



Combined impact of future trends on healthcare utilisation of older people: A Delphi study

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ARTICLE INFO

Article history:

Received 3 April 2019

Received in revised form 22 June 2019

Accepted 7 July 2019

Keywords:

Public health trends

Healthcare planning

Ageing society

Population health foresight

Delphi method

ABSTRACT

Purpose: To explore the combined effect of trends in older people on their future healthcare utilisation. **Methods:** A Delphi study consisting of two rounds was conducted. The heterogeneous expert panel (n = 16) in the field of elderly care rated the effect of combinations of trends in the Netherlands on the use of seven healthcare services: i.e. informal, home, general practitioner, acute, specialist, nursing home and mental health care. The percentage and direction of the overall consensus, for the different health services, and for three main trends were analysed.

Results: Experts reached consensus in 57 of 92 ratings (62%). Taking into account the interaction between trends, they expected an extra increase for informal, home, and general practitioner care, but no additional effect of interaction for specialist and acute care. Combinations that included trends leading to less support were expected to lead to an extra increase in utilisation.

Conclusions: Experts expect that interaction between trends will lead to an extra increase in the use of general practitioner, home, and informal care. This increase is mainly the result of interaction with trends leading to less support for older persons. The present results show the need to take the effect of interaction into account when designing new health policy and in research on future healthcare utilisation.

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1. Introduction

Governments need information on the current health status of a population and how it will develop in order to design and evaluate policy options and interventions [1–4]. The health status of a population depends on various factors, including population characteristics, individual health behaviour, the healthcare system, the external environment, and health outcomes [5]. Population health foresight studies aim to describe the development of these factors in the future, their underlying determinants, and their expected effects on future healthcare need, demand, use and supply. However, future developments always encompass a certain level of uncertainty due to limitations of the available evidence on the effect of trends and limited knowledge on how trends will evolve [6–8].

Population ageing is expected to lead to increased healthcare utilisation [9,10]. This is not a linear relationship, as the future older population will differ from the current older population in, for example, lifestyle, (e)health literacy skills, and social network [9–11]. The effects of single trends on future healthcare utilisation by older people have been examined [12–16]. However, because multiple trends apply to older persons, these trends influence each other's effect on the total healthcare utilisation of a population. Although most studies (at local and international level) acknowledge that multiple factors and the interaction between them play a role, they generally only take the individual effects of trends into account when reporting on future healthcare utilisation [11,15–18].

This preference for individual trends is not surprising. Interaction between and effects of multiple and often heterogeneous trends in public health and healthcare (i.e. health, disease, environmental and socio-economic trends) are notoriously hard to adequately quantify [19,20]. Methods that facilitate exchange of expert opinions, feedback of results, brainstorming and discussions, such as 'deliberative dialogues' or Group Decision Rooms (GDRs), were demonstrated to be useful to tackle this issue [6,21–23].

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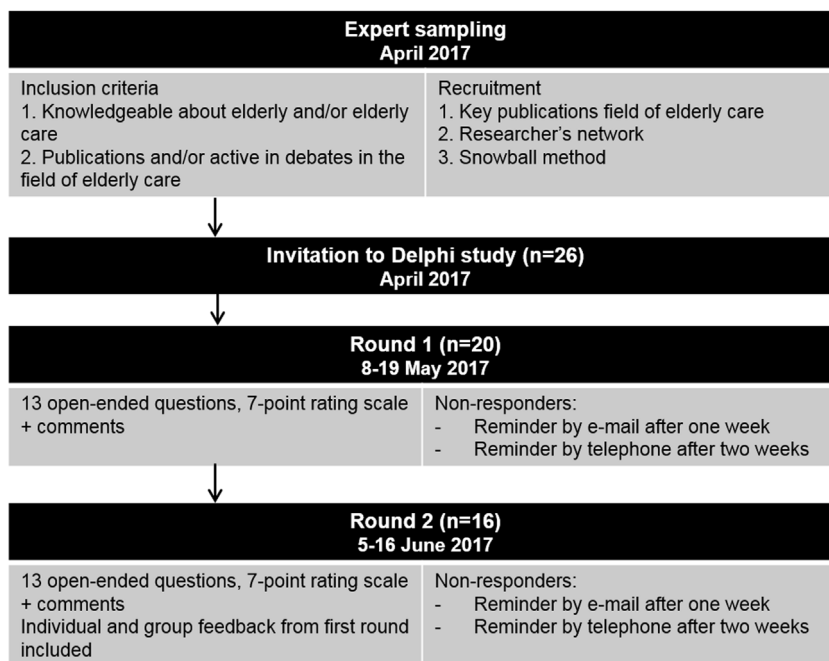


