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# Supplementing CAPI with CATI in a National Health Survey – effect on non-response

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## 1. Introduction

### 1.1 Description

In recent years response rates has decreased all over Europe and in many different surveys. In order to avert this problem several possibilities exists (Biemer 2003). One possibility is to use different modes of data collection. When applying this technique it would be desirable if the different modes were able to capture slightly different parts of the sample. For example it would in many countries be expected that younger persons more easily are contactable by telephone that by a visit in their home and thus it would be expected that younger persons would answer by telephone than by personal interviewing.

In Denmark nationally representative Health Interview Surveys on health and morbidity have been conducted regularly since 1986. In 2005 the Danish Health and Morbidity Survey 2005 was planned and carried out. In this survey a response rate of 70% was required and it was attempted to supplement the main data collection mode of computer-assisted personal interview (CAPI) by computer-assisted telephone interview (CATI), both initiatives in order to secure satisfactory response rate. In this paper we describe the effect of this strategy both with regard to non-response and with regard to consequences on a few selected health indicators. Further we compare the sex- age- and legal marital status-distribution among the two types of interviewing mode and non-responders.

## 2. The Danish Health and Morbidity Survey 2005 (DHMS-2005)

### 2.1 The Danish Health and Morbidity Survey Program

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The DHMS-2005 is part of the Danish Health and Morbidity Survey Program that was initiated in 1986 (Rasmssuen 2004). All surveys in this program are Health Interview Surveys where each selected individual receives a face-to-face interview in their home. In Denmark each inhabitant is uniquely registered in the Danish Civil Register. Each survey is based on a random sample from this register and consists of Danish citizens aged 16 or above. Each selected individual receives a written invitation and an introduction to the survey.
A broad range of questions on e.g. health, health behaviour, life-style, contact to general practitioner, morbidity and symptoms are posed in each survey. See www.si-folkesundhed.dk/sugy for more details.
Up to year 2005 general surveys had been conducted in year 1987, 1994 and 2000.

### 2.2 The DHMS-2005 survey

Data collection started May 1, 2005 and ended February 17, 2006. In the design phase of this survey it was decided that all interviews should be conducted using CAPI only. However as shown in section 3.1 this decision was revised during the data **collection** period.

The response rate in the DHMS-1987 survey was 79.9%, in the DHMS-1994 survey 77.2% and in the DHMS-2000 survey 74.2% (Davidsen 2004). Therefore a response rate of 70% was decided as goal for the overall response rate in the DHMS-2005 survey.

In Denmark a new administrative structure with impact on health care and prevention has been decided. A consequence of this decision is the introduction of 5 new regions and to take account of this it was decided that a stratified sample should be drawn. The sample should be constructed in such a way that
a) 3,000 interviews were obtained in each region
b) the overall response rate should be 70%
c) the regional response rate should be 70% except in region 1 where it should be 64%.

Based on these requirements a sample of 21,832 individuals was constructed. The sample comprised 4,688 individuals from region 1 and 4,286 individuals from region 2, 3, 4 and 5.

The data collection was conducted by SFI-SURVEY at the Danish National Institute of Social Research. All in all 176 interviewers took part in the data collection. Contact to individuals eligible for an interview was conducted by the interviewer who was obliged to make at least 4 attempts. Each interviewer was free to decide the order in which to contact persons appointed to her by SFI-SURVEY.

