

The experience of a heat wave and preparations for a hot future

A case study of climate change adaptation and health risks faced
by the elderly population of Trelleborg

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Abstract

As global temperatures rise, adverse health effects due to heat exposure are an increasingly pressing issue, particularly threatening to the health of elderly people. Mitigating these threats requires a dynamic climate adaptation system embedding a variety of measures. Ideally, such a system incorporates the coping strategies and experiences of the vulnerable themselves in a well-developed strategical work of municipalities. This study was performed in Trelleborg in the aftermath of the extraordinarily warm summer of 2018. The aim was to investigate the specific risk context of elderly and heat, in terms of how the municipality and its elderly population experience and manage such risks, both separately and in collaboration. Three focus group sessions with elderly individuals were conducted, as well as nine interviews with municipality officials. These were analysed alongside a number of official documents on the topic. The findings showed that the elderly's primary concerns with regards to the heat is with regards to the threats to society at large, or to other elderly individuals, rather than to their own health, thus implying a need for awareness-raising measures. Nonetheless, the elderly's lives were fundamentally altered during the summer of 2018. Coping strategies included alterations of circadian rhythm, food and drink intake, and movements, and were thus mostly behavioural. These coping strategies appear as unreflected rather than deliberate. The municipality has implemented response mechanisms, particularly aimed at the citizens within the elderly care system. Moreover, it has focused on the spreading of information on risks and possible counter-measures at the individual level. However, it fails to incorporate management of heat in the urban development. This thesis provides a discussion that extends into potential ways of enhancing the adaptational work of the municipality. Suggested improvements include implementation of ecosystem-based adaptation, more focus on the suitable channels of information, as well as achieving what I refer to as heat-escape.

Key words: *heat wave, climate change, climate change adaptation, elderly population, citizen participation, coping strategies, adaptation interaction, resilience*

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1 Introduction

Dubbed “the greatest health challenge of the 21st century” (WHO, 2018), the “existential threat” (UN.org 2018) known as climate change is a growing concern for people and governments across the globe. Unless abated, rising average temperatures attributed to anthropogenic emissions of greenhouse gases are expected to further amplify weather extremes, cause “unacceptable” harm to the lives of people and “overwhelm” the healthcare infrastructure on which populations rely (Watts et al., 2018). One estimation sees the number of excess deaths rise to 250 000 annually between 2030-2050 (WHO, 2014).

Increased mortality and morbidity associated with extreme heat events, or *heat waves*, make out one of the central health risks of climate change (EEA, 2017; WHO, 2014). The last decades have shown an increased frequency of extreme heat events affecting people globally (Watts et al., 2018), including the 1995 heat wave in Chicago which caused 600 excess deaths (Dematte et al., 1998). Heat waves were the deadliest form of extreme weather in Europe between 1991 and 2015 (EEA, 2017). A prominent example is the 2003 heat wave in Europe that caused about 70 000 excess deaths (Robine et al., 2008). In Sweden, the “extremely warm and sunny” (SMHI, 2018) weather during the summer of 2018 has been estimated to have caused around 700 excess deaths (Ahmed & Galanis, 2018). Along with rising temperatures, heat waves are expected to become more intense, more frequent and more durable (Pachauri & Meyer, 2014; Perkins et al., 2012; SMHI, 2014). The southern part of Sweden is expected to experience a significant rise in extreme heat events (EEA, 2017), with temperatures as high as 40 degrees Celsius every 20th year at the end of this century (SMHI, 2011), far exceeding the extraordinary temperatures of the summer of 2018.

The vulnerability to heat waves varies among the population according to geographical and demographic parameters. Due to the thermal properties of the materials and activities that characterize cities, urban environments generally have higher temperatures than their rural surroundings (Andersson et al., 2012). This phenomenon, known as the *urban heat island effect*, makes the occurrence of heat waves a particularly pressing issue for urban dwellers (Field et al., 2012; Li & Bou-Zeid, 2013; Ward et al., 2016). Thus it is to accurate in a double sense to describe cities as “hotspots of disasters and risk” (Wamsler, 2014).

