University of Otago Te Whare Wānanga o Otāgo New Zealand

Cancer Control and Screening Research Group
Wellington

C3: Cancer, Care and Comorbidity

Symposium
April 2014

hrc Health Research Council of New Zealand

Why do we care?

Comorbidity:

- is common among cancer patients.
- has a major impact on patients.
- has a major impact on health services.
- Is an important driver of inequities.
- the effects of comorbidities are modifiable.

C3: Cancer, Care and Comorbidity

1. How does comorbidity impact on cancer? Introduction to C3 studies? How did we measure comorbidity? (Diana Sarfati)
2. Key results from the routinely collected data. (Jason Gurney)
3. Key results from the notes review data.(Diana Sarfati, Ruth Cunningham, Virginia Signal)
4. Progress and key findings from C3 qualitative study (Louise Signal)
5. An intervention to help address comorbidity? (Inga O'Brien)
6. Discussion: where to next?

University of Otago Te Whare Wānanga o Otāgo New Zealand

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How does comorbidity interact with cancer

Associate Professor Diana Sarfati

How does cancer interact with comorbidity

- Why do cancer and other chronic conditions coexist?
- How does comorbidity impact on:
  - Diagnosis of cancer?
  - Treatment for cancer?
  - Outcomes from cancer?
  - Inequalities in outcomes from cancer?

How does cancer interact with comorbidity

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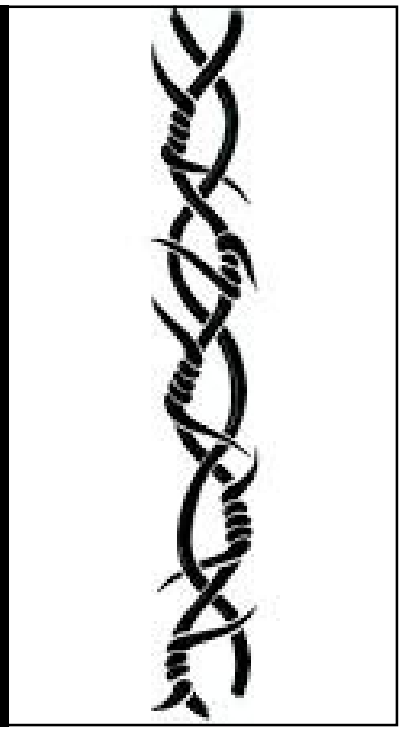
Why do cancer and other chronic conditions co-exist?

- Cancer and other conditions share common risk factors
- Comorbidity may cause cancer
- Cancer may cause comorbidity
- Comorbidity may protect from cancer
- There may be common genetic or physiological pathways between cancer and comorbidity.



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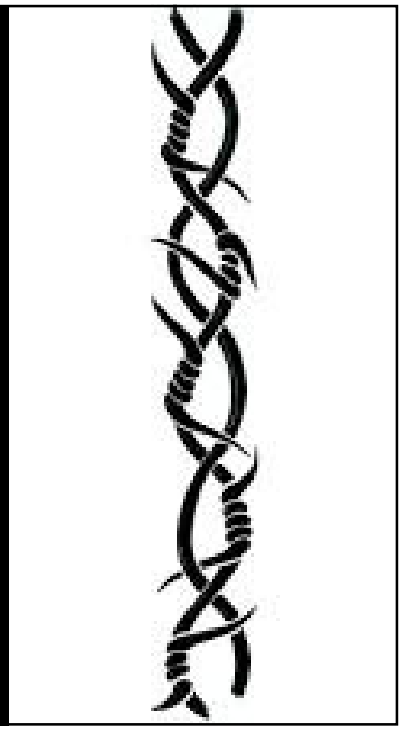
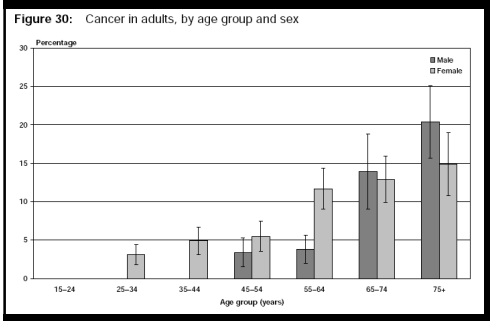


Common risk factors…



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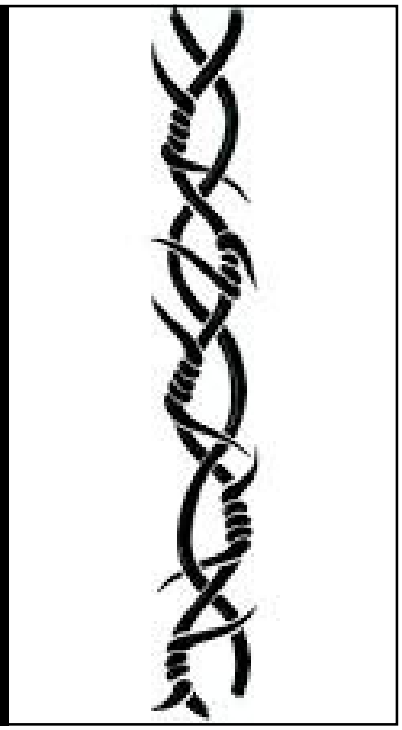

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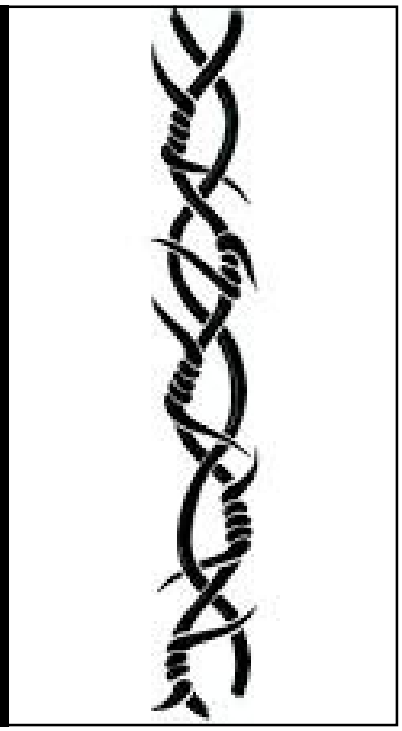
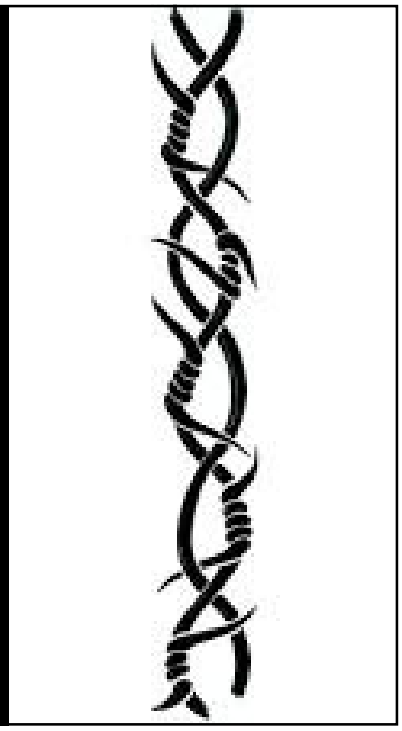


Why do cancer and other chronic conditions co-exist?

