

Table 1. Heat-map showing the distribution of PhDs by HRCS-combinations in percent and the sum of Health Categories (right column) and Research Activities (lower row).

	1.Underpinning	2.Aetiology	3.Prevention	4.Detection and Diagnosis	5.Treatment Development	6.Treatment Evaluation	7.Disease Management	8.Health Services	sum
Blood	0,0	1,0	0,0	0,3	0,2	0,0	0,1	0,2	1,8
Cancer and neoplasms	0,4	3,3	0,3	2,9	1,7	2,5	0,5	0,4	12,1
Cardiovascular	0,4	4,1	0,1	1,4	1,2	2,7	0,2	0,5	10,7
Congenital Disorders	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,0	0,2
Ear	0,0	0,3	0,0	0,0	0,1	0,0	0,2	0,0	0,6
Eye	0,2	0,0	0,0	0,2	0,5	0,4	0,0	0,1	1,4
Infection	0,5	2,3	0,5	0,2	0,4	0,4	0,1	0,5	4,9
Inflammatory and Immune System	0,3	2,1	0,6	0,9	0,9	0,9	0,1	0,1	5,8
Injuries and Accidents	0,0	0,8	0,2	0,0	0,0	0,3	0,0	0,0	1,3
Mental Health	0,6	2,7	0,1	0,6	0,3	1,6	3,5	1,2	10,5
Metabolic and Endocrine	0,2	2,4	0,3	0,5	0,6	1,4	0,3	0,0	5,8
Musculoskeletal	0,4	1,3	0,1	1,4	1,1	2,4	0,2	0,1	6,9
Neurological	1,1	2,3	0,1	1,0	0,6	1,8	0,3	0,4	7,6
Oral and Gastrointestinal	0,3	1,1	0,2	0,3	0,2	1,3	0,1	0,0	3,6
Renal and Urogenital	0,0	0,8	0,0	0,6	0,1	0,8	0,4	0,1	2,6
Reproductive Health and Childbirth	0,4	3,5	0,0	0,3	0,3	1,2	1,0	0,6	7,2
Respiratory	0,0	0,7	0,0	1,1	0,0	0,8	0,0	0,0	2,7
Skin	0,1	0,3	0,1	0,0	0,2	0,1	0,0	0,1	0,7
Stroke	0,1	0,9	0,1	0,4	0,2	0,4	0,4	0,0	2,5
Generic Health Relevance	2,1	1,9	0,1	0,9	0,7	0,3	1,7	2,2	9,8
Disputed Aetiology and Other	0,0	0,5	0,0	0,1	0,0	0,2	0,5	0,1	1,3
sum	7,1	32,1	2,6	13,3	9,3	19,7	9,5	6,4	100

Table 2. Distribution and total of citizenship (columns) and country of education qualifying for a PhD (rows).

Country of education	Citizenship					Total
	Africa	America and Oceania	Asia	Europe	Norway	
Norway	2	0	19	18	299	338
Other countries	17	6	19	56	49	147
Total	19	6	38	74	348	485

Table 3 The RA aggregated to 4 categories; basic research (RA 1 and 2), prevention of diseases (RA 3), translational and clinical research categories (RA 4, 5 and 6) and health service research (RA 7 and 8).

	PhDs 2018	H021-monitor 2014-18
Basic research	39%	34%
Prevention of diseases	3%	8%
Translational and clinical research	42%	43%
Health service research	16%	15%

Table 4. Comparison of the top three from Norwegian PhDs 2018, UK 2014 research grants and Norwegian research grants 2014-18.

