

# Use of the internet for health purposes: trends in Norway 2000–2010

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## Use of the internet for health purposes: trends in Norway 2000–2010

**Aim:** The aim of this work is to study the 10 year trends in the use and projected use of internet for health purposes in Norway. This includes more detailed analyses of changes in latter years, current uses, valuation as source of health information, reported effects and projected developments.

**Method:** Surveys on the use of the internet for health purposes have been conducted in Norway in the years 2000, 2001, 2003, 2005 and 2007. Representative samples were drawn from the population, and interviews were conducted by poll agencies using telephone (CATI).

**Results:** Internet use for health purposes in the Norwegian population has increased dramatically over the last 7 years from 19% in 2000 to 67% in 2007. If this trend continues, we estimate that 84% of the Norwegian population will be using internet for health purposes by the year 2010.

Reading about health or illness is the most common activity, and the rated importance of the internet as a source of health information is increasing. The internet is also used more for ordering medicines and other health-related products. Forty-four per cent of those having used the internet for health purposes reported having searched for lifestyle-related information, and 40% reported having felt inspired to change health behaviour.

**Conclusions:** The internet is an important source of health information, which is likely to increase in importance in the years to come. This study further underlines the potential of internet use for health promoting purposes, as well as the potential for exacerbating social disparities in health.

**Keywords:** survey, trends, e-health, internet, consumers, patient roles.

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## Background

In Norway (2007), 66% of the population had used the internet on an average day, and 88% had access at home. Internet use was higher among men, younger individuals and those with higher education (1). Health information is one of the most popular topics on the internet as 80% of US internet users (2) and 71% of European internet users (3) have searched for health information on the internet. Previous research has indicated that patients in addition to wanting to change appointments and renew prescriptions, also use the internet as a diagnostic tool and for second opinions on information provided by health professionals (HP) (3–8).

More research on the potential impact of internet use on public health has been called for (9–11). On one hand, the internet presents opportunities for combining great reach as a mass medium with good efficacy for supporting health behaviour change through computer tailoring (12–14), empowerment (9, 15), reassurance (3, 7) and possibilities for increasing availability of social support (9, 10). On the other hand, internet may exacerbate existing socio-economic differences in health (9, 10), spread faulty health information (5, 16), contribute to medicalization (9) and overwhelming responsibility for own illness (15). Henwood et al. (17) warn against the reification of the internet by emphasizing that the internet is a medium with many features, and that it is the users who put meaning into it through their use and their construction thereof. Nevertheless, population surveys are important tools to monitor such trends.

In Norway, the use of internet for health purposes has been monitored since 2000. The use of internet for health purposes in the Norwegian population increased from 19%

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in 2000 (18) to 58% in 2005 (19), and we hypothesized a continued increase in 2007.

Earlier studies both in Norway (19) and elsewhere (3, 7, 20, 21) have shown that women use internet for health purposes to a greater extent than men. There are, however, previous studies that do not find this gender difference (18, 22). A more consistent finding is that use of the internet for health purposes is higher among those with higher education (3, 7, 18, 20, 21) and younger people (3, 7, 18, 21, 22). Surveys with patient populations also confirm these demographic trends in use of the internet for health purposes (6, 8).

The current study looks closer at the trends in the Norwegian population's use of the internet for health purposes, and pursues five research questions.

- 1 On the basis of the present data, what can we stipulate about the future health-related use of the internet?
- 2 Are increases in use equal over all age groups?
- 3 What kind of health-related internet activities appear more important?
- 4 What are the most commonly reported effects of such use?
- 5 Is the growth in internet-use reflected in the users' valuation of this information channel?

## Methods

As part of a larger European study (3), two surveys on the use of the internet for health purposes were performed in Norway in October 2005 and April 2007. Representative samples were drawn from the population, and the surveys were carried out by professional poll agencies using telephone interviews (CATI). Mobile phone numbers were included and phone penetration therefore was close to 100%.

