | |
| Deprivation level | 1 (least) | 134 (8.6) | 264 (17.0) | 289 (18.6) | 260 (16.7) | 188 (12.1) | 141 (9.1) | 281 (18.0) | <0.001 |
| | 2 | 106 (7.5) | 225 (16.0) | 229 (16.3) | 233 (16.5) | 184 (13.1) | 146 (10.4) | 286 (20.3) | |
| | 3 | 88 (8.0) | 157 (14.2) | 192 (17.4) | 172 (15.6) | 150 (13.6) | 111 (10.1) | 234 (21.2) | |
| | 4 | 52 (6.0) | 119 (13.7) | 129 (14.9) | 135 (15.6) | 112 (12.9) | 98 (11.3) | 223 (25.7) | |
| | 5 (most) | 30 (4.1) | 82 (11.1) | 113 (15.3) | 126 (17.0) | 96 (13.0) | 74 (10.0) | 219 (29.6) | |

*p values derived from Chi-squared test, - primary suppression of cells for any cell with <5 people and corresponding secondary suppression

Supplementary Table S9: Condition counts in people living with and beyond colorectal cancer by patient demographics

| | | Condition count | | | | | | | P* |
|-------------------|-----------|-----------------|------------|------------|------------|------------|------------|------------|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6+ | |
| Age category | 18-44 | 29 (29.6) | 29 (29.6) | 19 (19.4) | 9 (9.2) | 7 (7.1) | - | - | <0.001 |
| | 45-59 | 74 (19.2) | 94 (24.4) | 77 (19.9) | 63 (16.3) | 29 (7.5) | - | - | |
| | 60-74 | 94 (7.6) | 206 (16.7) | 243 (19.7) | 213 (17.3) | 151 (12.3) | 127 (10.3) | 197 (16.0) | |
| | 75+ | 33 (2.2) | 85 (5.7) | 146 (9.9) | 223 (15.1) | 209 (14.1) | 180 (12.2) | 605 (40.9) | |
| Sex | Female | 137 (7.7) | 246 (13.9) | 248 (14.0) | 290 (16.4) | 214 (12.1) | 168 (9.5) | 465 (26.3) | 0.102 |
| | Male | 93 (6.5) | 168 (11.8) | 237 (16.6) | 218 (15.3) | 182 (12.7) | 157 (11.0) | 373 (26.1) | |
| Ethnicity | White | 206 (6.9) | 383 (12.8) | 447 (14.9) | 479 (16.0) | 372 (12.4) | 310 (10.3) | 801 (26.7) | 0.049 |
| | Asian | 11 (13.3) | 11 (13.3) | 15 (18.1) | 12 (14.5) | 10 (12.0) | 6 (7.2) | 18 (21.7) | |
| | Black | - | - | 12 (23.5) | 5 (9.8) | 8 (15.7) | - | 13 (25.5) | |
| | Other | - | - | 7 (14.9) | 12 (25.5) | 6 (12.8) | - | 5 (10.6) | |
| Deprivation level | 1 (least) | 61 (7.4) | 130 (15.8) | 141 (17.2) | 124 (15.1) | 101 (12.3) | 70 (8.5) | 195 (23.7) | 0.005 |
| | 2 | 61 (8.3) | 94 (12.7) | 116 (15.7) | 118 (16.0) | 87 (11.8) | 75 (10.1) | 188 (25.4) | |
| | 3 | 50 (7.9) | 89 (14.0) | 98 (15.4) | 103 (16.2) | 74 (11.7) | 62 (9.8) | 159 (25.0) | |
| | 4 | 38 (6.7) | 57 (10.1) | 77 (13.6) | 90 (15.9) | 84 (14.9) | 69 (12.2) | 150 (26.5) | |
| | 5 (most) | 19 (4.4) | 44 (10.2) | 52 (12.0) | 73 (16.9) | 50 (11.5) | 49 (11.3) | 146 (33.7) | |

*p values derived from Chi-squared test, - primary suppression of cells for any cell with <5 people and corresponding secondary suppression

Supplementary Table S10: Condition counts in people living with and beyond lung cancer by patient demographics

| | | Condition count | | | | | | | P* |
|-------------------|-----------|-----------------|-----------|-----------|-----------|-----------|-----------|------------|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6+ | |
| Age category | 18-44 | - | - | - | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | <0.001 |
| | 45-59 | 6 (8.7) | 11 (15.9) | 16 (23.2) | 11 (15.9) | 8 (11.6) | 5 (7.2) | 12 (17.4) | |
| | 60-74 | 7 (2.0) | 29 (8.5) | 43 (12.6) | 43 (12.6) | 53 (15.5) | 46 (13.5) | 121 (35.4) | |
| | 75+ | - | - | - | 22 (7.1) | 45 (14.6) | 38 (12.3) | 182 (59.1) | |
| Sex | Female | 10 (2.9) | 24 (7.0) | 25 (7.3) | 31 (9.1) | 50 (14.7) | 45 (13.2) | 156 (45.7) | 0.311 |
| | Male | 7 (1.8) | 30 (7.8) | 45 (11.7) | 45 (11.7) | 56 (14.5) | 44 (11.4) | 159 (41.2) | |
| Ethnicity | White | 15 (2.2) | 53 (7.7) | 65 (9.5) | 68 (9.9) | 99 (14.4) | 88 (12.8) | 298 (43.4) | 0.116 |
| | Asian | - | - | - | - | - | - | - | |
| | Black | - | - | - | - | - | - | - | |
| | Other | - | - | - | - | - | - | - | |
| Deprivation level | 1 (least) | - | - | 17 (15.2) | 8 (7.1) | 25 (22.3) | 8 (7.1) | 44 (39.3) | 0.017 |
| | 2 | - | - | 13 (8.9) | 23 (15.8) | 25 (17.1) | 13 (8.9) | 58 (39.7) | |
| | 3 | - | 17 (11.7) | - | 15 (10.3) | 14 (9.7) | 15 (10.3) | 69 (47.6) | |
| | 4 | - | - | 18 (11.7) | 12 (7.8) | 17 (11.0) | 25 (16.2) | 69 (44.8) | |
| | 5 (most) | - | 11 (6.5) | - | 18 (10.7) | 25 (14.8) | 28 (16.6) | 75 (44.4) | |