Norway PhDs 2018	UK (2018)	Research Funding 2014-18 HO21-monitor
<i>Aetiology 32.1%</i>	<i>Aetiology 30.6%</i>	<i>Aetiology 18.0%</i>
<i>Treatment Evaluation 19.7%</i>	<i>Underpinning 21.7%</i>	<i>Treatment Development 18.0%</i>
<i>Disease management 9.5%</i>	<i>Treatment development 11.9%</i>	<i>Underpinning 16.0%</i>

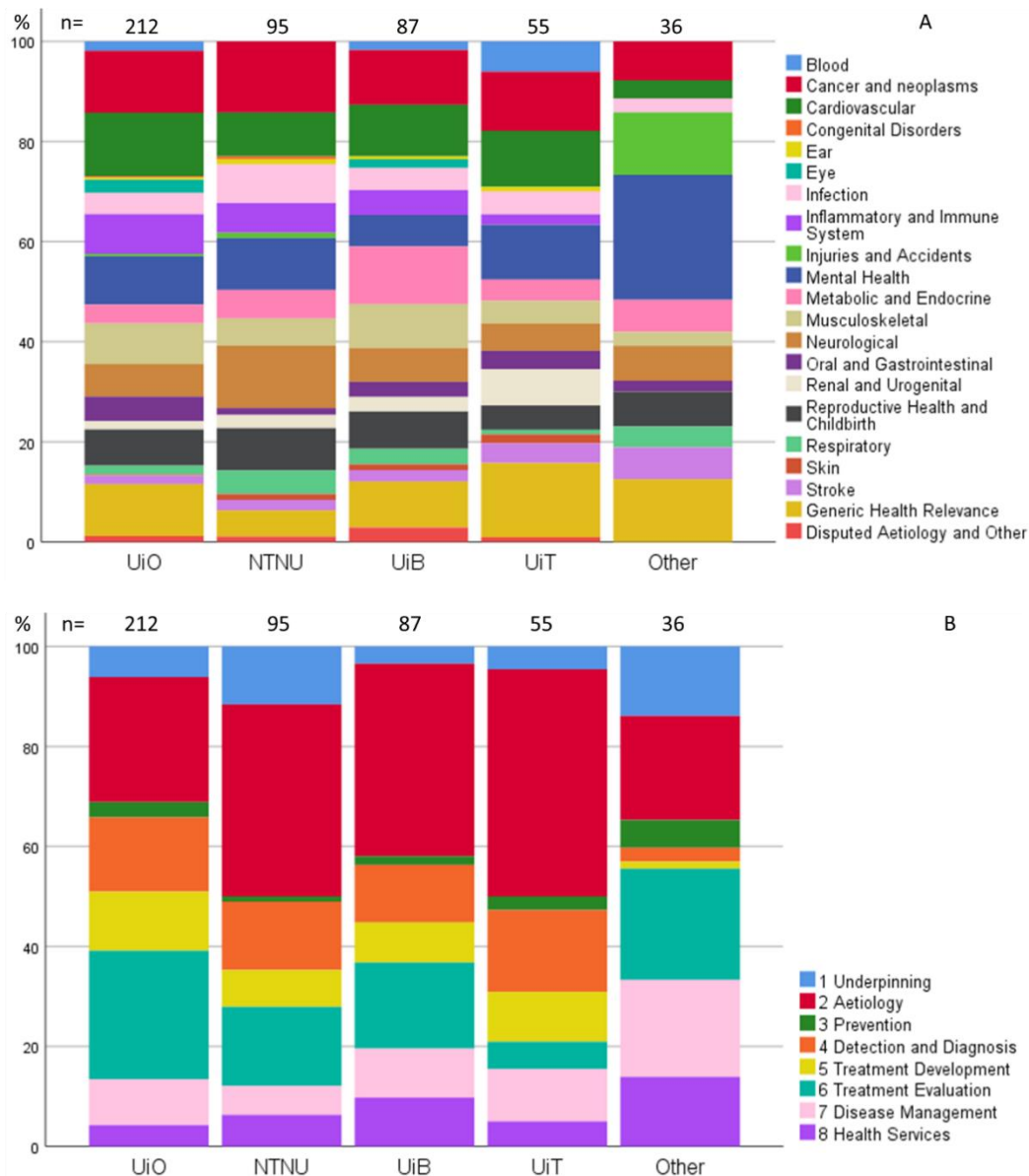


Figure 1 a and b. The PhD candidate's affiliation by health Category (upper pane, A) and Research Activity (lower pane, B) in 100%. Abbreviations UiO – University of Oslo, NTNU - Norwegian University of Science and Technology, UiB – University of Bergen, UiT - The Arctic University of Norway, Other – an aggregated variable of the last 7 universities all with less than 15 candidates.

