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Access to health care services in remote rural areas:

What impact does it have on settlement?

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Danish Institute of Rural Research and Development (IFUL)
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Executive Summary

The aim of this study is to shed light on motives for rural and urban settlement. In particular, we want to find out whether the supply of health care services has any impact on settlement. And, in case it has, whether electronic health services (eHealth) might contribute to counteracting out-migration from rural areas suffering from low levels of or cutbacks in traditional health care services.

The study is part of the INTERREG co-financed *Baltic eHealth* project, running from September 2004 to August 2007. The purpose of this project was to connect hospitals in the Nordic and Baltic countries in an electronic network, as well as develop telemedicine, so-called eHealth solutions, that can be used in areas where health care resources are limited.

The study draws on data from a questionnaire survey carried out in 2005 among 2015 randomly chosen persons in the Danish region of Funen. 1000 of these lived in a rural area – the small island of *Ærø*, south of Funen. The other 1015 lived in the largest city in Funen, Odense. A criterion was that respondents should have lived in Ærø/Odense for at least 3 years.

In addition, 43 semi-structured telephone interviews were carried out with persons who had migrated from *Ærø* to the cities of Odense and Svendborg (n=18), and from Odense and Svendborg to *Ærø* (n=25) in the period 2003-2005.

In line with previous studies, our study shows that a variety of settlement motives are at play – both with respect to whole population groups and single individuals. Overall, the study indicates that rural and urban settlement mainly is a question about choosing between two lifestyles. Thus, rural residents prefer a quiet and peaceful life in beautiful, natural surroundings, while urban residents primarily chose to settle in an urban area, due to easy access to job and education.

Until now, the question of whether access to healthcare services has an impact on settlement choices has been almost ignored in academic literature. Our study reveals a mixed picture. Thus, what concerns the reasons behind *actual, long-term settlement* and *actual moves*, our data shows that access to healthcare services has played an insignificant role. However, when asked about *presumed* (hypothetical) behaviour in case of cutbacks in local healthcare services, quite many indicate that they would consider moving away.

In what concerns eHealth, respondents from *Ærø* were relatively positive towards the two eHealth solutions they were asked to give their opinion about. When we take into account the documented potential of residents leaving *Ærø* in case of cutbacks in healthcare services, this makes probable that (efficient) eHealth solutions to a certain extent would be able to counteract out-migration from a remote, rural area such as *Ærø*.

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Jens F. L. Sørensen & Gunnar L. H. Svendsen

1 Introduction

1.1 Background

In recent years, Denmark has experienced a considerable migration from the countryside to the cities. In particular, remote rural areas have been affected. At the same time, there has been a minor contra-urbanization, primarily from cities to near-urban areas. Typical remote rural areas in Denmark, as e.g. the islands of Mors, Lolland and Ærø, have experienced an 8-21% decline in population from 1980 to 2005. This should be compared with the national Danish average of 6% growth.[2]

Overall, rural depopulation should be seen as a result of rationalisation within the Danish agriculture since the 1960s, combined with a lack of new jobs. For the individual person or family there are many motives for moving from the countryside to the city. Evidently, financial and social motives (jobs, education, family, and friends) play an important role, as does for example access to public services and cultural events.

This study focuses on whether the supply of health care services in rural areas plays a role for people when deciding whether to settle in rural areas or not. It is crucial to shed light on this question, because remote rural areas in Denmark have experienced – and most likely will experience in the future – increasing reductions in the supply of public health care services.[3] In recent years Denmark has witnessed a range of closures of small hospitals. This has led to serious protests in the affected communities, as for example in the case of the closure of hospitals in the towns of Assens, Bogense and Rudkøbing situated on Funen.[4] In addition, it has been difficult to get general practitioners to practise in remote areas, such as the islands of Mors and Samsø.[5]

The study is part of the INTERREG financed Baltic eHealth project. The main purpose of this project is to connect hospitals in the Nordic and Baltic countries in an electronic network. Second, it seeks to develop telemedicine – so-called eHealth solutions that can be used in areas where health care resources are limited. The project contains two pilot projects: eRadiology and eUltrasound. In the case of eRadiology, Svendborg Hospital in Denmark (where there is a shortage of radiologists) is connected, through an electronic network, to hospitals in Tallinn, Estonia and Vilnius, Lithuania (where there is a surplus of radiologists). The objective is to establish an exchange system, where radiologists in the Baltic countries will be able to assess X-ray pictures transmitted electronically from Svendborg Hospital. Similarly, in the case of eUltrasound,

[2] Our own calculations based on numbers from Denmark's Statistics Office (statistikbanken.dk).
[3] See for example the articles "Regioner må lukke sygehuse" in MetroXpress 26/10 2005 and "Småt er ikke godt", Klaus Larsen, *Ugeskrift for læger*, 2003, 165 (45): 4280.
[4] These were closed down in 1999, 2002 and 2005, respectively.
[5] See e.g. the news paper article "Lægemangel koster millioner" in Jyllands-Posten 15/11 2005

the Hospital of Västerbotten, Sweden is electronically connected to a hospital in Trondheim, Norway. This allows the Norwegian hospital to assist the Swedish hospital with ultrasound assessments.

The present report deals with a third purpose of the Baltic eHealth project, which is to investigate whether the introduction of eHealth solutions can limit migration from rural areas.

1.2 Problem

Can introduction of eHealth contribute to limiting demographic decline in rural areas? This question involves at least three specific questions:

1) Does access to health care services in fact play a role for settlement preferences?
2) Do doctors and patients want to use eHealth services?
3) Are eHealth solutions technically feasible at all?

This report will not examine the technical feasibility of eHealth solutions. Neither will it examine doctors' knowledge and opinions concerning the use of eHealth solutions. Rather, the report examines the importance of traditional health care services for settlement in rural areas, in the form of access to general practitioners and hospitals. Additionally, the report will, to a lesser extent, examine attitudes to the use of eHealth solutions from a citizen/patient perspective.

Thus, the problem can be formulated as follows:

> *To which extent can maintenance or improvement of local health care services, including introduction of electronic (eHealth) solutions, counteract rural out-migration?*

Note that eHealth services should be understood in a broad sense. Thus, it may involve that a hospital in a rural area assigns certain functions to other hospitals, as in the two pilot projects mentioned earlier (eRadiology and eUltrasound). It can, however, also mean the set-up of a videophone connection between doctor and patient or similar electronically supported arrangements.

1.3 Questions and hypothesis

Regarding the section on settlement preferences, the report seeks to answer two questions:

- Compared with other localisation factors, to what extent does access to local health care services affect the decision of settling in a rural area?
- Are there certain groups to whom access to local health care services is more important as a localisation factor than other groups?

One may assume that there are other localisation factors which are more important than access to health care services, e.g. access to job and education. One may also assume that families with young children, older people and people with chronic disease find access to health care services more important as a localisation factor than other groups.

Regarding the eHealth section, the report tries to answer the following question:

- To what extent will residents/patients be comfortable with receiving medical treatment based on eHealth technology?

If eHealth solutions will be able to replace ordinary physical contact between patient and doctor by use of modern electronic methods, we may expect that older and low-educated people will be the two most sceptical groups.

1.4 Literature

The literature on rural-urban migration is vast. It shows that since World War II migration from rural areas to urban centres has been considerable. There has been a minor migration from cities to rural areas as well. Contra-urbanization has primarily consisted of migration to rural areas close to cities. Not least, urbanization has taken place in the Nordic countries, where, in recent years, remote rural areas have increasingly been depopulated.

Case studies reveal a variety of settlement motives, ranging from occupational, social (e.g. living close to family and friends), environmental (e.g. living close to nature), to the general reputation and quality of a specific location.[6] A general pattern is that many older people have migrated to the most remote rural areas, while young people have moved away from these places. Therefore, we may assume that the need for local health care services in remote rural areas will increase in the future.

Several studies show that in general rural residents are content with local public services (Stratford and Christie 2000; Farmer et al. 2004). This also includes local health care services. Access to basic, public services are often taken for granted (e.g. Glesbygdsverket 2004). Another tendency is that people moving to rural areas tend to accept that the service level here is lower than in the city (Glesbygdsverket 2004).

Many rural residents find it important to have easy access to health care services, particularly to hospitals (Cromley 1993; Hart 1993; Cloke et al. 1994; Shucksmith et al. 1996; Hope et al. 2000). In EU countries, access to health care services is generally not regarded as a serious problem.

[6] For studies on settlement preferences in the Scandinavian countries, see Kåks et al. 1994; Stenbacka 1997; Graversen et al. 1997; Orderud and Onsager 1998; Villa 1999; Anvik 1999; Solvang 1999; Hordland Fylkeskommune 2000; Pedersen 2000; Sørlie 2000, 2003; Orderud 2001; Norstrand and Andersen 2002; Lundholm et al. 2004; Deding and Filges 2004; Ærø et al. 2005.

There is however a gap in literature concerning the significance of local health care services for in- and out-migration in remote areas. Only two studies touch upon this correlation. The first one is Muus et al. (1995), who shed light on the consequences of a hospital closure in a local community in North Dakota, USA. After the closure, residents had 40 miles to the nearest hospital. 246 residents were asked an open question about potential negative effects. Only 1.2% answered that they would "consider moving closer to medical treatment".

The second study is Farmer et al. (2004) who made a questionnaire survey on satisfaction with health care services in six areas in Scotland (1507 respondents). The questionnaire included the statement: "Older people who have spent their lives in a remote area should consider moving to town to be close to health services they might need". To this, 32% of respondents from larger cities agreed, while only 19% from remote rural areas agreed. Likewise, to the statement "Older people should be discouraged from moving to remote areas because the areas don't have the health services they might need" 51% from larger cities, and 33% from remote areas agreed (op.cit.: 32).

To conclude, existing literature does not clearly document to which degree local health care services influence migration movements. Furthermore, it is highly unclear whether new eHealth services will be able to prevent further migration from rural areas.

1.5 Design

The report will examine personal motives for choosing or not choosing a rural residence, focusing on the significance of access to public, medical treatment. The survey is based on two separate studies:

- A questionnaire study on reasons for (permanent) choice of residence among people, who either have lived in a chosen remote area (Ærø), or in a chosen urban area (Odense), for a longer period of time, i.e. minimum 3 years.
- A study of migration motives among people, who recently have moved between a chosen remote area in Denmark (Ærø) and two urban areas (Odense and Svendborg), based on telephone interviews made by one of the researchers.

The four respondent groups are shown in Table 1.

Table 1. Groups of respondents, who either have chosen a rural or urban place of residence

	Rural residence preference	*Urban residence preference*
Questionnaire study	Persons who have lived in a remote area for a minimum of 3 years	Persons who have lived in an urban area for a minimum of 3 years
Telephone interview study	Persons who have recently migrated to a remote area from an urban area	Persons who have recently migrated to an urban area from a remote area

1.5.1 Study areas

The island of Ærø was selected as rural study area. Ærø is situated south of Denmark's second largest island, Funen, and is part of the formerly County of Funen, which now is part of the newly established Region of Southern Denmark. Two cities on Funen, Odense and Svendborg, were selected as urban study areas. Odense is the main city on Funen and the third largest city in Denmark. Svendborg, the second largest city on Funen, lies in the very south of Funen, and is reachable from Ærø by ferry. In Map 1, the geographic locations of the study areas are shown.