*p values derived from Chi-squared test, - primary suppression of cells for any cell with <5 people and corresponding secondary suppression

Supplementary Table S11: Multimorbidity and Mental-physical Multimorbidity in Incident and PLWBC stratified by sociodemographic groups

| | | Breast cancer | | | | | Prostate cancer | | | | | Colorectal cancer | | | | | Lung cancer | | | | |
|---|-----------|---------------|--------|----------|------------|----------|-----------------|--------|---------|-----------|---------|-------------------|--------|----------|-----------|---------|-------------|--------|---------|-----------|---------|
| | | Total (N) | MM (%) | p- value | MP -MM (%) | p- value | Total (N) | MM (%) | p value | MP-MM (%) | p value | Total (N) | MM (%) | p- value | MP-MM (%) | p value | Total (N) | MM (%) | p value | MP-MM (%) | p-value |
| Incident Cancer Patients | | | | | | | | | | | | | | | | | | | | | |
| Sex | Male | 86 | 76.7 | 0.002 | 39.5 | 0.039 | 10230 | 71 | NA | 23.5 | NA | 3956 | 73.2 | 0.122 | 26.3 | <0.001 | 3311 | 84.6 | <0.001 | 34.6 | <0.001 |
| | Female | 9366 | 59.7 | | 28.8 | | NA | NA | | NA | | 3260 | 74.8 | | 33.7 | | 3049 | 87.3 | | 44.3 | |
| Age Category | 18-44 | 761 | 29.7 | <0.001 | 17.7 | <0.001 | 24 | 25.0 | <0.001 | 16.7 | 0.015 | 252 | 31.7 | <0.001 | 19.4 | <0.001 | 70 | 34.3 | <0.001 | 18.6 | <0.001 |
| | 45-59 | 3183 | 41.2 | | 22.9 | | 1221 | 43.6 | | 20 | | 1087 | 48.7 | | 26.1 | | 662 | 66.5 | | 41.8 | |
| | 60-74 | 3320 | 65 | | 31.9 | | 5195 | 66.4 | | 24 | | 2664 | 69.3 | | 30.2 | | 2659 | 82.5 | | 40.8 | |
| | ≥75 | 2188 | 89.7 | | 36.8 | | 3790 | 86.3 | | 24.1 | | 3213 | 89.6 | | 31.1 | | 2969 | 94.4 | | 37.8 | |
| Deprivation | 1 (least) | 2359 | 55 | <0.001 | 25.4 | <0.001 | 2779 | 67.5 | <0.001 | 19.1 | <0.001 | 1733 | 70 | <0.001 | 23.7 | <0.001 | 1054 | 85.3 | <0.001 | 34.1 | <0.001 |
| | 2 | 2186 | 57.7 | | 26.3 | | 2432 | 70.0 | | 20.4 | | 1595 | 73.5 | | 29.3 | | 1178 | 83 | | 34.6 | |
| | 3 | 1852 | 59.9 | | 27.9 | | 1966 | 71.6 | | 24.3 | | 1391 | 74.6 | | 29.5 | | 1151 | 84.2 | | 36.5 | |
| | 4 | 1633 | 63 | | 30.9 | | 1737 | 71.7 | | 26.1 | | 1322 | 74.3 | | 32 | | 1366 | 86.9 | | 41.9 | |
| | 5 (most) | 1410 | 67.5 | | 37.8 | | 1306 | 78.3 | | 34 | | 1170 | 79.3 | | 36.2 | | 1607 | 88.6 | | 46 | |