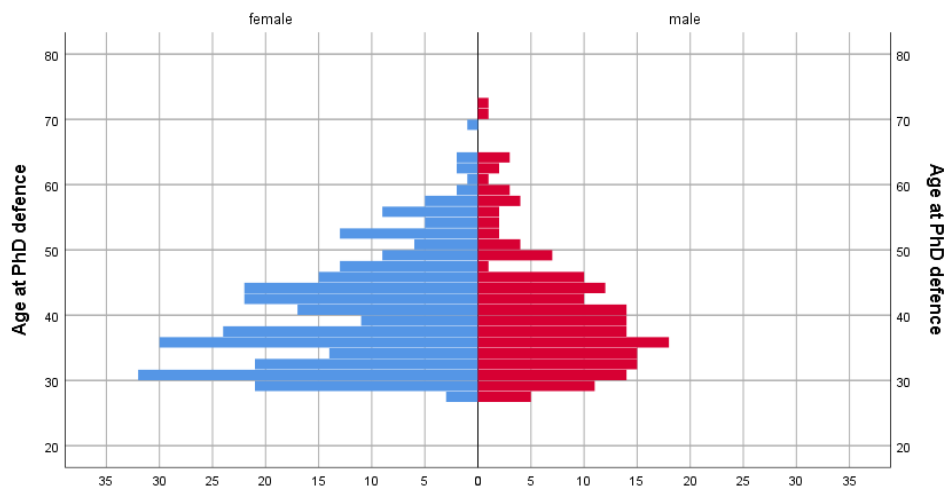


Figure 2 Gender and age distribution of the PhD theses within health and medicine 2018.