Among the population in a city, risk of suffering from heat-induced mortality or morbidity varies according to physiological and social factors, which together create a so-called *differential vulnerability* (Fernandez Milan & Creutzig, 2015; Jonsson & Lundgren, 2015). The elderly are known to be particularly susceptible to health risks from exposure to extreme heat (Ahmed & Galanis, 2018; Cadot et al., 2007; Frumhoff et al., 2007; Gamble et al., 2013; Jonsson & Lundgren, 2015) and according to WHO (2014), climate change is going to substantially increase

the risk of such exposure, even in high-income countries such as Sweden. Hence, there is a pressing need to increase the resilience of the elderly against extreme heat events.

The process of mitigating the negative effects of climate change is known as climate change adaptation, defined as “adjustment[s] in natural or human systems in response to actual or expected climatic stimuli or their effects” (McCarthy et al., 2001). To be successful, climate change adaptation needs to be dynamic, flexible and innovative (Morss et al., 2011; Wamsler, 2014). This can be achieved through the combination of multiple measures (Wamsler & Brink, 2014). Due to their multifunctionality, ecosystem-based solutions are widely advocated as an eligible way of tackling climate-related issues (Gill et al., 2007; Hall et al., 2015; Thoni, 2017). However, the theory and practice of climate change adaptation so far has been concentrated on the application of technological solutions, modification of physical structures and the organization of institutional response (Jonsson & Lundgren, 2015; Maller & Strengers, 2011), implicitly conveying an image of citizens as passive recipients of top-down governance (Fagan-Watson & Burchell, 2016; Jonsson & Lundgren, 2015). This image does not reflect reality in terms of what actually happens in times of crisis.

The role of citizens is in several ways crucial for climate change adaptation, which is confirmed by the importance granted to it in the Paris agreement (Nassopoulos et al., 2015; UNFCCC, 2015). The measures and actions taken by citizens prior to, and in response to heatwaves, are often referred to as “coping strategies” (Wamsler, 2014). These can mitigate the risks for the citizens themselves and for others (Mees et al., 2015). It has been argued that a one-sided focus on top-down strategies might lead to such ordinary measures being overlooked consequently weakening their potential to synergize (Adger et al., 2013; Maller & Strengers, 2011). Beyond the creation of efficient measures, promoting the participation of citizens in managing adaptation issues can have several co-benefits, and entail stronger legitimacy for solutions as well as an increased public understanding of the underlying issues (Burton & Nalau, 2013; Cloutier et al., 2015; Foss, 2016; Prutsch et al., 2018; Wiseman et al., 2010).

Despite these benefits, scientific inquiries into how elderly people and institutions respectively, manage and collaborate on heat-related hazards are few, at least in a “western” context. Scholars has called for qualitative studies that covers what citizens do when climate-related hazards occur (Cornes & Cook, 2018; Hegger et al., 2017; Jonsson & Lundgren, 2015), how citizens participate or engage in climate change adaptation (Brink, 2018; Rhoades, 2016; Sarzynski, 2015), as well as how citizens interact with municipalities on these issues (Brink & Wamsler, 2018). Moreover, it has been argued that vulnerable groups, such as the elderly in particular, have received limited attention when it comes to their role in climate change adaptation (Greenberg, 2014; Jonsson & Lundgren, 2015; Rhoades, 2016). The same has been said for the topic of heat (Brink, 2018).

