Dag W. Aksnes

Medical research and disease burden

A method for classifying publications according to the Health Research Classification System (HRCS)

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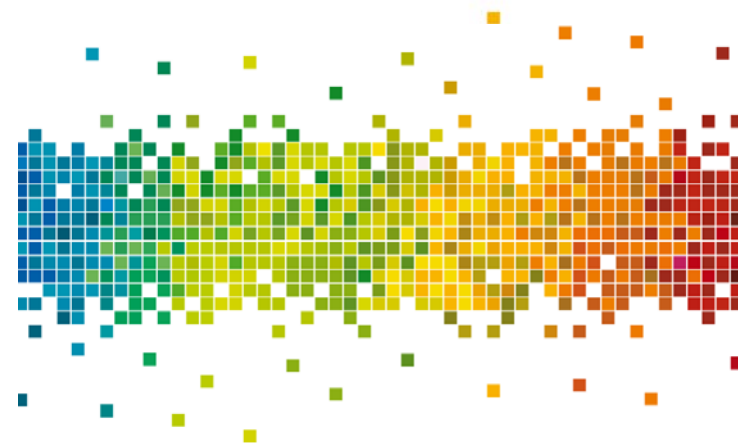# The Health Research Classification System (HRCS)

- A system for classifying and analysing all types of biomedical and health related research
- Developed in 2004 by 11 participating UK funding organisations
- Builds on the World Health Organization (WHO) International Classification of Diseases and a cancer-based system (the Common Scientific Outline)

The Health Research Classification System (HRCS)

- The main purpose of the system is to provide an overview of health research funding

- The research is classified according to a two dimensional framework

- Coding of individual projects/awards
  - labour intensive ("manual" coding), requiring a continuous pool of trained coders

UK Clinical Research Collaboration
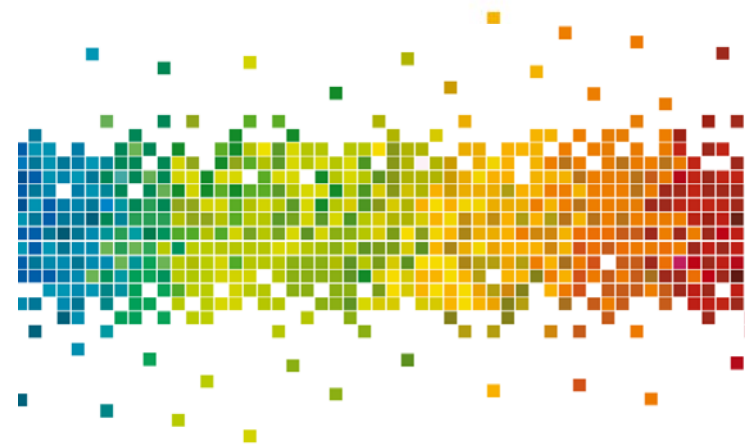**Health Research Classification System**

The Health Research Classification System (HRCS)

- One dimension is used to classify the type of health or disease being studied
- There are 21 categories encompassing various diseases and areas of health

UK Clinical Research Collaboration
Health Research Classification System

HRCS System

- Approach to Coding
- **Health Categories**
- Research Activity Codes
- Guidance Topics
- Search HRCS
- HRCS Overview
- Training

Categories

- **Blood**
- **Cancer**
- **Cardiovascular**
- **Congenital**
- **Ear**
- **Eye**
- **Infection**
- **Inflammatory**
- **Injuries**
- **Mental Health**
- **Metabolic**
- **Musculoskeletal**
- **Neurological**
- **Oral & Gastro**
- **Renal**
- **Reproduction**
- **Respiratory**
- **Skin**
- **Stroke**
- **Generic**
- **Other**

Health Categories ›

# Definitions of Health Categories

| Category | Overview | **Summary** | Advice | Search |

Category	Includes
Blood	Haematological diseases, anaemia, clotting and normal development and function of platelets and erythrocytes
Cancer	All types of cancers (includes leukaemia)
Cardiovascular	Coronary heart disease, diseases of the vasculature and circulation including the lymphatic system, and normal development and function of the cardiovascular system
Congenital Disorders	Physical abnormalities and syndromes that are not associated with a single type of disease or condition including Down's syndrome and cystic fibrosis
Ear	Deafness and normal ear development and function
Eye	Diseases of the eye and normal eye development and function
Infection	Diseases caused by pathogens, acquired immune deficiency syndrome, sexually transmitted infections and studies of infection and infectious agents
Inflammatory and Immune System	Rheumatoid arthritis, connective tissue diseases, autoimmune diseases, allergies and normal development and function of the immune system
Injuries and Accidents	Fractures, poisoning and burns
Mental Health	Depression, schizophrenia, psychosis and personality disorders, addiction, suicide, anxiety, eating disorders, learning disabilities, autistic spectrum disorders and studies of normal psychology, cognitive function and behaviour
Metabolic and Endocrine	Diabetes, thyroid disease, metabolic disorders and normal metabolism and endocrine development and function
Musculoskeletal	Osteoporosis, osteoarthritis, muscular and skeletal disorders and normal musculoskeletal and cartilage development and function
Neurological	Dementias, transmissible spongiform encephalopathies

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The Health Research Classification System (HRCS)

- The other dimension, the Research Activity Codes, classifies the type of research activity being undertaken (from basic to applied). There are 48 codes divided into eight groups

UK Clinical Research Collaboration
Health Research Classification System
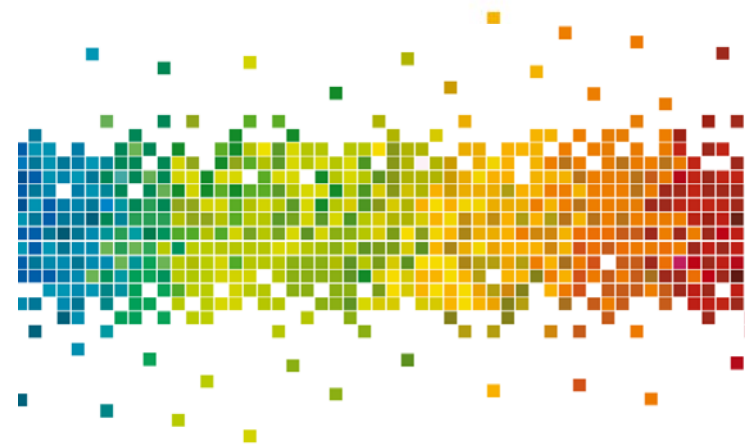
HRCS System

- **Approach to Coding**
- **Health Categories**
- **Research Activity Codes**
- **Guidance Topics**
- **Search HRCS**
- **HRCS Overview**
- **Training**

