Global Surveillance of Cancer Survival
(CONCORD-2 Study)

Hannah K Weir, Michel P Coleman, Benard Rachet,
Claudia Allemani on behalf of the CONCORD Working Group
Outline

- History of the CONCORD Programme
- The first CONCORD Study
- The CONCORD-2 Study
- Future Plans
Outline

- History of the CONCORD Programme
  - London School of Hygiene and Tropical Medicine
  - Michel P Coleman and Benard Rachet (co-PIs)
- The first CONCORD Study
- The CONCORD-2 Study
- Future Plans
<table>
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The Role of Population-based Survival in Evaluating Health Care

Clinical trials highest achievable survival

Population-based average survival achieved

Coleman, 1999
## EUROCARE 4

### Five-year relative survival (%) Europe, 1995-99

**All Cancers**

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### UK cancer survival rates 'worst in Europe'

**Staff and agencies**

Tuesday 2 July 2012 09:50 EDT

Authors
- Catherine Foot
- Tony Harrison

June 2011

How to improve cancer survival
Explaining England’s relatively poor rates
UK National Cancer Strategies: response to poor UK cancer survival (EUROCARE 4)
Cancer survival (5-years) in EUROCARE 2 and SEER-9: patients diagnosed 1985-89


![Cancer survival (5-years) in EUROCARE 2 and SEER-9: patients diagnosed 1985-89](image)
Outline

- History of the CONCORD Programme
- The first CONCORD Study
- The CONCORD-2 Study
- Future Plans
CONCORD

Long-term trends, 4 common cancers
- Patients diagnosed 1990-1995
- Follow-up to 1999
- Colorectum, lung, breast (women), prostate
<table>
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<tr>
<th>EUROCARE</th>
<th>Patients diagnosed</th>
<th>Countries</th>
<th>Cancer registries</th>
<th>Year</th>
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</table>
North American Coverage
CONCORD Study

Five-year relative survival (%) - breast cancer, women (15-99 years)
Five-year relative survival (%) - prostate cancer, (15-99 years)
Five-year relative survival (%) - colon cancer, women (15-99 years)
Five-year relative survival (%) - colon cancer, men (15-99 years)
Five-year relative survival (%) - rectum cancer, women (15-99 years)
Five-year relative survival (%) - rectum cancer, men (15-99 years)
Five-year relative survival (%) - breast cancer, women (15-99 years): USA, by race
Five-year relative survival (%) - prostate cancer, (15-99 years): USA, by race
Five-year relative survival (%) - colon cancer, women (15-99 years): USA, by race
Five-year relative survival (%) - colon cancer, men (15-99 years): USA, by race
Five-year relative survival (%) - rectum cancer, women (15-99 years): USA, by race
Five-year relative survival (%) - rectum cancer, men (15-99 years): USA, by race
Funnel plot

Cancer survival (%) vs. Precision of the survival estimate

Indicator

Less reliable ← More reliable
Funnel plot

Cancer survival (%)

Indicator

Precision of the survival estimate

Target

Less reliable  More reliable
Funnel plot

- Cancer survival (%)
- Precision of the survival estimate

Control limits
- More reliable
- Less reliable

Indicator
- OK

Target
- ??? Truly different ???

- E
All-cancers survival index: 1-year survival, PCT

Data points: 151 Primary Care Trusts

PCT outliers for 1996 are tracked (red dots)

National average
2005

All cancers

One-year survival index (%)

Precision of the survival index

Individual PCT survival

National average

95% limits

99.8% limits
Five-year relative survival (%), breast (F) USA, 1990-99, by race and program area
Five-year relative survival (%), prostate USA, 1990-99, by race and program area.
Five-year relative survival (%), colon (F)
USA, 1990-99, by race and program area
Five-year relative survival (%), rectum (F)
USA, 1990-99, by race and program area
Five-year relative survival (%), rectum (M)
USA, 1990-99, by race and program area
Economics Determine Cancer Survival Worldwide but Race Matters in U.S.

By Crystal Phend, Staff Writer, MedPage Today

LONDON, July 16 -- Cancer survival rates differ widely around the world, primarily along economic lines but racially in the U.S., according to the first direct global comparison.

Five-year survival rates for breast, colorectal, and prostate cancer were generally higher in North America, Australia, and Europe than in most other countries. Race also played a role in the U.S., with African Americans more likely to die of cancer even than whites in some cases.

The global analysis, by researchers in Denmark, is based on survival rates from 1990-2000, using data from 67 countries. It was reported online at the National Cancer Institute's Surveillance Research Program Web site.

Survival rates were defined as the percentage of cancer patients alive five years after diagnosis. Rates were calculated for breast, colorectal, and prostate cancer because they are among the most common cancers worldwide.

The researchers found that 62% of white women with breast cancer in the U.S. were alive five years after diagnosis, compared with 53% of black women.

For colorectal cancer, the five-year survival rate was 66% for white women and 54% for black women in the U.S., compared with 73% and 66% worldwide for white and black women, respectively.