| Ethnicity | White | 8478 | 60.9 | <0.001 | 29.8 | <0.001 | 9310 | 71.7 | <0.001 | 23.9 | 0.332 | 6708 | 74.9 | <0.001 | 29.9 | 0.133 | 5973 | 86.6 | <0.001 | 40 | 0.001 |
| | Asian | 399 | 52.9 | | 19.5 | | 227 | 78.9 | | 22.9 | | 160 | 71.9 | | 30.6 | | 140 | 85 | | 25 | |
| | Black | 246 | 55.7 | | 25.6 | | 412 | 64.9 | | 21.6 | | 151 | 60.9 | | 21.2 | | 105 | 69.5 | | 31.4 | |
| | Other | 213 | 49.8 | | 23 | | 146 | 56.2 | | 18.5 | | 111 | 60.4 | | 31.5 | | 77 | 68.8 | | 32.5 | |
| People living with and beyond cancer | | | | | | | | | | | | | | | | | | | | | |
| Sex | Male | 40 | 72.5 | 0.554 | 30 | 0.859 | 5685 | 77.9 | NA | 27.0 | NA | 1768 | 78.3 | 0.02 | 29.3 | <0.001 | 341 | 90 | 0.923 | 38.1 | <0.001 |
| | Female | 7159 | 66.8 | | 32.8 | | NA | NA | | NA | | 1428 | 81.7 | | 38.1 | | 386 | 90.4 | | 48.2 | |
| Age Category | 18-44 | 330 | 38.8 | <0.001 | 20.9 | <0.001 | 6 | 50 | <0.001 | 16.7 | 0.064 | 98 | 40.8 | <0.001 | 22.4 | 0.089 | 8 | 25 | <0.001 | 12.5 | 0.194 |
| | 45-59 | 2386 | 47.9 | | 27.9 | | 247 | 48.2 | | 20.2 | | 386 | 56.5 | | 31.3 | | 69 | 75.4 | | 40.6 | |
| | 60-74 | 2889 | 71.8 | | 35.4 | | 2651 | 71 | | 26.7 | | 1231 | 75.6 | | 34 | | 342 | 89.5 | | 46.2 | |
| | ≥75 | 1594 | 92.9 | | 37.8 | | 2781 | 87.1 | | 27.9 | | 1481 | 92 | | 33.9 | | 308 | 96.1 | | 41.9 | |
| Deprivation | 1 (least) | 1879 | 61 | <0.001 | 28.5 | <0.001 | 1557 | 74.4 | <0.001 | 22.7 | <0.001 | 822 | 76.8 | <0.001 | 29.8 | <0.001 | 112 | 91.1 | 0.416 | 36.6 | 0.462 |
| | 2 | 1703 | 65.5 | | 31.3 | | 1409 | 76.5 | | 27.5 | | 739 | 79 | | 34.8 | | 146 | 90.4 | | 44.5 | |
| | 3 | 1406 | 65.6 | | 31 | | 1104 | 77.8 | | 25.1 | | 635 | 78.1 | | 27.1 | | 145 | 86.2 | | 42.8 | |
| | 4 | 1216 | 71.1 | | 35.7 | | 868 | 80.3 | | 28.9 | | 565 | 83.2 | | 37 | | 154 | 91.6 | | 43.5 | |
| | 5 (most) | 990 | 77 | | 42.8 | | 740 | 84.9 | | 35.7 | | 433 | 85.5 | | 41.3 | | 169 | 92.3 | | 47.9 | |
| Ethnicity | White | 6522 | 67.4 | 0.076 | 33.5 | 0.006 | 5207 | 78.3 | 0.526 | 27.4 | 0.119 | 2998 | 80.4 | 0.027 | 34.20 | <0.001 | 686 | 90.1 | 0.7 | 43.9 | 0.017 |
| | Asian | 338 | 66.3 | | 26.9 | | 115 | 81.7 | | 18.3 | | 83 | 73.5 | | 12.0 | | 19 | 94.7 | | 15.8 | |
| | Black | 168 | 68.5 | | 27.4 | | 231 | 75.8 | | 24.7 | | 51 | 88.2 | | 37.3 | | 14 | 85.7 | | 35.7 | |
| | Other | 116 | 56 | | 25 | | 75 | 74.7 | | 24.0 | | 47 | 66 | | 14.9 | | 6 | 100 | | 83.3 | |