Code Groups

- **1 Underpinning**
- **2 Aetiology**
- **3 Prevention**
- **4 Detection & Diagnosis**
- **5 Treatment Development**
- **6 Treatment Evaluation**
- **7 Disease Management**
- **8 Health Services**

Research Activity Codes ›

Definitions of Research Activity Codes

| Code | Overview | **Summary** | Advice | Search |

Code Group	Includes	Codes
1 Underpinning Research	Research that underpins investigations into the cause, development, detection, treatment and management of diseases, conditions and ill health	Summary of codes in 1 Underpinning
2 Aetiology	Identification of determinants that are involved in the cause, risk or development of disease, conditions and ill health	Summary of codes in 2 Aetiology
3 Prevention of Disease and Conditions, and Promotion of Well-Being	Research aimed at the primary prevention of disease, conditions or ill health, or promotion of well-being	Summary of codes in 3 Prevention
4 Detection, Screening and Diagnosis	Discovery, development and evaluation of diagnostic, prognostic and predictive markers and technologies	Summary of codes in 4 Detection & Diagnosis
5 Development of Treatments and Therapeutic Interventions	Discovery and development of therapeutic interventions and testing in model systems and preclinical settings	Summary of codes in 5 Treatment Development
6 Evaluation of Treatments and Therapeutic Interventions	Testing and evaluation of therapeutic interventions in clinical, community or applied settings	Summary of codes in 6 Treatment Evaluation
7 Management of Diseases and Conditions	Research into individual care needs and management of disease, conditions or ill health	Summary of codes in 7 Disease Management
8 Health and Social Care Services Research	Research into the provision and delivery of health and social care services, health policy and studies of research design, measurements	Summary of codes in 8 Health Services

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Applications - HRCS

- The HRCS has been used extensively in the UK. A number of funders now routinely classify all awards under HRCS, for both internal reporting and for reports in the public domain
  - E.g. to inform research management and to undertake prospective analyses
  - Discussion about the amount spent on the various topics etc.

- Used also in Norway, Sweden, Singapore, Ireland….

This study – *a pilot*

- The HRCS system is mainly developed for analyzing the funding of research

- A method for classifying the publication output according to HRCS categories

- Norwegian case study

- Based on the method, it is possible to analyze how the research output compares with the research funding amount, which also has been classified according to the HRCS-system

Klassifisering av vitenskapelig publisering etter Health Research Classification System (HRCS)

En pilotstudie

Dag W. Aksnes

Arbeidsnotat 2016:12

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Methods

- A combination of journal based and content based delineation using topic specific key-words
- First, we have included all publications from the journals that entirely or mainly cover the various research topics

Correspondence WoS categories vs HRCS

WoS-category	HRCS-category																				
	1. Blood	2. Cancer	3. Cardiovascular	4. Congenital Disorders	5. Ear	6. Eye	7. Infection	8. Inflammatory and Immune System	9. Injuries and Accidents	10. Mental Health	11. Metabolic and Endrocrine	12. Musculoskeletal	13. Neurological	14. Oral and Gastrointestinal	15. Renal and Urogenital	16. Reproductive Health and Childbirth	17. Respiratory	18. Skin	19. Stroke	20. Generic Health Relevance	21. Other
ALLERGY								x													
ANDROLOGY															x						
AUDIOLOGY & SPEECH-LANGUAGE PATHOLOGY					x																
CARDIAC & CARDIOVASCULAR SYSTEMS			x																		
CLINICAL NEUROLOGY													x								
DENTISTRY/ORAL SURGERY & MEDICINE														x							
DERMATOLOGY																		x			

Journal based classification

Journal	WoS-Category	HRCS-catgory
ACTA ONCOLOGICA	ONCOLOGY	Cancer
ACTA RADIOLOGICA ONCOLOGY	ONCOLOGY	Cancer
ADVANCES IN CANCER RESEARCH	ONCOLOGY	Cancer
AMERICAN JOURNAL OF CANCER RESEARCH	ONCOLOGY	Cancer
AMERICAN JOURNAL OF CLINICAL ONCOLOGY-CANCER CLINICAL TRIALS	ONCOLOGY	Cancer
AMERICAN JOURNAL OF PEDIATRIC HEMATOLOGY ONCOLOGY	ONCOLOGY	Cancer
AMERICAN JOURNAL OF TRANSLATIONAL RESEARCH	ONCOLOGY	Cancer
ANNALS OF ONCOLOGY	ONCOLOGY	Cancer
ANNALS OF SURGICAL ONCOLOGY	ONCOLOGY	Cancer
ANTI-CANCER AGENTS IN MEDICINAL CHEMISTRY	ONCOLOGY	Cancer
ANTI-CANCER DRUG DESIGN	ONCOLOGY	Cancer
ANTI-CANCER DRUGS	ONCOLOGY	Cancer
ANTICANCER RESEARCH	ONCOLOGY	Cancer
ASIAN PACIFIC JOURNAL OF CANCER PREVENTION	ONCOLOGY	Cancer
ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY	ONCOLOGY	Cancer

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Classification -example

Tumour Markers in Pancreatic Cancer

C. Haglund, P. J. Roberts, P. Kuusela & H. Jalanko

References　Citations　Metrics　Reprints & Permissions　Get access

Abstract

The serum levels of three new tumour markers defined by monoclonal antibodies, CA 19-9, CA 50 and CA 125, were analysed and compared with carcinoembryonic antigen (CEA) in samples from 91 patients with pancreatic cancer and from 111 patients with benign pancreatic, biliary tract and hepatocellular diseases. High serum concentrations of CA 19-9 and CA 50 were found in most patients with pancreatic cancer, 78% and 72%, respectively. The serum levels of these two markers showed a positive correlation, while no other correlation was found between the markers. Benign extrahepatic cholestasis was often associated with moderately elevated CA 19-9 and CA 50 levels. The CA 125 and CEA levels were elevated in about half of the patients with pancreatic cancer. Both CA 19-9 and CA 50 seem promising in the follow-up of patients with pancreatic cancer.