- Cancer and other conditions share common risk factors
- Comorbidity may cause cancer
  - E.g. chronic infections such as H Pylori, Hepatitis B, HIV, TB associated with cancer
  - Diabetes (esp Type II) associated with increased risk of several cancers incl colorectal, pancreatic, liver, bladder.



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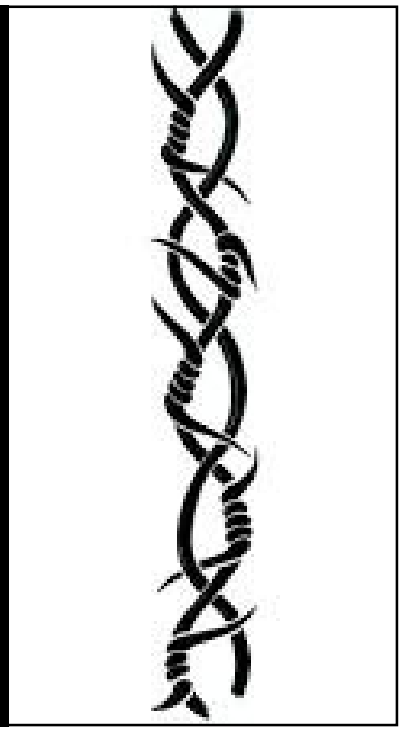

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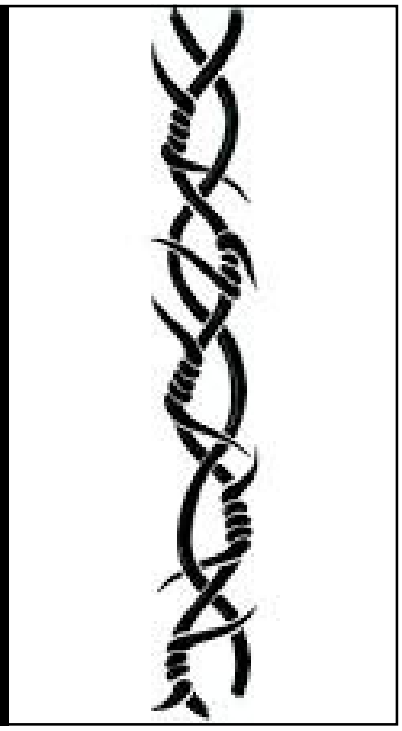
  - Much less common.
  - Pancreatic cancer may cause diabetes



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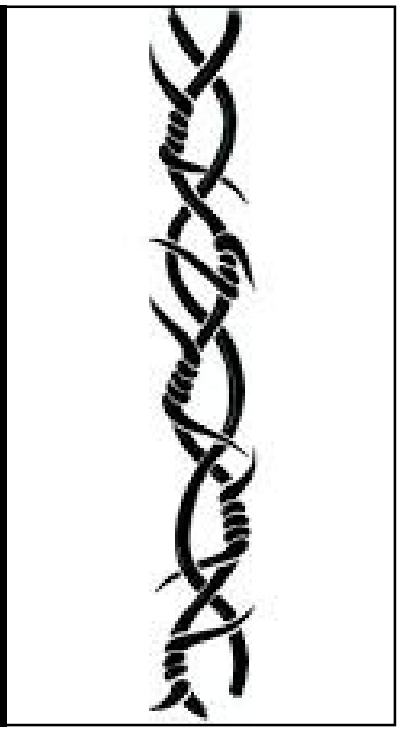

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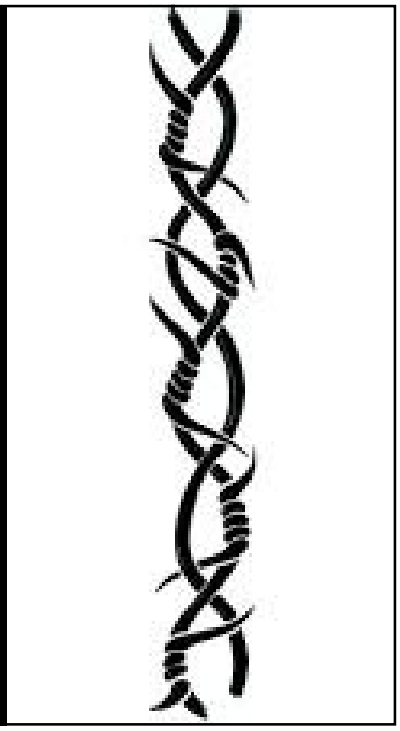
  - Diabetes protects from some cancers e.g. lung, prostate and Hodgkins. Hypothyroidism: lower rates of breast cancer
  - NSAIDs used in arthritis reduces risk of colorectal cancer



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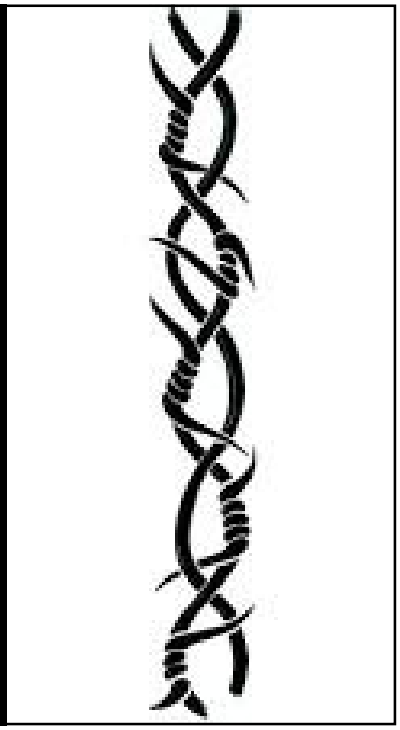

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A multichoice question….

There is evidence from high quality studies that:

a. Patients with comorbidity tend have their cancer diagnosed earlier than those without.

b. Patients with comorbidity tend have their cancer diagnosed later than those without.

c. Patients with comorbidity tend have their cancer diagnosed at around the same time as those without.

d. All of the above.

