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*Scand J Public Health* 2008; 36; 685

DOI: 10.1177/1403494808096170

The online version of this article can be found at:  
<http://sjp.sagepub.com/cgi/content/abstract/36/7/685>

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ORIGINAL ARTICLE

## Norhealth: Norwegian Health Information System

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### Abstract

Norhealth ([www.norgeshelsa.no](http://www.norgeshelsa.no)) is a web-based health information system that monitors health and health related conditions, including risk- and protective factors, over time. Norhealth was developed to create a knowledge base for health promotion and prevention strategies in Norway and is targeted at politicians, decision makers, media, students and health professionals. Norhealth has a Norwegian and English version.

Users of Norhealth can create their own tables, graphs, time series, maps and radar diagrams. Most Norhealth elements can be exported to PDF and tables can also be exported to Excel. Norhealth elements can also be pasted into Word or PowerPoint.

Norhealth has 40 health indicators, but aims to reach 70. The indicator list corresponds roughly to the European Community Health Indicators (ECHI) short list. Data is presented at the national and regional level and by age group and gender. Around 50 fact sheets are written in Norwegian.

Future developments include linking fact sheets to figures in Norhealth, writing annual health reports, translating fact sheets to English, improving user friendliness, adding more health indicators and monitoring social inequalities in health.

**Conclusions:** Norhealth is an interactive web-based health information system that was developed to create a knowledge base for health promotion and prevention strategies in Norway.

**Key Words:** *Health knowledge, health status indicators, health status, health*

### Background

Norhealth is a web-based health information system that monitors health and health related conditions, including risk- and protective factors, over time. It also serves as a system to describe inequalities between geographical and administrative units (counties, health regions), socioeconomic groups, age groups and genders.

Development of a national health indicator system first started in 1998 on the basis of a parliamentary report highlighting the need for a better knowledge base for forming strategies for health promotion and disease prevention in Norway [1]. A project group with representatives from 11 different institutions and health bodies was led by the Norwegian Institute of Public Health (NIPH) during 1998–99. Their task was to create a health information system that was relatively simple and

easily accessible to relevant users, such as politicians, decision makers, media, different professional groups and voluntary organizations. The key focus was health and health related conditions, including important risk and protective factors affecting the Norwegian population. Use of health services was not central in this context. Norhealth was launched as a downloadable program in 2000 [2] and was based on the World Health Organization's Health For All database (<http://www.euro.who.int/HFADB>). The current interactive version was launched in 2003.

Members of the Norhealth project group have been actively involved in EU-work such as European Community Health Indicators (ECHI), European Community Health Indicators Monitoring (ECHIM) and the EU Public Health Information & Knowledge System (EUPHIX).

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(Accepted 4 July 2008)

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DOI: 10.1177/1403494808096170

Norhealth follows the taxonomy of EUPHIX and the indicator list corresponds roughly to the ECHI short list, enabling the comparison of Norway with other European countries. The basic elements in Norhealth are: population and socioeconomic factors; births and abortions; risk and protective factors; morbidity and diseases; mortality; and health services and treatment. Norhealth has around 40 indicators, but aims to reach 70 indicators.

### Users of Norhealth

Norhealth is targeted at a wide audience of health professionals, politicians, decision makers, media, different professional groups and voluntary organizations. The system aims to improve the knowledge base for policy forming in the areas of health promotion and prevention.

The number of users of Norhealth is variable and can be influenced by media coverage. Norhealth received 7,718 visits during 2007, an average of 21 users per day. May was an exceptional month with over 1,800 visits, when a major newspaper in Norway (Dagbladet) ran a feature story on Norhealth. Normal traffic for all other months was 500 to 1,000 visits. The ten most visited indicators, in ranked order, were: Mortality and causes of death; cancer incidence; population size; abortions; physical inactivity; mental distress; smoking; life expectancy; body mass index; and fertility rate.

Eighty five percent of all visits in 2007 were from Norway. The remaining 15% of visits came from 70 different countries. Around 90% of all visits were to the Norwegian pages and 10% to the English pages.

### Data sources

National health registries and surveys are the primary data sources for Norhealth. Norway has good coverage of population demography, births, deaths, medicine use and communicable diseases. The main areas of weakness for health monitoring in Norway are non-communicable diseases, such as diabetes, dementia and cardiovascular diseases, and risk factors for disease, such as body mass index, blood pressure and cholesterol.

Like other Scandinavian countries, Norway has the advantage of being able to link official registries, health surveys and cohort studies with the use of unique personal identification numbers allocated at birth. This provides excellent opportunity to conduct high quality health monitoring and research, for example by linking health registries with population registries such as education and income. Future

plans for Norhealth include linking more health indicators to socioeconomic position to monitor social inequalities in health.