Footnote: MM= Multimorbidity, MP-MM= Mental-physical multimorbidity. *p values derived from Chi-squared test

Supplementary Table S12: Logistic regression model of unadjusted and adjusted odds of multimorbidity prevalence in women newly diagnosed with one of three cancers

| Incident Female cancer patients | | | | | |
|---------------------------------|------------|-------------|-------------|------------------------------|------------------------------|
| Multimorbidity | | No | Yes | OR (univariable) | OR (multivariable) |
| Cancer type | Colorectal | 795 (24.9) | 2404 (75.1) | - | - |
| | Breast | 3681 (40.0) | 5530 (60.0) | 0.50 (0.45-0.54, p<0.001) | 0.83 (0.75-0.91, p<0.001) |
| | Lung | 377 (12.5) | 2641 (87.5) | 2.32 (2.03-2.65, p<0.001) | 2.15 (1.86-2.49, p<0.001) |
| Age category | 18-44 | 632 (69.2) | 281 (30.8) | - | - |
| | 45-59 | 2179 (55.4) | 1757 (44.6) | 1.81 (1.56-2.12, p<0.001) | 1.79 (1.53-2.09, p<0.001) |
| | 60-74 | 1626 (29.4) | 3914 (70.6) | 5.41 (4.66-6.31, p<0.001) | 4.81 (4.12-5.63, p<0.001) |
| | 75+ | 416 (8.3) | 4623 (91.7) | 24.99 (21.06-29.75, p<0.001) | 21.68 (18.17-25.93, p<0.001) |
| Deprivation level | 1 (least) | 1318 (37.1) | 2233 (62.9) | - | - |
| | 2 | 1164 (34.3) | 2234 (65.7) | 1.13 (1.03-1.25, p=0.013) | 1.11 (1.00-1.25, p=0.055) |
| | 3 | 942 (32.2) | 1984 (67.8) | 1.24 (1.12-1.38, p<0.001) | 1.27 (1.13-1.42, p<0.001) |
| | 4 | 811 (28.6) | 2022 (71.4) | 1.47 (1.32-1.64, p<0.001) | 1.58 (1.40-1.78, p<0.001) |
| | 5 (most) | 618 (22.7) | 2102 (77.3) | 2.01 (1.79-2.25, p<0.001) | 2.09 (1.84-2.38, p<0.001) |
| Ethnicity | White | 4359 (30.5) | 9910 (69.5) | - | - |
| | Asian | 214 (42.0) | 296 (58.0) | 0.61 (0.51-0.73, p<0.001) | 1.01 (0.83-1.24, p=0.921) |
| | Black | 145 (40.7) | 211 (59.3) | 0.64 (0.52-0.79, p<0.001) | 0.86 (0.68-1.10, p=0.223) |
| | Other | 135 (46.1) | 158 (53.9) | 0.51 (0.41-0.65, p<0.001) | 0.81 (0.63-1.05, p=0.112) |

Supplementary Table S13: Logistic regression model of unadjusted and fully adjusted odds of multimorbidity in women living with one of three cancers

| Female survivors | | | | | |
|------------------|------------|-------------|-------------|---------------------------|---------------------------|
| Multimorbidity | | No | Yes | OR (univariable) | OR (multivariable) |
| Cancer Type | Colorectal | 255 (18.1) | 1151 (81.9) | - | - |
| | Breast | 2332 (32.9) | 4751 (67.1) | 0.45 (0.39-0.52, p<0.001) | 0.74 (0.63-0.87, p<0.001) |
| | Lung | 37 (9.6) | 348 (90.4) | 2.08 (1.46-3.04, p<0.001) | 2.11 (1.45-3.12, p<0.001) |
| Age category | 18-44 | 223 (59.2) | 154 (40.8) | - | - |

| | | | | | |
|-------------------|-------|-------------|-------------|------------------------------|------------------------------|
| | 45-59 | 1302 (50.5) | 1278 (49.5) | 1.42 (1.14-1.77, p=0.002) | 1.49 (1.19-1.86, p=0.001) |
| | 60-74 | 922 (26.2) | 2596 (73.8) | 4.08 (3.28-5.08, p<0.001) | 4.19 (3.36-5.25, p<0.001) |
| | 75+ | 177 (7.4) | 2222 (92.6) | 18.18 (14.10-23.54, p<0.001) | 18.26 (14.08-23.77, p<0.001) |
| Deprivation level | 1 | 788 (35.0) | 1462 (65.0) | - | - |
| | 2 | 648 (31.1) | 1436 (68.9) | 1.19 (1.05-1.36, p=0.006) | 1.21 (1.05-1.38, p=0.009) |
| | 3 | 542 (31.2) | 1193 (68.8) | 1.19 (1.04-1.36, p=0.012) | 1.24 (1.07-1.44, p=0.004) |
| | 4 | 385 (25.1) | 1150 (74.9) | 1.61 (1.39-1.86, p<0.001) | 1.68 (1.43-1.97, p<0.001) |
| | 5 | 261 (20.6) | 1009 (79.4) | 2.08 (1.78-2.45, p<0.001) | 2.29 (1.92-2.73, p<0.001) |
| Ethnicity | White | 2388 (29.3) | 5760 (70.7) | - | - |
| | Asian | 123 (31.9) | 263 (68.1) | 0.89 (0.71-1.11, p=0.282) | 1.27 (1.00-1.61, p=0.047) |
| | Black | 55 (27.1) | 148 (72.9) | 1.12 (0.82-1.54, p=0.494) | 1.35 (0.96-1.90, p=0.085) |
| | Other | 58 (42.3) | 79 (57.7) | 0.56 (0.40-0.80, p=0.001) | 0.75 (0.52-1.09, p=0.129) |

Supplementary Table S14: Logistic regression model of unadjusted and fully adjusted odds of multimorbidity in men newly diagnosed with one of four cancers