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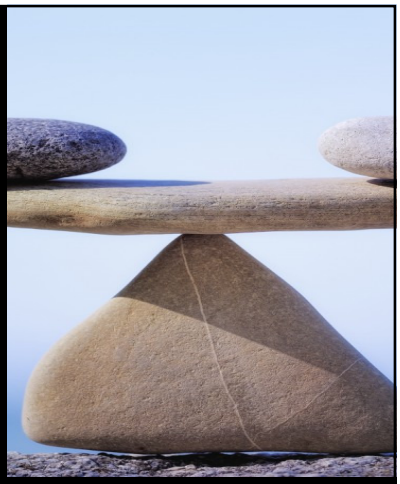
d. All of the above.

Impact on diagnosis

- Competing demands hypothesis
- Surveillance hypothesis
- Death from other causes hypothesis

Fleming 2006



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Another multichoice question….

There is evidence from high quality studies that:

a. Patients with comorbidity tend have to have more treatment for their cancer than those without.

b. Patients with comorbidity tend have to have less treatment for their cancer than those without.

c. Patients with comorbidity tend have to have similar treatment for their cancer than those without.

d. All of the above.

Another multichoice question….

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d. All of the above.

Impact on treatment

- Why?
  - Concern by clinician that treatment may be less effective among those with comorbidity
  - Concern by clinician or patient that comorbidity will increase toxicity of treatment.
  - Life expectancy is insufficient to justify treatment
  - Patient more likely to decline treatment

Impact on treatment

- 190 patients with stage III colon cancer
- Those with comorbidity were considerably less likely to receive chemotherapy
  - 84% without comorbidity (Charlson comorbidity score=0) cf
  - 19% with comorbidity (Charlson comorbidity score of 3+)
- Among those with highest comorbidity there was around a 60% reduction in excess risk of death if offered chemotherapy.

Sarfati D, Hill S et al. The effect of comorbidity on the use of adjuvant chemotherapy and survival from colon cancer: a retrospective cohort study. *BMC: Cancer*. 2009: 9; 16.

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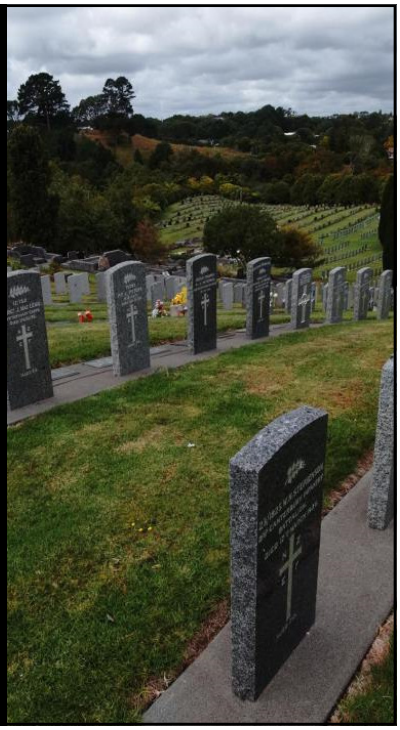
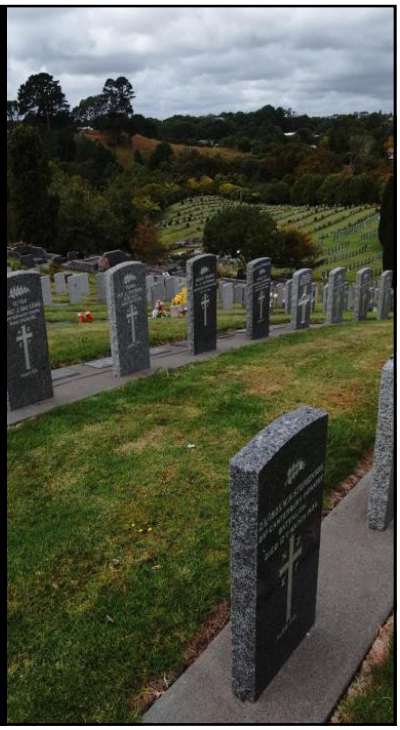
Impact on survival

- Comorbidity has been found to have an adverse impact on survival in every cancer site investigated.
- Some studies have found comorbidity to have a similar prognostic significance as stage at diagnosis



Impact on survival:

- Why does comorbidity affect survival
  - Direct effect
  - Indirect effect because of reduced cancer treatment
  - Effect of comorbidity on cancer progression
    - Recurrence more likely in those with diabetes even in context of RCT (Meyerhardt et al 2003)



Impact on other outcomes

- Quality of life
- Costs of care

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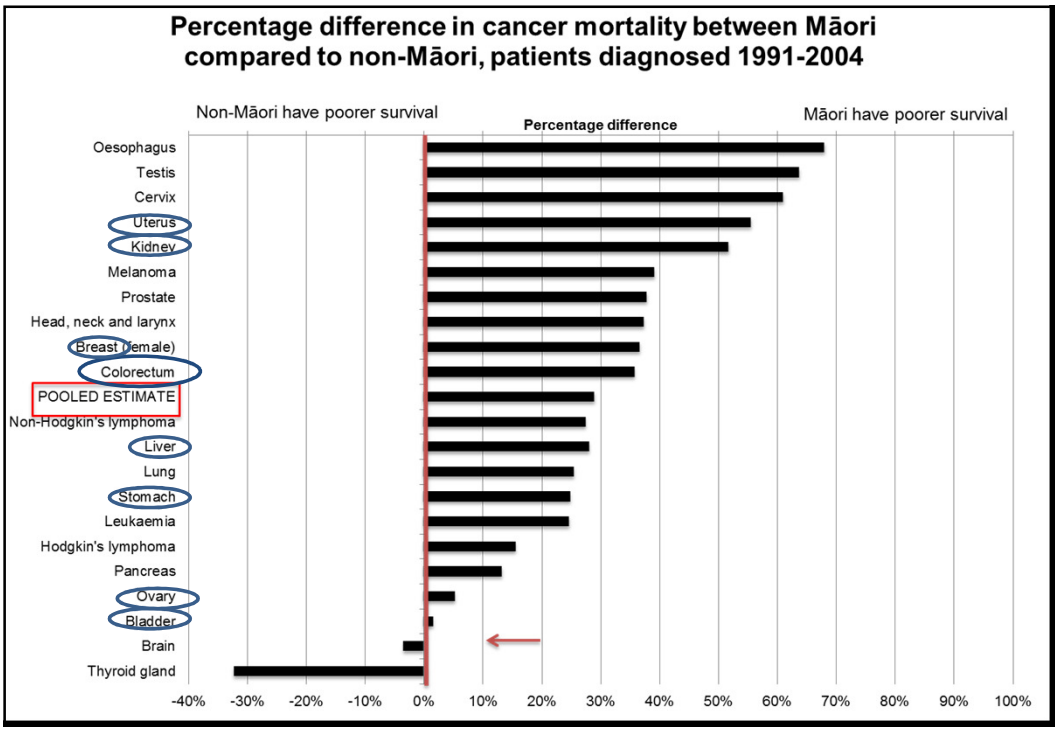
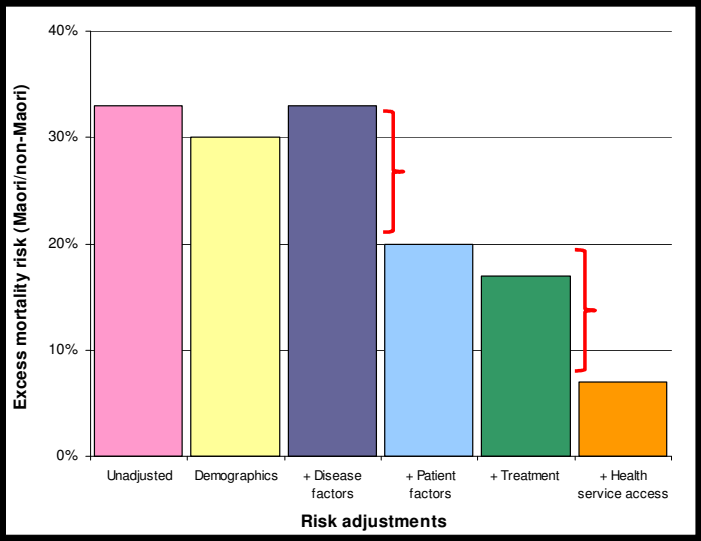