### Health registries

Norhealth presents aggregated data from the following health registries: Cause of Death Register, Cancer registry of Norway, Medical Birth Registry of Norway, Norwegian Surveillance System for Communicable Diseases, Tuberculosis Registry, Childhood Vaccination Register, Norwegian Patient Register and Norwegian Prescription Database. Data from the Military Health Registry will also be added soon.

### Health Surveys

The main national health survey used in Norhealth is Statistics Norway's Health Interview Survey, repeated every three to four years. Where nationally representative data is not available, county-based cohort studies are used and data is presented only at the county level [3].

### Future data sources

The Norwegian Patient Registry will soon be individually based. This will improve the possibilities for monitoring incidence, prevalence and survival rates of non-communicable diseases in Norway. A new diabetes register is also under development.

Norway has nominated to be one of the European countries to conduct a health examination survey pilot in the next three to five years. This project is coordinated by the EU and would provide a great opportunity to collect nationally representative data on risk factors in Norway.

### Presentation of the data – tables and graphics

Norhealth uses Nesstar technology, which enables users to create their own tables, graphs, time series and maps. Most Norhealth elements can be exported to PDF and tables can also be exported to Excel. Norhealth elements can also be pasted into Word or PowerPoint. Nesstar technology is being constantly developed to improve user friendliness.

The default view for a health indicator when it is selected from the left hand margin is a table (Figure 1). Graphs, time series and maps (Figure 2) may be viewed by using the icons in the top right hand corner. There are also icons here for exporting to Excel and PDF, printing, creating bookmarks and for help.



Figure 1. Default table view for a health indicator in Norhealth. Icons in the top right corner are used to switch to graphs, time series or maps. Created by Nesstar technology.

Norhealth presents health data primarily at the national and regional level. Municipality level health data is presented, also with use of Nesstar technology, by the Norwegian Directorate of Health (<http://nesstar.shdir.no/khp/>). Other users of Nesstar technology are listed on their website (<http://www.nesstar.com/about/customers.html>).

### County profiles

Norhealth has a radar diagram which provides a visual snapshot of the health status in a county, compared with the national average. The radar diagram includes the most recent data for 23 selected health indicators (Figure 3). The ring at 0% on the axis represents the national average for each indicator and the other ring represents the percentage deviation from the national average for the selected county. A positive percentage represents a poorer health outcome for the county, compared with the national average.

Figure 3 shows the county profile for Oslo. This figure indicates that, compared with the national average, Oslo has a higher suicide rate for women, Figure 3 shows the county profile for Oslo. This figure indicates that, compared with the national average, Oslo has a high suicide rate for women (selvmord, k), high abortion rates (aborter) and more users of diabetes medicine (diabetesmedisin). Cardiovascular mortality (hjerter-kardødelighet) is slightly below the national average, while cancer (kreftdødelighet) and total mortality (totaldødelighet) are above the national average.

The radar diagram makes it easy to summarize a county at a glance and can be used as a starting point for creating a county health profile. The radar diagram is currently only available in Norwegian (<http://www.norgesshelsa.no/norgesshelsaspider/>).

### Fact sheets

In addition to presenting figures in Norhealth, NIPH has a series of fact sheets (around 50 as per June 2008) that describe trends in prevalence and incidence of diseases and health related factors over time. Fact sheets use data from Norhealth where possible. They follow a similar structure to EUPHIX, with a combination of text, graphs and tables. They are written for the general public, but also contain references to more in-depth literature.

Fact sheets have been successful in reaching a large audience in Norway. For example, the Alcohol fact sheet has been read 83,740 times since December 2003. Other popular topics include ADHD, which has had 35,788 hits since it was launched in January 2007, and overweight/obesity which has had 23,153 hits since March 2004.

Fact sheets are written by a health science journalist in collaboration with researchers from both inside and outside of NIPH. The fact sheets are currently only written in Norwegian, but translation into English will receive priority in 2009. Fact sheets can be reached from NIPH's website ([www.fhi.no](http://www.fhi.no)), through Norhealth ([www.norgesshelsa.no](http://www.norgesshelsa.no)) or directly through this link: <http://www.fhi.no/eway/default>.