Key Words: Antigen, cancer, antigen, carcinoembryonic, cancer, pancreatic, tumour marker

WoS-category:
GASTROENTEROLOGY &
HEPATOLOGY

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SCANDINAVIAN JOURNAL OF
Gastroenterology

www.informahealthcare.com/gas
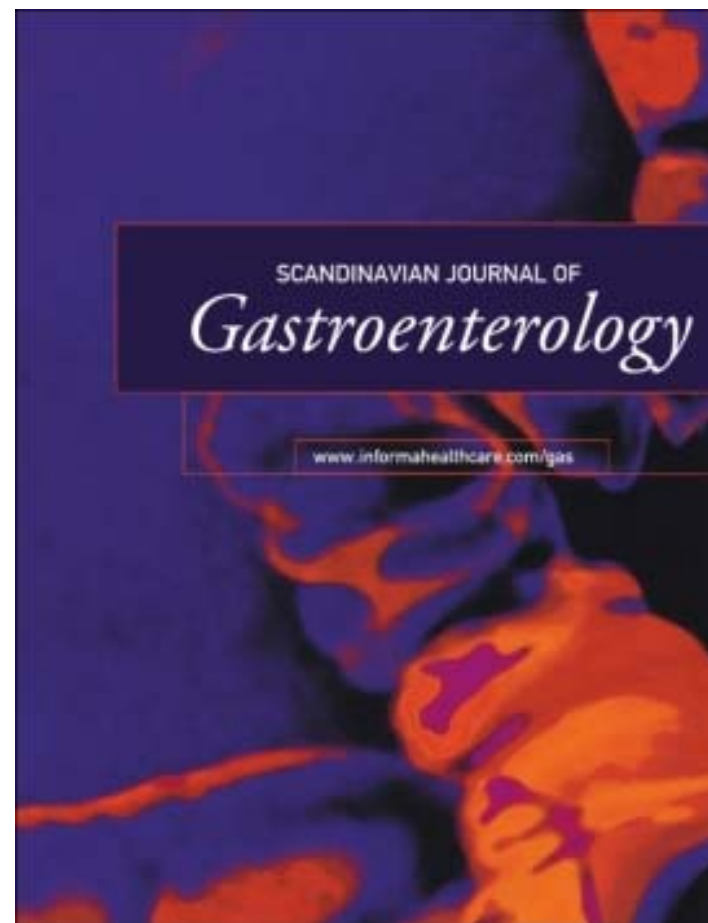
Classification - example

WoS-category:
GASTROENTEROLOGY &
HEPATOLOGY

↓

Research Article

## Are Anxiety and Depression Related to Gastrointestinal Symptoms in the General Population?

T. Tangen Haug, A. Mykletun & A. A. Dahl

Pages 294-298 | Published online: 08 Jul 2009

66 Download citation   🔗 http://dx.doi.org/10.1080/0036552023172841 92

📄 References   66 Citations   📊 Metrics   🖶 Reprints & Permissions   Get access

Abstract

Background: In clinical studies there is a strong relationship between gastrointestinal symptoms, anxiety and depression. The results may be biased, however, since anxiety and depression will influence the decision to consult a doctor. The aim of this study was to investigate the relationship between these symptoms in the population. Methods: In the Health Study of Nord-Trøndelag County of Norway (HUNT) a questionnaire concerning physical and mental health, demographic and life-style factors was sent to all inhabitants aged 20 years and above (a total of 94,197 persons). Valid questionnaires were returned by 62,651 persons (66.5%). Presence of nausea, heartburn, diarrhoea and constipation during the last year was self-reported. Anxiety disorders and depression were based on self-ratings of the Hospital Anxiety and Depression Scale (HADS). Results: 48% of the population reported one or more of the four gastrointestinal symptoms. Based on the HADS ratings, 15.3% of the population had an anxiety disorder and 10.4% a depression. Anxiety disorder was most strongly associated with nausea (OR 3.42). Anxiety was also

SCANDINAVIAN JOURNAL OF
Gastroenterology

www.informahealthcare.com/gas
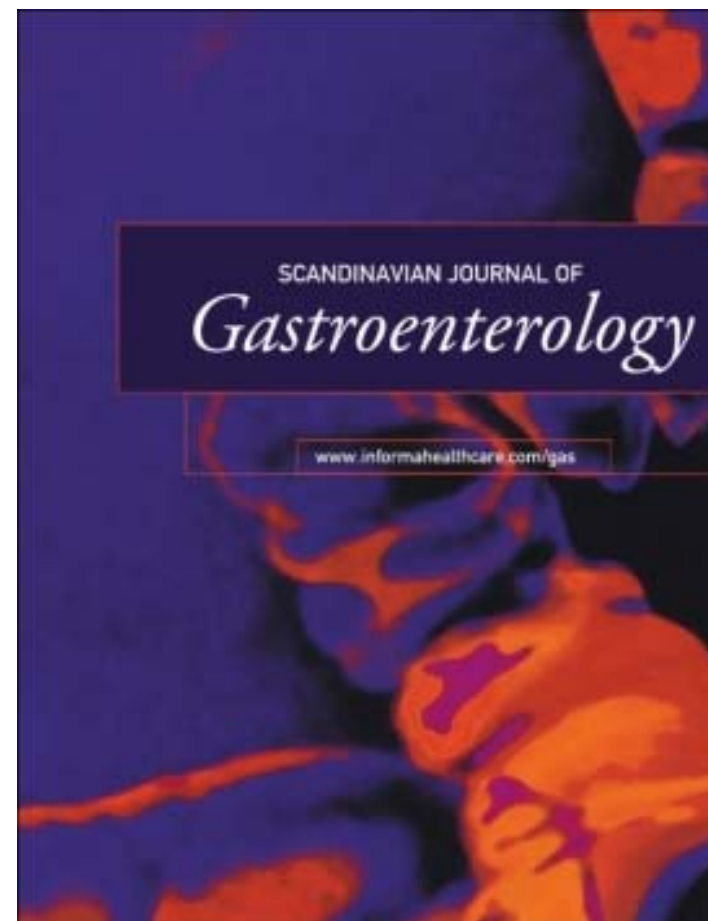
Example - Blood

View Health Categories

| Category | Overview | Summary | Advice | Search |

Blood

> Haematological diseases, anaemia, clotting and normal development and function of platelets and erythrocytes

Advice:

Not all haemopoietic cells or 'blood cells' are erythrocytes. This term is often used to encompass lymphocytes, macrophages, granulocytes and other white cell types. Check the context of the research eg if the research relates to leukaemia it will be referring to lymphocytes etc and not to erythrocytes and therefore should not be coded as *Blood*.

Example - Blood

Journal	WoS-category	HRCS-category
ACTA HAEMATOLOGICA	HEMATOLOGY	1. Blood
ACTA HAEMATOLOGICA JAPONICA	HEMATOLOGY	1. Blood
AMERICAN JOURNAL OF HEMATOLOGY	HEMATOLOGY	1. Blood
ANNALS OF HEMATOLOGY	HEMATOLOGY	1. Blood
BAILLIERES CLINICAL HAEMATOLOGY	HEMATOLOGY	1. Blood
CLINICAL LYMPHOMA MYELOMA & LEUKEMIA	HEMATOLOGY	2. Cancer
HEMATOLOGICAL ONCOLOGY	HEMATOLOGY	2. Cancer
LEUKEMIA & LYMPHOMA	HEMATOLOGY	2. Cancer
LEUKEMIA RESEARCH	HEMATOLOGY	2. Cancer

Methods

- Second, we have applied search terms for identifying the publications.