Soeberg M, Blakely T, Sarfati D et al (2012). *Cancer Trends: Trends in Survival by Ethnic and Socioeconomic Group, New Zealand 1991–2004*. Wellington: University of Otago and Ministry of Health.

Ethnic inequities in colon cancer survival



Comorbidity and treatment/health service factors each accounted for a third of the survival difference.

Hill S, Sarfati D et al. *Cancer*. 2010: 116; 3205-14.

Unanswered questions

- What is the best way of measuring comorbidity in the context of cancer?
- To what extent does comorbidity affect survival directly, or through its effects on treatment choice?
- To what extent does comorbidity affect inequalities in survival, and treatment receipt?
- How do patients and doctors understand comorbidity? And how does it effect their decisions?
- What are the implications of comorbidity to health-related policy and service planning?

Two C3 projects:

Effect of comorbidity on care and cancer survival inequalities (C3 Quant)

Cancer care journeys and clinical decision-making (C3 Qual)

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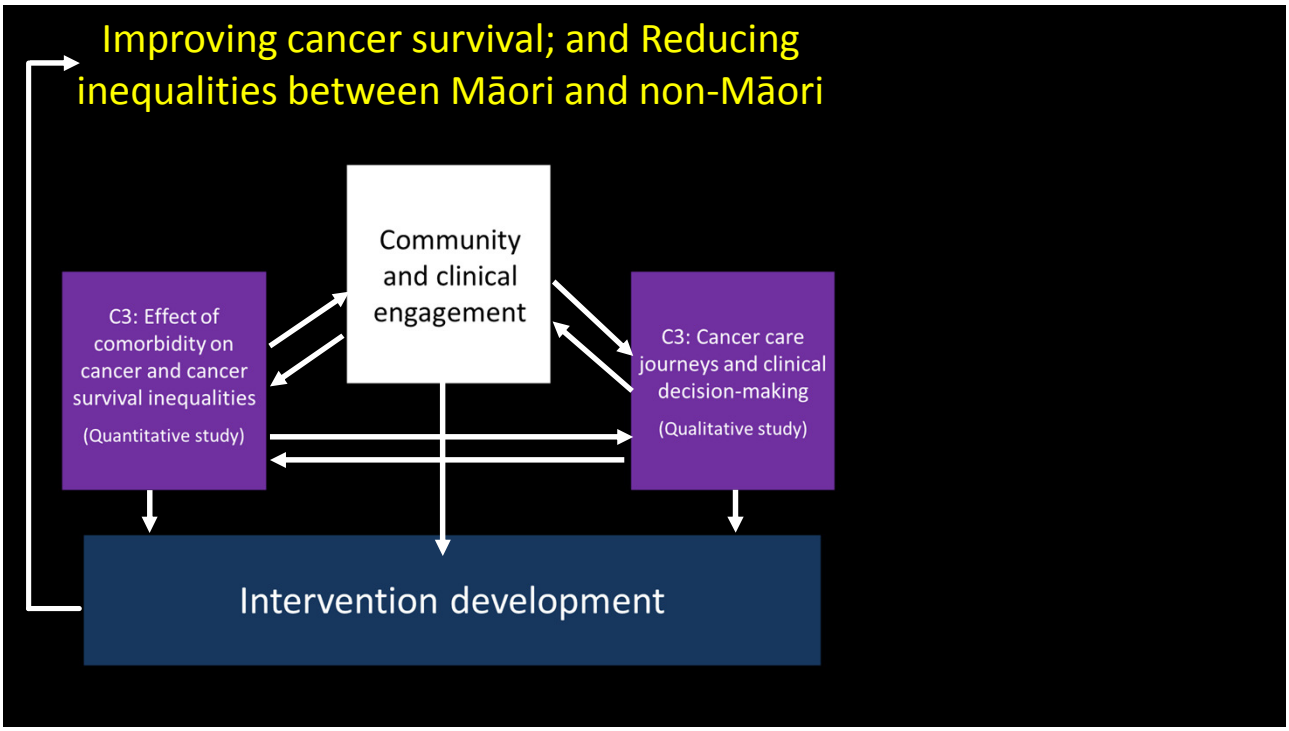
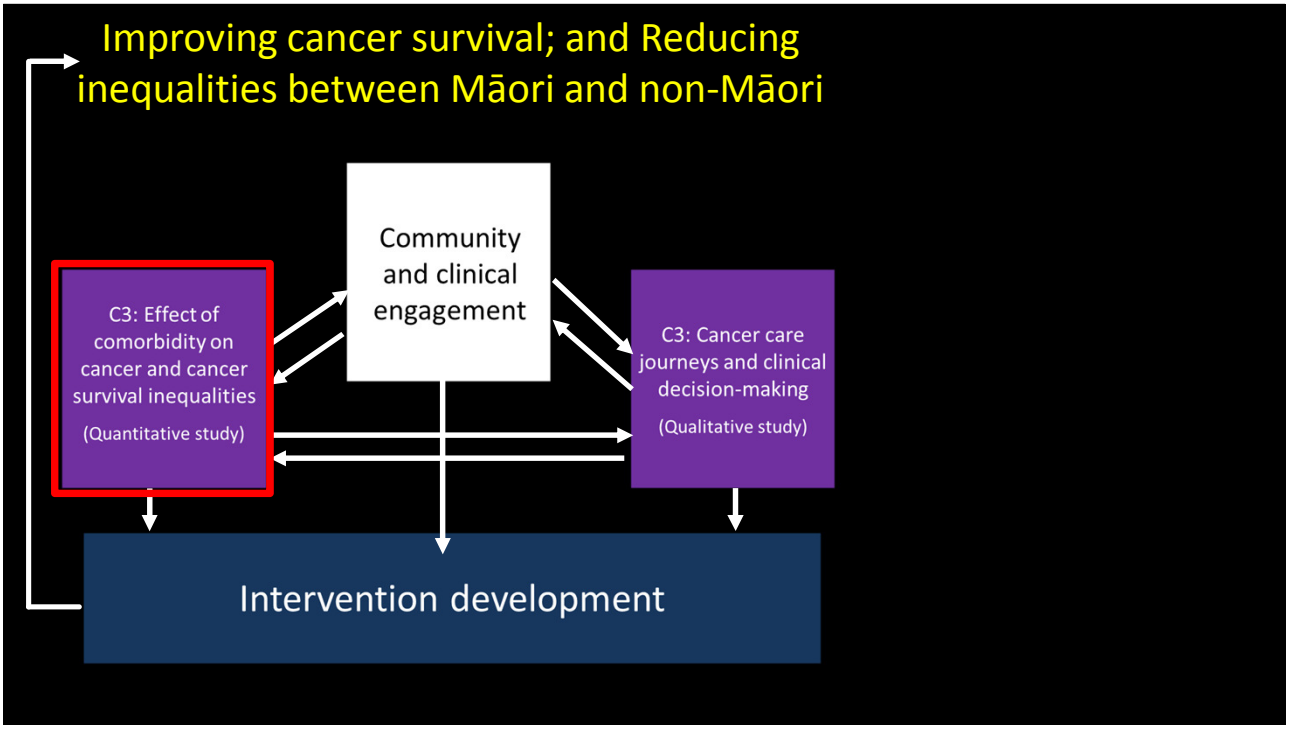