Until 2006, Ærø consisted of two municipalities, both of which were *outskirt municipalities* according to the definition of the Danish Ministry of the Interior and Health (Danish Ministry of the Interior and Health, 2004). Furthermore, in 2003 Ærø was included among a number of peripheral areas, for which special governmental initiatives were launched to promote business development and increased settlement (Danish Ministry of Economics and Business Affairs, 2003). The island is only connected to other parts of Denmark by ferry connections. In 2004, the biggest town on Ærø, Marstal, had 2327 inhabitants, compared to about 145000 and 27000 inhabitants in Odense and Svendborg, respectively.[7] Both Odense and Svendborg have well-equipped hospitals (1058 and 269 somatic beds in 2001). Ærø has a small hospital (36 somatic beds in 2001).[8] Unlike Odense and Svendborg, Ærø has witnessed a strong population decline during the past decades, cf. Figure 1.

[7] Data from Statistics Denmark: http://www.statistikbanken.dk.
[8] Information obtained from Funen County.

Map 1. Map of Denmark with study areas

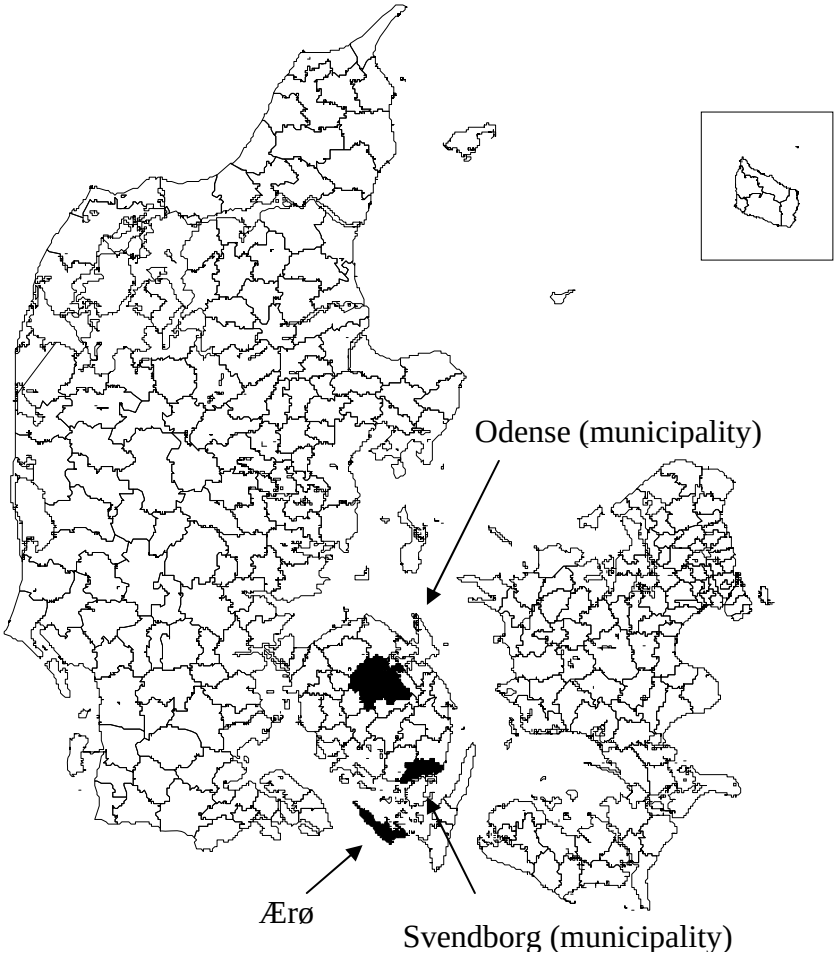
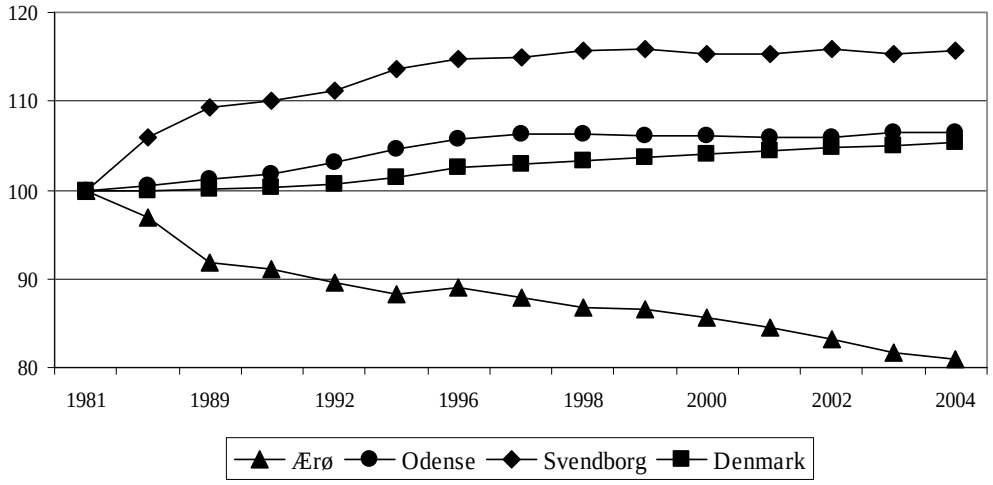


Figure 1. Population trends 1981-2004 (1981=100)



Source: Denmark's Statistics Office, statistikbanken.dk

1.5.2 The questionnaire study (fully structured telephone interviews)

Questionnaires were collected by phone among populations who had lived on Ærø and in Odense, respectively, in a coherent period of minimum 3 years. The questions dealt with:

- Preferred versus actual residence (rural, close to urban area, city)
- Reasons for choice of present residence
- The significance of access to health care as location factor
- Presumed settlement behaviour resulting from possible changes in the supply of health care services
- Attitudes towards various eHealth solutions
- The background of the respondents (age, status, number of children, use of health care services, medical history etc.)

The study was designed to assess to which extent health care services can be identified as localisation factor. Furthermore, it will explore people's attitudes to various eHealth solutions. A weakness of this method is that people may not all together be conscious of their personal motives for choosing a specific place of residence. Besides, some questions concern respondents' wishes, attitudes and possible behaviour in various scenarios. Of course, answers to such hypothetical questions should be regarded with certain reservations. The advantage of the method is that it is relatively easy to gather a large data set.

1.5.3 Semi-structured telephone interviews with migrants

The migrant study consists of 43 short telephone interviews (maximum 10 minutes), carried out by one of the authors. The purpose was to further qualify, as well as get a deeper understanding of, the results from the questionnaire survey. Therefore, answers were written down verbatim, and all information stored in an electronic data base.

These semi-structured interviews were conducted with two kinds of interview persons:

- People who have moved from Ærø to Svendborg/Odense in 2004 (n=12)
- People who have moved from Svendborg/Odense to Ærø in 2004 (n=19)

Apart from this, the researcher made a few, additional interviews with persons who had migrated between these destinations in 2003 and 2005 (n=12).

The interviews aimed to uncover specific motives behind choice of settlement. An explicit question about the importance of access to health care service was included. Furthermore, the interviewer asked whether respondents considered moving back.

This method did not have the same weaknesses as the questionnaire survey, in that it allowed us to get a deeper understanding of the specific *causal* connections leading to a move. Thus, the interviews shed light on actions which had actually been carried out. Besides, we may assume that respondents were able to remember clearly their motives for moving.

2 Questionnaire survey

2.1 Method

In 2005, a telephone based questionnaire survey was conducted among 2015 randomly selected persons (18-80 years old), who had been living on Ærø (n=1000) and in Odense (n=1015) for a minimum of 3 years.

2.1.1 Questionnaire

The questionnaire consisted of 42 questions, including 9 screening questions. The questions concerned preferred residence, reasons for present settlement, the importance of health care services, presumed behaviour in case of changes in the supply of health care services, attitude towards various eHealth solutions, as well as some standard questions concerning gender, age, consumption of health care services, etc. (See the questionnaire in Appendix 1).

The questionnaire was tested several times before data collection. The objective was to identify possible problems and deficiencies related to the questions. First, the project group conducted personal interviews with 4 random persons. This was followed up by a session, where 5 random persons were interviewed and, afterwards, participated in a discussion with the project group about the questionnaire. As a result, some minor changes were made. Before the telephone data collection was initiated, 8 test telephone interviews were carried out among people from Ærø and in Odense city. No further adjustments were necessary. The questionnaire worked according to intentions, and the test persons did not experience difficulties in understanding the questions.

2.1.2 Fieldwork

Vilstrup A/S conducted the fieldwork through telephone interviews from November 10-22, 2005. Vilstrup A/S also conducted the test phone interviews. By using the so-called CATI system (Computer Assisted Telephone Interviewing), it was possible to register appointments for re-interviews at times, which fitted the respondents better. When people were not at home, they were contacted again between 3 to18 times.[9] The conducted interviews lasted in length between approximately 9 to 15 minutes.

2.1.3 Test sample

Selection of telephone numbers was done through simple, random selection based on postal codes. By contacting either the male or female head of the household, a screening was made aiming to include 18-80 year old persons

[9] This wide range is due to calls being made at different times during the survey period, meaning that the calls at the end of the period had the lowest rate of recalls.

who had lived minimum 3 years in the area in question. To ensure an equal gender distribution, a rotation principle was applied, meaning that, by turns, the interviewer asked to speak with the male or female head of the household. Change of respondent was possible in the case of couples, who lived together, but where only one of them fulfilled the inclusion requirements.

Both fixed network telephone numbers and, in lack of such, mobile phone numbers were used. Numbers were selected so to ensure an equal distribution among postal codes. On Ærø, all three postal codes covering the island were used. In Odense city, the nine postal codes that cover Odense city were used. Seven out of the nine postal codes go beyond the city limits of Odense. Therefore, an additional screening was conducted among respondents from Odense postal codes, and only those who explicitly claimed to live in Odense city were included.

2.1.4 Test sample control

During the fieldwork, continuous test sample controls were made, in the form of a supervisor listening to a full interview. Moreover, recalls of a random sample of already interviewed persons were made. The number of recalls was approximately 1% of the total number of valid interviews. The purpose was to secure that the original interview was performed correctly. Furthermore, to control that the correct person had been interviewed, whether the person fulfilled the participation criteria, how the interview was experienced (short/long, problem areas, etc.), and how respondent had experienced the interviewer. Finally, some questions from the survey were asked again.

In a subsequent report from Vilstrup to the researchers, it was stated that had been no problems with carrying out the survey in a correct way. Interviewers as well as respondents found the survey relevant and interesting.

2.1.5 Completion of interviews

In order to carry out valid interviews with 1000 persons on Ærø and 1015 persons in Odense city, a total number of 5106 households had to be contacted. Non-participants included refusals and neutral losses, cf. Table 2.

Table 2. Participation and non-participation

	Ærø	Odense	Total	Total %
Completed interviews	1000	1015	2015	39%
Refusals	555	647	1202	24%
Neutral losses	614	1275	1889	37%
Total (gross sample)	2169	2937	5106	100%

In total, there were 1889 neutral losses. Among these 554, persons were rejected, because they did not fulfil the inclusion requirements. These persons

did not fit the age range (18-80 years), had not lived for a minimum of 3 years in the survey areas, had a Odense postal code but lived outside the city limits, or did not actually live in the survey areas (e.g. only had a vacation residence there). 701 households were not available during the period of the fieldwork, and in the case of 535 households, it was arranged that they would be contacted when the period of the fieldwork had ended. Finally, there were 99 neutral losses caused by other reasons, see Table 3.