- Search through the titles and abstracts of all the publications

- We assumed that selected key-terms would generally appear either in the title or in the abstract

Methods - topic specific key-words

- In principle, for each HRCS category an almost endless number of keywords may be identified
- Have limited the number for each category to a selection of central words and concepts which can be assumed to be mentioned in the title or abstracts of the articles
- Various challenges e.g
  - words that have multiple meanings should be avoided

- Not sufficient to identify key concepts within a field: the suitability as keywords also needs to be considered.

Example - Blood

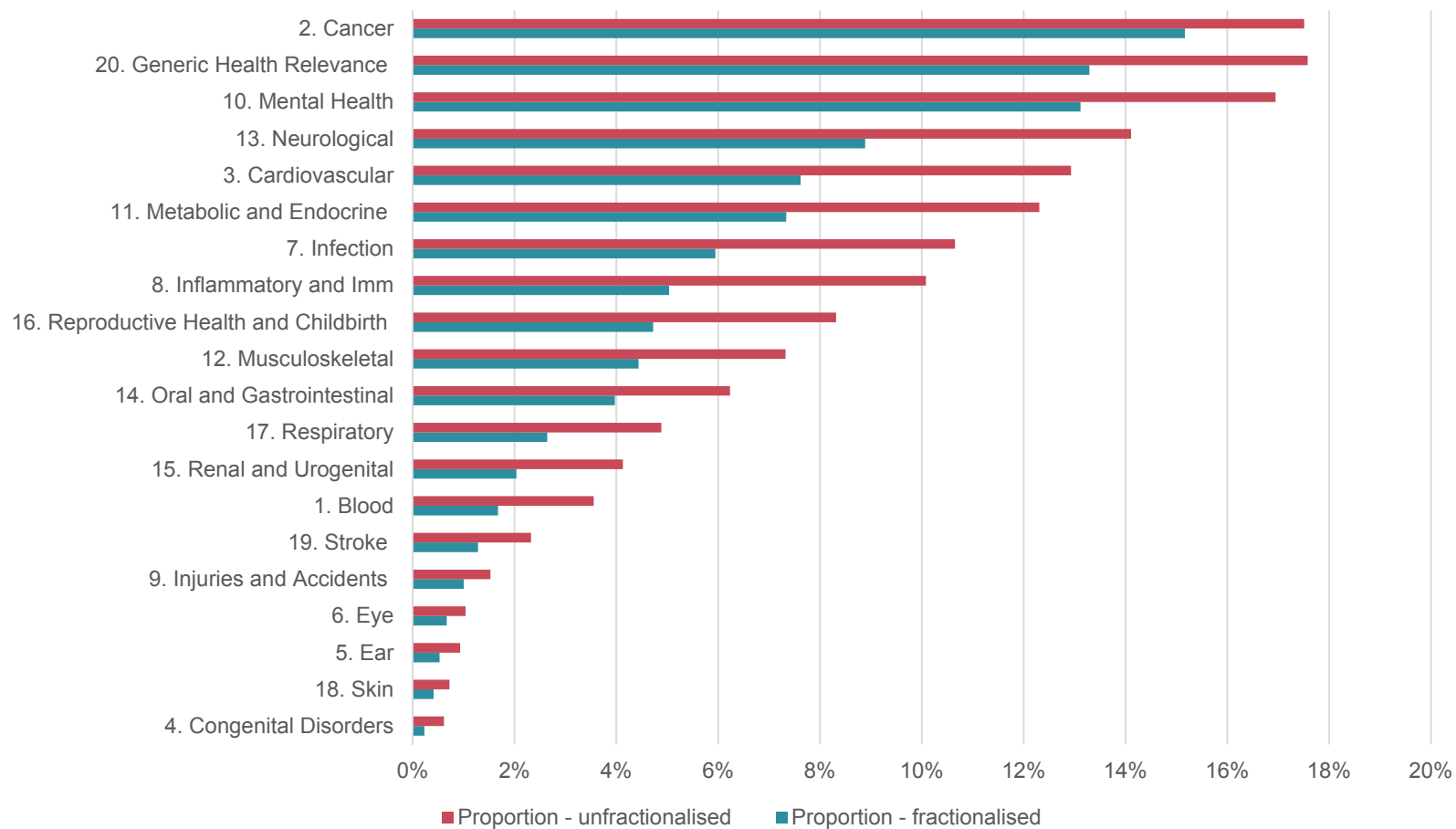| Search terms - including	Search terms - excluding
haematological disease, hematological disease, anaemia, anemi, platelet, erythrocyte, thrombocyte, hemolytic, haemolytic, favism, hemoglobinuria, haemoglobinuria, hemostasis, haemostasis, thrombocyte, serum albumin, haematopoiesis, hematopoiesis, haemopoiesis, hemopoiesis, erythropoiesis, thrombosis, thrombo, polycythemia, polycythaemia, polyglobulia, thrombocytosis, hemophili, haemophili, cryoprecipitate, Hemochromatosis, Haemochromatosis	lymphocyte, macrophage, granulocyte, leukaemia, leukemia, leukocyte, agranulocyte, monocyte

Example - Cardiovascular

Search terms - including	Search terms - excluding
coronary heart disease, vasculitis, pulmonary hypertension, congenital heart disorder, congenital heart disease, vascular, cardiovascular, angiology, circulatory system, arteries, artery, arterial, blood pressure, capillaries, aorta, aortic, coronary artery disease, angina, myocardial infarction, cardiomyopathy, artery, arterial, cardiomyopathy, cardiac, ischemia, ischemic, myocardium, arteriosclerosis, atherosclerosis, heart failure, heart defect, cardiomyocytes, myocardiocytes, ventricle, ventricular, hypercholesterolemia, dyslipidemia, veins, venous, atrial fibrillation, cardiopulmonary, myocardial, heart transplantation, cardiology, thrombosis, lymphatic, coronary interventions	Stroke, cerebrovascular accident, cerebrovascular insult, brain attack, cerebral infarction, brain ischemia, ischemic attack, cerebral hemorrhage, cubarachnoid hemorrhage, cerebral hypoperfusion, intercranial hemorrhages, cerebrovascular apoplexy, brain vascular accident