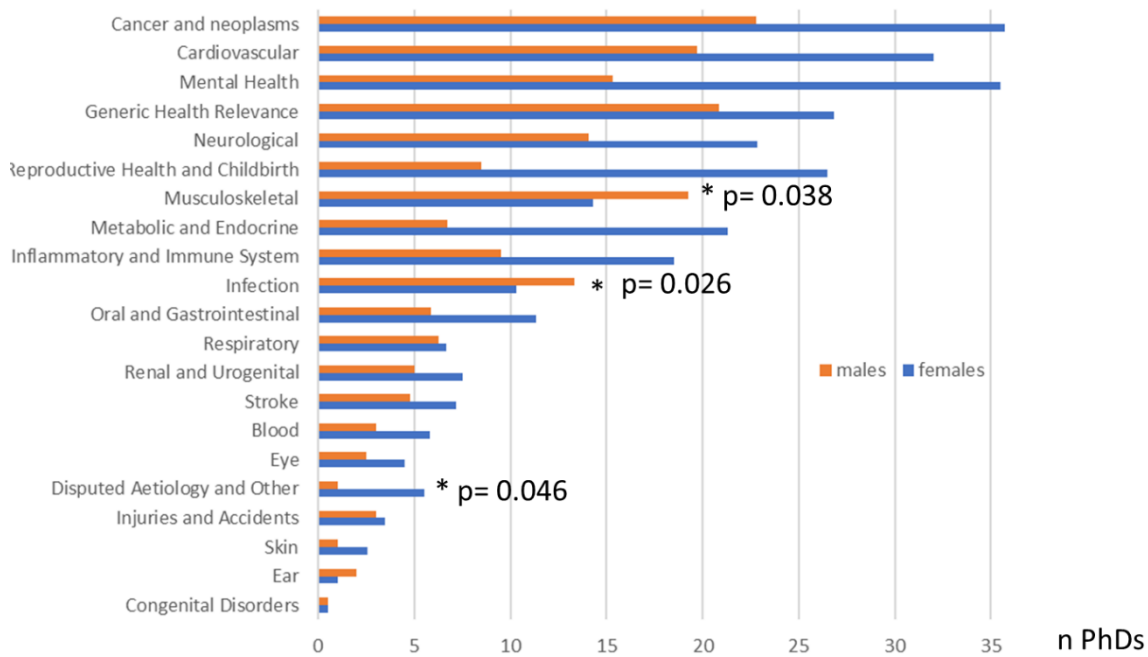


Figure 3 The Health Categories by gender

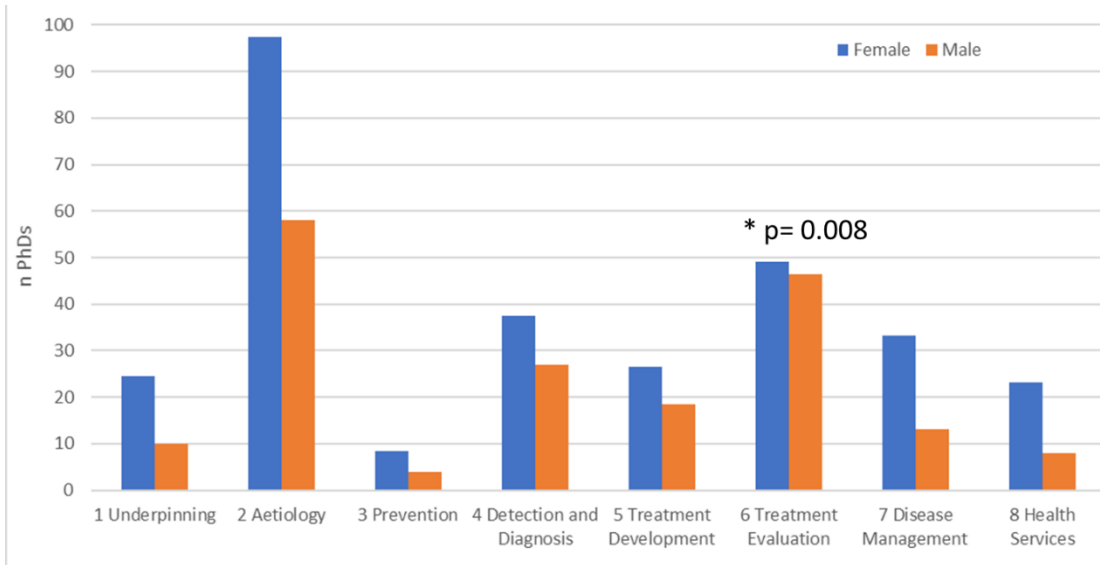


Figure 4 The Research Activities by gender

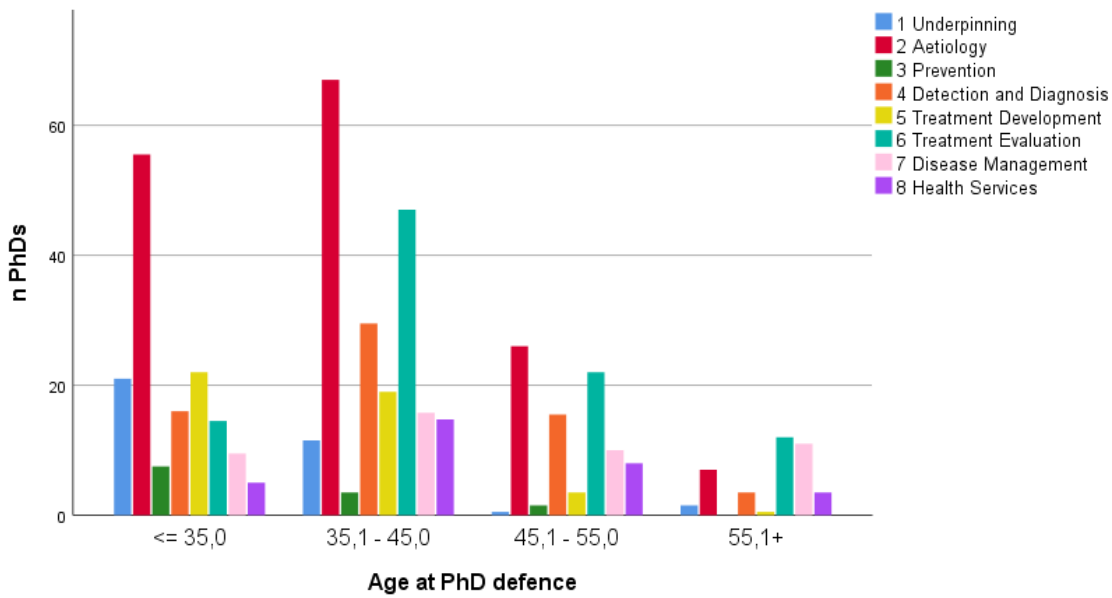


Figure 3. Research Activities and age at PhD defence. Y axis