Table 3. Neutral losses

	Ærø	Odense	Total	Total %
Not available during the period	253	448	701	37%
To be contacted after the interview period	95	440	535	28%
No one in the age group 18-80 years	149	87	236	12%
Did not live in Odense city itself	0	221	221	12%
Had not lived 3 years at the location	40	31	71	4%
Poor hearing/incomprehensible	29	10	39	2%
Not living in area/moved/vacation home	23	3	26	1%
Inadequate language skills in Danish	5	18	23	1%
Dismantled phone/non-private residence	9	6	15	1%
Previous participation (different number)	1	1	2	0%
Other losses	10	10	20	1%
Total	614	1274	1889	100%

2.1.6 Response rate

The response rate is found by comparing the number of refusals and the number of participants, cf. Table 4. The response rate is an expression for the willingness to be interviewed.

Table 4. Response rates

	Ærø	Odense	Total
Completed interviews	1000	1015	2015
Refusals	555	647	1202
Net sample (1)	1555	1662	3217
Response rate (completed interviews of net sample)	64.3%	61.1%	62.6%

(1) Gross sample exclusive of neutral cessations.

The total response rate was 62.6%. According to Vilstrup, the response rate is higher than what is normally achieved in representative surveys of a similar design. There are normally 3 refusals per 4 completed interviews, equivalent to

a response rate of 57%.[10] The reason why the response rate was so high is most likely that the contacted persons found the survey relevant to them. The response rate was slightly higher on Ærø than in Odense, which may reflect that there is a higher local interest in the subject on Ærø.

Furthermore, the calculated response rates should be seen as "minimum rates", since potential respondents were asked if they wanted to participate before finding out whether they fulfilled the inclusion requirements or not. This means that there undoubtedly have been refusing respondents, who did not meet the inclusion requirements at all, and thus were not part of the target group. No background information about refusals (e.g. age and gender) was gathered.

2.1.7 Self-selection

In an assessment of the response rate, it is relevant to evaluate whether the group of refusals in any way could have conducted a self-selection based on the thematic area of the questionnaire. The potential respondents had to decide whether they wanted to participate on the background of the following opening remark:

> *"Hello, my name is … I am calling from Vilstrup Research and I would like to talk to the house father or house father of the household, please.*
> *[To whom it may concern:]*
> *I would like to ask you some questions about the reasons why you have chosen to live where you live. The questions are part of a research project at the University of Southern Denmark. The objective of the project is to examine the reasons why people choose to live either in urban or in rural areas. Participation is anonymous. This session will take approximately ten to twelve minutes. Will you take the time to answer the questions?"*

The phrasing of the opening line concerning the thematic area of the questionnaire makes it difficult to think that some groups would have a greater interest in answering the questions than others. There are probably some people who are more aware of, or interested in, their own choices of residence than others. But there is nothing to suggest that they would answer questions in a significant different way than others. Consequently, we have no reason to believe that the data has a selection bias stemming from the thematic area of the questionnaire. If, on the other hand, the opening line had revealed that some of the questions would be about the impact of health care services on choice of settlement, it would have been likely that people, who find that this specific topic has an immediate relevance to them, would be more willing to answer the questions than others.

[10] The information comes from the Vilstrup project manager on the survey.

2.1.8 Representation

The only methodological tools to enhance representation consisted of the abovementioned rotation between men and women, and the stratified sampling that concerned the geographic distribution of telephone numbers along postal codes.

An examination of representation in the present survey should preferably contain a comparison of the test sample with its background population - the whole population of 18-80 year old people, who have lived for a minimum of 3 years in either Ærø or Odense city. Since Denmark's Statistical Office does not supply accessible data based on the length of settlement, we chose to compare the test sample group with municipal data for the whole population on Ærø and in Odense.

The comparison is shown in Tables 5 and 6. Population on Ærø is estimated by adding numbers from the two municipalities on Ærø, Ærøskøbing and Marstal. The test sample from Odense city is compared with the population in the Municipality of Odense.[11]

Gender
Compared with municipal populations, women are slightly overrepresented in our samples – by 6.7 percentage points on Ærø and 3.1 percentage points in Odense city. This may be explained by women spending more time in their homes than men, and, perhaps, their feeling more obliged to answer the questions. It is difficult to say whether women answer differently to questions than men. If we accept the truism that women are more concerned about soft values than men, it is probable that the overrepresentation of women pushes certain answers in an upward direction, e.g. the significance of living close to family and friends and, if there are children involved, the significance of access to schools and health care services. However, we may assume that respondents living with a partner to a certain degree answer on behalf of the couple, rather than just on their own behalf.

[11] This introduces and extra uncertainty, even if Odense city accounts for a large share of the population of the Municipality of Odense (78.6% per 1/1 2004, calculated on data from statistikbanken.dk, BEF4A).

Table 5. Test sample compared with municipal population (per 1/1 2005). Pct.

	ÆRØ		ODENSE	
	Test sample	Muni-cipal data (1)	Test sample	Muni-cipal data (2)
A. Gender, 18-80 years				
Male	44.4	51.1	46.1	49.2
Female	55.6	48.9	53.9	50.8
B. Age, 18-80 years				
18-24 years	1.8	5.1	2.7	13.4
25-29 years	3.2	4.1	8.2	11.3
30-39 years	11.6	13.0	21.7	19.7
40-49 years	18.7	18.7	18.8	17.7
50-59 years	24.3	23.2	21.8	16.6
60-69 years	22.4	20.3	16.5	12.4
70-80 years	17.9	15.6	10.4	8.9
C. Singles/couples, 18-80 years				
Single adults	33.5	35.5	33.2	39.3
Adults living together (3)	66.5	64.5	66.8	60.7
D. With/without children, 18-80 years				
Adults with children living at home	26.0	22.8	32.5	27.5
Adults without children living at home	74.0	77.2	67.5	72.5

(1): Added figures for the two municipalities on the island: Marstal and Ærøskøbing municipalities. The figures are per 1.1 2005.
(2): Figures for the Municipality of Odense. The figures for cities in question are not freely accessible through Denmark's Statistical Office. The figures are per 1/1 2005. Source: Own survey and Denmark's Statistical Office's home page (www.statistikbanken.dk).

Age
The age composition shows an underrepresentation of young people. This not least includes those below 25 years: 3.3 percentage points on Ærø and 10.7 percentage points in Odense. Evidently, this pushes the significance of educational motives for choice of settlement in a downward direction. The predominance of people between 50 and 80 years pushes other parameters upward, such as the significance of nursing homes and the supply of health care services.

Singles/couples and adults with/without children living at home
It is difficult to make an isolated evaluation of the importance of the small overrepresentation of adult couples living in Odense. On the other hand, the overrepresentation of adults with children living at home pushes the results upward in terms of e.g. the significance of access to health care services and

schools. There is, however, not a large overrepresentation (3.2 percentage points on Ærø and 5.0 percentage points in Odense) and consequently, the effect would be small.

Level of education
In general, respondents have a higher level of education than the background population. Hence, there is a considerable overrepresentation of respondents with short to long, higher education at 14.9 percentage points on Ærø and 24.7 percentage points in Odense. This large overrepresentation may push data in a certain direction but it is difficult to say how. For instance, it is probable that the preference for living close to cultural activities is positively correlated with high levels of education.
The overrepresentation is in itself interesting because, to some extent, the desire to participate in an interview with a vaguely formulated theme seems to depend on a person's educational level.

Table 6. Test sample in relation to municipal population (per 1/1 2005). Pct.

	Test sample	Muni-cipal data (1)	Test sample	Muni-cipal data (2)
E. Education, 20-69 years				
Primary school	15.4	31.8	11.5	26.9
Upper secondary school	6.5	3.7	9.3	12.1
Vocational school	41.8	43.1	28.0	34.3
Short/medium-length higher education	30.0	19.0	35.8	20.9
Long higher education	6.3	2.4	15.5	5.7
F. Work situation, 20-69 years				
Employed	61.3	62.7	69.5	58.3
Unemployed	3.9	4.6	4.3	5.1
Student	2.6	3.2	6.9	13.4
Outside the workforce	32.2	29.5	19.3	23.2

(1): Added figures are from the two municipalities on the island: Marstal and Ærøskøbing. The figures are from 1.1 2005, except for the work situation which is from 1/1 2004.
(2): Figures from the Municipality of Odense. The figures for cities in question are not freely accessible through Denmark's Statistical Office. The figures are from 1.1 2005, except for the work situation which is from 1/1 2004.
Source: Own survey and Denmark's Statistical Office's home page (www.statistikbanken.dk).

Work situation
Employed respondents in Odense are overrepresented by 11.2 percentage points. This should push the significance of job-related motives for settlement upward. What regards the work situation for the test sample from Ærø, there is good representation.

Summary
Discrepancies between test sample and population can lead to biases. When presenting results, this can be seen in accumulated results that have not been specified, e.g. in relation to gender and age. Biases occur, however, only if the overrepresented part answered in a different way than the underrepresented counterpart.

It is not possible to determine whether, or to what extent, the reported discrepancies are due to the fact that the test sample is not compared with the correct population. If, however, we take the comparison at face value, the test sample from Ærø generally displays a better representation than the one from Odense. In the case of Ærø, the discrepancies are primarily limited to gender and level of education.

Most probably, the discrepancies have given the data a minor selection bias. For example, if we suppose that female and male respondents from Ærø give diametrically opposite answers in a yes/no question, the overrepresentation would cause an error of 6.7 percentage points – compared to a situation, where gender was correctly represented. As it is unlikely that female and male respondents should have diametrically opposite opinions, the error margin is somewhere between 0 and 6.7 percentage points.

Generally, the discrepancies should be seen as acceptable – in particular, if they are taken into consideration when accumulated results are reported.

2.2 Results

2.2.1 Is there a potential for migration to rural areas?

The main reason for undertaking this study is the depopulation of marginal Danish, rural areas. In this context, it is important to find out whether depopulation can be counteracted by ensuring access to health care services in rural areas. However, first it seems relevant to ask whether there is a potential *at all* among Danes for settling in rural areas.

In the questionnaire, respondents were asked to classify the area, in which they live. Then they were asked where they would prefer to live, that is, if they could choose freely and without taking e.g. job and family into consideration. Both questions contained the same 5 possible answer categories. Results are shown in Table 7.

Table 7. Preferred and present localisation, %. Odense and Ærø, N=1975. 2005.

	Preferred localisation (a)	Present localisation (b)	Difference
A large city	23	27	-5
A medium-sized city	17	15	2
A smaller town	30	34	-4
A country village	15	16	-1
The countryside	15	7	8
Total	100	100	
N	1975	1975	

(a) Question 21: "Where would you prefer to live if given a free choice that is if you did not have to consider your job and family situation? I will give you 5 options"
(b) Question 20: "Which of the following descriptions fits the area you live in most accurately?"

Table 7 shows that 30% prefer to live in a village or in the countryside if given a free choice. This is a higher percentage than the 23%, who already live in a village or in the countryside. As the test sample has an equal division between rural and urban residents, this suggests a potential for immigration to the Danish rural areas of about 7%. A smaller immigration potential of 2% was found in a former survey conducted by Byforum (2001). In that survey, which was based on telephone interviews with a representative segment of the Danish population, 29% preferred to live in a village or in the countryside – as opposed to the 27%, who already lived there.[12]

The 7% immigration potential to rural areas found among residents in Odense and on Ærø may indicate that some people refrain from settling in rural areas. The data does not explain what keeps them from realising their wish to 'move to the countryside'. Possible answers could be, for instance, lack of job opportunities, education or service, including access to health care.

2.2.2 Reasons for rural and urban settlement

To be able to identify factors that keep potential rural residents from settling in the countryside, one has to know the factors that determine people's choice of residence. In order to shed light on the reasons for rural and urban settlement, the questionnaire has two kinds of questions – partly an open question, and partly questions with fixed answers.