Fig. 1. Flowchart study procedure and expert participation.

Therefore, this study aims to explore the relevance of the combined effect of trends in older people on their future healthcare utilisation using a similar interactive method: the Delphi study. While it does not offer the possibility of *real time* exchange, it does offer a platform for expert exchange of opinions, feedback of results, brainstorming and discussions, which are necessary to gain insight in the complex interaction of heterogeneous trends. Furthermore, the Delphi method can be used when evidence on a topic is limited and complex interdependencies play a role [8]. It uses an expert consensus procedure to identify the main effects and needs for further research. The results of this study will give an indication of the relevance, direction and effect of interacting trends in terms of healthcare utilisation that could not be adequately quantified. By doing so, this study can provide input for strategic discussions on complex public health issues, like population ageing.

2. Methods

2.1. Delphi method

The Delphi method is a validated technique used to collect the opinions of a group of experts on a complex topic on which there is limited evidence. The goal of the Delphi method is to reach consensus within an expert panel on the topics under discussion. However, the absence of consensus also provides information, as it indicates the topics for which there are knowledge gaps or disagreements. The expert panel usually consists of fifteen to twenty respondents [24–30].

The present study used a Delphi consensus procedure consisting of two rounds of questionnaires distributed via e-mail. The topic investigated was: the combined effect of medical and social trends on healthcare utilisation by the older population in 2040 in the Netherlands. The responses to the first questionnaire were fed back anonymously to the expert panel. This feedback enabled participants to reflect on the different views and modify their own view in the second round, when they again filled out the same questionnaire [24–28]. All experts were asked to participate in both rounds of the study; they could only participate in the second round if they had completed the first one. Each round lasted two weeks. In case

of non-response, e-mail and telephone reminders were sent after one and two weeks, respectively. The Delphi study was conducted between April 2017 and June 2017. Fig. 1 gives an overview of the study procedure. No ethical approval was required for this study.

2.2. Expert panel and patient involvement

A total of 26 experts in the field of elderly care in the Netherlands were invited by e-mail to participate in this Delphi study. Experts were those who 1) were knowledgeable about older people and/or elderly care in the Netherlands, and 2) had published and/or were active in debates in the field of elderly care. Recruitment of experts was guided by the researchers' network, key publications in the field, and the snowball method. During the selection and inclusion process, the representativeness of the panel for the whole scope of elderly care in the Netherlands was kept in mind. The future old (65–80 years) and oldest old (80+ years) were involved in the study as part of the Delphi expert panel, by inviting representatives of the elderly board region South-Holland North to participate. Further details on the expert panel are provided in the Results section.

2.3. Questionnaire design

The questionnaire (S1 Appendix) for both rounds consisted of combinations of (mostly) quantitative trends in the determinants of healthcare utilisation of older people. These trends were extracted from the Dutch Public Health Foresight Study (*Volksgezondheid Toekomst Verkenning-2018; VTV-2018*) Trend Scenario [9,10]. This report describes future trends in the (public) health status of the Dutch population until the year 2040. To be included in this study, trends also had to be a proven determinant of healthcare utilisation according to the literature [13,31–36]. The trends (S2 Appendix) included demographic changes, socioeconomic changes, trends in lifestyle and health, and recent developments in health policy.