| Incident Males | | No | Yes | OR (univariable) | OR (multivariable) |
|-----------------------|------------|-------------|-------------|------------------------------|------------------------------|
| Multimorbidity | | | | | |
| Cancer Type | Colorectal | 1017 (26.5) | 2826 (73.5) | - | - |
| | Breast | 20 (24.4) | 62 (75.6) | 1.12 (0.68-1.90, p=0.674) | 1.33 (0.78-2.37, p=0.315) |
| | Lung | 498 (15.2) | 2775 (84.8) | 2.01 (1.78-2.26, p<0.001) | 1.71 (1.50-1.94, p<0.001) |
| | Prostate | 2879 (28.7) | 7149 (71.3) | 0.89 (0.82-0.97, p=0.008) | 0.87 (0.79-0.95, p=0.002) |
| Age category | 18-44 | 126 (70.4) | 53 (29.6) | - | - |
| | 45-59 | 1067 (50.9) | 1030 (49.1) | 2.29 (1.66-3.22, p<0.001) | 2.43 (1.74-3.43, p<0.001) |
| | 60-74 | 2444 (30.3) | 5617 (69.7) | 5.46 (3.97-7.62, p<0.001) | 5.95 (4.30-8.36, p<0.001) |
| | 75+ | 777 (11.3) | 6112 (88.7) | 18.70 (13.53-26.19, p<0.001) | 20.11 (14.45-28.35, p<0.001) |
| Deprivation level | 1 | 1231 (29.2) | 2980 (70.8) | - | - |
| | 2 | 1046 (27.1) | 2813 (72.9) | 1.11 (1.01-1.22, p=0.034) | 1.09 (0.98-1.21, p=0.096) |
| | 3 | 844 (25.4) | 2478 (74.6) | 1.21 (1.09-1.34, p<0.001) | 1.22 (1.09-1.36, p<0.001) |

| | | | | | |
|-----------|-------|-------------|--------------|---------------------------|---------------------------|
| | 4 | 768 (24.5) | 2370 (75.5) | 1.27 (1.15-1.42, p<0.001) | 1.36 (1.22-1.53, p<0.001) |
| | 5 | 525 (19.5) | 2171 (80.5) | 1.71 (1.52-1.92, p<0.001) | 1.92 (1.69-2.18, p<0.001) |
| Ethnicity | White | 4026 (25.1) | 11992 (74.9) | - | - |
| | Asian | 86 (21.0) | 324 (79.0) | 1.26 (1.00-1.62, p=0.055) | 1.29 (1.00-1.67, p=0.051) |
| | Black | 200 (36.4) | 350 (63.6) | 0.59 (0.49-0.70, p<0.001) | 0.68 (0.56-0.83, p<0.001) |
| | Other | 102 (41.1) | 146 (58.9) | 0.48 (0.37-0.62, p<0.001) | 0.61 (0.46-0.80, p<0.001) |

Supplementary Table S15: Logistic regression model of unadjusted and fully adjusted odds of multimorbidity in men living with one of four cancers

| Male survivors | | | | | |
|-----------------------|------------|-------------|-------------|-----------------------------|------------------------------|
| Multimorbidity | | No | Yes | OR (univariable) | OR (multivariable) |
| Cancer Type | Colorectal | 373 (21.5) | 1362 (78.5) | - | - |
| | Breast | 11 (27.5) | 29 (72.5) | 0.72 (0.37-1.52, p=0.364) | 0.63 (0.31-1.41, p=0.237) |
| | Lung | 33 (9.7) | 306 (90.3) | 2.54 (1.77-3.76, p<0.001) | 2.20 (1.51-3.30, p<0.001) |
| | Prostate | 1223 (21.8) | 4378 (78.2) | 0.98 (0.86-1.12, p=0.766) | 0.78 (0.67-0.90, p=0.001) |
| Age category | 18-44 | 41 (68.3) | 19 (31.7) | - | - |
| | 45-59 | 226 (48.3) | 242 (51.7) | 2.31 (1.32-4.18, p=0.004) | 3.01 (1.69-5.52, p<0.001) |
| | 60-74 | 950 (27.2) | 2547 (72.8) | 5.79 (3.39-10.23, p<0.001) | 8.52 (4.88-15.41, p<0.001) |
| | 75+ | 423 (11.5) | 3267 (88.5) | 16.67 (9.72-29.60, p<0.001) | 25.14 (14.32-45.67, p<0.001) |
| Deprivation level | 1 (least) | 507 (24.7) | 1544 (75.3) | - | - |
| | 2 | 416 (22.4) | 1442 (77.6) | 1.14 (0.98-1.32, p=0.087) | 1.14 (0.98-1.33, p=0.098) |
| | 3 | 327 (21.5) | 1196 (78.5) | 1.20 (1.03-1.41, p=0.023) | 1.25 (1.06-1.48, p=0.009) |
| | 4 | 240 (19.3) | 1002 (80.7) | 1.37 (1.15-1.63, p<0.001) | 1.43 (1.19-1.72, p<0.001) |
| | 5 (most) | 150 (14.4) | 891 (85.6) | 1.95 (1.60-2.39, p<0.001) | 2.29 (1.86-2.85, p<0.001) |
| Ethnicity | White | 1518 (21.1) | 5667 (78.9) | - | - |
| | Asian | 33 (19.8) | 134 (80.2) | 1.09 (0.75-1.62, p=0.669) | 1.39 (0.93-2.14, p=0.118) |
| | Black | 61 (23.8) | 195 (76.2) | 0.86 (0.64-1.16, p=0.299) | 0.83 (0.61-1.16, p=0.266) |
| | Other | 28 (26.2) | 79 (73.8) | 0.76 (0.50-1.19, p=0.207) | 0.98 (0.62-1.60, p=0.938) |