is n PhDs and x the four age groups divided by RAs.

Number of doctorate degrees

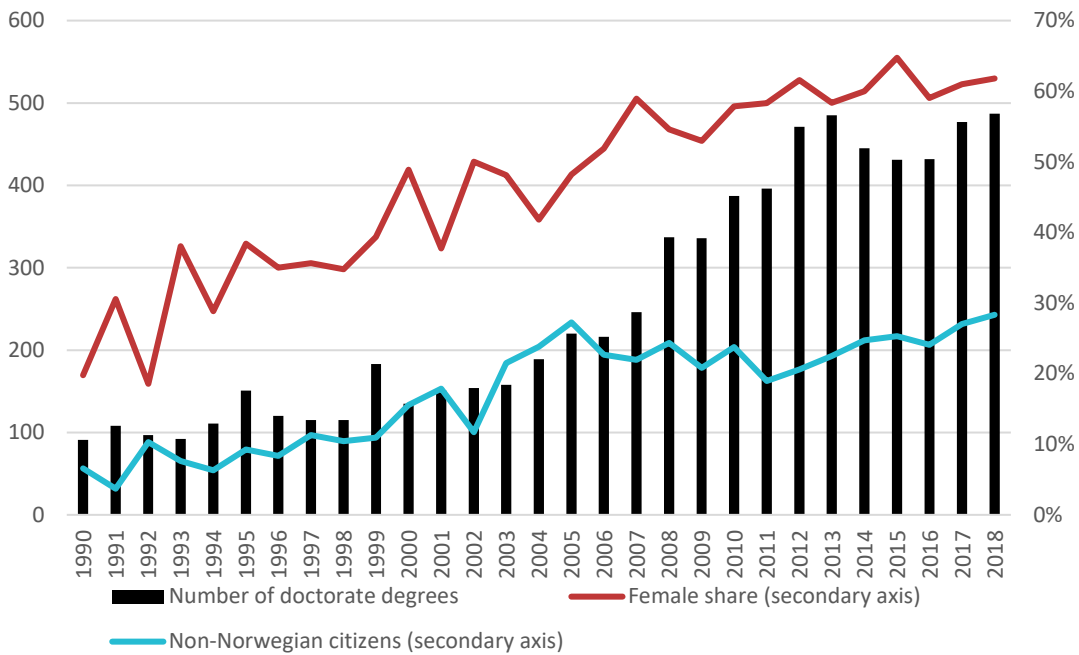


Figure 4 Number of doctoral degrees within medicine and health in Norway, and percentage of women and non-Norwegian citizens. 1990–2018 (Source: NIFU).