## 3. Response rate and CATI supplement

### 3.1 CATI supplement

Shown in table 1 is the response rate overall and in each region on December 8. 2005. The response rate was quite low (58.7%) especially in region 1 (50.2%) and 2 (50.3%). Furthermore due to the way contact between interviewer and respondent was made it was expected that response rate would be lower during the last 2 months of data collection. Based on these considerations it was decided to supplement by interviewing by telephone (CATI).

| Region | Interviews | Response rate (%) |
|---|---|---|
| 1 | 2371 | 50.6 |
| 2 | 2276 | 53.1 |
| 3 | 2806 | 65.5 |
| 4 | 2652 | 61.9 |
| 5 | 2700 | 63.0 |
| Total | 12805 | 58.7 |

**Table 1: Regional response rate December 8 2005**

CATI interviewing was attempted with the following groups of persons:

- 'soft' refusers - persons who not unambiguously had refused to participate
- persons out of town
- persons who had not been met
- persons who had been hospitalized

Prior to start of CATI interviewing it was decided that only 34 experienced interviewers should conduct the interviews, the interviews should be performed primarily in region 1 and 2 and performed in January and February 2006.

Prior to a full-scale CAI interviewing a small pilot study of 40 persons was established. This study showed that it was possible to contact the above mentioned group of persons again.

Unfortunately among persons refusing to have an interview at December 8 2005 it was not registered who were 'soft refusers' and who were not. Therefore it is not possible to report CATI response rates in this paper. Personal communication with SFI-SURVEY indicate a CATI response rate of approximately 20%. In further sections we therefore focus on final interviewing status.

### 3.2 Final response rates

Shown in figure 1 is the cumulative response rate as a function of days elapsed since May 1. 2005. The solid line shows the response rate for both CAPI and CATI interviews while the dotted shows response rate by CAPI alone – i.e. regarding CATI as non-response. Thus it can be seen that the introduction of CATI increased the response rate by 3.2%. The two curves start to split at December 8 2005.

| Response December 8. | CAPI | CATI sup | Non-response | n |
|---|---|---|---|---|
| Refused | 2.1 | 7.6 | 90.3 | 4912 |
| Out of town | 2.0 | 12.8 | 85.1 | 148 |
| Not met | 3.2 | 13.8 | 83.0 | 814 |
| Not contacted | 42.6 | 6.0 | 51.4 | 2030 |
| Other | 6.7 | 5.7 | 87.6 | 1123 |
| Total | 11.9 | 7.6 | 80.5 | 9027 |