Methods – further steps

- Each article may be classified in one or more HRCS category
- Fractionalised calculations: An article classified in four different categories is weighted as 0.25 article in each category
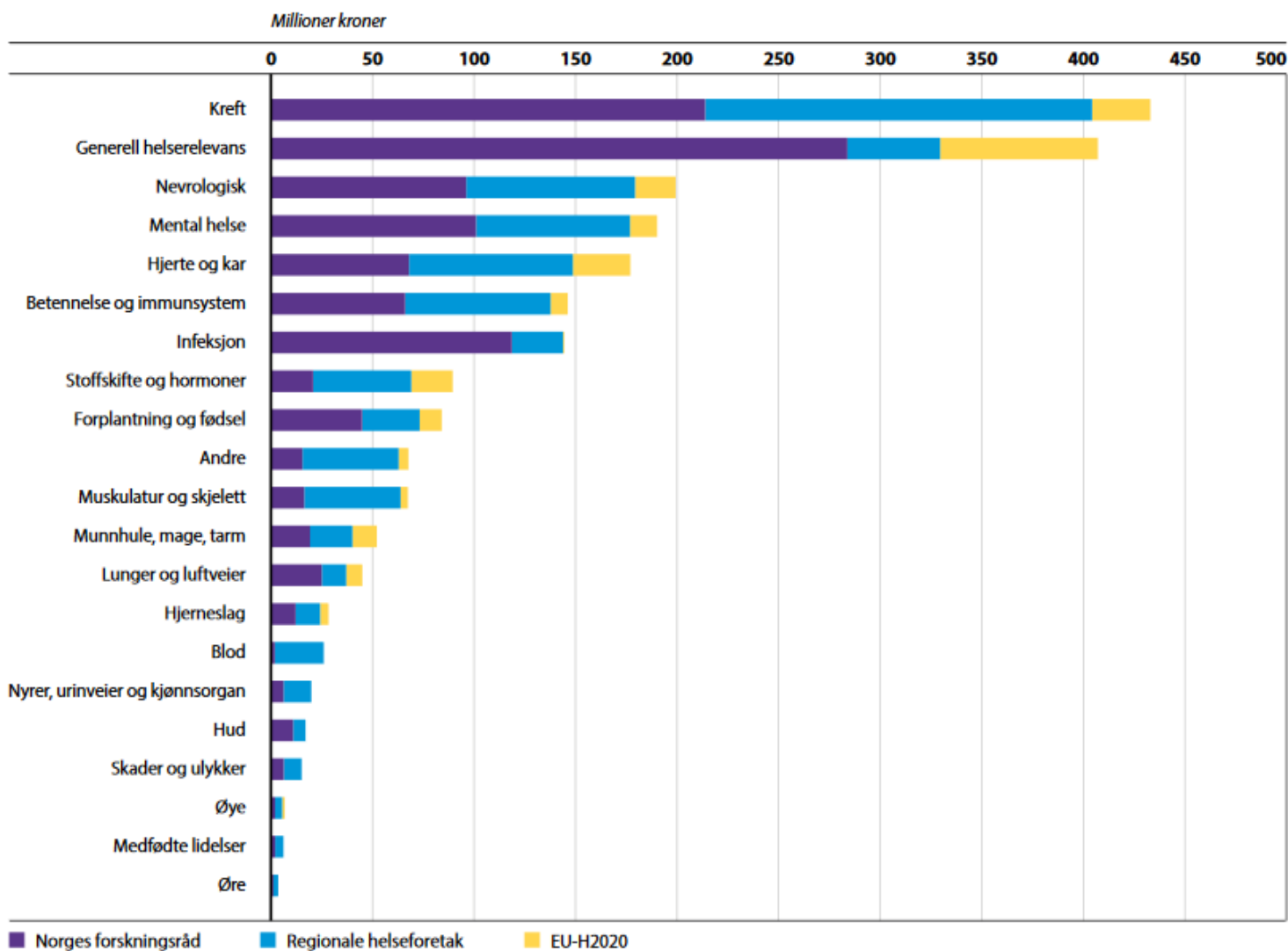
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Test results. Distribution of articles (2011-2015) by HRCS categories

Legend: ■ Proportion - unfractionalised ■ Proportion - fractionalised

Categories (top to bottom):
- 2. Cancer
- 20. Generic Health Relevance
- 10. Mental Health
- 13. Neurological
- 3. Cardiovascular
- 11. Metabolic and Endocrine
- 7. Infection
- 8. Inflammatory and Imm
- 16. Reproductive Health and Childbirth
- 12. Musculoskeletal
- 14. Oral and Gastrointestinal
- 17. Respiratory
- 15. Renal and Urogenital
- 1. Blood
- 19. Stroke
- 9. Injuries and Accidents
- 6. Eye
- 5. Ear
- 18. Skin
- 4. Congenital Disorders

Prosjektfinansiert helseforskning i Norge etter helsekategorier (HRCS) og finansieringskilde

2015, millioner kroner

Millioner kroner

Legend:
- Norges forskningsråd
- Regionale helseforetak
- EU-H2020

Categories (top to bottom):
- Kreft
- Generell helserelevans
- Nevrologisk
- Mental helse
- Hjerte og kar
- Betennelse og immunsystem
- Infeksjon
- Stoffskifte og hormoner
- Forplantning og fødsel
- Andre
- Muskulatur og skjelett
- Munnhule, mage, tarm
- Lunger og luftveier
- Hjerneslag
- Blod
- Nyrer, urinveier og kjønnsorgan
- Hud
- Skader og ulykker
- Øye
- Medfødte lidelser
- Øre

Further applications and analyses

- As a next step, the results may be linked to disease burden measurements, for example in terms of prevalence, mortality, extent of disability and social economic costs of various diseases
- This represents new and interesting background information in the setting of research funding priorities.