Reasons for settlement (open question)
The respondents were asked the following open question:

> *Please state in 1 or 2 keywords the most important reasons why you live on Ærø/ in Odense*

[12] Number of respondents: 1512.

All 2015 respondents stated one keyword (1st keyword). Furthermore, 1432 respondents stated a second keyword (2nd keyword). The keywords were subsequently categorised in 10 categories. Tables 8 and 9 show 1st keyword and the 2nd keyword.

Table 8. Reasons for choice of current residence, 1st keyword, Ærø and Odense, %

	Ærø	Odense
Job	10.5	24.6
Education	0.9	7.9
Family and friends	15.8	17.9
Housing conditions	2.2	3.2
Access to public service, other than health care	0.0	0.4
Access to health care services	**0.0**	**0.5**
Quiet surroundings close to nature	25.8	2.3
Access to cultural and leisure time activities	0.5	2.8
Born and/or raised in the area	16.8	13.5
Other answers	27.7	27.0
Total, %	100	100
Total, number of respondents	1000	1015

Table 9. Reasons for choice of current residence, 2nd keyword, Ærø and Odense, %

	Ærø	Odense
Job	6.0	13.1
Education	0.8	3.1
Family and friends	19.8	25.4
Housing conditions	3.3	3.4
Access to public service, other than health care	0.3	1.3
Access to health care services	**0.0**	**0.3**
Quiet surroundings close to nature	31.7	3.7
Access to cultural and leisure time activities	1.2	5.3
Born and/or raised in the area	6.1	7.4
Other answers	30.7	36.9
Total, %	100	100
Total, number of respondents	732	700

The two tables reveal notable differences between what makes people settle in rural areas and in cities. The residents from Odense refer mostly to the many job and educational opportunities when explaining their choice of settlement. Furthermore, they mention cultural and leisure time activities. Among Ærø residents, the wish to live in quiet surroundings close to nature is seen as the most important reason for choice of settlement.

Still another interesting difference is the attachment to the place where one is born and raised.[13] More than Odense residents, Ærø residents state that their choice of residence was due to being born and raised in the area. This, however, only applies for the 1st keyword.

An interesting similarity is that both Ærø and Odense residents attribute great importance to living close to family and friends – something that is expressed especially in the second keyword.

There are only few respondents who mention access to public services as a reason for choice of settlement. Of particular interest to this report is the low significance attributed to access to health care services. Among the 1st keywords, there are only 5 out of 2015 who mention access to health care services as being important for their choice of settlement, i.e. a mere 0.2%. And among 2nd keywords, only 2 persons mention health care services. These 7 people all were Odense residents. No Ærø residents seemed to have settled on the island primarily because of the access to health care services there. This is hardly surprising since Ærø – in contrast to Odense – have no apparent, comparative advantages in that field.

Reasons for settlement (fixed answers categories)
In the second question that concerned reasons for choosing to settle on Ærø or Odense respectively, respondents were asked to assess the importance of various reasons for settlement choice. The following phrase was used:

> *I will now mention some common reasons for why people chose to live where they live. I would like you to state whether these reasons are **very important, important, of little importance or not important** for your decision to live on Ærø/in Odense?*

After this, respondents were asked about 8 possible reasons for settlement, see question 23 in the questionnaire in Appendix 1:

1. Job conditions
2. Educational conditions
3. Living close to family and friends
4. Housing conditions
5. Access to the following services in the local area: day care, schools and nursing homes
6. Access to health care services, such as general practitioners, hospitals, emergency rooms etc.
7. Living in quiet surroundings close to nature
8. Access to cultural and leisure time activities

Table 10 shows the proportion of respondents, who replied that the factor in question was “very important”.

[13] It was not expected in advance that this category would be so significant. One might rightly question, whether being born and raised in an area can count as a reason for settlement. Nevertheless, a large number of respondents seemed to think so.

Table 10. The importance of localisation factors on choice of current settlement. Proportion who stated "great importance", %.

	Odense	Ærø
Job conditions	55	42
Educational conditions	41	18
Living close to family and friends	55	52
Housing conditions	59	60
Access to day care, schools and nursing homes	44	47
Access to health care services	48	73
Living in quiet surroundings close to nature	52	87
Access to cultural and leisure time activities	43	23

As far as the *relative difference* between Ærø and Odense is concerned, we see the same tendencies as we found in the keyword answers. Thus, Odense residents assign great importance to job, education and access to cultural and leisure time activities, while Ærø residents place great emphasis on living in quiet surroundings close to nature. Note that both groups place equal emphasis on the importance of living close to family and friends, housing conditions, and access to public service other than health care. However, far more people on Ærø consider *access to health care* to have great importance.

Comparing the closed and open questions it appears surprising that certain factors that were unimportant in the open question suddenly are considered to be of great importance for choice of present settlement. This is particularly true for housing conditions as well as access to public service, including health care services.

Thus, no less than 73% of Ærø respondents consider access to health care services as having great importance for their choice of residence, compared to 48% among Odense respondents. These figures are surprising, considering that practically nobody stated access to health care services as the most significant reason for choice of residence in the open questions. Therefore, we may assume that respondents simply had misunderstood the closed question. Answers are probably not related to the real reason for having chosen to live on Ærø or in Odense. Rather, they are more likely to reflect what respondents *generally* consider as being important to the place where they are living.[14]

Therefore, concerning the two types of questions, we may conclude that access to health care services has only motivated a few people in their choice of residence. These are solely found among Odense respondents. At the same

[14] In the closed question, access to health care services is considered the second most important reason for having settled on Ærø, second only to a wish to live in quiet surroundings close to nature. It is, however, unthinkable that the supply of health care services on Ærø should have motivated so many people to settle on the island. Rather, such a thing would occur in (urban) areas, where the supply of health care services is considerably larger. And, say, that it in fact did have such an importance, this should have appeared from the open question where, however, *no respondents at all* mention health care services in 1st or 2nd keyword.

time, access to health care services is generally seen as important by respondents, that is, when asked explicitly.

In the following sections, we will make a further attempt to shed light on the importance of health care services. We first look at answers to general questions concerning access to health care services. Then we look at respondents' answers to how they would react in case of future cutbacks in local health care services.

General importance of living close to health care services
The following three questions were applied in order to shed light on the importance of living close to health care services:

> *1. How important is it <u>generally</u> to you to have access to health care services in your local area?* (If necessary, examples were given: general practitioner, hospital, health visitor, emergency room, specialist doctor, etc.)
>
> *2. How important is it to you to live close to your general practitioner?*
>
> *3. How important is it to you to live close to a hospital?*

Respondents were asked to reply with "very important", "important", "of little importance", or "not important". Table 11 shows the results.

The figures in Table 11 confirm that it is important for people to live close to health care services. The proportion of respondents who replied "very important" or "important" to the three questions is found in the interval 53% to 90% (lowest in Odense in question 2 and highest on Ærø in question 1).

Ærø respondents generally find it more important to live close to health care services than respondents from Odense. Most likely, the explanation is that Ærø residents feel rather worried about their hospital. As also became evident from the semi-structured interviews with migrants, many Ærø residents fear that the local hospital will eventually be closed down, as has been the case with three neighbouring hospitals (Assens Hospital in 1999, Bogense Hospital in 2002 and, most recently, Rudkøbing Hospital in 2005). This fear clearly makes Ærø residents stress even more the importance of having their own hospital – and the health care services this entails – unlike Odense residents, whose hospital does not run the risk of being closed.

Table 11. General importance of living close to health care services, %

	Question 1: "How important is it generally to you to have access to health care services in your local area?"		Question 2: "How important is it to you to live close to your general practitioner?"		Question 3: "How important is it to you to live close to a hospital?"	
	Ærø	Odense	Ærø	Odense	Ærø	Odense
Very important	62%	33%	30%	16%	47%	22%
Important	28%	41%	39%	37%	37%	39%
Of little importance	8%	22%	28%	40%	14%	34%
Not important	2%	4%	3%	7%	2%	5%
Total, %	100%	100%	100%	100%	100%	100%
Respondents	995	1010	990	1011	996	1008

2.2.3 Which groups attach the highest importance to access to health care services?

One of the purposes of the survey has been to identify the socioeconomic groups that find it most important to have access to health care services. With this in mind, we will take a closer look at the answers to the above-mentioned three questions, which concern the general importance of living close to health care services.

Table 12 shows multiple, logistical regression analyses for the three answers. The estimated odds ratios express to what extent single groups have answered "very important" compared to a reference group that has been assigned the value 1.00. To a significantly greater extent than men, for example, women reply that it is "very important" to have access to health care services in their local area. This is expressed in an odds ratio for women of 1.41, compared to men with a reference value of 1.00, cf. the first question in the table. We can therefore conclude that, with a factor 1.40, access to local health care is more important to women than to men. The asterisk symbols indicate to which degree the estimated correlations should be seen as significant, that is, not coincidental. For a further explanation of the logistical regression analysis, see Appendix 2.

Table 12 relatively clearly points out the groups that attach particular importance to living close to health care services. First of all, the table shows that *women* are generally more concerned about living close to health care services than men.

Secondly, *older people* find it especially important. Hence, there are significant odds ratios for age groups over 59 years of age.

Table 12. The importance of living close to health care services. Adjusted odds ratios (OR) calculated by multiple regression

	Very important to have access to health care services in the local area	Very important to live close to a GP	Very important to live close a hospital
	OR	OR	OR
Gender			
Men (R)	1.00	1.00	1.00
Women	1.40**	1.22	1.45***
Age			
18-29 (R)	1.00	1.00	1.00
30-39	1.33	0.78	1.32
40-49	1.41	0.78	1.41
50-59	1.50	1.26	2.11**
60-69	2.21**	1.75*	2.90***
70-80	2.10**	2.29**	2.46***
Children (1)			
None (R)	1.00	1.00	1.00
1 child	1.10	0.99	1.26
2 children	0.87	0.85	1.47*
> 2 children	1.03	0.82	1.34
Long-term illness (2)			
No (R)	1.00	1.00	1.00
Yes	1.29*	1.42**	1.30*
Doctor visits in past year (3)			
0 times (R)	1.00	1.00	1.00
1-2 times	1.22	1.23	1.16
3-5 times	1.79***	1.52*	1.19
> 5 times	3.19***	2.01***	1.78**
Education			
Only basic school (R)	1.00	1.00	1.00
Secondary school	0.69	0.69	0.82
Vocational education	1.10	0.85	0.94
Short-medium higher educ.	0.75	0.69*	0.65**
Long higher education	0.61*	0.59*	0.60*
Place			
Odense (R)	1.00	1.00	1.00
Ærø	3.20***	2.05***	2.46***
Model			
N	1947	1943	1947
Nagelkerke R^2	0.18	0.12	0.16

(1) Children under the age of 18 living at home; (2) Answer to the question: ”Do you or anyone in your household suffer from a long-term illness?”; (3) Answer to the question: “Within the past 12 months, how many times have you or anybody from your household taken medical advice or been treated in a hospital?”

(R): Reference group *: p<0.05, **: p<0.01, *** p<0.001

Thirdly, the importance respondents attach to local health care seems to increase in line with the risk profile as well as the consumption pattern. Respondents living in a household, which includes a person suffering from a *long-term illness*, attach higher importance to access to health care services. Likewise, the attributed importance increases in line with the household's *number of visits to the doctor* within the past year.

Fourthly, *respondents with primary schooling as the highest completed education* find access to health care services significantly more important than respondents with a long higher education, and partly also compared to respondents with a short or medium length higher education.