Supplementary Table S16: Logistic regression model of unadjusted and fully adjusted odds of mental-physical multimorbidity in women newly diagnosed with one of three cancers

| Incident Female | | | | | |
|---------------------------------------|------------|-------------|-------------|---------------------------|---------------------------|
| Mental-physical multimorbidity | | No | Yes | OR (univariable) | OR (multivariable) |
| Cancer Type | Colorectal | 2118 (66.2) | 1081 (33.8) | - | - |
| | Breast | 6541 (71.0) | 2670 (29.0) | 0.80 (0.73-0.87, p<0.001) | 0.92 (0.84-1.01, p=0.073) |
| | Lung | 1678 (55.6) | 1340 (44.4) | 1.56 (1.41-1.73, p<0.001) | 1.42 (1.28-1.57, p<0.001) |
| Age category | 18-44 | 744 (81.5) | 169 (18.5) | - | - |
| | 45-59 | 2937 (74.6) | 999 (25.4) | 1.50 (1.25-1.80, p<0.001) | 1.45 (1.21-1.75, p<0.001) |
| | 60-74 | 3567 (64.4) | 1973 (35.6) | 2.44 (2.05-2.91, p<0.001) | 2.16 (1.81-2.59, p<0.001) |
| | 75+ | 3089 (61.3) | 1950 (38.7) | 2.78 (2.34-3.32, p<0.001) | 2.39 (2.00-2.87, p<0.001) |
| Deprivation level | 1 | 2557 (72.0) | 994 (28.0) | - | - |
| | 2 | 2370 (69.7) | 1028 (30.3) | 1.12 (1.01-1.24, p=0.038) | 1.10 (0.99-1.22, p=0.075) |
| | 3 | 2007 (68.6) | 919 (31.4) | 1.18 (1.06-1.31, p=0.003) | 1.17 (1.05-1.31, p=0.004) |
| | 4 | 1826 (64.5) | 1007 (35.5) | 1.42 (1.28-1.58, p<0.001) | 1.42 (1.27-1.58, p<0.001) |
| | 5 | 1577 (58.0) | 1143 (42.0) | 1.86 (1.68-2.07, p<0.001) | 1.80 (1.61-2.00, p<0.001) |
| Ethnicity | White | 9457 (66.3) | 4812 (33.7) | - | - |
| | Asian | 398 (78.0) | 112 (22.0) | 0.55 (0.45-0.68, p<0.001) | 0.64 (0.52-0.80, p<0.001) |
| | Black | 266 (74.7) | 90 (25.3) | 0.66 (0.52-0.84, p=0.001) | 0.68 (0.53-0.86, p=0.002) |
| | Other | 216 (73.7) | 77 (26.3) | 0.70 (0.54-0.91, p=0.008) | 0.82 (0.62-1.07, p=0.144) |

Supplementary Table S17: Logistic regression model of unadjusted and fully adjusted odds of mental-physical multimorbidity in women living with one of three cancers

| Female survivors | | | | | |
|---------------------------------------|------------|-------------|-------------|---------------------------|---------------------------|
| Mental-physical multimorbidity | | No | Yes | OR (univariable) | OR (multivariable) |
| Cancer Type | Colorectal | 869 (61.8) | 537 (38.2) | - | - |
| | Breast | 4749 (67.0) | 2334 (33.0) | 0.80 (0.71-0.90, p<0.001) | 0.87 (0.77-0.98, p=0.027) |

| | | | | | |
|-------------------|-------|-------------|-------------|---------------------------|---------------------------|
| | Lung | 200 (51.9) | 185 (48.1) | 1.50 (1.19-1.88, p<0.001) | 1.39 (1.10-1.74, p=0.005) |
| Age category | 18-44 | 292 (77.5) | 85 (22.5) | - | - |
| | 45-59 | 1834 (71.1) | 746 (28.9) | 1.40 (1.09-1.81, p=0.010) | 1.38 (1.07-1.80, p=0.013) |
| | 60-74 | 2214 (62.9) | 1304 (37.1) | 2.02 (1.58-2.61, p<0.001) | 1.92 (1.50-2.48, p<0.001) |
| | 75+ | 1478 (61.6) | 921 (38.4) | 2.14 (1.67-2.78, p<0.001) | 1.96 (1.52-2.55, p<0.001) |
| Deprivation level | 1 | 1567 (69.6) | 683 (30.4) | - | - |
| | 2 | 1400 (67.2) | 684 (32.8) | 1.12 (0.99-1.27, p=0.081) | 1.11 (0.98-1.26, p=0.111) |
| | 3 | 1180 (68.0) | 555 (32.0) | 1.08 (0.94-1.24, p=0.269) | 1.10 (0.96-1.26, p=0.187) |
| | 4 | 958 (62.4) | 577 (37.6) | 1.38 (1.20-1.58, p<0.001) | 1.41 (1.23-1.62, p<0.001) |
| | 5 | 713 (56.1) | 557 (43.9) | 1.79 (1.55-2.07, p<0.001) | 1.83 (1.59-2.12, p<0.001) |
| Ethnicity | White | 5281 (64.8) | 2867 (35.2) | - | - |
| | Asian | 289 (74.9) | 97 (25.1) | 0.62 (0.49-0.78, p<0.001) | 0.64 (0.50-0.80, p<0.001) |
| | Black | 145 (71.4) | 58 (28.6) | 0.74 (0.54-1.00, p=0.052) | 0.69 (0.50-0.94, p=0.021) |
| | Other | 103 (75.2) | 34 (24.8) | 0.61 (0.41-0.89, p=0.012) | 0.64 (0.43-0.94, p=0.028) |