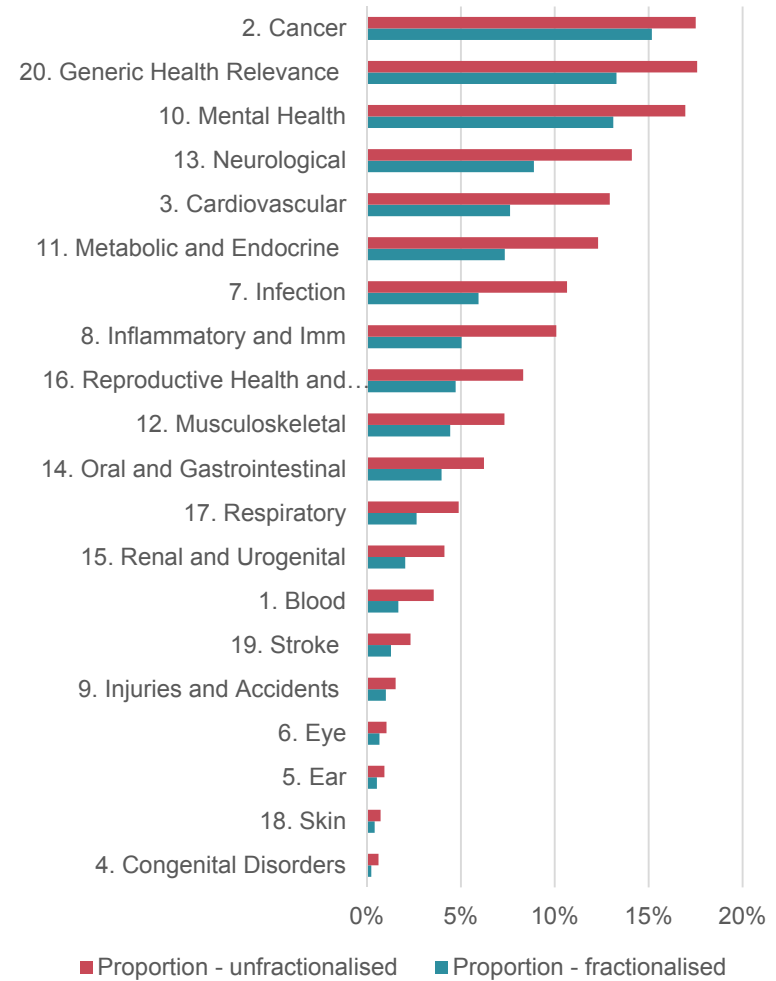# Number of disability adjusted life years, Norway 2013
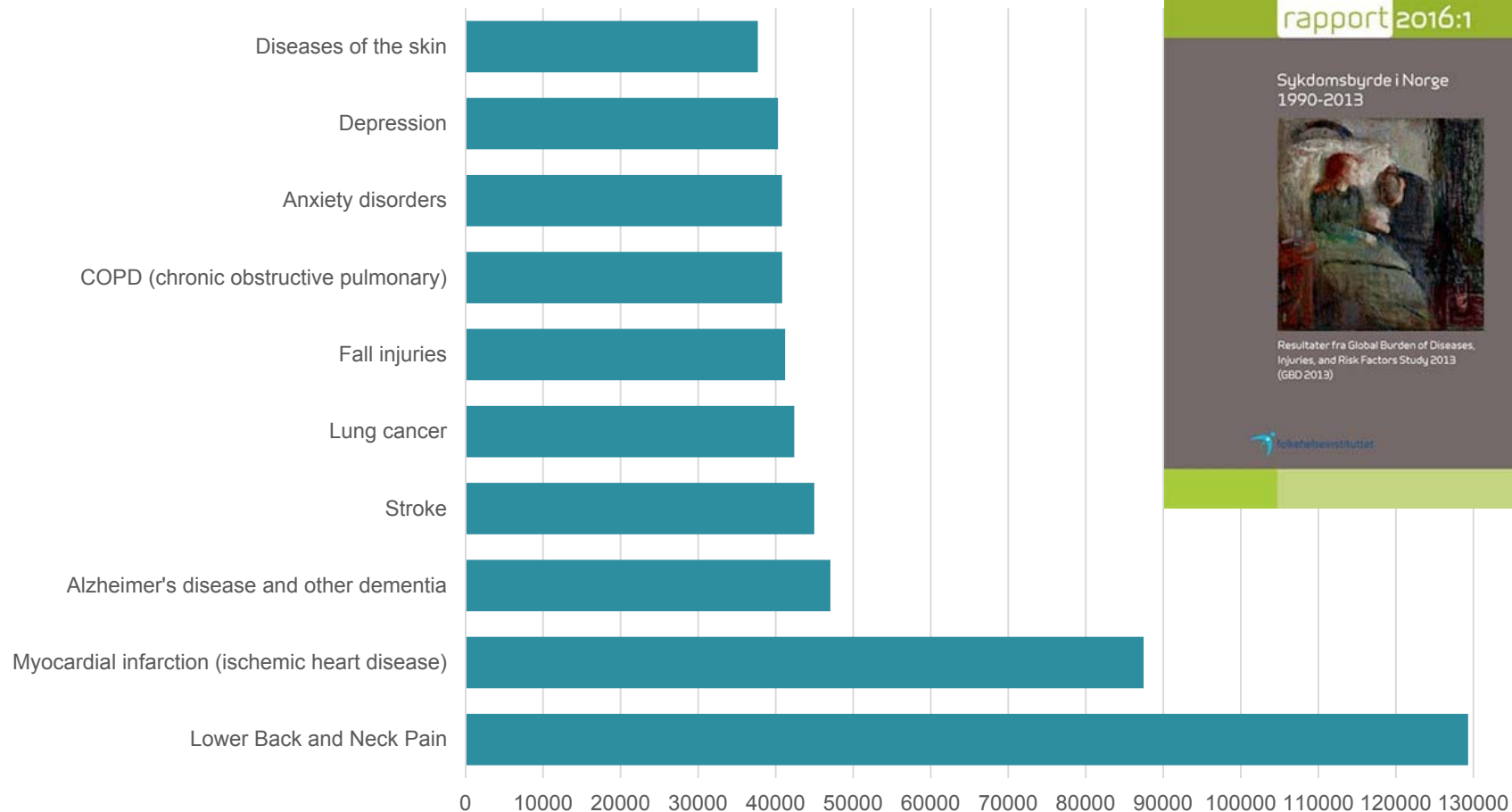
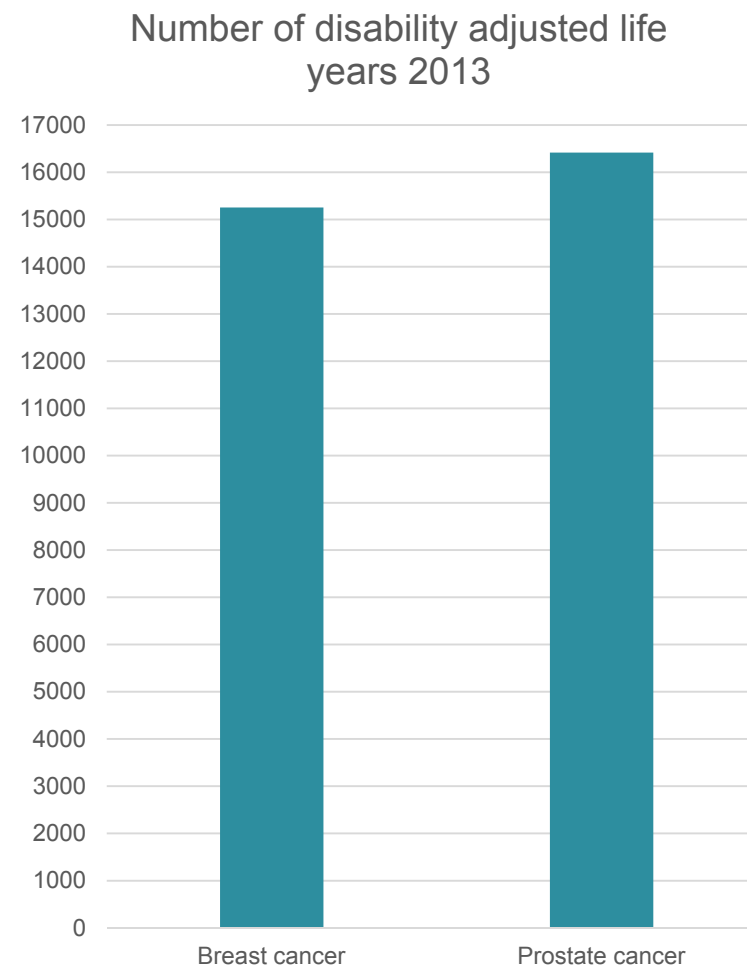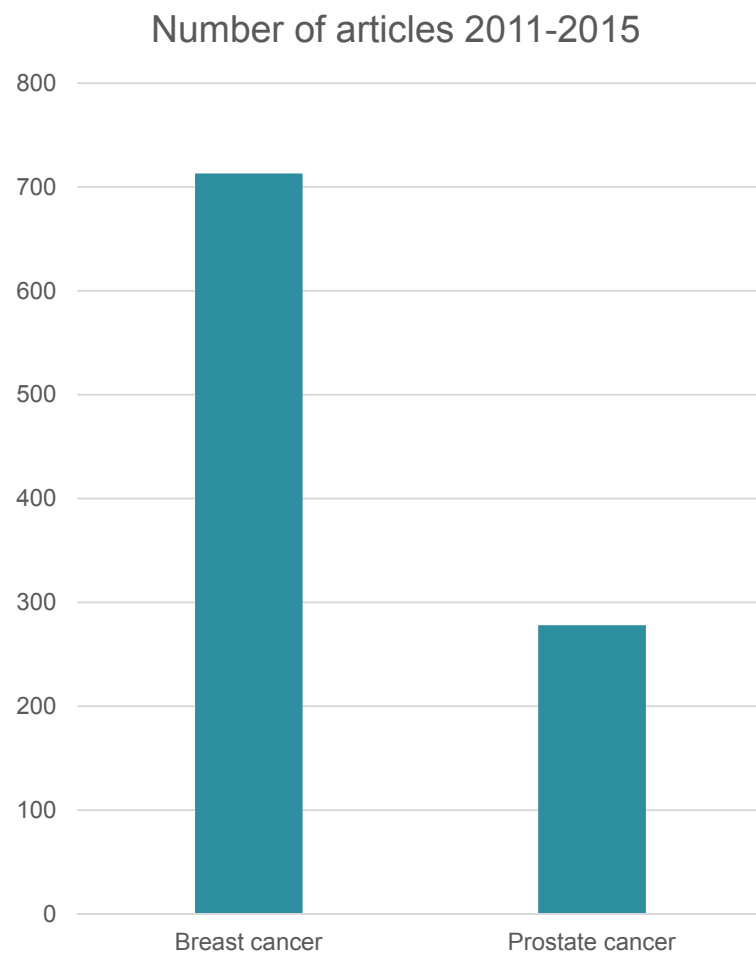# Is the Norwegian health research in line with the disease burden?