1.1 Aim & research questions

The aim of this thesis is to investigate the specific risk context of elderly and heat, with respect to how a municipality and its elderly population manage such risk. The study is performed in the municipality of Trelleborg, Sweden with special focus on the “extremely warm and sunny” summer of 2018 (SMHI, 2018). The inquiry attempts to answer the following research questions:

- (1) *How was the hot weather during the summer of 2018 perceived by the elderly population in Trelleborg, in terms of its health risks?*
- (2) *How did the elderly population of Trelleborg cope with the hot weather during the summer of 2018?*
- (3) *How does the municipality of Trelleborg strategically manage the health risks to its elderly population due to heat exposure?*
- (4) *How does the elderly population and the municipality of Trelleborg interact on mitigating the health risks to elderly due to heat exposure?*
- (5) *With respect to the answers of questions 1-4, how can the municipality of Trelleborg improve the flexibility of its adaptational measures regarding health risks to elderly?*

1.2 Definitions

The elderly is the part of the population whose age exceeds 65 (Folkhälsomyndigheten, 2015). *Health risk* is the risk of morbidity (illness) and/or mortality (death) (Astrom et al., 2011).

1.3 Scope & constraints

Research question one and two are constrained to a particular group of elderly, as opposed to striving for the “average” elderly individual. The implications of which is elaborated on in section 3.3.

1.4 Disposition

Chapter 2 outlines the theoretical framework and main concepts used to analyse the empirical material. Chapter 3 outlines the methodological conduct of the study. Chapters 4-8 correspond to the research questions 1-5 and includes the presentation, and analysis, of the results. Chapter 9 concludes with the main findings of the study.

2 Theoretical framework

This chapter outlines the theory and concepts that was used to understand the empirical material and put it in context. The analysis of the adaptational measures taken by the municipality and elderly citizens (research question two and three), makes use of a theoretical framework created by Wamsler (2014) (section 2.1). The structuring of citizen-municipality interactions (research question four) makes use of the concept *adaptation interactions* (section 2.2). The elderly's perceptions of the summer of 2018 (research question one) are understood through the notions of *risk perception* (section 2.3).

2.1 Mainstreaming climate change adaptation

Increasing the resilience of society in order to make it withstand climate related hazards such as heat waves, requires climate change adaptation to be “mainstreamed” (Brink & Wamsler, 2018; Hall et al., 2015; Wamsler, 2006, 2014; WHO, 2018). This essentially means that the adaptational issues are given active consideration “in all sectors and at all levels of society” (Wamsler, 2014, p. 271). To foster adaptation mainstreaming, Wamsler (2014) has created an analytical framework which allows for categorization of the adaptational measures taken by municipalities and citizens. This makes it possible to expose gaps among the measures. The framework has been used in order structure and analyse the empirical data of this study that concerns the coping strategies by the elderly, as well as the heat management by the municipality. Wamsler (2014) has identified five main “activities” of climate change adaptation, Firstly, *hazard reduction and avoidance*, include those measures that reduce, or lead to avoidance of, hazard exposure. *Vulnerability reduction* include measures that does not affect the hazard itself but reduce vulnerability to it. *Preparedness for response* include those measures that puts in place response mechanisms that can be activated during hazards. *Preparedness for recovery* include those measures that enhance the ability of individuals and institutions to recover after an extreme weather event. *Risk assessment* measures asses risk of hazards and is therefore fundamental to the previous four activities. Additionally, within each activity, the subcategories of “grey”, “green” and “behavioural” is provided as further distinctions, respectively referring to the sort of measure taken. *Grey* measures are technical solutions or consist of hard structures. *Green* measures are based on ecosystem services or nature-based solutions. *Behavioural* measures targets behaviours or awareness through for example information. This is sometimes also

referred to as *soft* measures (EEA, 2012). It is often argued that addressing risks with a broad set of measures characterizes strong systems which are enhanced by synergetic effects (Hintz et al., 2018). Wamsler and Brink (2014) uses the notions of “flexibility” and “inclusiveness” to denote such systems. “Inclusive” systems utilize all of the five previously mentioned activities to mitigate climate related risks, whereas “flexibility” refers to the implementation of measures from all the subcategories (grey, green, behavioural) within each activity. According to Wamsler and Brink (2014), resilience “does not depend on the effectiveness of individual practices but on the *flexibility* and *inclusiveness* of coping/adaptation systems”, thus bringing a normative dimension to the analytical framework.