Fourthly, *respondents with primary schooling as the highest completed education* find access to health care services significantly more important than respondents with a long higher education, and partly also compared to respondents with a short or medium length higher education.

Finally, we see that the respondents from Ærø find it significantly more important to live close to health care services than respondents from Odense. This pattern is similar to what we saw earlier and, again, it must be understood in the light of pressures on health care services on Ærø.

It may surprise that the number of children in the household does *not* play a significant role. There is, however, a certain children effect in connection with the evaluation of how important it is to live close to a hospital. Here respondents with 2 children consider it significantly more important than respondents with no children. However, when the category "Doctor visits in past year" is taken out of the model, there is no children effect.

2.2.4 Do people move if local health care services disappear?

The questionnaire contains two more questions that aim to shed further light on the role of access to health care services on settlement. These questions concerned how residents would react in case of a decrease in the supply of health care services. The questions were as follows:

> *1. Would you consider moving if the nearest hospital were closed?*
>
> *2. Imagine the following situation: Your GP moves or retires. Would you consider moving, if you had to travel a considerably longer time to see a doctor than you do today?*

Table 13. Share of respondents who would consider moving away if supply of local health care services is reduced

	Ærø	Odense	Total number of answers
People who would consider to move if			
Nearest hospital were closed	29%	10%	1936
Transportation time to nearest GP increases considerably	9%	13%	1965

Table 13 shows that as much as 29% of Ærø respondents would consider relocation in case of a closure of the nearest hospital. In comparison, only 10% of the respondents from Odense would consider moving. Again, we may assume that this is due to the fact that Ærøskøbing hospital is more threatened by closure. Odense University Hospital is not threatened by closure, and the question to the residents from Odense is therefore somewhat theoretical.

Equally relevant for Ærø and Odense residents is the question whether one would consider moving if the distance if transportation time to the nearest GP increased considerably. A few more Odense residents, in total 13%, would then consider moving, compared to Ærø residents (9%).

Thus, all results indicate that access to health care services does play a role when considering where to live. In particular, Ærø residents find it important to keep their own hospital.

Table 14 shows group-specific odds ratios on the willingness to relocate, given the two hypothetical situations.

Table 14. Share of respondents, who would consider moving away if supply of local health care services is reduced. Adjusted odds ratios (OR) calculated by multiple regression

	Would consider to move if the nearest hospital was closed	Would consider to move if transportation time to the nearest GP is increased considerably
	OR	OR
Gender		
Male (R)	1.00	1.00
Female	1.11	1.12
Age		
18-29 (R)	1.00	1.00
30-39	0.87	0.77
40-49	0.80	0.79
50-59	0.83	0.57
60-69	0.73	0.65
70-80	0.36**	0.44*
Children (1)		
None (R)	1.00	1.00
1 child	1.76**	0.66
2 children	2.01**	0.68
> 2 children	2.14*	0.77
Long-term illness (2)		
No (R)	1.00	1.00
Yes	1.44*	1.11
Doctor visits in past year (3)		
0 times (R)	1.00	1.00
1-2 times	1.05	1.15
3-5 times	1.14	1.37
> 5 times	1.16	1.33
Education		
Primary schooling (R)	1.00	1.00
Secondary schooling	0.86	0.74
Vocational training	0.88	0.81
Short-medium higher education	1.02	0.72
Long-term higher education	0.66	0.67
Location		
Odense (R)	1.00	1.00
Ærø	4.48***	0.65**
Model		
N	1885	1912
Nagelkerke R^2	0.15	0.02

(1) Children under 18 living at home., (2) Answer to the question: "Do you or anyone in your household suffer from a long-term illness?" , (3) Answer to the question: "Within the last twelve months, how many times has someone from your household visited the doctor or received treatment at the hospital?"
(R): Reference group. *: $p<0.05$, **: $p<0.01$, *** $p<0.001$

Significant factors for *considering moving away if nearest hospital closes* are: Age, number of children in the household, whether a member of the household has a chronic disease, and location (Ærø/Odense). First of all, *age* plays a role. 70-80 year old people would consider relocation to a much lesser degree than others. This is probably due to the low mobility among this age group, which otherwise is one of the groups that attach high value to having access to health care services, cf. Table 12. Secondly, *whether you have children or not* is crucial when considering relocation. Moreover, the more children respondents have, the more they appear willing to move to another place. Thirdly, it is important whether single households include persons with a *chronic disease*. Surprisingly, maybe, the actual number of visits to the doctor is not significant, not even when "long-term illness" is omitted from the analysis. Fourthly, *location* is significant. Thus, considerably more Ærø residents would consider moving. Finally, it should be noted that educational levels do not have any impact.

As far as the willingness to relocate *if the distance to nearest GP is increased considerably* is concerned, significantly more people in Odense would consider relocating. Otherwise there are no significant differences, except that the 70-80 age group to a lesser extent would consider relocating, compared to the 18-29 age group. Again, this is most likely due to differences in degree of mobility.

2.2.5 Attitudes towards eHealth solution

The last part of the questionnaire was designed to analyse the attitudes of residents to receiving treatment based on eHealth solutions, i.e. health care services delivered by use of electronic media.

First, respondents were asked about their attitudes to consulting a specialist doctor over video phone. The result is shown in Table 15. It shows that to 42% of Ærø respondents and 48% of Odense respondents, this treatment would be agreeable. This means that more than half of all respondents did not feel happy with the idea of such consultation.

Table 15. Attitudes towards the use of video consultation with a specialist doctor

	Ærø	Odense	Total
Agree mostly with statement 1: "If I can get faster treatment from a specialist doctor, it is fine with me that the consultation is carried out by video telephone"	42%	48%	45%
Agree mostly with statement 2: "I am not happy with the idea of idea of having a consultation with a specialist doctor carried out by video telephone"	58%	52%	55%
Number of respondents	935	980	1915

Next, people were asked how they would feel about having a doctor in another country assessing their X-ray pictures. Here, 74% of Ærø respondents and 70% of Odense respondents would not have any problems with such procedure, cf. Table 16.

The significantly higher willingness to let a doctor abroad read one's X-ray pictures is probable due to the lack of direct doctor contact. Moreover, the respondents seem to have a great deal of faith in the clinical expertise among doctors in foreign hospitals.

Table 16. Attitudes towards having a doctor abroad to read my X-rays

	Ærø	Odense	Total
Agree mostly with statement 1: "If I can get faster treatment in Denmark, it is fine with me that it is a doctor at a foreign hospital who reads my X-rays"	74%	70%	72%
Agree mostly with statement 2: "I am not happy with the idea that it is a doctor at a foreign hospital who reads my X-rays"	26%	30%	28%
Number of respondents	949	974	1923

Table 17 points out the person groups that are especially negative towards the eHealth solutions. This is done by calculating the odds ratios for answering "agree mostly" with the negative statement 2 in the two questions.

In the previous regression analyses of the importance of living close to health care services, the number of children living at home, chronic disease and the household's number of visits to the doctor were included in the analyses. Since the present questions concern individual's view on eHealth solutions, these factors are not included in the analysis, because they cannot be seen as being decisive for whether a person feels comfortable about e.g. a video consultation or not. Thus, only the following personal explanatory variables were included: gender, age, education and location (Ærø/Odense).[15]

As we see in Table 17, gender, age and educational level seem to determine the level of discomfort *with video consultation with a specialist doctor*. Thus, women are inclined to feel less comfortable than men, and the discomfort rises with age (significantly for 70-80 year-old people compared to 18-29 year-old people). Finally, people with primary schooling and vocational education as

[15] Household income and work situation might also have been included. However, these two parameters only seem to reflect age and education, which is already included in the model. For example, a variable that describes the work situation would include a large group of persons outside the workforce, who feel uncomfortable about a video consultation (65%). This discomfort is, however, not caused by them being outside the workforce, but because they are in the high end of the age scale and in the low end of the education scale.

highest completed education feel less comfortable, while people with long educations feel most comfortable about such consultations. Whether one lives on Ærø or in Odense is not significant.

We see that gender, age, educational level and location determine whether respondents *feel comfortable or not about having a doctor in a foreign country to evaluate his or hers X-rays.* Again, women tend to feel less comfortable than men. Similarly, young people (aged 18-29) feel more comfortable than old people (aged 70-80). Looking at educational levels, people with only primary schooling as the highest completed education feel most uncomfortable about this solution, while respondents with short-medium and long educations feel significantly more comfortable about it. Finally, and somewhat surprisingly, Ærø residents generally feel more comfortable about having their X-rays evaluated by foreigners than Odense residents.

Table 17. Attitudes towards different eHealth solutions. Adjusted odds ratios (OR) calculated by multiple regression

	Not happy with the idea of having a consultation with a specialist doctor carried out by video telephone"	**Not happy with the idea that it is a doctor at a foreign hospital who reads my X-rays"**
	OR	OR
Gender		
Male (R)	1.00	1.00
Female	1.38**	1.61***
Age		
18-29	0.79	0.45**
30-39(R)	1.00	1.00
40-49	1.07	1.03
50-59	1.18	0.93
60-69	1.23	0.89
70-80	2.73***	1.89**
Education		
Only basic school (R)	1.00	1.00
Secondary school	0.64*	0.63
Vocational education	0.88	0.77
Short-medium higher education	0.66**	0.54***
Long-term higher education	0.42***	0.53**
Location		
Odense (R)	1.00	1.00
Ærø	1.02	0.69***
Model		
N	1913	1921
Nagelkerke R^2	0.07	0.07

(R): Reference group

*: p<0.05, **: p<0.01, *** p<0.001

2.2.6 Can eHealth solutions counteract the migration from rural areas?

The main question of this study is whether migration from rural areas be counteracted through maintenance or expansion of local health care services, e.g. through the use of eHealth solutions.

Above we concluded that a number of Ærø residents would consider relocating in case of future reductions in the local health care services – 29% if Ærøskøbing Hospital closes and 9% if the distance to nearest GP increases considerably. Hence, the answer to the first part of the main question is that the maintenance of existing health care services could *partly* counteract migration.

The last part of the main question relates to whether the use of eHealth solutions can be used to countermove reductions in traditional health care services, which otherwise would lead to a migration from the rural areas.

A *precondition* for successful implementation of eHealth solutions is that populations in remote areas have positive attitudes towards these solutions. Table 18 compares Ærø residents' answers regarding considering relocating in the case of hospital closure with their attitude towards the eHealth solution of outsourcing a hospital function to a doctor in a foreign country. The underlying idea is that such form of outsourcing could ultimately help preserve the hospital.

Of most interest is to examine how people who would consider *moving away* if the hospital closes evaluate eHealth solutions. Of those considering moving away, 72% are positive towards the eHealth solution. This indicates that eHealth solutions of that kind have some potential of counteracting migration. Note, however, that doctors' attitudes towards using such a solution and whether it is technically, legally and economically feasible is not considered here.

Table 18. Migration and eHealth, Ærø (n=915)

		Attitude towards having a doctor abroad read one's X-rays		Total
		Positive	Negative	
Would consider relocating if nearest hospital closes	Yes	21%	8%	29%
	No	53%	18%	71%
Total		74%	26%	100%

Similarly, Table 19 shows the relation between possible out-migration from Ærø if distance to nearest GP is increased considerably and Ærø residents'

attitude towards the use of video phone (which might eliminate this problem). 44% (4% / 5%) of those who would consider relocating are positive towards this eHealth solution. Again, this indicates that eHealth solutions of that kind have some potential of counteracting *part* of the migration caused by lack of GPs.