Sampling continued until we reached the predetermined sample size of 1000 respondents. In 2005, a total of 5737 calls were made, while in 2007, 7225 calls were made. Out of these, 972 (2005) and 1001 (2007) answered the phone, were in the target group of 15–80 years of age, and completed the interview. In 2007, 2967 (41%) did not want to take part in the survey for various reasons such as lack of interest or time, resulting in a response rate of 59%. The 2005 sample was weighted for minor skewedness in the distribution of gender and educational attainment, while in 2007 a representative sample was obtained using quota sampling.

### Measures

The interview consisted of 21 main questions starting with background and general internet use and progressing to more specific use of internet for health purposes and effects of this for those who had used the internet. If no questions were skipped, the interview lasted about 20 minutes.

Internet use for health purposes was measured with the question: 'How often do you use this internet to get information about health or illness?' The response alternatives were: 'Every day', 'Every week', 'Every month', 'Every 6 months', 'Every year', 'Less than once a year', 'Never'. All those answering every year or more frequently were coded as having used the internet for health purposes.

The more specific activities 'Get information on health and illness', 'Interact with HP you have not met face to face (f2f)', 'Participate in forums or self-help groups' and 'Order medicines or other health products online' were measured on a 7-point scale going from 'Every day' to 'Never' and later re-coded into 'Have used' or 'Have never used' (Table 1). The activity 'Interact with a HP you also know from f2f meetings' was only registered as 'Have done this' or 'Have not done this'. All participants were asked whether they thought they would use the internet for each of these specific activities in the future. The respondents answered these questions on a 5-point scale from 1 'Unlikely' to 5 'Very likely'. These answers were recoded so that all answering 3 (Neutral) or above were labelled 'Think they might do this in the future'.

Effects of health-related internet use was assessed with the question: 'Has information on health or illness which you have obtained from the internet led to any of the following?' to which the participant responded 'Yes' or 'No' with regard to six different items that can be seen in Table 2.

The respondents were presented with five alternative kinds of health information they could have searched for during the last 6 months: 'Life style', 'Pregnancy or baby care', 'Managing aspects of illness', 'Specific illness' and 'Other types of health information'. To measure the importance of different health information channels, the respondents were asked to rate the importance of eight such channels on a scale going from 1 'not important' to 5 'important' (Table 3).

### Analyses

Changes in proportions from 2005 to 2007 were tested for statistical significance using chi-squared tests, while ANOVA was used for continuous variables. For the chi-squared test for differences in increase of internet use for health purposes between age groups,  $n = 250$  was used for all subgroups over all years to calculate expected values for the following years based on the 2000 survey data, as in 2000 four fairly equal age groups had been sampled, and the total sample was around 1000 each year of the survey. The curve estimation procedure in *SPSS* 15.0 was used to estimate percentages for the 5 years within the range 2000–2010 when surveys were not conducted, based on data from the five survey years. A logistic function was chosen based on how internet use have been growing so far, and

**Table 1** Online health activities among those who stated that they had used the internet for health purposes in 2005 compared with 2007

	2005 (n = 650)		2007 (n = 669)		Significance test
	%	95% CI	%	95% CI	
Read about health or illness	92.6	90.0–95.2	90.0	87.0–93.0	$\chi^2 = 2.87$ , p = 0.090
Interact with health professionals you have not met face-to-face	27.1	22.6–31.6	29.1	24.6–33.7	$\chi^2 = 0.70$ , p = 0.43
Order medicines or other products related to health or illness management online	18.6	14.7–22.5	23.6	19.4–27.8	$\chi^2 = 4.95$ , p = 0.031
Participate in forums or self-help groups (focusing on health or illness)	20.8	16.7–24.7	23.2	19.0–27.4	$\chi^2 = 1.11$ , p = 0.32

**Table 2** Reported effects of online health activities among those who stated that they had used the internet for health purposes in 2005 compared with 2007