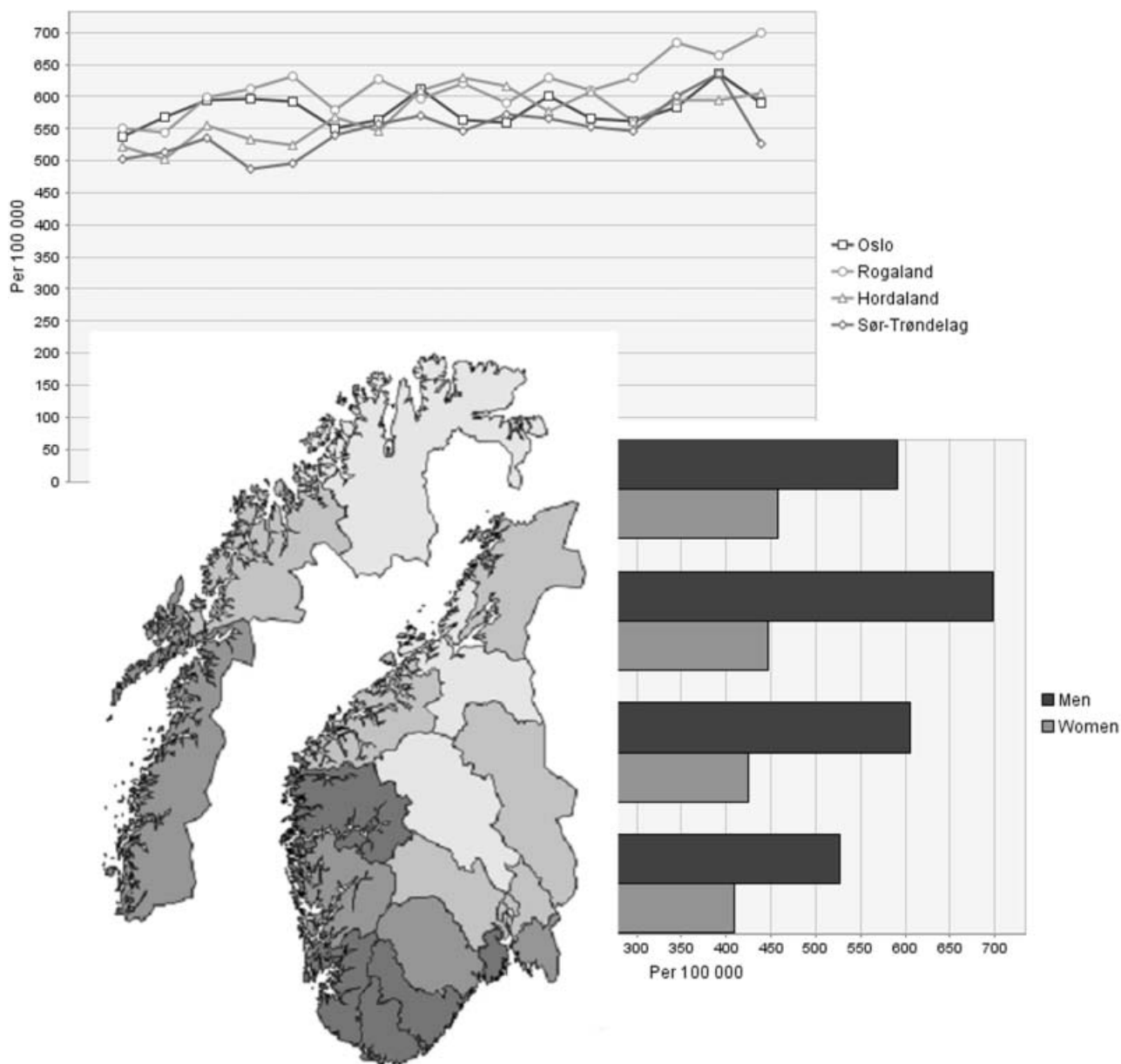


Figure 2. Norhealth graph, time series and map. Created by Nesstar technology.

aspx?pid=233&trg=MainLeft\_5661&MainArea\_5661=5648:0:15,2917:1:0:0:::0:0.

### Further development – combining Norhealth and fact sheets

Some users of health information systems may be interested in obtaining detailed figures or creating their own tables and graphs. Other users, such as journalists and politicians, may prefer a finished product with text that summarizes the key trends and issues. While Norway's health information system provides both these options via Norhealth

and fact sheets, respectively, the main disadvantage is that they are located on two different web-servers and it is not so easy to move between them.

New technology being developed in collaboration with Nesstar will link figures and fact sheets closer together. Fact sheets will contain live tables and graphs from Norhealth which can be opened in a new window and manipulated by the user. It will also be easier to move in the opposite direction, from Norhealth to fact sheets.