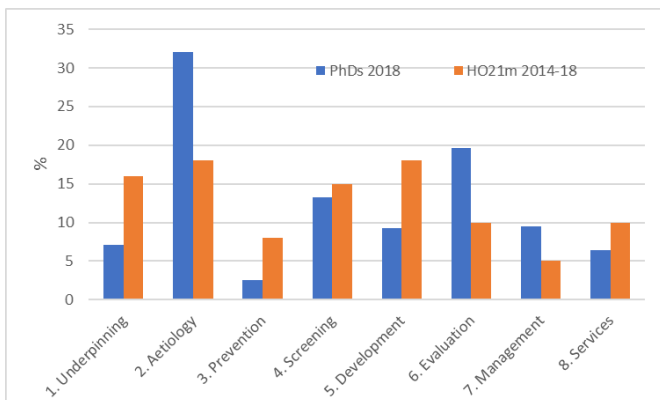


Figure 5 Research Categories in % of PhDs 2018 and Funding of Research 2014-18. Further the HC and Funding of research.

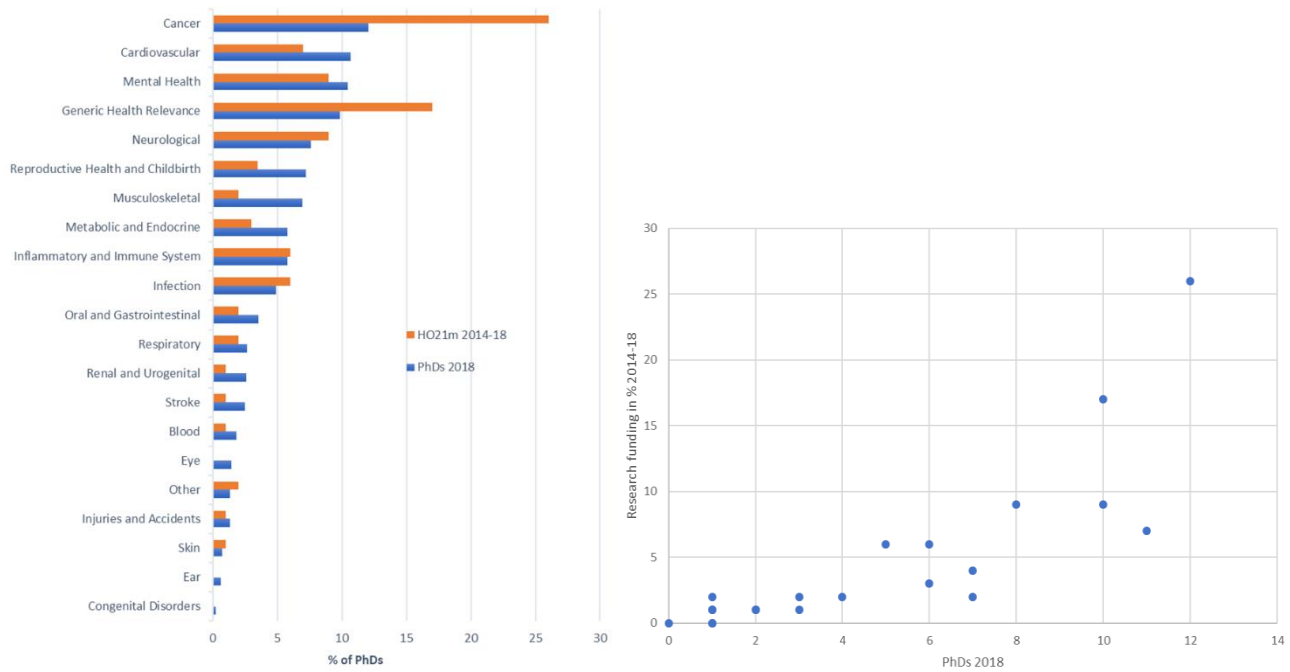


Figure 8. The HCs for funding of Research 2014-18 and PhDs 2018, bar and correlation plot, Spearman correlation $r=0.91$, $p<0.001$.