Table 19. Migration and eHealth, Ærø (n=912)

		Attitude towards receiving consultation with a specialist doctor using a video phone		Total
		Positive	Negative	
Would consider relocating if transportation time to nearest GP increased considerably	Yes	4%	5%	9%
	No	39%	52%	91%
Total		42%	58%	100%

The above mentioned comparisons are, of course, very coarse since they build on presumed behaviour and attitudes and do not consider e.g. technical, legal and financial problem areas. Nevertheless, the comparison indicates that eHealth solutions under certain conditions would able to counteract migration from rural areas.

3 Interviews with in- and out-migrants

3.1 Method

We wanted to shed further light on the results from the questionnaire survey. Therefore, we obtained data from the Danish Central Personal Register (CPR) concerning migrants, who had recently moved to or from the island of Ærø. This allowed us to interview people about the *specific causes* that had induced them to move to or from Ærø, including the importance of local healthcare services.

The interviews were carried out by one of the authors in spring 2006 – in total 43 interviews with representatives for households, including 23 women. Respondents were distributed within the age group of 18-70 with a predominance of people younger than 40 (62% of all respondents). 31 out of the 43 households/interviewees migrated in 2004. These interviews were supplemented with 3 and 9 interviews with persons migrated in 2003 and 2005, respectively. All respondents had undertaken one of four moves: from Ærø to Odense, from Ærø to Svendborg, from Odense to Ærø, from Svendborg to Ærø. The duration of these short telephone interviews was 5-15 minutes. Answers were written down verbatim and later stored in an electronic data base.[16]

3.1.1 The questions

The interview guide contained 11 questions. Often the interviewer asked respondents to further clarify their answers, using small additive questions such as ”Why?”, ”What do you mean by that?” and ”Could you please tell more about that?”. The questions concerned: Why the person/household had decided to move; whether the supply of healthcare services (GP, hospital, homecare) had any impact on the decision to move; and whether the interviewee considered moving back, and why/why not. See interview guide in Appendix 3.

3.1.2 Response rate

By going through a CPR database containing all migrations to and from Ærø, we found that in total 85 households moved between Ærø and Odense/Svendborg in the year 2004, which we chose as our year of investigation. It was possible to trace correct phone numbers and contact 36 among these households. 5 of these refused; hence the response rate became 86%. Table 20 shows participation and non-participation for respondents migrated in 2004.

[16] In case the interviewer did not have time to write down the answers, the interview person was asked to wait a moment and, occasionally, to repeat his or her answer.

Table 20. Participation and non-participation. Migration in 2004

	Ærø to Oden-se	Ærø to Svend-borg	Odense to Ærø	Svend-borg to Ærø	Total
Completed interviews	5	7	7	12	31
Refusals	0	2	0	3	5
Ph. number non-existent*	10	9	4	11	34
No answering	0	3	1	3	7
New address**	1	4	0	3	8
Total (gross sample)	16	25	12	32	85

* Phone number could not be found in www.krak.dk

** New address outside the area of investigation

Table 21 summarizes completed interviews.

Table 21. Completed interviews in relation to year and type of migration

	Ærø to Odense	Ærø to Svendborg	Odense to Ærø	Svendborg to Ærø	Total
2003	0	0	2	1	3
2004	5	7	7	12	31
2005	6	0	2	1	9
Total	11	7	11	14	43

3.2 Results

In general, interviewees were happy to answer the questions.[17] After the interview, a few respondents wanted to know more about the purpose of the research study. Most often, the youngest respondents gave brief answers, while older respondents took their time to give more detailed answers. For an overview of personal data for respondents, see Appendix 4.

3.2.1 Reasons for relocation – open question

Concerning reasons to move, interviewees were asked to list maximum 5 reasons in an order of priority. When selecting the highest prioritized answers, i.e. the most important reason for moving, *education* and *family/friends* were seen as the most important reason for moving from Ærø to Odense/Svendborg (28% and 22% of all answers, respectively), while *job*, *quiet surroundings close to nature*, as well as *being born/having grown up in the local area* were seen as the most important reasons why people had moved from the cities of Odense and Svendborg to Ærø (both 16% of all answers).

[17] Among the 5 refusals, 3 were abroad on holiday and/or traveling abroad.

A similar pattern arises when we add up the figures of *all* answers (n=95), cf. Table 22. Notice that the categories applied in the questionnaire survey have been included. Note also that in-migrants to Ærø have listed twice as many reasons as out-migrants.

Table 22. Reasons for relocation in relation to type of relocation. All answers.

	Total, numbers		Total, %	
	From rural (Ærø) to urban	From urban to rural (Ærø)	From rural (Ærø) to urban	From urban to rural (Ærø)
Job	2	4	7%	6%
Education	5	1	17%	2%
Family and friends	7	18	23%	28%
Housing conditions	0	0		
Access to public service*	0	0		
Access to health care services	0	0		
Quiet surroundings close to nature	0	14		22%
Cultural and leisure time activities	3	0	10%	
Born and/or grown up in the area	0	9		14%
More socializing	0	4		6%
Transport	3	0	10%	
Other answers	10	15	33%	23%
Total	30	65	100%	100%

*Other than health care services

Somewhat surprisingly, *job* concerns do not appear to have much importance for actual rural-urban migrations as was the case in the questionnaire survey. Instead, *friends and family* seem to play an important role for all decisions to move – 23% from Ærø to Odense/Svendborg and 28% from the two cities to Ærø, respectively. Typical statements were: ”Because I met a man [in Svendborg]; ”because my two daughters live in Odense”; ”My friends lived in Odense”; ”The major part of our family lives here [on Ærø]”; ”I moved [to Ærø] because my boyfriend lived there”; ”We have family on Ærø”; etc.

Moreover in what concerns rural-urban migration, important factors are *education*, *access to cultural and leisure time activities*, and *transport* facilities, respectively 17%, 10% and 10% of the answers from this group. Typical statements are: ”Due to education”; ”Nothing ever happens [on Ærø]”; ”It was so boring [on Ærø]”; ”It’s difficult to get to the island”; ”I didn’t want to commute [to and from Ærø]”. In particular, many youngsters said they had moved because ‘nothing happened’ on the island, as in the case of a 24-year

male student living in Odense who found that ”basically all youngsters my age move away”.

Concerning urban-rural migration, important factors are *quiet surroundings close to nature* and the mere fact that one is born and grown up on Ærø – respectively 22% and 14% of all answers from this group. Social concerns also matter. Typical statements are: ”It’s so wonderfully peaceful here”; ”We feel secure here”; ”People on Ærø are more social”; ”The children are raised in quiet and secure surroundings”; ”We were born and have grown up on Ærø”.

It is interesting in our context to notice that there was no mentioning at all of access to local health care services and, in general, to public service.

When asked whether the respondent/the household had *considered moving back* to Odense/Svendborg, 2 answered in the affirmative and 4 ”maybe” (11% and 22% of urban-rural migrants, respectively). The reasons given by the two persons, who answered yes were: ”Because, meanwhile, my boyfriend has lost his job” and ”Because Ærø is awful during the winter time, not a bloody thing ever happens”. In comparison, 3 persons had considered moving back to Ærø from the two cities, while 5 answered ”maybe” (12% and 20% of rural-urban respondents). The reasons given by the three persons answering yes were: ”Because I have the possibility to take over my father’s enterprise and because I want to have children there”, ”Because I had the possibility to get a job there”, ”Because it’s a good place to raise your children”.

3.2.2 Health care services – specific question

We also asked a more specific question, namely whether the household had taken *the supply of health care services* into consideration before moving. Here 2 rural-urban migrants answered in the affirmative, i.e. 11% of all respondents in this group, cf. Table 23. The first one was a 59 year old woman who told that she had moved to Svendborg with her spouse due to chronic disease. She had not been confident about visiting Ærøskøbing Hospital, which she did not regard as a ”very competent hospital” compared to Svendborg Hospital and besides, the home care service was ”very bad”. In contrast, a 74 year old woman told that she had moved to Svendborg, because it was “more convenient” (due to medical specialists), however, she also stressed that the hospital in Ærøskøbing was ”extremely good” and the home care service ”perfect”.

To this question, 5 of the urban-rural migrants answered in the affirmative (25%), cf. Table 23. A 50 year old man answered that he and his wife had taken local health care into consideration before moving and they had reached the conclusion that ”there would be a sufficient supply [on Ærø]”. A 29 year old woman told that she and her boyfriend ”would not have moved in case there had not been a hospital on the island” and she further argued: ”When I am going to have children or when I get old, I don’t want to be dependent on a helicopter”. Similarly, a 60 year old woman told that she would not have moved if there had not been a hospital, so that she didn’t need to worry. A 60 year old man told the same thing and added that he and his wife had discussed

the matter several times before they decided to move: "That if the hospital [in Ærøskøbing] closes, we will be sure to move again". Finally, a 30 year old man said that it was important for him to be able to consult his old GP again.

Asked about whether the supply of health care services simply had been a *part of the reason to move*, 1 rural-urban respondent answered yes (6%), namely the above mentioned 59 year old woman so dissatisfied with Ærøskøbing Hospital. Also 2 urban-rural migrants answered yes (8%), namely the above mentioned 29 year old woman, who did not wish to be dependent on a helicopter from Odense Hospital, and the 60 year old woman who had no problems about moving, knowing that there was a hospital, cf. Table 23.

Table 23. Answers to the question concerning health care services

	Did you/the household take the supply of health cares services into consideration before moving?			Has the supply of health care services been a part of the reason for moving?		
	From rural (Ærø) to urban by	From urban to rural (Ærø)	Total	From rural (Ærø) to urban by	From urban to rural (Ærø)	Total
Yes	2 (11%)	5 (25%)	7	1 (6%)	2 (8%)	3
No	16	20	36	17	23	40
Total	18	25	43	18	25	43

3.2.3 The general interest for health care services on Ærø

As was the case in the questionnaire survey, we detected a vivid interest for health care services among actual and previous Ærø residents – often accompanied by a strong emotional engagement, not least among elderly respondents. Thus, both in- and out-migrants expressed pronounced opinions on this matter, mostly positive but also in a few cases strongly negative. There was a general concern that the hospital would be closed down.

4 Summary and conclusion

4.1 Summary

The purpose of this study was to shed light on motives for rural and urban settlement. In particular, we wanted to find out whether the supply of health care services has any impact on settlement. And in case it has, whether electronic health services (eHealth) might contribute to counteracting out-migration from rural areas suffering from low levels of or cutbacks in traditional health care services.

The study was part of the *Baltic eHealth* project. This project aims to build an electronic network between hospitals in the Nordic and Baltic countries and to develop telemedicine, so-called eHealth, solutions to be used in areas where health care resources are limited.[18] Further, the project aims to investigate whether the introduction of eHealth solutions can limit migration from rural areas.

Accordingly, the main question of this study was:

To which extent can maintenance or improvement of local health care services, including introduction of electronic (eHealth) services, counteract rural out-migration?

We stressed that the study did not take into consideration the feasibility of eHealth solutions. Neither did we take into consideration the attitudes of health care personnel towards eHealth solutions, but alone the attitudes of *rural residents*. We did this by seeking, step by step, to answer the following questions:

- What are the determinants for rural and urban settlement?
- Specifically, which role does access to health care services play?
- Which attitudes do residents have to eHealth solutions?
- Can eHealth counteract migration due to cutbacks in ordinary health care services?

Previous studies show that there are many motives for settling in rural areas. These include job concerns, social concerns (e.g. short distance to family and friends), as well as environmental concerns (e.g. living close to nature). Moreover, they can be more generally related to the reputation and quality of the location.