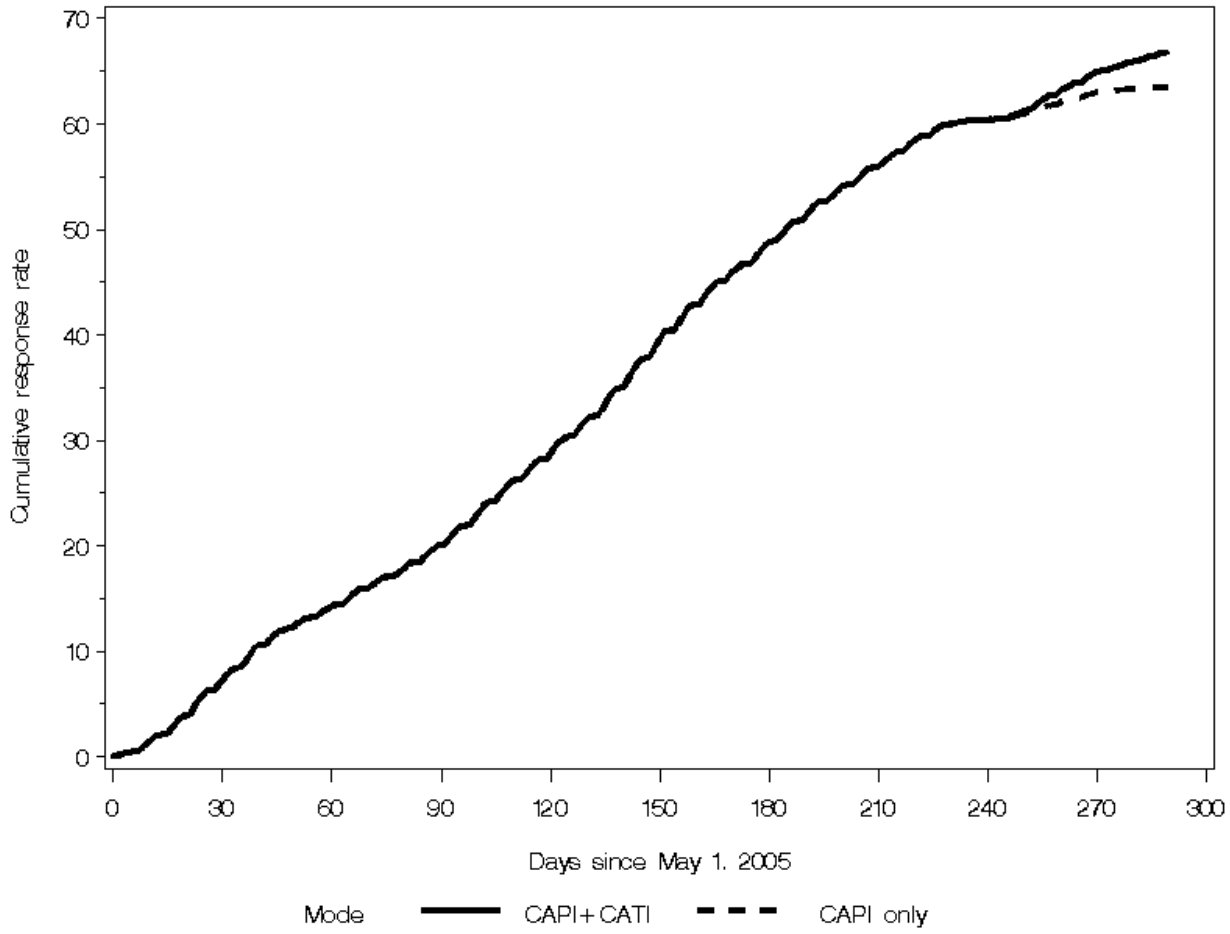


**Figure 1 Cumulative response rate from May 1. 2005**

Shown is table 2 is the final interviewing status for persons who had not been interviewed at December 8 2005 where CATI interviewing was decided. It is seen that interview has been obtained among all persons who were selected for contact. Note that invitations were sent out continuously during the data collection period and therefore not all persons had been contacted December 8. The high CAPI response rate in the \Not yet contacted'-group shows 2CATI was indeed regarded as a supplement in January and February 2006.

| Response status December 8. | CAPI | CATI sup | Non-response | n |
|---|---|---|---|---|
| Refused | 2.1 | 7.6 | 90.3 | 4912 |
| Out of town | 2.0 | 12.8 | 85.1 | 148 |
| Not met | 3.2 | 13.8 | 83.0 | 814 |
| Not contacted | 42.6 | 6.0 | 51.4 | 2030 |
| Other | 6.7 | 5.7 | 87.6 | 1123 |
| Total | 11.9 | 7.6 | 80.5 | 9027 |

**Table 2: Final response status according to status when CATI was decided**

Shown in table 3 is the final interviewing status distributed according to the 5 Danish regions. It is seen that all in all 13,875 CAPI and 691 CATI interviews were performed leading to an overall response rate of 66.7%. Thus the required response rate of 70% was not attained. Furthermore it is seen that 3,000 interviews was obtained in only one region Thus although CATI interview seemed to increase the response rate in especially region 1 and 2 the initial demands on response rate was not met.

| | CAPI | | CATI sup | | Interview | | |
|---|---|---|---|---|---|---|---|
| Region | n | % | n | % | n | % | Total |
| 1 | 2731 | 58.3 | 192 | 4.1 | 2923 | 62.4 | 4688 |
| 2 | 2499 | 58.3 | 319 | 7.4 | 2818 | 65.7 | 4286 |
| 3 | 3077 | 71.8 | 12 | 0.3 | 3089 | 72.1 | 4286 |
| 4 | 2776 | 64.8 | 98 | 2.3 | 2874 | 67.1 | 4286 |
| 5 | 2792 | 65.1 | 70 | 1.6 | 2862 | 66.8 | 4286 |
| Total | 13875 | 63.6 | 691 | 3.2 | 14566 | 66.7 | 21832 |