With regard to demographic changes, various aspects of population ageing were incorporated in the questionnaire. These include an increase in the number of oldest old (80+ years), an increase in the number of older people that will live independently, and a decrease in the parent support ratio (i.e. the ratio of the 50 to

64-year-olds to those aged ≥ 85 years). This latter trend gives an indication of the future decrease in 'potential informal caregivers' [37–39]. With regard to (population) health, trends in the number of people with multiple chronic diseases, in self-rated health and in loneliness were included [40]. Other population characteristics that were included concerned tangible and less tangible trends in the level of education, income and expectations about healthcare [10,14,41–43]. Lastly, several contemporary trends in health policy were incorporated in the questionnaire. These include i) the ambition of the Dutch government to enable older people to live independently for as long as possible, ii) the gradual increase of the retirement age, and iii) the ambition to stimulate the use of eHealth-solutions in healthcare [44,45].

The researchers incorporated combinations of trends that (according to the literature) contrasted in terms of consequences for future healthcare utilisation by older people in thirteen questions using a seven-point rating scale. Most questions focussed on either the old (65–80 years) or the oldest old (80+ years), as these are different groups and the VTV-2018 trend descriptions often only described one of them. For each question, the experts were asked to score on a scale of 1–7 (1 = very great decrease; 7 = very great increase) what they thought would be the combined effect of the trends on healthcare utilisation by older people [46]. This was asked for seven different types of health services: informal care, home care, general practitioner (GP) care, hospital/specialist care, nursing home care, mental healthcare and acute care. One question, which was about income and the parent support ratio (i.e. the ratio of the 50 to 64-year-olds to those aged ≥ 85 years), also covered private care as a type of health service. The experts had the opportunity to comment on their scoring in a free-text field. In the first round, they were asked to always add a comment if they scored the highest or lowest score on the rating scale, or if they were uncertain about their answer. In the second round, the experts were asked to always comment on their scoring if it strongly deviated from what most experts had scored in the first round, or if they were uncertain about their answer. In the questionnaire of the second round, the responses to the first round were presented per question as the number of experts scoring each rating category. Moreover, all comments of the first round were anonymised and presented per question in the second round. The questionnaire was tested on one elderly care expert and one future older person; these persons were not included in the Delphi study.

2.4. Data analysis

In the analysis, the scoring categories one and two were categorised into the cluster 'great decrease' and the scorings six and seven into the cluster 'great increase'. The other scoring categories (3=decrease, 4=no effect, 5=increase) were analysed separately. If an expert filled in two scores instead of one for a question ($n = 2$), the score closest to the category 'no effect' was chosen. Consensus was defined as a certain percentage of agreement. In the literature, different percentages are applied, depending on, amongst others, the design of the study (e.g. number of rounds and rating scale used) [30]. In this study, two levels of consensus were used because of the limited number of rounds. 'Full consensus' was defined as $\geq 75\%$ agreement on the strength of the effect expected for a type of healthcare service. More than or equal to 62.5% agreement was also considered relevant and was described as 'intermediate consensus'. The criteria for consensus were determined before the start of the study. Finally, the results were also analysed on consensus on the direction of the effect: decrease (score 1–3), no effect (score 4), increase (score 5–7) (percentage of agreement: $\geq 62.5\%$). In the sub analyses (i.e. health services, overarching trends, and age groups), the three types of consensus are described together under the term 'consensus'.

SPSS Statistics version 24.0 (IBM Corp., Armonk, NY, USA) was used for the quantitative analysis. For each question, the scoring frequency per rating category and the median (with its interquartile range) was calculated per type of health service. Afterwards, the percentage and direction of consensus was calculated i) for overall, ii) for the seven types of health services, and iii) for questions with similar trends. The percentage of consensus was calculated as the number of items with consensus divided by the total number of items in that category. Finally, the comments accompanying each question were categorised according to the theme and expected effect (e.g. extra decrease, no effect, or extra increase). These categories were analysed regarding the extent to which they supported and explained the scoring of the expert panel.