Supplementary Table S18: Logistic regression model of unadjusted and fully adjusted odds of mental-physical multimorbidity in men newly diagnosed with one of four cancers

| Incident Males | | | | | |
|--------------------------------|------------|-------------|-------------|---------------------------|---------------------------|
| Mental-physical multimorbidity | | No | Yes | OR (univariable) | OR (multivariable) |
| Cancer Type | Colorectal | 2819 (73.4) | 1024 (26.6) | - | - |
| | Breast | 51 (62.2) | 31 (37.8) | 1.67 (1.05-2.61, p=0.026) | 1.78 (1.12-2.79, p=0.013) |
| | Lung | 2133 (65.2) | 1140 (34.8) | 1.47 (1.33-1.63, p<0.001) | 1.37 (1.23-1.51, p<0.001) |
| | Prostate | 7652 (76.3) | 2376 (23.7) | 0.85 (0.79-0.93, p<0.001) | 0.87 (0.80-0.95, p=0.001) |
| Age category | 18-44 | 149 (83.2) | 30 (16.8) | - | - |
| | 45-59 | 1576 (75.2) | 521 (24.8) | 1.64 (1.11-2.50, p=0.016) | 1.71 (1.15-2.61, p=0.010) |
| | 60-74 | 5885 (73.0) | 2176 (27.0) | 1.84 (1.26-2.78, p=0.003) | 1.95 (1.33-2.97, p=0.001) |

| | | | | | |
|-------------------|-------|--------------|-------------|---------------------------|---------------------------|
| | 75+ | 5045 (73.2) | 1844 (26.8) | 1.82 (1.24-2.75, p=0.003) | 1.89 (1.28-2.87, p=0.002) |
| Deprivation level | 1 | 3328 (79.0) | 883 (21.0) | - | - |
| | 2 | 2963 (76.8) | 896 (23.2) | 1.14 (1.03-1.27, p=0.015) | 1.12 (1.01-1.25, p=0.033) |
| | 3 | 2432 (73.2) | 890 (26.8) | 1.38 (1.24-1.53, p<0.001) | 1.36 (1.22-1.51, p<0.001) |
| | 4 | 2213 (70.5) | 925 (29.5) | 1.58 (1.42-1.75, p<0.001) | 1.55 (1.39-1.73, p<0.001) |
| | 5 | 1719 (63.8) | 977 (36.2) | 2.14 (1.92-2.39, p<0.001) | 2.07 (1.85-2.31, p<0.001) |
| Ethnicity | White | 11730 (73.2) | 4288 (26.8) | - | - |
| | Asian | 310 (75.6) | 100 (24.4) | 0.88 (0.70-1.10, p=0.283) | 0.82 (0.64-1.02, p=0.083) |
| | Black | 424 (77.1) | 126 (22.9) | 0.81 (0.66-0.99, p=0.044) | 0.70 (0.57-0.86, p=0.001) |
| | Other | 191 (77.0) | 57 (23.0) | 0.82 (0.60-1.09, p=0.182) | 0.78 (0.57-1.05, p=0.104) |

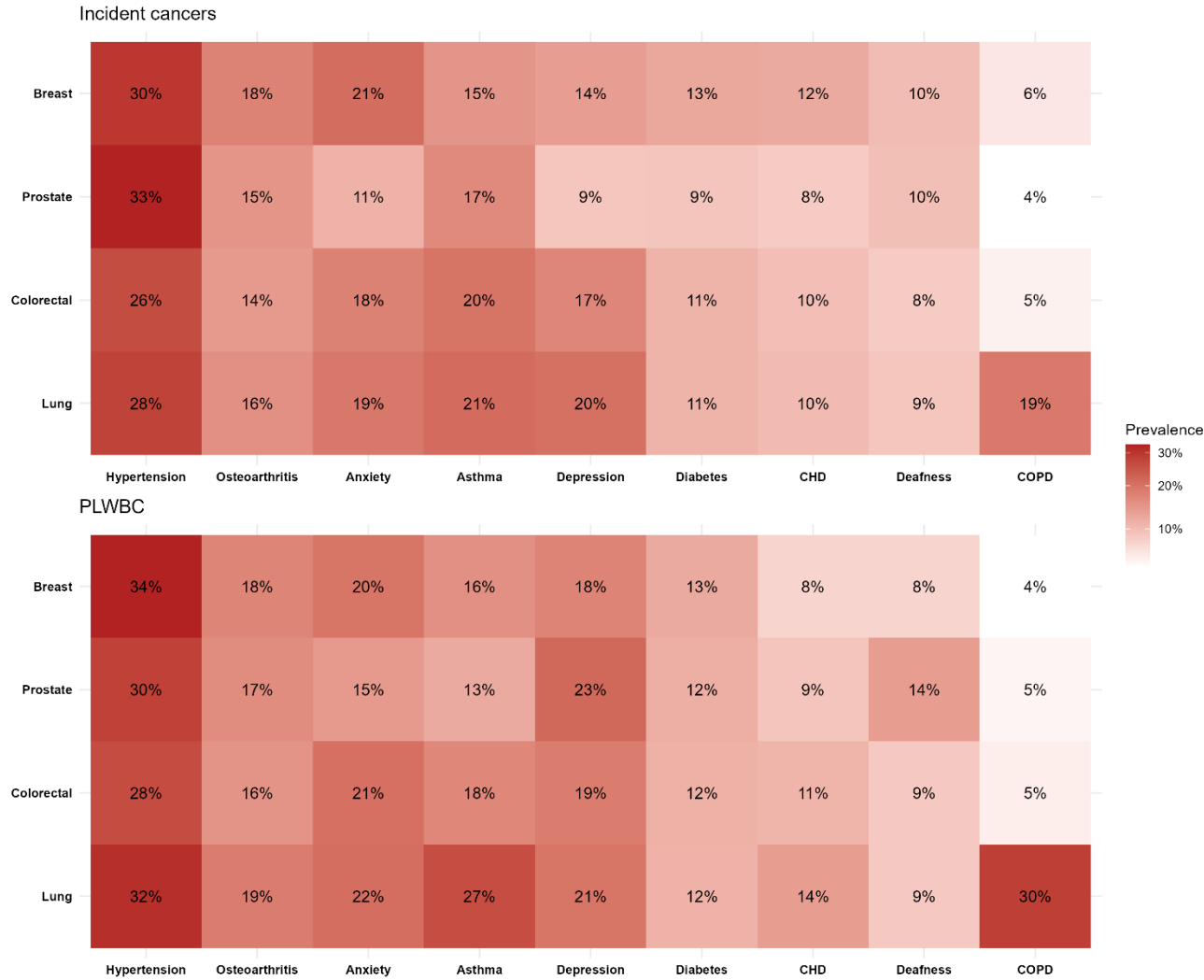
Supplementary Table S19: Logistic regression model of unadjusted and fully adjusted odds of mental-physical multimorbidity in men living with one of four cancers