Improving cancer survival; and Reducing inequalities between Māori and non-Māori
Community and clinical engagement
C3: Effect of comorbidity on cancer and cancer survival inequalities
(Quantitative study)
C3: Cancer care journeys and clinical decision-making
(Qualitative study)
Intervention development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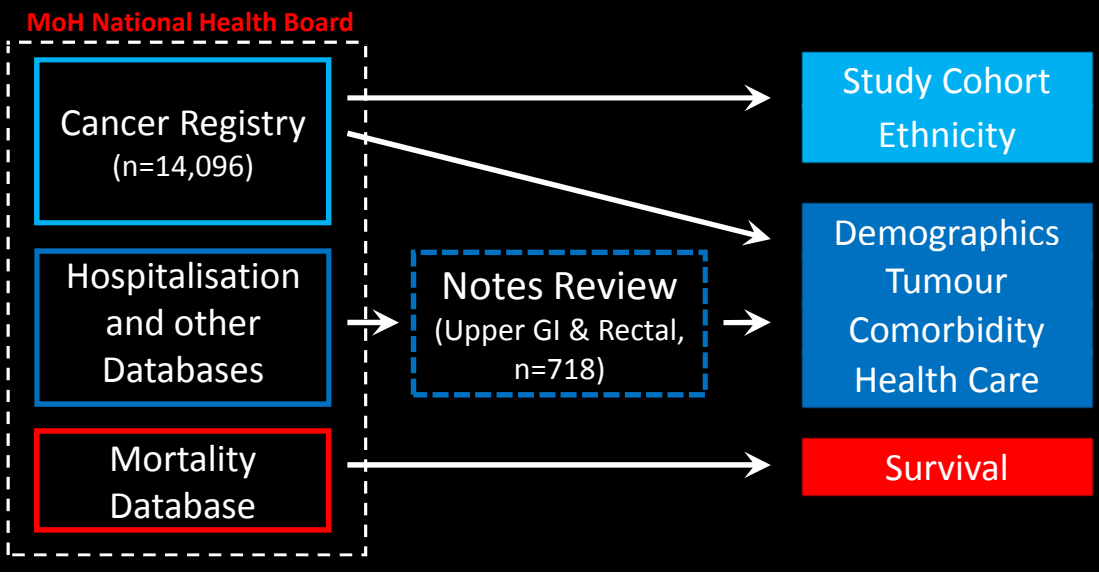
C3: Cancer care journeys and clinical decision-making
(Qualitative study)
Intervention development