3. Results

3.1. Expert panel

Of the 26 invited experts, 20 responded to the first questionnaire (response rate 77%) and 16 experts responded to the second questionnaire (response rate 80%, $n = 20$). Reasons for dropout were time constraints and not feeling comfortable with filling in the questionnaire. The final expert panel was heterogeneous and comprised five 'experience experts' (representatives from the current 45+, 65+ and 80+ cohorts) and eleven experts in the field of demography ($n = 2$), social networks ($n = 1$), cultural perception of older people ($n = 1$), health beliefs ($n = 1$), organisation of healthcare ($n = 3$), elderly care ($n = 2$) and informal care ($n = 1$). This panel was considered to reflect different perspectives regarding older people and elderly care in the Netherlands (Table 1).

3.2. Overall consensus throughout the rounds

In both rounds, the expert panel scored thirteen questions on seven (and once on eight) types of health services (total $n = 92$). The level of overall consensus within the expert panel increased throughout the rounds. After the first questionnaire, experts agreed on the direction of change in 38% (35/92) of the cases; the experts also agreed on the strength of the effect in 8% of the cases (7/92). These latter agreements all represent an 'intermediate' level of consensus as described in the methods section.

In the second round, experts agreed on the direction of change in 57 of 92 ratings (62%). The experts also agreed on the strength of the change in 45% of the ratings (41/92), of which 18% was full consensus and 27% intermediate consensus. In all cases where consensus was reached ($n = 57$), the panel expected either no effect on healthcare (42%, 24/57) or an extra increase of healthcare utilisation (58%, 33/57) due to interaction between the presented trends. At no time did the panel expect an *extra decrease* of healthcare utilisation. In all questions, the overall scoring centred around 'increase' to 'no effect' (Table 2).

3.3. Health services

The experts did not expect an effect of interaction between trends on the use of specialist and acute care (for both: 10 of 13 ratings consensus, 80% (8/10) no effect). In contrast, the experts expected an extra increase in the use of informal care (8 of 13 ratings consensus, 75% (6/8) extra increase), home care (7 of 13 ratings consensus, 86% (6/7) extra increase), and GP care (9 of 13 ratings consensus, 100% (9/9) extra increase). The expected increase was explained by one of the experts as follows: "Much of the healthcare demand – either acute or not – will end up with GPs; that is the aim of government policy after all". This quote illustrates the way the Dutch healthcare system is currently organised. In the Netherlands, GPs are the first medical professionals to contact in

Table 1
Characteristics Delphi expert panel.

Expert	Gender	Professional background	Field of expertise	Completed 2 nd round (yes/no)
1	M	Business administration and economics	Organisation of healthcare	Y
2	M	Economics	Demography	Y
3	M	Medical doctor / researcher	Demography	Y
4	F	Social and cultural anthropology	Cultural perception of older people	Y
5	F	Manager in healthcare and social welfare	Informal care	Y
6	M	Geriatrician / researcher	Health beliefs	Y
7	F	Sociology	Social networks	Y
8	M	Health economics	Organisation of healthcare	Y
9	F	GP / researcher	Elderly care	Y
10	M	Specialist internal medicine / researcher	Elderly care	Y
11	F	Econometrics	Organisation of healthcare	Y
12	F	Clinical nurse / researcher	Representative future old	Y
13	M	Elderly board	Representative older people	Y
14	F	Elderly board	Representative older people	Y
15	M	Elderly board	Representative older people	Y
16	M	Elderly board	Representative older people	Y
17	F	Elderly board	Representative older people	N
18	F	GP / researcher	Elderly care	N
19	F	Public health sciences	Health literacy	N
20	F	Health sciences	Patients with chronic diseases and quality of life	N

Table 2
Scoring results Delphi round 2.