However, there is a gap in the literature in what specifically concerns the importance of local health care services for settlement preferences in marginal

[18] The EU initiative programme INTERREG III B co-financed the project. Project period: September 2004 to August 2007.

rural areas. Only two studies are touching upon this relation. The first one is Muus et al. (1995), who shed light on the consequences of a hospital closure in a local community in North Dakota. In their study, only 1.2% answered that they would consider moving in order to get medical treatment. The other one is Farmer et al. (2004), who asked respondents whether older people should be advised to move from remote rural areas in order to be closer to health care services they might need. Among urban respondents, 32% found that they should while only 19% of rural respondents agreed. Still other studies indicate that many rural residents find it important to have easy access to health care services, not least hospitals (Cromley 1993; Hart 1993; Muus 1993; Cloke et al. 1994; Shucksmith et al. 1996; Hope et al. 2000). However, this does not mean that access to these services actually influence people's decisions about where to live.

We chose Ærø as our study area because this small island has experienced a severe decline in population during the past decade. However, a small hospital is (still) situated here.

Data were collected in the form of questionnaires and telephone interviews. Questionnaires were collected in November 2005 among long-term residents on Ærø (n=1000) and in Odense city (n=1015). Respondents were asked about reasons for choice of settlement, the importance attributed to access to health care services, assumed behavior in case of reduction in local health care, as well as their attitudes to eHealth solutions. In regards to the telephone interviews, they were conducted by one of the authors. He both interviewed migrants from Ærø to Odense and Svendborg (n=18), and migrants from Odense and Svendborg to Ærø (n=25) in the period 2003-05. In particular, people were asked about their specific reasons for moving, including the role of health care.

In the questionnaire survey, the most important reasons for settling on Ærø were: To live close to nature (26% of respondents), being born and/or having grown up in the area (17%), and to live close to family and friends (16%). Among the Odense respondents, the most important reasons were: Job (25%), to live close to family and friends (18%), and being born and/or having grown up in the area (13%). In the telephone interviews with Ærø in- and out-migrants, the most important reasons for moving from Odense/Svendborg to Ærø were: To live close to family and friends (28%), to live in quiet surroundings close to nature (22%), and being born and/or having grown up in the area (14%). And the motives of migrants from Ærø to Odense/Svendborg were: To live close to family and friends (23%), education (17%), access to cultural and leisure time activities (10%), and easy transport (10%).

Similar to previous studies, this study finds a range of settlement motives in play – both seen from the perspective of whole population groups and from the perspective of individuals. Moreover, a finding is that important incentives for rural settlement are the wish to live in peaceful surroundings, close to nature, in one's native heath. In comparison, urban settlement usually happens due to a concern about one's career. For both types of settlement the wish to live close to family and friends plays a crucial role.

In the questionnaire survey, respondents were also asked to explain the reason why they live where they live in 1 or 2 keywords. Only 7 persons mentioned health care services, i.e. 0.2% of all answers. All these persons are Odense residents. Obviously, this is due to the supply of health care services being much larger in Odense than in other places in the Funen region. Similarly, in the small migration study conducted in the form of telephone interviews, nobody spontaneously mentioned access to health care services as a motive for moving. It was first when people were explicitly asked about this topic that 3 persons told that this had been a part of the reason why they had decided to move. This said, the questionnaire survey shows that – although access to health care services was not mentioned as an important factor for settlement in the open question – no fewer than 90% of long-term Ærø residents found it important or very important to have access to health care services in the area, as compared with 74% in Odense. That is, when they were asked explicitly. Furthermore, the survey reveals that 29% of Ærø respondents would consider moving if the local hospital were closed. These attitudes were prevailingly found among respondents with small children and from households that included members with a chronic disease. 70-80 year old people were less willing to move, although this group found it particularly important to be close to health care services. Finally, 9% of Ærø respondents would consider moving in case transport time to nearest GP would be significantly increased.

Concerning the two eHealth solutions, respondents showed rather positive attitudes. 74% from Ærø and 70% from Odense would not be concerned if their X-ray pictures were evaluated by a doctor in a foreign country. Another 42% and 48% of respondents from Ærø and Odense, respectively, would feel fine about consulting a specialist via video telephone. Skeptics were mostly found among women and elderly people, while young and well-educated people felt most confident about these new types of treatment.

A main hypothesis in the Baltic eHealth project is that small hospitals with capacity problems can avoid closing down if basic tasks such as interpretation of X-ray pictures are assigned to hospitals with a surplus capacity, for example a hospital in another country. In this way it would be possible to avoid out-migration from the area, provoked by the closure of the hospital. On the one hand, this thesis presupposes that local residents *in fact* would migrate in case of a hospital closure, on the other hand that they would accept such outsourcing of health care services to other hospitals.

As mentioned, 29% of Ærø respondents would consider moving in case of hospital closure. Out of this group 72% would feel comfortable about having their X-rays interpreted in a foreign hospital. This indicates that outsourcing of time-consuming tasks via eHealth technology may have the potential of counteracting a part of the (probable) out-migration caused by closures of small hospitals. Likewise, our data indicate that the 'eHealth solution' *video telephone* probably would be able to counteract out-migration due to lack of GPs in remote areas. We, however, hurry to stress that such innovations can only *partly* solve the problem. Out of the 9% of Ærø respondents who would con-

sider moving if transport time to local GP is increased significantly, only 44% feel confident about consulting a GP via video telephone.

4.2 Conclusion

Overall, this study shows that rural and urban settlement preferences reflect a choice between two different lifestyles. Rural residents praise a life in quiet surroundings close to nature, in places where their children can enjoy a free, secure and happy childhood. Rather, urban residents have chosen their location out of consideration for job and education, that is, careers.

In respect to which impact access to health care services has on settlement, the evidence is more unclear. Based on expressed reasons for *actual settlement* and *actual relocation*, access to local health services seemed only to play a highly marginal role. However, when we look at *assumed* settlement preferences in case of reduction in the local health care supply, these services tend to be attributed much more importance by locals. Admittedly, a methodological weakness in this approach is that we precisely deal with assumed and not actual behavior. We may nevertheless conclude that, *when asked explicitly*, rural residents find local health care services very important – a finding, which can also be found in similar studies.

Both rural and urban residents reveal relatively positive attitudes to the two (electronic) eHealth solutions examined, made feasible due to recent innovations within health care telematics. When also taking into consideration that a not insignificant number of Ærø residents would consider moving in case of reductions in local health care, this makes probable that efficient and well-implemented eHealth solutions to a certain extent would be able to counteract migration from remote, rural areas.

Appendix 1: Questionnaire for the resident population on Ærø and in the city of Odense. Collected by telephone

Part 1: Screening and background information on the respondents

"Hello, my name is … I am calling from Vilstrup Research and I would like to speak to the father or mother of the household, please."

(To right respondent): I would like to ask you some questions about the reasons why you have chosen to live where you live. The questions are part of a research project at The University of Southern Denmark. The objective of the project is to examine the reasons why people choose to live either in urban or in rural areas. Participation is anonymous. This session will take approximately ten to twelve minutes. Will you take the time to answer the questions?

1. What is your postal code? *If the respondent does not remember it, suggest the postal code from the known data. If still not recognized -> key 9999 and close.*

5000:	5000 Odense C
5230:	5230 Odense M
5210:	5210 Odense NV
5220:	5220 Odense SØ
5240:	5240 Odense NØ
5250:	5250 Odense SV
5260:	5260 Odense S
5270:	5270 Odense N
5960:	5960 Marstal
5970:	5970 Ærøskøbing
5985:	5985 Søby
9999:	Do not know/not informed

Filter: *If 3 to 9 in question 1*

2. Do you live in Odense City? *Meaning if the respondent lives within the city limits? The relevant districts are: Næsby, Tarup, Bolbro, Fruens Bøge, Sanderum, Dalum, Hjallese, Vollsmose.*

1:	Yes
2	No

3a. Enter gender

1: Male
2: Female

4a. How old are you?

_____ years

5. How many years have you lived on Ærø/ in Odense? *Meaning a continuous period of time up until present time – not necessarily in the same house.*

_____ years

6. Do you live in a relationship or a marriage?

1: Yes => go to question 8
2: No

Filter: *If 1 to question 6:*
7. How many years has your partner lived on Ærø/in Odense? *Meaning a continuous period of time up until present time – not necessarily in the same house.*

_____ years

To be accepted as a respondent, the person must have lived on Ærø or in Odense in the past three years – not necessarily in the same house. If the person does not meet that requirement and if the partner does, you must ask to speak to him or her.

When replacing respondent:

(To right respondent): I would like to ask you some questions about the reasons why you have chosen to live where you live. Your answers will be used in a research project carried out by researchers at The University of Southern Denmark. The objective of the project is to examine the reasons why people

choose to live either in urban or in rural areas. This session will take approximately ten to twelve minutes. Will you take the time to answer the questions?

3b. Enter gender

1: Male
2: Female

4b. How old are you?

_____ years

8. Did you grow up on Ærø/in Odense
(Must have lived there most of the childhood/must have lived there when starting school or before that). Mark yourself "Yes" if it is clear from the answers to questions three and four/six

1: Yes
2: No

9: What is your highest level of education?
Mark the relevant category yourself. When in doubt ask more questions.

1: Primary schooling
2: Secondary schooling
3: Vocational training
4: Short and medium-length higher education (1 – 4 years)
5: Long higher education (5 years or longer)

10. What is your job situation? *Mark the relevant category yourself. When in doubt ask more questions.*

1: Self-employed business owner
2: Assisting spouse
3: Wage-earner
4: Unemployed
5: Student => go to quest. 14
6: Retired (old-age pensioner or early retiree) => go to quest. 16
7: Other (i.e. non-working housemother/father) => go to quest. 16

Filter: If 1, 2 or 3 to quest. 10:

11. Do you work on Ærø/ in Odense

1: Yes
2: No

Filter: If 1,2, or 3 go to quest. 10:

12. How many minutes do you travel from home to work?
Enter only the time it takes to travel one-way using the means of transportation most often used. If the respondent gives a time interval, use the average full minutes, rounding down, i.e. when the answer is 10 – 15 minutes, enter 12 minutes.

_____ *minutes*

Filter taking an education/undergoing training (5 in quest. 10)

13. Are you currently taking an education/undergoing training on Ærø/in Odense?

1: Yes
2: No

Filter taking an education/undergoing training (5 in quest. 10)

14. How many minutes do you travel from home to the place of education/training?
Enter only the time it takes to travel one-way using the means of transportation most often used. If the respondent gives a time interval, use the average full minutes, rounding down, i.e. when the answer is 10 – 15 minutes, enter 12 minutes.

_____ minutes

15. How many children under the age of 18 live in your household?_____

Filter: If children (15>0):

16. How old are the children living in your household – starting with the youngest child?
Enter the answer in the appropriate space yourself.

If children (5>0) Quest.	16.1:	Youngest child's age?: _____
If children (5>1) Quest.	16.2:	Youngest child's age?: _____
If children (5>2) Quest.	16.3:	Youngest child's age?: _____
If children (5>3) Quest.	16.4:	Youngest child's age?: _____
If children (5>4) Quest.	16.5:	Youngest child's age?: _____
If children (5>0) Quest.	16.6:	Youngest child's age?: _____

17. How many adult children not living at home do you have?

_____ (number of grown up children)

18. What kind of housing do you live in?
Enter the answer yourself. When in doubt, ask more questions.

1:	Single-family house/terraced house/villa
2:	Apartment
3:	Farm, productive
4:	Farm, non-productive
5:	Holiday house
6:	Do not know

19. Do you/you and your partner own your house?
If it is owner-partnership housing (andelsbolig) – the answer is "yes".

1:	Yes
2:	No

20. Which of the following descriptions fits the area you live in most accurately?
Respondents from Ærø can choose between answers 3-5. Respondents from Odense can choose between answers 1-2.