	2005 (n = 610–644)		2007 (n = 644–663)		Significance test
	%	(95% CI)	%	(95% CI)	
Feelings of anxiety	17.3	14.4–20.3	19.0	16.0–22.0	$\chi^2 = 0.60$ , p = 0.44
Feelings of reassurance or relief	42.6	38.7–46.5	36.0	32.3–39.7	$\chi^2 = 5.72$ , p = 0.017
Willingness to change diet or other life-style habits	37.8	34.0–41.5	39.9	36.2–43.6	$\chi^2 = 0.64$ , p = 0.44
Suggestions or queries on diagnosis or treatment from your family doctor, specialist or other health professionals	19.3	16.3–22.4	25.1	21.8–28.4	$\chi^2 = 6.26$ , p = 0.012
Changing of use of medicine without consulting your family doctor, specialist or other health professionals	4.1	2.5–5.6	4.6	3.0–6.2	$\chi^2 = 0.20$ , p = 0.66
Making, cancelling or changing an appointment with your family doctor, specialist or other health professionals	11.0	8.6–13.4	12.6	10.1–15.1	$\chi^2 = 0.77$ , p = 0.38

**Table 3** The importance of different sources of health information in Norway

	2005 Mean (95% CI)	2007 Mean (95% CI)	Significance test
Family, friends and colleagues	3.83 (3.76–3.89)	4.02 (3.95–4.08)	$F_{(1,2117)} = 15.24$ , p < 0.001
Face-to-face contact with health professional	4.01 (3.94–4.08)	3.93 (3.86–4.01)	$F_{(1,2117)} = 2.02$ , p = 0.16
Newspapers and magazines	3.60 (3.53–3.66)	3.48 (3.41–3.55)	$F_{(1,2115)} = 5.75$ , p = 0.017
TV and radio	3.37 (3.31–3.44)	3.28 (3.21–3.36)	$F_{(1,2117)} = 3.28$ , p = 0.070
The internet	2.82 (2.73–2.91)	3.22 (3.13–3.31)	$F_{(1,2090)} = 37.56$ , p < 0.001
Pharmacies	3.15 (3.07–3.23)	3.12 (3.03–3.20)	$F_{(1,2114)} = 0.32$ , p = 0.57
Books and leaflets	2.87 (2.79–2.95)	2.76 (2.67–2.84)	$F_{(1,2115)} = 3.48$ , p = 0.062
Courses and lectures	2.27 (2.19–2.35)	2.48 (2.40–2.57)	$F_{(1,2103)} = 13.83$ , p < 0.001

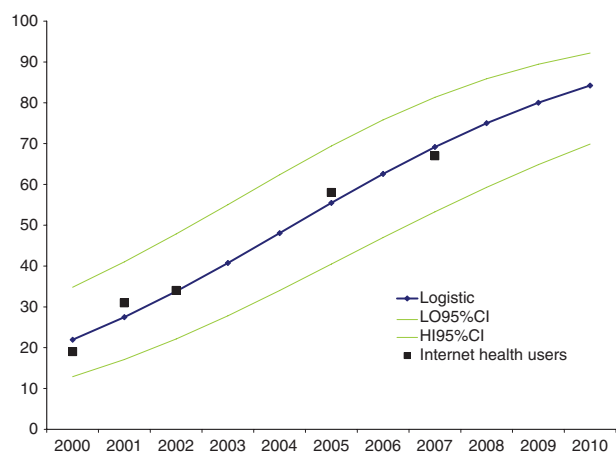
Changes 2005–2007. Respondents rated importance on a scale from 1 (not important) to 5 (important).

our expectancies that increase in use will slow down and approach a horizontal asymptote over time. All reported confidence intervals are 95%.