**Table 3: Final response status according to region**

## 4. Comparison of groups

### 4.1 Comparison of interviewing status by basic characteristics

In the DHMS-2000 survey it was demonstrated that non-response was highest among men, among older persons and among unmarried persons (Kjøller 20002). In order to see how CATI interviewing influence this pattern the distribution according to sex, age and legal marital status among CAPI, CATI and non-responders is shown in table 4. As is seen, the CATI group resembles the non-responders with regard go sex (51.3% respectively 51.5% men) and legal marital status (37.6% respectively 35.5% unmarried) more than it resembles the CAPI groups (corresponding figures: 48.3& men and 28.3% unmarried). With regard to age it would seem that the CATI group is somewhat younger than both the CAPI- and non-responders.

| % | CAPI | CATI sup | Non-resp. |
|---|---|---|---|
| *Sex* | | | |
| Men | 48.3 | 51.3 | 50.5 |
| Women | 51.7 | 48.7 | 49.5 |
| *Age* | | | |
| 16-24 | 9.5 | 14.1 | 10.8 |
| 25-44 | 33.2 | 34.6 | 31.3 |
| 45-66 | 39.3 | 35.5 | 36.7 |
| 67- | 17.9 | 15.8 | 21.1 |
| Marital status | | | |
| Widow | 7.3 | 7.5 | 9.7 |
| Divorced | 8.7 | 9.3 | 10.7 |
| Married | 55.7 | 45.7 | 44.0 |
| Unmarried | 28.3 | 37.6 | 35.6 |

**Table 4: Distribution according to sex, age and legal marital status among CATI-, CAPI and non-responders**

## 4.2 Comparison of selected health indicators.

To further assess the impact of the CATI supplement we compared the prevalence of 3 selected health indicators among persons interviewed. These are self-perceived health, obesity and alcohol consumption. Obesity is defined based on a body mass index (weight (kg) / ((height (cm))$^2$)) of 30 or more. Alcohol consumption is defined as exceeding recommendations set up by the Danish National Board of Health. The results are shown in table 5 in the form of age-standardised prevalence's. It is seen that CATI-respondents have a considerable worse self-perceived health than the CAPI-respondents (prevalence of good/very good health 78.0% vs. 74.7%) Likewise it is seen that there is no difference with regard to obesity but that CATI-responders has a markedly lower alcohol intake than CAPI-responders.

| Age-standardised prevalence | CAPI | CATI supp. | Total |
|---|---|---|---|
| *Self-rated health* | | | |
| Very good/good | 79.0 | 74.7 | 78.8 |
| Bad/very bad | 5.8 | 6.6 | 5.8 |
| *BMI* | | | |
| Obese | 11.8 | 12.1 | 11.8 |
| *Alcohol consump.* | | | |
| Abstainer | 22.6 | 31.2 | 23.0 |
| Above recommended | 14.5 | 9.7 | 14.2 |

**Table 5: Effect of CAPI and CAPI interviewing on three selected health indicators**

## 5. Conclusion

Including CATI interviewing in the Danish Health and Morbidity Survey 2005 was not planned from the start of the survey and was a result of trying to improve response

rates in order to accomplish pre-defined requirements. Although an increase in response rate has been demonstrated it has not lead to a fulfilment of these requirements. It has been shown that CATI-interviewing has the effect of obtaining interview with groups of persons that we would expect would have more tendencies to non-response (men and unmarried persons) which is a positive result. The fact that persons who accept an interview by CATI reports worse self-perceived health supports this claim but the fact that they report lower alcohol consumption does not. Thus it would seem that the CATI supplement has had a positive effect.

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