Burden of diseases
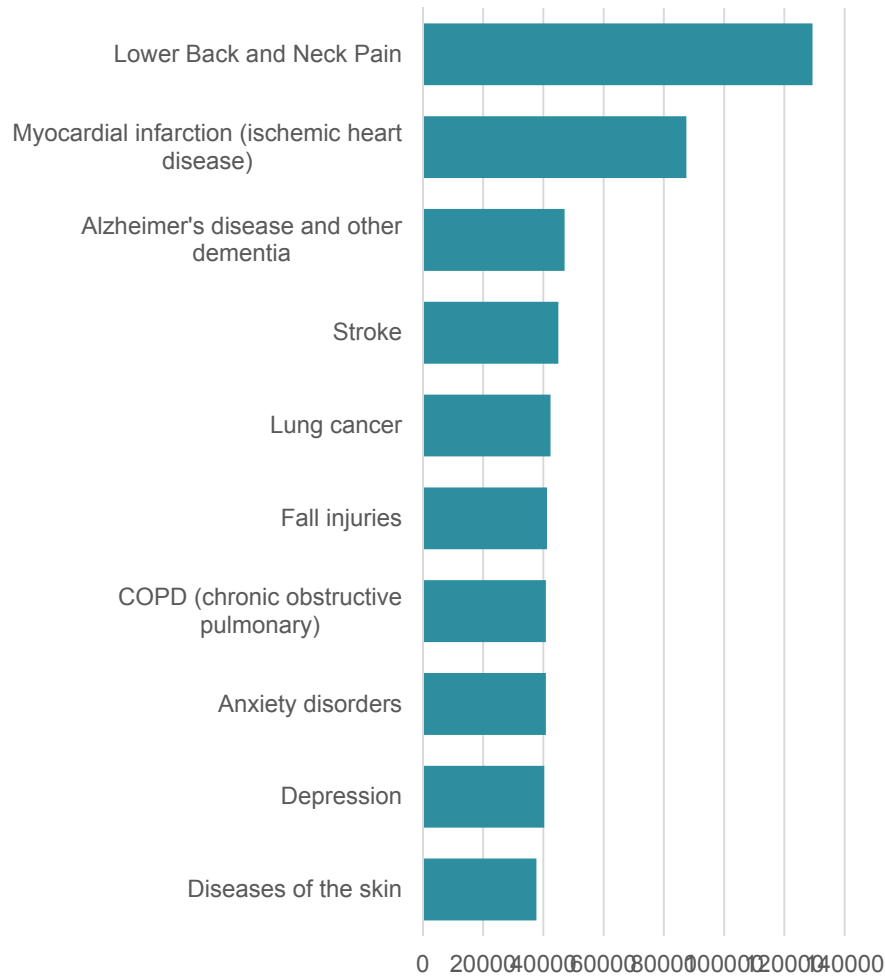
Publication output

Further analyses -example

Number of articles 2011-2015

Number of disability adjusted life years 2013

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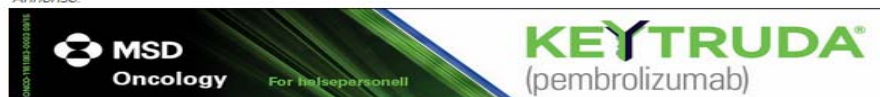# Er kjønn likt fordelt i medisinsk kunnskap?