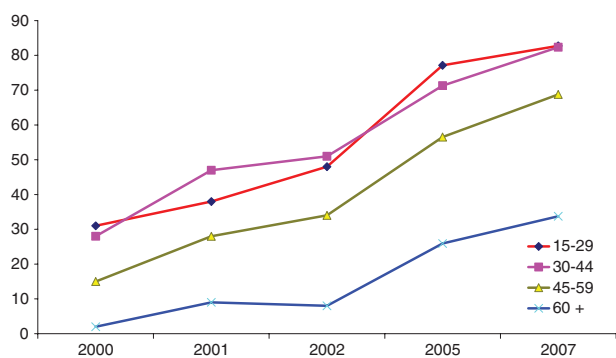
## Results

The proportion of the Norwegian population that uses the internet for health purposes continues to increase to 66.9% (64–70) in 2007. A significant logistic model with years as predictor accounting for 97% of variance can be seen in Fig. 1 ( $F = 109.27$ , p = 0.002). According to this regression, if the current trend continues, 84.2% (69.9–92.2) of the

Norwegian population will be using the internet for health purposes by the year 2010. As can be seen in Fig. 2, internet for health use is highest among people under 45 years of age and lowest among those over 60. The differences between age groups did not remain constant over the five survey years ( $\chi^2 = 524.18$ , p = 0.024), especially oldest age group had a more rapid increase in use of the internet for health purposes than could have been expected based on the 2000 survey data. Differences in internet use for health purposes according to education were found also in 2007, with 41.8% (34–49) of those with completed primary education or less, 63.3% (59–68) of those with secondary education, and



**Figure 1** Logistic regression of Internet use for health purposes in the Norwegian population based on survey data from 2000, 2001, 2002, 2005 and 2007.



**Figure 2** Increase in use of the internet for health purposes in the Norwegian population by age groups.

79.6% (76–83) of those with tertiary education reporting such use. No significant gender differences were found with 67.9% (64–72) of men compared to 65.9% (62–70) of females reporting health related use of the internet.

Reading about health or illness is still the most common health-related activity on the internet, undertaken by over 90% of the internet health users ( $n = 669$ ; Table 1). As seen in Table 1, the only significant change in specific activities from 2005 is an increase in ordering medicine or other health-related products online, with a quarter of those who had used the internet for health purposes reporting this specific activity.

In 2007, 44% had searched for information about health behaviours such as nutrition or smoking. Information on a specific illness had been searched for by 35%, with more women (48%) than men (39%) having searched for this information ( $\chi^2 = 5.13$ ,  $p = 0.024$ ). Information on pregnancy and baby care had been searched for by 11.5%, with less differences between women (14%) and men (9%;  $\chi^2 = 3.67$ ,  $p = 0.056$ ). There were 24.7% who had looked for information on legal or administrative aspects of illness, such as health insurance or rights to sick leave.

Reported effects of using the internet for health purposes can be seen in Table 2. The most common was feeling inspired to change health behaviour, reported by 40% of those having used the internet for health purposes. The second most common effect was feelings of reassurance or relief, reported by 36%, compared to 43% in 2005. At the same time, 19% reported feelings of anxiety as a result of using the internet for health purposes. A quarter of those having use the internet for health purposes in 2007 reported that use had resulted in suggestions or queries on diagnosis or treatment, compared to 19% in 2005. The least commonly reported effect was a change of medication, reported by 5%.

As can be seen in Table 3, the internet is increasing in importance as a source of health information. The f2f interaction, whether with family, friends and colleagues, or with HP, is still rated as the most important source. For further details, see Table 3.

## Discussion

If the observed increase in use of the internet for health purposes in Norway continues, we have estimated that by the year 2010, 84% of the Norwegian population will use the internet for health purposes. The increase is likely following an S-curve, specifically a Gompertz function (23), where initial uptake is slow while the technology is new, and we expect the curve to flatten out soon as we reach a ceiling effect in uptake. This finding coincides well with the US data, where internet use for health purposes now has stabilized at around 80% of the population for the last years (21).

The differences in proportions of people using the internet for health purposes between age groups were constant over the five survey years, showing that increases does not only happen among the young. However, the continued educational gap in use of the internet for health purposes can potentially fuel social disparities in health (10). Conversely, research efforts should be aimed at how health services online may better be tailored to breach such disparities.