	Informal care	Home care	GP care	Specialist / hospital care	Acute care	Nursing home care	Mental healthcare
eHealth							
Increase oldest old + eHealth (oldest old)							
Increase loneliness + eHealth (oldest old)							
Increase education level + eHealth (old)							
Less support							
Decrease parent support ratio + increase alone living older persons + increase low feeling control (oldest old)							
High proportion older persons rural areas + low service level (oldest old)							
Increase alone living men (vs alone living women) (oldest old, not explicit)							
Decrease income + decrease parent support ratio (old)							
Transition care + increase alone living older persons + decrease parent support ratio (both)							
Change in health status							
Higher expectations + no change age physical limitations (oldest old)							
Decrease smokers + increase overweight and obesity (old)							
Longer working + increase chronic conditions (old)							
Increase chronic conditions + increase proportion feeling healthy (old)							
Increase education level + increase migration background (both)							

Table 2 legend: GP, general practitioner.

Consensus $\geq 75\%$.

Consensus.62.5–75%.

Consensus <62.5%.

Green – Extra increase expected.

Purple – No effect expected.

Orange – Extra decrease expected.

case of health problems for all community-dwelling persons. They serve as a gatekeeper for more specialised healthcare services (i.e. hospital care and mental healthcare). The quote also illustrates the effect of recent government policy, which aims for substitution of hospital/specialist care with primary care and for older people to live independently for as long as possible [47–49].

Besides the direction of the expected effect, the percentage of consensus reached also differed between the types of health services. The health services specialist and acute care had a high

percentage of consensus (both 77% of 13 ratings), while the percentage of consensus reached for informal, home and GP care was lower with 62%, 54% and 69%, respectively (all 13 ratings). The percentage of consensus for nursing home care and mental healthcare was low (46% and 38%, respectively, both 13 ratings); equally often, the experts expected both 'no effect' as well as 'an extra increase' in the use of these two services because of the interacting trends. These ambiguous expectations were formulated by one expert as follows: "I do expect a slight increase in the need of nursing home

care, but no increase in the effective demand – as the health system discourages this. . .”. This quote illustrates the tension between demographic trends in the population and current healthcare policies. Demographic trends such as an increase of the number of older people living alone and a decrease of the parent support ratio tend to increase the use of institutionalised care [50]. On the other hand, current policies intend to increase independent living (i.e. reduce institutionalisation and the use of long-term care) and to give people more responsibility to organise their own care [47–49]. For private care, assessed with one question, the panellists reached consensus on the direction of the effect (i.e. extra increase).

3.4. Overarching trends

Three overarching trends can be identified in the questions presented to the experts: eHealth, less support, and change in health status. Experts rarely reached consensus on questions that included eHealth (consensus on 6 of 21 ratings, 29%) and they never expected an effect on healthcare utilisation. An expert formulated his doubts as follows: “. . . it goes beyond my imagination, on the one hand because future developments in the field of eHealth are hard to visualise, and on the other hand because the differences in the competence to use these new care forms will probably increase”. In this quote the expert formulates two uncertainties, the first being the rapid developments in the field of eHealth, which are often unexpected and therefore unpredictable. The uncertainty as formulated in second part of the quote refers to the, already existing, differences in health and eHealth literacy, which are shown to influence healthcare use [51,52]. In contrast to the questions on eHealth, a high percentage of consensus was reached on questions that included trends that will lead to less support (consensus on 26 of 35 ratings, 74%). Such trends include a decrease in the parent support ratio (i.e. the ratio of the 50 to 64-year-olds to those aged ≥ 85 years) and an increase in older people living independently. Questions including these trends were mainly expected to lead to an extra increase in healthcare utilisation (81% of all consensus, 21/26) and, in particular, in informal, home and GP care. This increase was motivated as follows: “Because of less possibilities in informal care, the need for home care will increase considerably, just like the need for GPs, as they are a trusted advisor within someone’s social network.” Combinations of trends that included a change in health status reached a percentage of consensus of 65% (23 of 35 ratings) and were equally often expected to have no effect (57% of all consensus, 13/23) or to lead to an extra increase (43% of all consensus, 10/23) in healthcare utilisation. The expected extra increase was mainly in GP and specialist care (70% of all expected increase, 7/10).