A set of 25 key health indicators have been selected for launching this new technology. The selected indicators are of national importance and cover both current and future public health issues

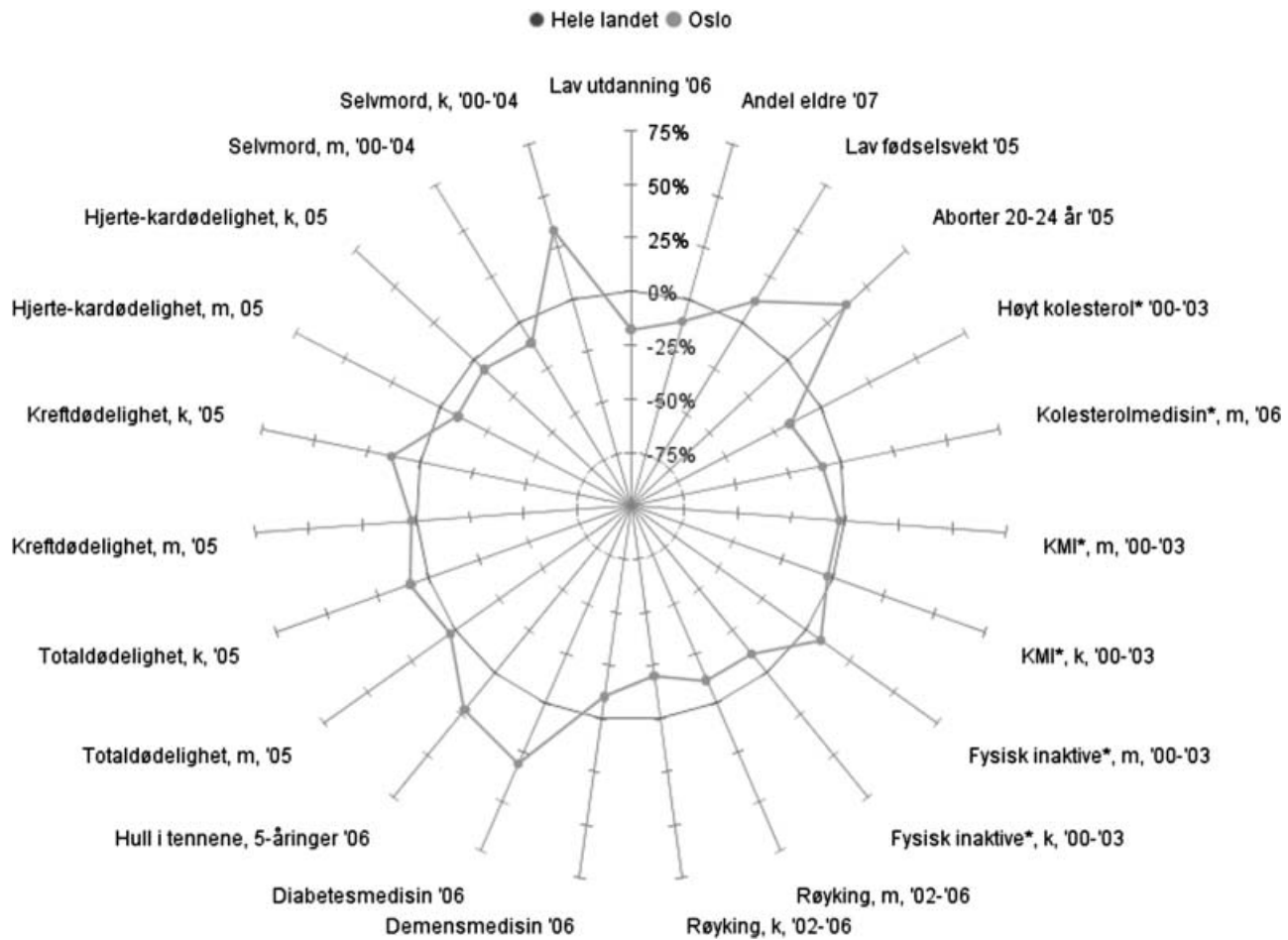


Figure 3. Norhealth county profile for Oslo. Created by Nesstar technology.

in Norway. More indicators may be added later. Annual health reports will also be created by summarizing the fact sheets of key health indicators. A more comprehensive public health report may be published every three to five years.

The Norwegian version will be launched towards the end of 2008. A timeline for implementation of an English version is not yet determined, but will receive priority in 2009.

## Conclusion

Norhealth is an interactive web-based health information system that monitors health and health related conditions, including risk- and protective factors, over time. Norhealth was developed to create a knowledge base for health promotion and prevention strategies in Norway. Future developments include linking fact sheets to figures in Norhealth, writing annual health reports, translating

fact sheets to English, improving user friendliness, adding more health indicators and monitoring social inequalities in health.

## Acknowledgements

We would like to acknowledge Øyvind Hesselberg, Kari Alvær, Jørgen Meisfjord, Steinar Bjørnæs and Hanna Hånes for their contribution to the development of Norhealth over the past 10 years.

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