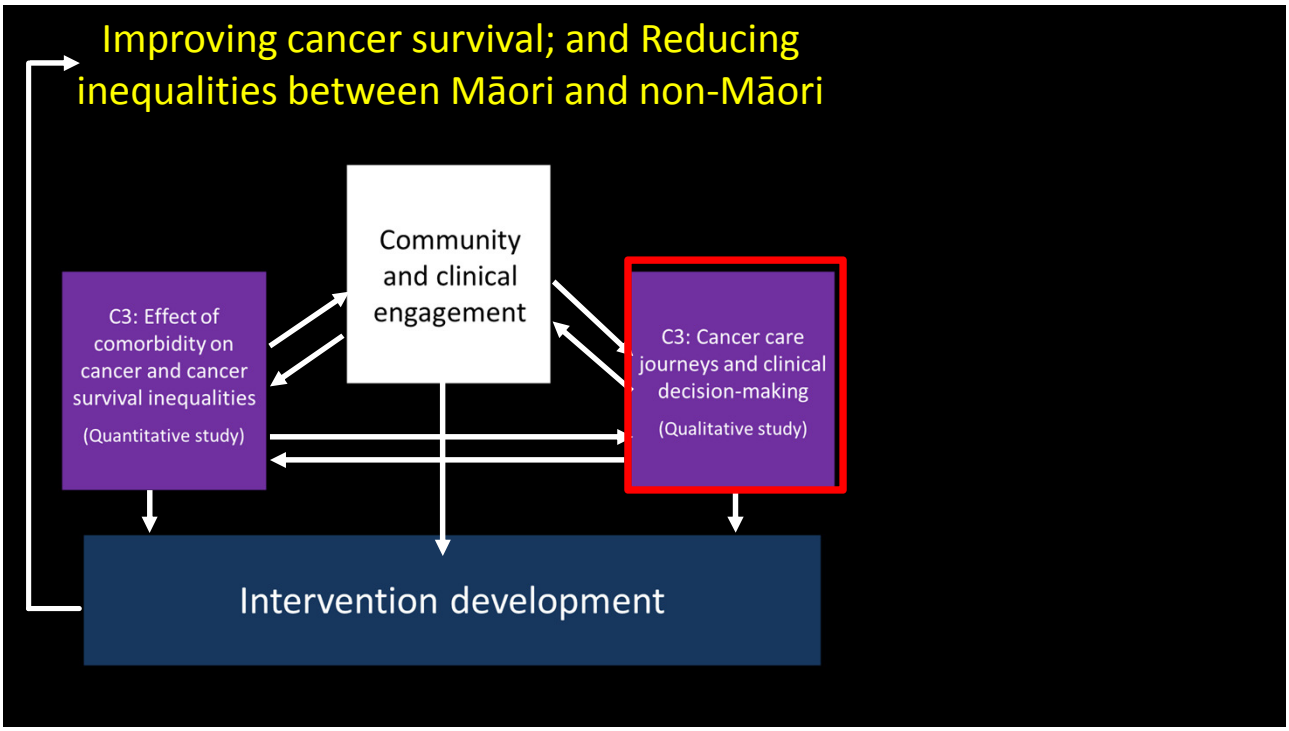
C3 Quant Investigators

Effect of comorbidity on cancer and cancer survival inequalities

- Diana Sarfati
- Jason Gurney
- Chris Cunningham
- James Stanley
- Lis Ellison-Loschmann
- Jonathan Koea
- Liz Dennett
- Andrew Simpson
- Tony Blakely
- Clare Salmond
- Virginia Signal
- Ruth Cunningham
- Esther Swart
- Josh Chamberlain
- Bee Lim
- Clare McSherry
- Jennifer Haubrock
- Ken Richardson
- Nasser Bagheri

The 'C3' Studies: Cancer, Comorbidity and Care





Investigators

C3: Cancer care journeys and clinical decision-making (Qualitative study)

- Louise Signal
- Chris Cunningham
- Jeannine Stairmand
- Kevin Dew
- Diana Sarfati
- Lis Ellison-Loschmann
- Jonathan Koea
- Liz Dennett
- Andrew Simpson
- Maureen Holdaway
- Lesley Batten
- Cheryl Davies

C3: Cancer, comorbidity and care: Cancer care journeys and clinical decision-making (Qual)

Four phases:

1. Clinical decision making in the context of Multidisciplinary team meetings.
2. Patient and clinician responses to clinical consultations
3. Patient understanding of their journeys
4. Interventions

Advisors

Community (Māori) Oversight Group

- Joanne Doherty
  - Cancer Policy Advisor
- Ria Earp
  - CEO Mary Potter Hospice
- Chery Goodyear
  - Whānau Care Services; CCDHB
- Steve Kenny
  - Central Cancer Network
- Teresea Olsen
  - Kokiri Marae
- Janice Wenn
  - Massey University

Technical Advisory Group

- D'Arcy Holman; Neil Pearce
  - Epidemiologists
- Clare Salmond
  - Biostatistician
- Peter Crampton
  - Health services researcher

Clinical Advisory Group

- Andrew Simpson
  - Oncologist
- Jonathan Koea
  - Hepatobiliary surgeon
- Liz Dennett
  - CR surgeon
- Ian Campbell
  - Breast specialist
- Ross Lawrenson
  - Primary care
- Rod Studd
  - Urologist
- Howard Clentworth
  - Gynaecologist
- Carol Johnson
  - Radiation oncologist
- Rose Miller
  - Pathologist

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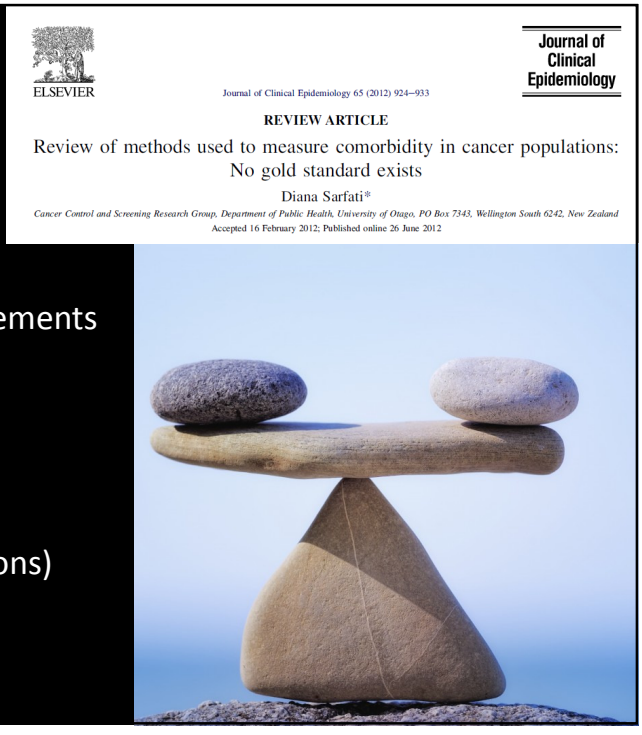
Measuring comorbidity in cancer populations

Comorbidity

1. No gold standard exists.
2. Measure depends on:
   1. Specificity vs generalisability requirements
   2. Data availability
   3. Resource availability
   4. Study questions
3. Recommendations:
   1. Administrative data (large populations)
   2. Inclusive of conditions
   3. More than one data source



ELSEVIER

Journal of Clinical Epidemiology 65 (2012) 924–933

Journal of Clinical Epidemiology

REVIEW ARTICLE

Review of methods used to measure comorbidity in cancer populations: No gold standard exists

Diana Sarfati*

Cancer Control and Screening Research Group, Department of Public Health, University of Otago, PO Box 7343, Wellington South 6242, New Zealand

Accepted 16 February 2012; Published online 26 June 2012

Two approaches to measuring comorbidity in cancer populations

Hospitalisation data for 5 years prior to diagnosis

↓

Identification of all important concurrent conditions that were likely to have an impact on function or length of life

↓

n=50 conditions

↓

C3 Index

Sarfati D, Gurney J, Stanley J, et al *J Clin Epidemiol* 2014; 67(5): 586-95.