3.5. Old and oldest old

The percentage of consensus reached was almost equal for the old and oldest old [60% (21/35) and 54% (23/42), respectively]. However, an extra increase of healthcare utilisation due to interaction between trends was expected slightly more often for the oldest old (65%, 15/23) than for the old (43%, 9/21). This difference is based on small dissimilarities in expectations regarding GP, home and informal care (i.e. extra increase expected: old 7/15; oldest old 10/18), and by differences in expectations regarding nursing home care and mental healthcare. In cases where consensus was reached on nursing home care and mental healthcare, there was never an effect of interaction expected for the old (no effect 4/10; increase 0/10), while for the oldest old an extra increase was sometimes expected (no effect 2/12; increase 3/12). This difference is in line with current policies that aim to reserve institutional care (i.e. nursing home care and mental healthcare) exclusively for the most frail, which are often the oldest old.

4. Discussion

This study aimed to explore the effect of interaction between trends in older people on their future healthcare utilisation with the help of a Delphi study. Our study shows that interaction between trends will lead to an extra increase in the use of healthcare. In other words, the experts expect a greater increase in healthcare utilisation than the already expected increase based on the extrapolation of single trends. However, there were clear differences between types of healthcare services and trends regarding the expected effect and the extent to which the experts agreed on this. The experts rarely agreed on the effect of interaction on nursing home care and mental healthcare. On the other hand, an extra increase in use due to interaction was expected for GP, home and informal care, while mostly no effect of interaction was expected for specialist and acute care. The most important trends that contribute to the expected extra increase in healthcare use due to interaction are those that lead to less support for older people (e.g. decrease of the parent support ratio, increase in the number of older people living independently). The effect of interaction between demographic trends and eHealth, which plays an important role in current health policy, was rarely agreed on by the experts.

4.1. Difference between healthcare services

Based on this study, two explanations could be given regarding both the difference between health services on the expected effect of interaction and the difference in the extent to which the experts agreed on this. First of all, the difference between the healthcare services might be explained by a difference in focus between these services. For example, GP, home and informal care are healthcare services that provide a more integrated type of care, which is focussed on both disease and social circumstances. Interaction between trends is expected to cause an extra increase in the use of these latter services. On the other hand, the use of specialist and acute care is expected to be unaffected by interaction between trends; because the care provided by these services is more directly related to a disease, social circumstances affect the use of these services to a lesser extent. Even though the trends included in this study cover both changes in disease and/or physical health, as well as changes in social circumstances, the extra utilisation is mainly expected for healthcare services that focus on both disease and social circumstances. Thus, interaction between trends has a stronger influence on healthcare services that provide both disease-related and social-focussed care than on services that provide more disease-related care alone.

A second explanation for the differences between health services could be the interplay between trends and their interactions with current trends in health policy. As apparent from the experts’ comments, interaction between demographic trends, such as an increase in the number of older people, might increase the need of care. However, the eventual use of healthcare services is not only the effect of trends in a population, but also of current trends in health policy. Current policies, for example, aim to dampen the use of long-term and institutionalised care, to stimulate the substitution of hospital/specialist care with primary care, and to increase self-reliance of all citizens, including that of older persons. As a result, a future rise in the need of care will not necessarily lead to a rise in the use of care. Our findings of an expected effect of interaction on GP, home and informal care, and no effect on specialist and acute care is, for example, in line with the contemporary policy focus on substitution of hospital/specialist care with primary care. Also, the lack of agreement and uncertainty expressed by the experts concerning nursing home care and mental healthcare seem to be a consequence of developments in health policy. Both services were recently subjected to major policy changes in