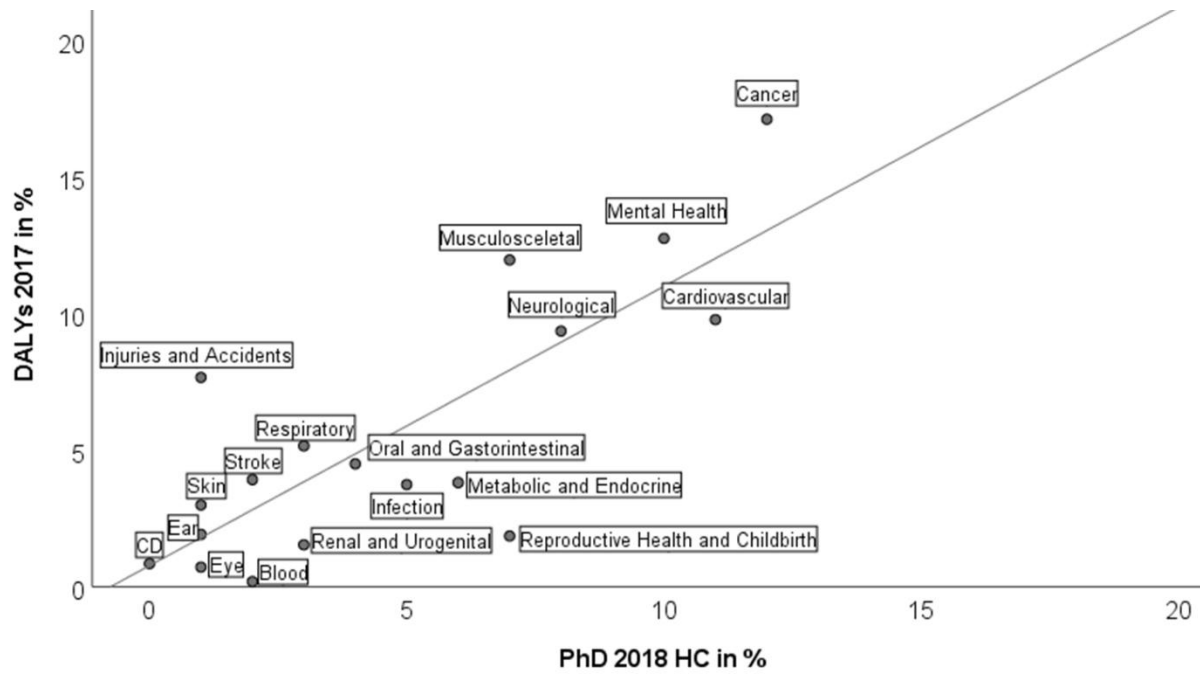


Figure 6. Norwegian DALYs 2017 and PhDs 2018 by HRCS, both in percent. CD is short for Congenital Disease. Spearman correlation $r=0.695$, $p=0.001$.