Pharmaceutical data in year* prior to diagnosis

↓

Identification of all important concurrent conditions that were likely to have an impact on function or length of life

↓

n=19 conditions

↓

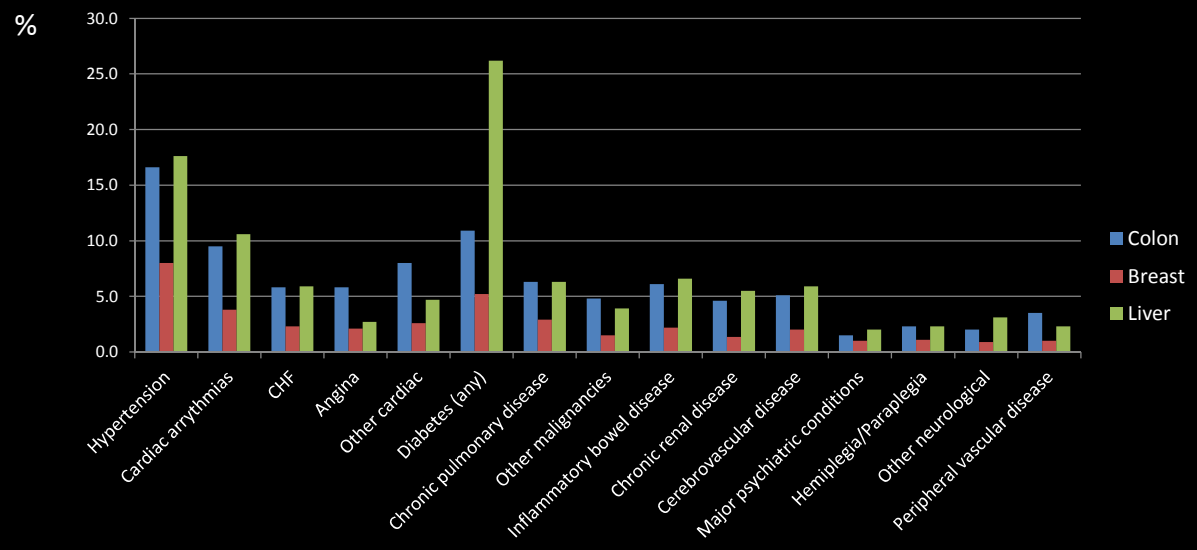
PBCI

*excl 3 months immediately prior

Sarfati D, Gurney J, Stanley J, et al *Medical Care; In press.*

AIDS
Alcohol abuse
Anemia deficiency
Angina
Anxiety& Behavioral disorders
Bowel disease: inflammatory
Cardiac arrhythmias
Cardiac diseases: other
Cardiac valve disease
Cerebrovascular diseases
Chronic pulmonary disease
Chronic renal disease
Coagulopathy & blood disorders
Congestive heart failure
Connective tissue disease
Dementia
Diabetes: uncomplicated
Diabetes: with complications
Drug abuse
Endocrine disorders
Epilepsy
Eye problems
GI ulcer & upper GI disease
Hepatitis; chronic viral
Hypertension: primary
Immune system disorders
Infection: chronic NOS
Inner ear disorder

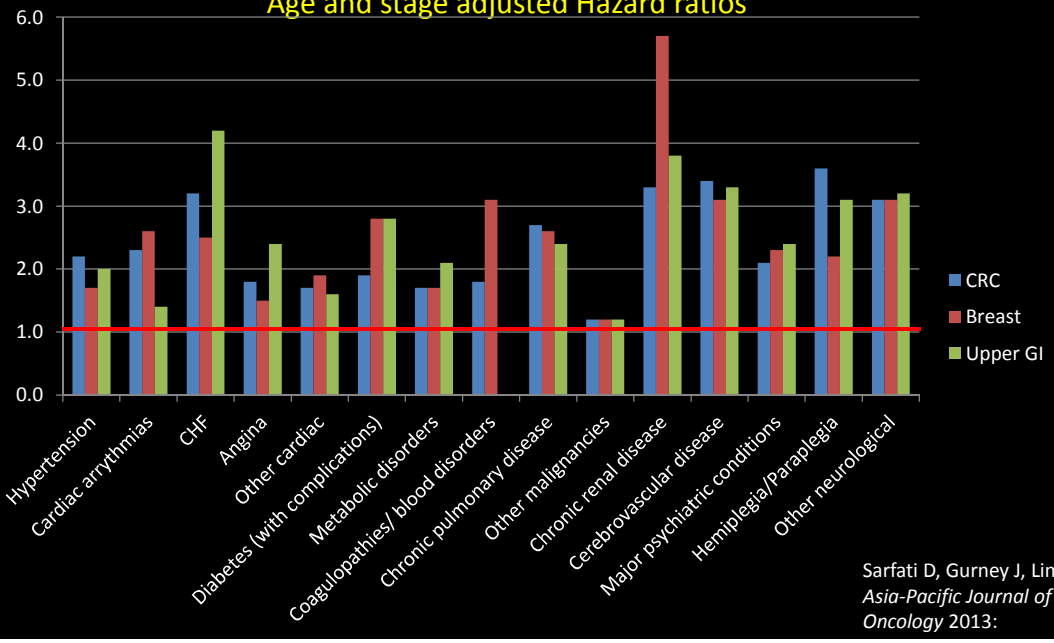
Prevalence of comorbid conditions among cancer patients



Sarfati D, Gurney J, Lim B, et al. *Asia-Pacific Journal of Clinical Oncology* 2013:

Impact of comorbid conditions on non-cancer mortality:

Age and stage adjusted Hazard ratios



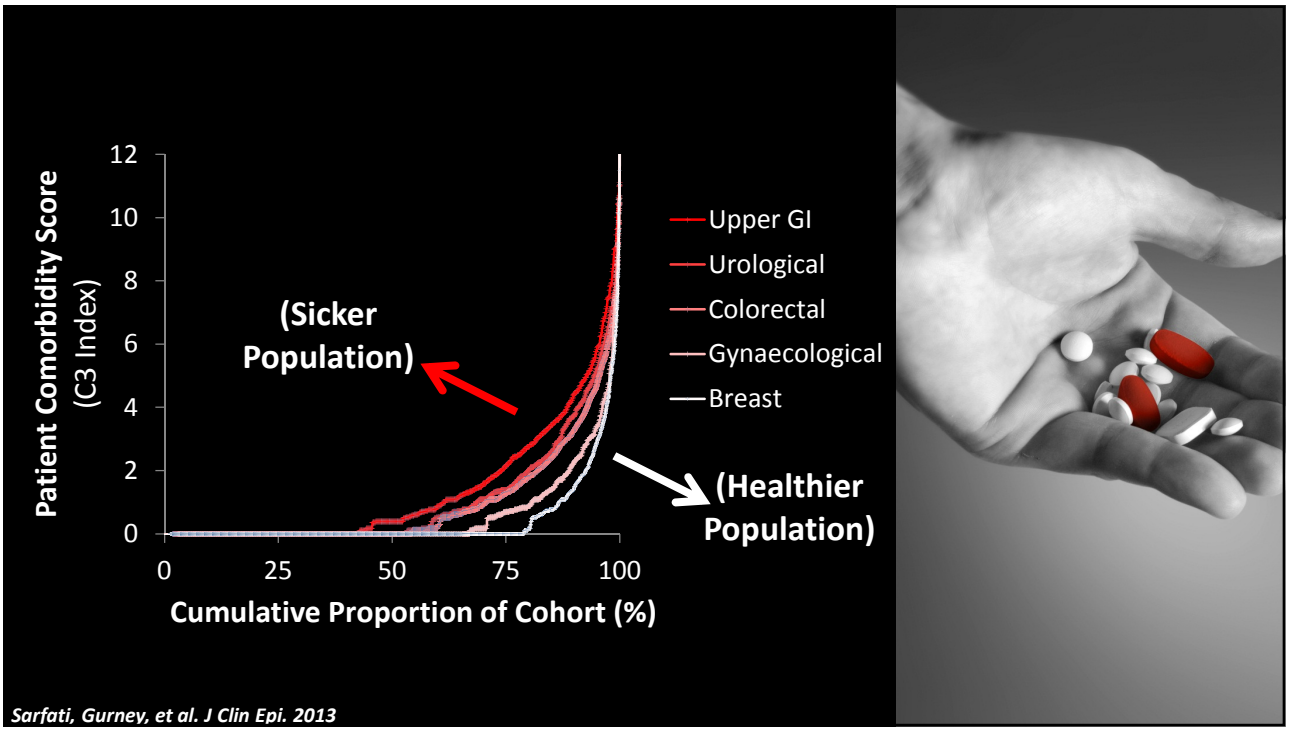
Sarfati D, Gurney J, Lim B, et al. *Asia-Pacific Journal of Clinical Oncology* 2013:

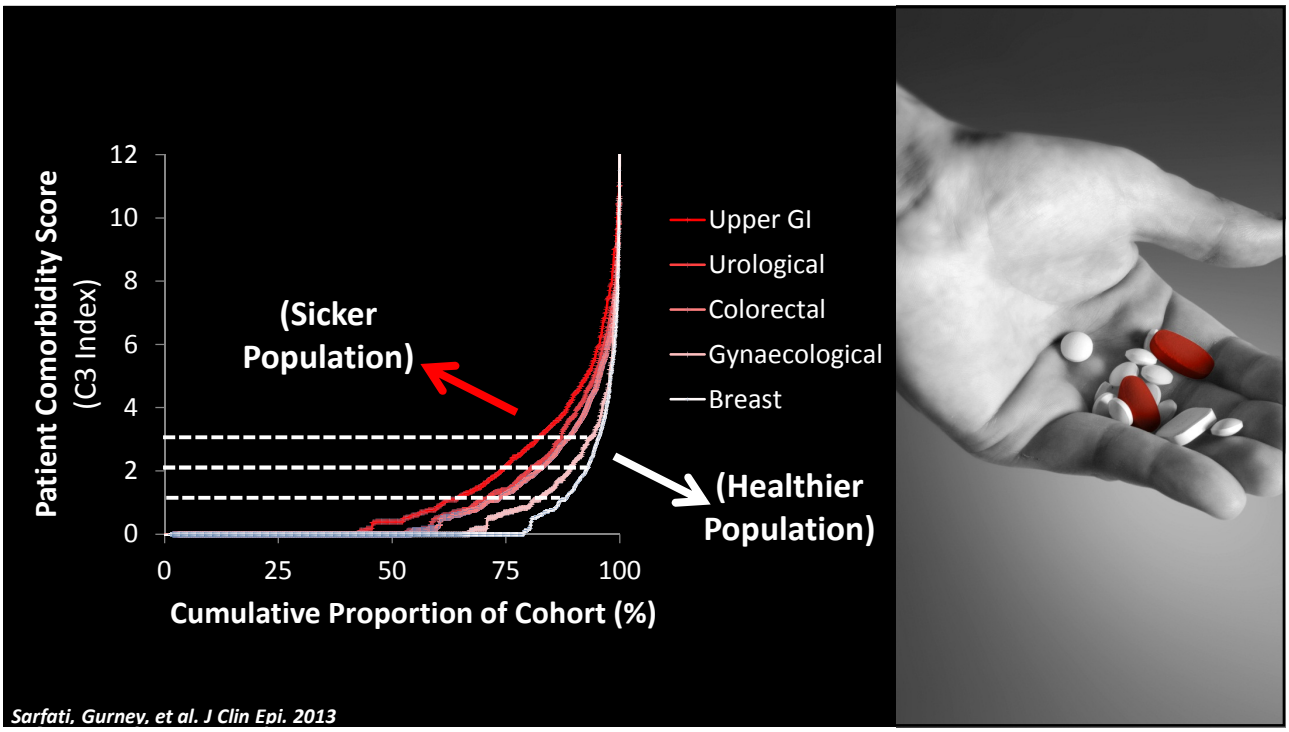
The C3 Index:

is a cancer-specific compilation of comorbid conditions, weighted according to their association with non-cancer death.

major eye conditions
connective tissue disorders
inner ear disorders
anxiety/behavioural disorders
hypertension
venous insufficiency
cardiac arrythmia
angina
nutritional disorders
major psychiatric disorders
obesity
cardiac valve disorders
hepatitis
congestive heart failure
copd/asthma
anaemia
joint/spinal disorders
pulmonary circulation disorder
alcohol abuse
renal disease
nerve/muscle disorder
sleep disorders
diabetes with complications
other cardiac conditions
peripheral vascular disease
endocrine disorders
inflammatory bowel disease
neurological disorders
cerebrovascular disease
epilepsy
myocardial infarction
dementia
paralysis
liver disease
metabolic conditions
osteoporosis/bone disorders
blood disorders

Sarfati, Gurney, et al. J Clin Epi. 2013 (font sizes = condition weights)


Patient Comorbidity Score
(C3 Index)
12
10
8
6
4
2
0
0
25
50
75
100
Cumulative Proportion of Cohort (%)
(Sicker Population)
(Healthier Population)
Upper GI
Urological
Colorectal
Gynaecological
Breast
Sarfati, Gurney, et al. J Clin Epi. 2013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Sarfati, Gurney, et al. J Clin Epi. 2013

"I am a little deaf, a little impotent, and on top of this are two or three abominable infirmities, but nothing destroys my hope"

Voltaire