the Netherlands and are therefore still rapidly evolving. Although the experts stated in their comments that they expect an effect of interaction between demographic trends on healthcare need, they did not reach agreement on what the effect on healthcare use would be because of policy trends that aim to redirect these needs. Finally, no conclusions can be drawn from this study regarding the effect of interaction on private care, as this type of health service was covered by only one question.

4.2. Decreasing support and eHealth

The expected extra increase in the use of health services (especially GP, home and informal care) can mainly be attributed to trends that lead to less formal and informal support for older people. This observation is in line with the conclusion above: services with a focus on both disease and social circumstances are affected by the interaction of health and social trends to a larger extent than the disease-related health services. These findings also show that, although self-reliance is an important focus of current health policies, interaction between trends that lead to less support is expected to lead to an increase in the use of care anyway. However, the experts expect that this increase in healthcare utilisation will be redirected from institutions and hospital to primary care. In contrast to the trends that lead to less support, the expert panel rarely agreed on the effect of interaction of trends with eHealth on healthcare utilisation. As is apparent from the experts' comments, this low consensus is mainly the result of both rapid developments in the field of eHealth, which makes it hard to visualise the future, and scepticism about the actual positive effects of eHealth, especially in an older population. Despite these existing uncertainties, current healthcare policy (i.e. to stimulate independent living and self-reliance) does rely on the expected advancement of eHealth [45,51,52]. The expert panel in this study seems to have more restrained expectations on the potential of eHealth for both cure and care.

4.3. Considering interaction between trends: the added value of a Delphi Study

To our knowledge, this study is the first to assess the effect of interaction between trends on future healthcare utilisation and therefore cannot be compared to previous reports. However, the results of this study are in line with previous research on determinants of healthcare utilisation. In these latter studies, multivariable models were often used to identify factors that influenced care utilisation in a retrospective cohort. The effect of some factors (e.g. age and living alone) was consistent across studies, but the estimated effect of most factors (e.g. gender and income) varied widely between the studies. However, all these studies on determinants of healthcare utilisation showed that healthcare utilisation is the result of an interplay between different factors [53–58]. To our knowledge, the present study is the first to attempt to translate this knowledge to research on future healthcare utilisation. Therefore, it gives a more accurate impression of future healthcare utilisation based on quantitative trends than previous studies; more importantly, it emphasises the need to include interaction in research and reports on future healthcare utilisation. A reason for not having done this before, might be the scarcity of (quantitative) data and evidence on the combined effect of trends, which complicates extrapolation of interaction and quantitative modelling. However, interaction could be included in research on future healthcare utilisation by means of the Delphi method. The interpretation of trends by multiple experts can yield different estimations of future healthcare utilisation than expected when based on the analysis of single

trends and, thereby, provide a more comprehensive impression of future healthcare utilisation [24,29].

4.4. Strengths and limitations

One of the strengths of this study is the diversity and size of the expert panel. As the results from a Delphi study are highly dependent on the included experts, an expert panel needs to cover the whole field under study [30]. In the present study, the perspectives of experts from multiple areas of expertise were combined, including those of future older people themselves. Therefore, the results include perspectives from the entire scope of elderly care in the Netherlands, which strengthens the validity of the results. Another strength of this study is the inclusion of both disease-related and social trends in the questionnaire. Previous research often only included single trends that were either disease-related or social, while healthcare utilisation is influenced by both. In the present study, the inclusion and combination of both groups of trends brings the results closer to reality.