Supplementary material

Supplementary table 1 Research Activity groups and codes

<i>Research Activity Groups</i>	<i>Research Activity Codes</i>
<i>1 Underpinning</i>	1.1 Normal biological development and functioning
	1.2 Psychological and socioeconomic processes
	1.3 Chemical and physical sciences
	1.4 Methodologies and measurements
	1.5 Resources and infrastructure (underpinning)
<i>2 Aetiology</i>	2.1 Biological and endogenous factors
	2.2 Factors relating to physical environment
	2.3 Psychological, social and economic factors
	2.4 Surveillance and distribution
	2.5 Research design and methodologies (aetiology)
	2.6 Resources and infrastructure (aetiology)
<i>3 Prevention</i>	3.1 Primary prevention interventions to modify behaviours or promote well-being
	3.2 Interventions to alter physical and biological environmental risks
	3.3 Nutrition and chemoprevention
	3.4 Vaccines
	3.5 Resources and infrastructure (prevention)
<i>4 Detection and Diagnosis</i>	4.1 Discovery and preclinical testing of markers and technologies
	4.2 Evaluation of markers and technologies
	4.3 Influences and impact
	4.4 Population screening
	4.5 Resources and infrastructure (detection)
<i>5 Treatment Development</i>	5.1 Pharmaceuticals
	5.2 Cellular and gene therapies
	5.3 Medical devices
	5.4 Surgery
	5.5 Radiotherapy
	5.6 Psychological and behavioural
	5.7 Physical
	5.8 Complementary
	5.9 Resources and infrastructure (development of treatments)
<i>6 Treatment Evaluation</i>	6.1 Pharmaceuticals
	6.2 Cellular and gene therapies
	6.3 Medical devices
	6.4 Surgery
	6.5 Radiotherapy
	6.6 Psychological and behavioural
	6.7 Physical
	6.8 Complementary
	6.9 Resources and infrastructure (evaluation of treatments)
<i>7 Disease Management</i>	7.1 Individual care needs
	7.2 End of life care
	7.3 Management and decision making
	7.4 Resources and infrastructure (disease management)
<i>8 Health Services</i>	8.1 Organisation and delivery of services
	8.2 Health and welfare economics
	8.3 Policy, ethics and research governance

- 8.4 Research design and methodologies (health services)
- 8.5 Resources and infrastructure (health services)

Supplementary table 2 Health Category names in short and full-length name.

<i>Short Health Categories</i>	<i>Health Categories</i>
<i>Blood</i>	Blood
<i>Cancer</i>	Cancer and Neoplasms
<i>Cardio</i>	Cardiovascular
<i>Congenital</i>	Congenital Disorders
<i>Ear</i>	Ear
<i>Eye</i>	Eye
<i>Infection</i>	Infection
<i>Immune</i>	Inflammatory and Immune System
<i>Injuries</i>	Injuries and Accidents
<i>Mental</i>	Mental Health
<i>Metabolic</i>	Metabolic and Endocrine
<i>Muscle</i>	Musculoskeletal
<i>Neuro</i>	Neurological
<i>Oral</i>	Oral and Gastrointestinal
<i>Renal</i>	Renal and Urogenital
<i>Reproduction</i>	Reproductive Health and Childbirth
<i>Respiratory</i>	Respiratory
<i>Skin</i>	Skin
<i>Stroke</i>	Stroke
<i>Generic</i>	Generic Health Relevance*
<i>Other</i>	Disputed Aetiology and Other

* Research applicable to all diseases and conditions or to general health and well-being of individuals. Any research that cannot be attributed to a particular disease or condition or to normal function of a specific type of cell or system, defined by the top 19 health categories. If research is judged relevant to more than five Health Categories, then these should be substituted for 100% Generic Health Relevance. As an additional code for studies with a disease(s)/condition(s) of focus which also has relevance to many other diseases/conditions.

Table 4. The universities and university colleges included in this study, a complete translated list

<i>English name</i>	<i>Norwegian name</i>	<i>n</i>
<i>Nord University</i>	Nord universitet	2
<i>Norwegian School of sport sciences</i>	Norges idrettshøgskole	12
<i>Norwegian University of Life Sciences</i>	Norges miljø- og biovitenskapelige universitet	2
<i>Norwegian University of Science and Technology</i>	Norges teknisk-naturvitenskapelige universitet	95
<i>Oslo Metropolitan University</i>	OsloMet	9
<i>University of Agder</i>	Universitetet i Agder	3
<i>University of Bergen</i>	Universitetet i Bergen	87
<i>University of Oslo</i>	Universitetet i Oslo	212
<i>University of Stavanger</i>	Universitetet i Stavanger	6
<i>University of South-Eastern Norway</i>	Universitetet i Sørøst-Norge	2
<i>The Arctic University of Norway</i>	Universitetet i Tromsø - Norges arktiske universitet	55