1:	City
2:	Town
3:	Small town (Ærøskøbing, Marstal or Søby on Ærø)
4:	Village
5:	Countryside

21. Where would you prefer to live if given a free choice, that is if you did not have to consider your job and family situation. I will give you 5 options:

Read up the 5 options.

1: City
2: Town
3: Small town (Ærøskøbing, Marstal or Søby on Ærø)
4: Village
5: Countryside

PART 2: Reasons for choice of current settlement

22. State in <u>one or two keywords</u> the most important reasons why you live on Ærø/in Odense.

If the respondent cannot answer the question, write: "Cannot answer".
The respondent can answer on behalf of him/herself or on behalf of the household.

a) First keyword _____ ENTER

b) Second keyword _____ ENTER

23. I will now mention some common reasons for why people chose to live where they live. I would like you to state whether these reasons are <u>very important, important, of little importance or not important</u> for your decision to live on Ærø/in Odense?

a) How important are circumstances concerning the job situation?

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

b) How important are circumstances concerning education/training?

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

c) How important is it for you to live near family and friends? *Read out 1 –4 if necessary*

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

d) How important are housing conditions? *Suggest the following conditions. Housing prices, parental home, house of your dreams. Read out 1 –4 if necessary*

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

e) How important is easy access to the following institutions in your neighbourhood: day care, schools, nursing homes? *Read out 1 – 4 if necessary*

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

f) How important is easy access to different healthcare services such as general practitioner, hospital, emergency room etc. *Read out 1 – 4 if necessary*

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

g) How important is it for you to live in a quiet environment in the countryside? *Read out 1 – 4 if necessary*

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

h) How important is easy access to cultural and other leisure-time activities. *Read out the following examples, if necessary: football, cinemas, etc.*

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

Part 3: Use of and view on healthcare services

24) Finally, I would like to ask you some questions regarding medical treatment. How many times have you or anybody from your household taken medical advice or been treated in a hospital? *Make sure that the respondent answers for everybody in the household.*

_____ (number of times)

98: Do not know
99: Do not want to answer

25. Do you or anybody in your household suffer from a long-term illness?

1: Yes
2: No
3: Do not know
4: Do not want to answer

26. How important is it <u>generally</u> to you to have access to healthcare services in your local area? *Suggest: general practitioner, hospital, health visitor, emergency room, medical specialist etc.*

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

27. How happy are you with the number of healthcare benefits accessible in your local area?

1: Very satisfied
2: Satisfied
3: Not very satisfied
4: Not satisfied
5. Do not know

28. How important is it for you to live close to your general practitioner?

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

29. How important is it for you to live close to a hospital?

1: Very important
2: Important
3: Of little importance
4: Not important
5. Do not know

30. How many minutes do you have to travel from home to your general practitioner? *Enter only the time it takes to travel one-way using the means of transportation most often used. If the respondent gives a time interval, use the average full minutes, rounding down, i.e. when the answer is 10 – 15 minutes, enter 12 minutes.*

_____ minutes

999: Do not know

31. Do you find that the transportation time acceptable?

1: Yes
2: No
3: Do not know

32. Imagine the following situation: Your GP moves or retires. Would you consider moving, if you had to travel a considerably longer time to see a doctor than you do today?

1: Yes
2: No => go to quest. 34
3: Do not know => go to quest. 34

Filter: 1 in quest. 32:

33. How many minutes would you be willing to travel at the most in order to see your general practitioner before you would consider moving? *Enter only the time it takes to travel one-way using the means of transportation most often used. If the respondent gives a time interval, use the average full minutes, rounding down, i.e. when the answer is 10 – 15 minutes, enter 12 minutes.*

_____ minutes

999: Do not know

34. How many minutes do you have to travel from home to the nearest hospital? *Enter only the time it takes to travel one-way using the means of transportation most often used. If the respondent gives a time interval, use the average full minutes, rounding down, i.e. when the answer is 10 – 15 minutes, enter 12 minutes.*

_____ minutes

999: Do not know

31. Do you find the transportation time acceptable?

1: Yes
2: No
3: Do not know

36. Would you consider moving if the nearest hospital were closed?

1: Yes
2: No => go to quest. 38
3: Do not know => go to quest. 38

Filter: If 1 to quest. 36:

37. How many minutes would you be willing to travel <u>at the most</u> in order to go to the hospital before you would consider relocating? *Enter only the time it takes to travel one-way using the means of transportation most often used. If the respondent gives a time interval, use the average full minutes, rounding down, i.e. when the answer is 10 – 15 minutes, enter 12 minutes.*

_____ minutes

999: Do not know

38. I will now read two statements and I would like you to state which one you <u>mostly</u> agree with. *Read and say "Statement 1" and "Statement 2" prior to the actual statement.*

1: "If I can get faster treatment from a specialist doctor, it is fine with me that the consultation is carried out by video telephone"

2: "I am not happy with the idea of having a consultation with a specialist doctor carried out by video telephone"

3: "Do not know"

39. I will now read two statements and I would like you to state which one you <u>mostly</u> agree with. *Read and say "Statement 1" and "Statement 2" prior to the actual statement.*

1: "If I can get faster treatment in Denmark, it is fine with me that it is a doctor at a foreign hospital who reads my X-rays"

2: "I am not happy with the idea that it is a doctor at a foreign hospital who reads my X-rays"

3: "Do not know"

40. What is the approximate total gross income of your household?

_____ (income in thousands)

98: Do not know

99: Do not want to answer

Filter: If 98 or 99 in question 40:

41. Would it be easier for you to answer if I give you some intervals? *Suggest the following categories*:

1: Under 100.000 Danish kroner
2: 100.000 – 299.000 Danish kroner
3: 300.000 – 499.000 Danish kroner
4: 500.000 – 699.000 Danish kroner
5: Above 700.000 Danish kroner
6: Do not know
7: Do not want to answer

Thank you for your participation!

Appendix 2: Multiple logistic regression analysis. Explanation

By using multiple logistic regressions, it is possible to examine the relation between a dependent variable factor and a set of independent (explanatory) variable factors.

We will explain the basics behind multiple logistic regressions by referring to the analysis in Table 12, column 1, where the relationship between the dependent variable factor (Y) and seven independent variables (X_{1-7}) is analysed:

Y = How important is it generally for you to have access to healthcare services in your local area?

X_1 = Respondent's gender
X_2 = Respondent's age, 6 intervals
X_3 = Number of children in the household, 4 intervals
X_4 = One or more members of the household suffering from chronic disease – or not
X_5 = Total number of visits to the GP over the past year, 4 intervals
X_6 = Respondent's level of education, 5 levels
X_7 = Location of the respondent's home (Ærø or Odense)

The dependent variable Y is a categorical variable with two levels: 1 = respondent finds it "very important" to have access to healthcare services in the local area; 0 = the respondent finds it either "important", "of little importance" or "not very important" to have access to healthcare services in the local area. Also the explanatory variables are categorical variables. Gender has two categories (female or male) while the others have more categories, such as age, which is split up into six different age categories.

By regression, the explanatory variables (X_{1-7}) are measured on their ability to explain the answer to variable Y. Within each explanatory variable, odds ratios are calculated to show how each person category has answered question Y in comparison with a reference category within the explanatory variable. The reference category is assigned a neutral effect: odds ratio = 1. The other odds ratios express to what extent the category in question differs from the reference category. Thus, persons in one category with an odds ratio > 1 have to a higher degree answered "very important" to that particular question. Similarly, the persons in a category with an odds ration < 1 have to a minor extent answered "very important" to that particular question.

The regression method ensures that the explanatory variables are adjusted in relation to each other. For instance, the calculated effect of whether you live on Ærø or in Odense is adjusted for all other explanatory variables, e.g. adjusted for different age compositions and medical histories.

If we take an example from the first column in Table 12, we can see that it is more important for persons at the age of 70-80 years than for persons at the age of 18-29 years to have access to healthcare services in the local area (odds ratio = 2.10). One can say that having access to healthcare services in the local area is 2.10 times more important to persons at the age of 70-80 years than for persons at the age of 18 – 29. To this question, 31% of the 18-29 year-old people answered “very important”, whereas 59% of the 70-80 year-old people answered “very important”. If you divide 59 by 31, you will *not* get 2.10 (the obtained odds ratio), which is due to the fact that the calculations are adjusted for other variables.

Furthermore, the model calculates whether the calculated odds ratios are significantly different from the reference value. Normally, a level of significance of less than 0.05 is accepted. This means that there is a 95 % probability that there in fact is a difference between the calculated odds ratio and the reference value, which is 1. In the table, three levels of significance (0.05; 0.01; 0.001) are given, which expresses a rising levels of significance.

Appendix 3: Interview guide (telephone interviews)

Baltic eHealth – Interview guide – Odense to MARSTAL municipality
Date:
Name:
Age:

Hello, this is Gunnar Svendsen from University of Southern Denmark. We are doing an investigation as to why people chose to settle in cities or in the country. In this connection, we have learned that you have moved from Odense to Ærø in _____.
For our investigation, I would like to ask you eleven short questions. It will only take about 10 minutes. Would you like to participate?

1) Did you move alone or together with someone else?

2) Why did you move – mention the most important reasons first?
    1.
    2.
    3.
    4.
    5.

3) Something like the supply of health care services (doctors, hospital, home care), was that something you thought about prior to the move?

4) IF YES: Would you say that it was actually a *part* of the reason why you moved??

5) Have you thought about moving back again? (Why?) (i.e. temporary or permanent move?)

6) Then I would like to ask you a couple of questions about medical treatment. Within the latest 12 months, how many times has someone from your household been to the doctor or gone for treatment at the hospital? Just roughly: _____ times.

7) Have you or anyone else in your household a chronic disease?

8) What is your highest completed education?

9) What is your employment status?

10) Have you got a spouse?

11) Have you got children?

I thank you for your answers!

Appendix 4: Respondents by type of relocation (N=43)

	Rural to urban moves		Urban to rural moves		Total
	Ærø to Odense	Ærø to Svendborg	Odense to Ærø	Svendborg to Ærø	
Gender					
Male	6	2	5	7	20 (47%)
Female	5	5	6	7	23 (53%)
Age					
18-39	7	3	7	10	27 (62%)
40+	4	4	4	4	16 (38%)
Moved alone?					
Yes	7	4	7	9	27 (62%)
No	4	3	4	5	16 (38%)
Living status					
Lives with partner	1	4	3	7	15 (35%)
Lives without partner	10	3	8	7	28 (65%)
Children					
None	7	3	4	8	22 (51%)
1 child	0	4	4	4	12 (28%)
> 1 child	4	0	3	2	9 (21%)
Education					
Only basic school	1	2	1	1	5 (12%)
Secondary school	3	1	2	3	9 (21%)
Vocational	5	1	5	3	14 (33%)
Short-medium term	1	2	2	6	11 (26%)
Long	1	1	1	1	4 (9%)
Employment					
Self-employed	0	0	0	2	2 (5%)
Employed	3	3	3	8	17 (40%)
Unemployed	1	1	2	1	5 (12%)
Under education	4	1	2	1	8 (19%)
Pensioner	2	2	2	2	8 (19%)
On sick leave	1	0	2	0	3 (7%)
Chronic disease					
Yes	3	2	5	2	12 (28%)
No	8	5	6	12	31 (72%)
Doctor visits last year					
0 times	3	2	1	2	8 (19%)
1-9 times	7	5	6	12	30 (70%)
> 10 times	1	0	4	0	5 (12%)

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