For prostate cancer, 77% of white men were alive five years after diagnosis in the U.S., compared with 72% worldwide. The rate was 59% for black men in the U.S., compared with 58% worldwide.
Outline

- History of the CONCORD Programme
- The CONCORD Study
- **The CONCORD-2 Study**
- Future Plans
Global surveillance of cancer survival

Participants
- 279 cancer registries
- 67 countries

Long-term trends, 10 common cancers
- Patients diagnosed 1995-2009
- Follow-up to 2009
- Stomach, colon, rectum, liver, lung, breast (women), cervix, ovary, prostate, leukaemia
- Acute lymphoblastic leukaemia in children
### Population-based Cancer Survival in High Income Countries

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<tr>
<th>EUROCARE</th>
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<td>2003 – 2007</td>
<td>-</td>
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Cancer registries: data transfers 2014
## Cancer registries, data sets

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<td>America C+S</td>
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<td>America N</td>
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<td><strong>Total</strong></td>
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North America - United States

83.2% population coverage
# Number of cancer patients

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<td>America N</td>
<td>13,579,666</td>
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<td>3,804,259</td>
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<td>Europe</td>
<td>11,132,170</td>
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<td>Oceania</td>
<td>1,050,246</td>
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Note: provisional figures, February 2014
Centralised quality control
3 steps

1. Protocol adherence
   Is each variable correctly coded?

2. Exclusions
   Is each tumour record logically coherent?

3. Editorial
   Are the distributions in the data plausible?
Quality control of survival data

Excluded
- Vital status unknown
- Sex unknown
- Sex site error
- Site-morphology inconsistency
- Age-site inconsistency
- Age-morphology inconsistency
- Age-site-morphology inconsistency
- Duplicate registration
- Synchronous tumour
- Death-certificate-only (DCO)

Included – multiple primary tumours
CONCORD-2 protocol adherence: Georgia

15 May 2013

1 Introduction

1.1 This 'protocol adherence' report describes the first phase of quality control of your data. This report indicates whether the data set(s) from your registry contain any important deviations from the CONCORD-2 protocol.

1.2 For each cancer data set that you sent, we have checked each variable in every tumour record, to see if the values comply with the description in Annex 3 to the protocol. The attached table shows the number and percentage of variables that are compliant with the protocol. Please check the table carefully, and let us know quickly if you detect any major discrepancies with the data you provided, or if we have somehow misinterpreted your data.

1.3 If we have not identified major problems in this report, we will now carry out the second phase of quality control procedures.

1.4 If we have identified major problems, we will need to resolve these with you before we perform the second phase of quality control.

2 Report on your data

2.1 We are pleased to report that the data submitted by the Georgia Comprehensive Cancer Registry were for the most part compliant with the CONCORD protocol.
## Cancer patients submitted and included

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Life tables

Life tables: all-cause mortality rates by age, sex, (race), geographical area (country, state, region) and single calendar year
Methods

- Net survival: Pohar Perme approach (stns)
- Cohort approach 1995-99, 2000-04
- Period approach 2005-09
- Age-standardisation: International Cancer Survival Standard (ICSS) weights
Global surveillance of cancer survival 1995–2009: analysis of individual data for 25 676 887 patients from 279 population-based registries in 67 countries (CONCORD-2)


Summary

Background Worldwide data for cancer survival are scarce. We aimed to initiate worldwide surveillance of cancer survival by central analysis of population-based registry data, as a metric of the effectiveness of health systems, and to inform global policy on cancer control.

Methods Individual tumour records were submitted by 279 population-based cancer registries in 67 countries for 25·7 million adults (age 15–99 years) and 75 000 children (age 0–14 years) diagnosed with cancer during 1995–2009 and followed up to Dec 31, 2009, or later. We looked at cancers of the stomach, colon, rectum, liver, lung, breast (women), cervix, ovary, and prostate in adults, and adult and childhood leukaemia. Standardised quality control procedures were applied; errors were corrected by the registry concerned. We estimated 5-year net survival, adjusted for background mortality in every country or region by age (single year), sex, and calendar year, and by race or ethnic origin in some countries. Estimates were age-standardised with the International Cancer Survival Standard weights.

All 496 co-authors are indexed in PubMed.
Breast cancer in 5,486,928 women (15-99 years): age-standardised 5-year net survival (%)
Main findings

- World-wide differences in 5-year survival
- Breast, colorectal: increase in most developed countries, and in South America
- Liver, lung: still lethal in most countries
- Stomach: survival very high in south-east Asia
- Prostate: striking increases, still wide range
- Cervix, ovary: wide range, little improvement
- Adult leukaemia: low survival in Asian countries
- Childhood ALL: wide gap in 5-year survival
Some key messages

- Cancer survival for 67 countries, home to 2/3 of world population
- Fits overarching goal of UICC World Cancer Declaration 2013
- Wide range in survival – inequity in diagnosis and treatment
- Differences in survival suggest lessons can be learnt
- Raises questions for further research
- World-wide surveillance is crucial for cancer control policy
- Cancer registries need political, legislative and financial stability
The article is OPEN ACCESS

Main article (34 pages)
http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)62038-9/fulltext

Supplementary appendix (175 pages)
http://download.thelancet.com/mmcs/journals/lancet/PIIS0140673614620389/mm
c1.pdf?id=eaa6KPWwDrwIJ-q3s0sOu

Allemani et al., The Lancet 2015
Outline

- History of the CONCORD Programme
- The CONCORD Study
- The CONCORD-2 Study
- Future Plans
  - Site specific analyses including population cure, avoidable deaths
  - US Survival monograph – using survival to inform cancer control
  - US – Canada SE
References


Thank You

Hannah K. Weir, PhD
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770 488-3006

The findings and conclusions in this presentation are those of the presenter and do not necessarily represent the official position of the Centers for Disease Control and Prevention.