There was a tendency towards increasing use of the internet to buy medicines or other health-related products. This is not so surprising in light of the pharmaceutical industry's aggressive online marketing, for instance through the sponsoring of self-help programmes and forums, and through advertisements on health information websites. Besides the risk for improper medication when not purchased over the counter with the accompanying guidance from a professional, there is also a risk of a general increase in use of medications (24).

At the same time, relatively few people reported changing their medication without consulting HP. Suggestions or queries on diagnosis or treatment were more common in 2007, with 25% reporting this as a result of

having consulted the internet for health queries. This could possibly reflect changes in patient–doctor roles, which internet use has previously been hypothesized to contribute to (25).

Although still reported by 36%, there was a 7% decline in proportion reporting feeling reassured by health information found online. This could possibly reflect the ever increasing multitude of information present, and hopefully a more critical approach in dealing with it. There was no corresponding increase in reporting feelings of anxiety. The number of health related websites is huge and increasing, and quality of information is a concern (5, 6, 21, 26).

The most commonly reported effect was willingness to change health behaviour, a finding which, in conjunction with the high frequency of searching for such information, indicates a positive potential for using the internet for health promoting interventions. We do, however, not know how many have actually changed health behaviour as a result of internet research, but this number is likely much lower than the ones reporting intent (27).

While the internet is increasing in importance as a source of health information, there is still a rather big gap between the importance of f2f contact – both with HP and family and friends – and other, nonpersonal information channels. Hence, we do not expect the internet or the other mass-media to challenge the position of doctors and other healthcare professionals. Nevertheless, our natural bias towards giving more weight to personal accounts than to statistically based information (28) may fuel dissemination of counter-evidence-based information as personal stories abound online. Conversely, this is also a feature that could be exploited in a conscious manner by health promoters by presenting evidence-based information as personal narratives from real or constructed patients, or from HP that personally present information.

The potential for increased use in areas like interaction with HP, ordering of medicines, or participation in self-help groups that was observed in the previous survey (19) has not yet been realized in actual use as much as expected, although it does seem to increase. Especially interesting for the healthcare community is perhaps the rather large proportion, more than 40% of the sample, who expect that they will use the internet to make, cancel or reschedule doctor's appointments in the future. This signals an expectation that health care follow suit with other service sectors (e.g. banking, travel) in accommodating consumers with online services. Further, almost a third, 28%, think they might interact with a HP online during the next year, thus also suggesting a readiness for clinical uses of online health services.

#### *Limitations of the study*

As this is a cross-sectional study, we cannot draw any causal conclusions, only generate such hypotheses that might be

tested in future research with longitudinal designs. The response rate in this survey was not much lower than comparable surveys as the European Social Survey, which had a target response rate of 70% using f2f follow-up of those not reached by phone (29). Of greatest concern are those who declined to participate in the interview because they lacked interest in the topic of the survey. Such nonresponse does limit the generalizability of this study (30).

## **Conclusions**

Use of the internet for health purposes continues to grow in the Norwegian population, as does the importance of the medium as a source of health information. Moreover, the study shows a trend towards a more positive attitude towards future uses of this channel for health-related communication and shopping for health-related products. This study further confirms the reach potential that lies in using the internet for health promoting purposes, and conversely for spreading faulty information, or increasing social disparities in health. Future research should address who internet-based health interventions reach and to what extent the intentions to engage in health promoting behaviours reported here are resulting in actual behavioural changes. More research is also needed on the internet's potential role in increasing or bridging social disparities in access to and use of health information online.

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## **Author contribution**

All authors have contributed to conceptions and design, acquisition of data, analysis and interpretation of data, drafting and revising the manuscript critically for important intellectual content, and have approved the final version of the manuscript.

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## Conflicts of interest

The authors declare they have no conflicts of interest.

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