Dagens helsevesen er først og fremst egnet til å utrede og behandle sykdom hos menn.

Publisert: 2016-05-13 14:36 Skrevet av: Hege Cathrine Finholt / Siri Vangen

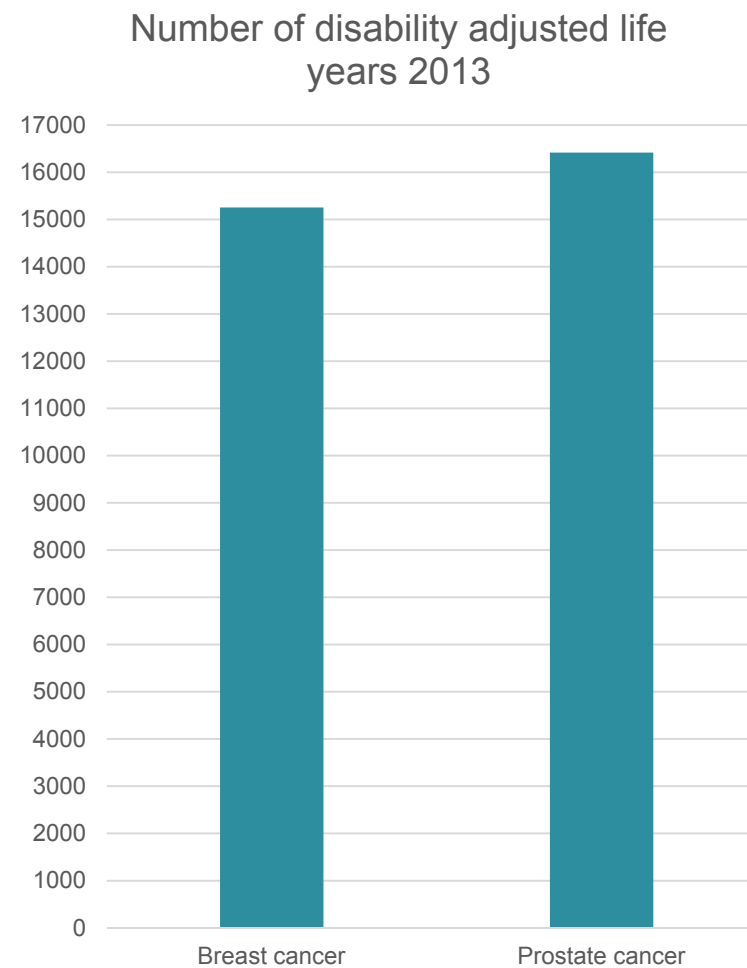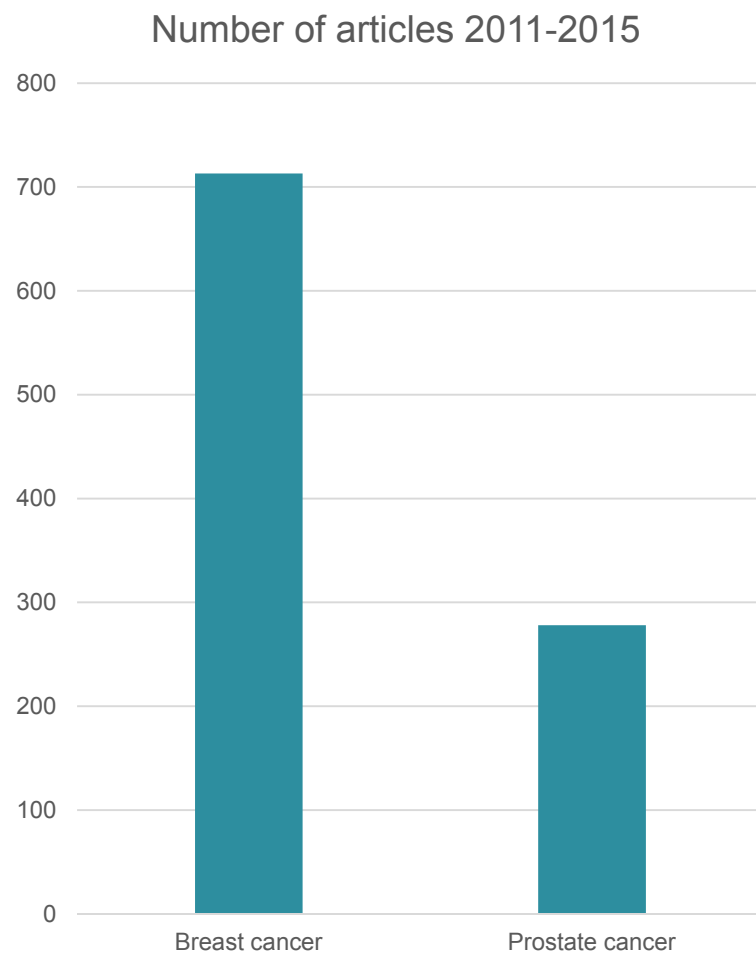Del: f Del 76   Tweet 0   in Del   ✉ Mail   Skriv ut

Hege Cathrine Finholt, Ph.D. og førstelektor ved Institutt for filosofi, ide- og kunsthistorie og klassiske språk, Universitetet i Oslo
Siri Vangen, seniorforsker og spesialist i obstetrikk og gynekologi. Leder for Nasjonal kompetansetjeneste for kvinnehelse, Avdeling for kvinne- og barnehelse, Oslo Universitetssykehus

DET ER EN økende erkjennelse av at kvinner og menn har ulikt sykdomsbilde, og at medisinsk forskning og vårt medisinske system i stor grad har vært utviklet på bakgrunn av menns helse. Derfor er dagens helsevesen best egnet til å utrede og behandle sykdom hos menn. Hvordan er det mulig i et av verdens mest likestilte land?

Et nyttig redskap for å analysere likestilling i et samfunn, er gitt av filosofen Simone de Beauvoir, som diskuterer temaet i verket «Det Annet Kjønn». Hun viser at på de fleste områder defineres kvinnen i relasjon til mannen og ikke i kraft av sin egen person: Mannen er «Den ene» og kvinnen er «Den andre». Mannen blir

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Further analyses -example

Number of articles 2011-2015

	Breast cancer	Prostate cancer

Number of disability adjusted life years 2013

	Breast cancer	Prostate cancer

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