| Male survivors | | No | Yes | OR (univariable) | OR (multivariable) |
|---------------------------------------|------------|-------------|-------------|---------------------------|---------------------------|
| Mental-physical multimorbidity | | | | | |
| Cancer Type | Colorectal | 1224 (70.5) | 511 (29.5) | - | - |
| | Breast | 28 (70.0) | 12 (30.0) | 1.03 (0.50-1.99, p=0.940) | 1.02 (0.50-2.00, p=0.945) |
| | Lung | 210 (61.9) | 129 (38.1) | 1.47 (1.15-1.87, p=0.002) | 1.34 (1.05-1.72, p=0.018) |
| | Prostate | 4083 (72.9) | 1518 (27.1) | 0.89 (0.79-1.00, p=0.056) | 0.86 (0.76-0.97, p=0.016) |
| Age category | 18-44 | 52 (86.7) | 8 (13.3) | - | - |
| | 45-59 | 354 (75.6) | 114 (24.4) | 2.09 (1.02-4.88, p=0.061) | 2.26 (1.09-5.31, p=0.040) |
| | 60-74 | 2516 (71.9) | 981 (28.1) | 2.53 (1.27-5.79, p=0.015) | 2.84 (1.41-6.54, p=0.007) |
| | 75+ | 2623 (71.1) | 1067 (28.9) | 2.64 (1.33-6.04, p=0.011) | 2.97 (1.47-6.84, p=0.005) |
| Deprivation level | 1 | 1565 (76.3) | 486 (23.7) | - | - |
| | 2 | 1316 (70.8) | 542 (29.2) | 1.33 (1.15-1.53, p<0.001) | 1.33 (1.15-1.53, p<0.001) |
| | 3 | 1133 (74.4) | 390 (25.6) | 1.11 (0.95-1.29, p=0.189) | 1.12 (0.96-1.31, p=0.152) |
| | 4 | 869 (70.0) | 373 (30.0) | 1.38 (1.18-1.62, p<0.001) | 1.40 (1.19-1.65, p<0.001) |
| | 5 | 662 (63.6) | 379 (36.4) | 1.84 (1.57-2.17, p<0.001) | 1.92 (1.63-2.27, p<0.001) |

| | | | | | |
|-----------|-------|-------------|-------------|---------------------------|---------------------------|
| Ethnicity | White | 5135 (71.5) | 2050 (28.5) | - | - |
| | Asian | 139 (83.2) | 28 (16.8) | 0.50 (0.33-0.75, p=0.001) | 0.49 (0.32-0.72, p=0.001) |
| | Black | 189 (73.8) | 67 (26.2) | 0.89 (0.66-1.17, p=0.411) | 0.78 (0.58-1.04, p=0.097) |
| | Other | 82 (76.6) | 25 (23.4) | 0.76 (0.48-1.18, p=0.241) | 0.74 (0.46-1.16, p=0.205) |

Supplementary Figure S1: Age-sex standardised prevalence (%) of the most common long-term conditions in Incident and People Living with and Beyond Cancer*

Age-sex standardised prevalence



CHD: coronary heart disease; COPD: chronic obstructive pulmonary disease * Listed conditions are those which are one of the five most prevalent for one or more of the four cancers

Supplementary Figure S2: Prevalence of mental-physical multimorbidity in the most and least deprived quintiles across age categories