A limitation of this study is the complexity of the topic. One of the experts remarked: "...the combined effect is difficult to interpret", and several experts reported to have difficulty filling out the questionnaire. This complexity might have led to the large dropout in the study; however, this was also the reason for selecting the Delphi method for this study. By asking a group of experts with diverse backgrounds to share their opinion and reflect on it, various inputs and perspectives can be combined into a more comprehensive overall conclusion [24]. It might also be seen as a limitation that this study does not report on the expected total future healthcare utilisation of older people in the Netherlands, or that of subgroups within this group. However, it was not the aim of this study to estimate future healthcare utilisation, but to study the *relevance* of interaction for future utilisation and the expected direction of the effect of interaction.

Finally, it could be seen as a limitation that this study only included Dutch experts and trends. However, we do expect that our findings are valid outside the Netherlands. Most trends included in this study are also seen in other countries (e.g. ageing of the population, decreasing (informal) support for older people). This study assessed the combined effect of these (universal) trends in the Dutch context and showed that interaction between such trends does have an influence on healthcare utilisation. Although the exact effect of interaction depends on the cultural and health system context, we expect that the presence of an effect of interaction on healthcare utilisation does not. Furthermore, we expect that the presence of the influence of policy on the effect of interaction, as observed in this study, is generalisable to other healthcare settings. Therefore, the conclusions of this study that interaction between trends has an effect on healthcare utilisation and that health policy influences this effect are expected to be applicable to other international contexts. Finally, trends in health policy that are seen in the Netherlands, such as an increased focus on self-reliance and stimulation of independent living outside institutions, are answers to the challenges of an ageing society. As countries throughout the world face similar challenges because of an ageing society, similar patterns of the effect of trends on the use of care due to interaction can be expected in other countries.

4.5. Conclusions

To conclude, our Delphi-study shows that experts expect that interaction between future trends will lead to an extra increase in the use of GP, home and informal care by older people on top of the expected increase due to population ageing. The main trends behind this extra increase are those that lead to less support for older people (i.e. decrease parent support ratio, increase older peo-

ple living alone, high proportion older people living in rural areas). Although the exact effect of interaction on healthcare utilisation is dependent on the national healthcare system, national health policy and cultural differences, the presence of an effect of interaction between trends, as shown in this study, is likely to also be there in other international contexts. Therefore, the results of this study emphasise the importance of taking into account the interaction between trends when studying future healthcare utilisation.

In this study we used the Delphi method as a first exploration of the effect of interaction between trends as expected by experts. As a next step in future healthcare research, interaction could be included in and studied in more detail by means of simulation modelling. Furthermore, the effect of interaction between trends in a population should be taken into consideration when designing new health policy. Future healthcare use was already expected to increase because of population ageing, but this study shows that this increase is expected to be even higher because of interaction between trends. In addition, policy makers should keep in mind that contemporary trends in health policy are also expected to influence the effect of interaction between other trends on healthcare utilisation. Therefore, the consequences of (new) health policy on the interaction between trends and the resulting healthcare use should be taken into account when designing new health policies.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data statement

Data available on request – The raw data are not publicly available because it would compromise participant privacy. However, they are available from the National Institute for Public Health and the Environment upon request (email address: vtv2018@rivm.nl).

CRedit authorship contribution statement

W.M. Ravensbergen: Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft, Writing - review & editing, Project administration. **Y.M. Drewes:** Conceptualization, Methodology, Writing - review & editing, Supervision. **H.B.M. Hilderink:** Resources, Writing - review & editing. **M. Verschuren:** Resources, Writing - review & editing. **J. Gussekloo:** Writing - review & editing, Supervision. **R.A.A. Vonk:** Conceptualization, Methodology, Resources, Data curation, Writing - review & editing, Supervision.

Declaration of Competing Interest

None.

Acknowledgement

The authors thank all the experts in this Delphi study for their participation and valuable comments. We also thank the staff of the Master Vitality and Ageing (Leiden University) and the staff of the National Institute for Public Health and the Environment for facilitating and supporting this study.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.healthpol.2019.07.002>.

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