2.2 Adaptation interactions

Research question four of this inquiry addresses citizen-municipality interactions on adaptation to heat exposure. The study structures the results according to the concept “adaptation interactions”, which is defined as “interactions between citizens and municipalities that further adaptation to and management of adverse climate effects” (Brink & Wamsler, 2018). The concept focus on interactions resting on active engagement by the municipality and citizen, with primary focus on the outcome. As such, the concept is broader than the more common concept of citizen participation. Adaptation interactions differentiates between four types of interactions, namely; *collaboration*, for example through co-managing risks through jointly developed plans; *contestation*, by which citizens challenge top-down governance; *compliance*, through which citizens follow top-down directives; and *choice*, for the interactions where citizens freely choose to follow incentives.

2.3 Risk perception

The notion of risk is commonly defined as “the consequences of an action or event multiplied by its likelihood” (Adger et al., 2018). However, there are relevant subjective dimensions to the concept. The elderly’s perceptions of the summer of 2018 actualizes the notion of *risk perception*, which can be defined as “the subjective judgement that people make about the characteristics and severity of a risk” (Brighetti et al., 2011). Alongside the adjacent concepts of *health risk perception* and *risk awareness*, it has received attention in the climate adaptation literature (K. L. Akerlof et al., 2015; Akompab et al., 2013; Beaulieu et al., 2016; Demski et al., 2017; Taylor et al., 2014). It underlines the subjective dimension of risk and relates to vulnerability in the sense that it influences adaptive behaviour, and ultimately the development of climate adaptation.

3 Methodology & material

3.1 A case study

This thesis is a case study done in the context of the municipality of Trelleborg and the unusually hot summer of 2018. Case studies are said to be appropriate when researching “contemporary phenomenon[s] in depth and within [their] real-world context” (Yin, 2014). Due to the particularities of the summer of 2018, and the geographical properties of Trelleborg previously mentioned, it is clear that they make out an appropriate *real-world context* when researching the phenomenon of climate change adaptation to heat related hazards. Case studies are commonly questioned over the generalizability of one case (Denscombe, 2018), but experienced case study researchers has labelled such propositions as “misunderstandings” (Flyvbjerg, 2006). Case studies might not be generalizable to populations, but neither is that the point. Yin (2014), for example, reasons that case studies are generalizable to “theoretical propositions”, and as such, they can be warranted by making out important contributions to what Flyvbjerg (2006) refers to as the “collective process of knowledge accumulation”.

3.2 Research approach

Following key initial decisions regarding the case and its context, the study progressed throughout the following phases; (1) a reading of the theoretical field; (2) construction of the methodological approach and sampling; (3) collection of the empirical material and finally; (4) the analysis of the empirical material. This does not however designate a strictly linear research process. Rather, the analysis in phase four shuttled back and forth between the empirical material and the theoretical field, with prominent influence of the theoretical framework by Wamsler outlined in chapter 2. As a consequence, the final work is a result of the interplay between theory and empirical material affecting each other. A research approach such as the one described is neither exclusively inductive nor deductive, but is often labelled *abductive*, and allows the researcher a certain freedom often necessary when conducting case study research (Alvesson & Sköldbberg, 2008; Patel & Davidson, 2011).

Since case studies usually go “in depth”, they depend on a rich empirical material, often derived from several kinds of sources using multiple data collection methods (Denscombe, 2018; Robson, 1993; Yin, 2014). Accordingly, this study is done in a mixed methods fashion, making use of three qualitative methods (see table 1). A detailed description of how each method was used follows in section 3.3 (focus groups), 3.4 (semi-structured interviews) and 3.5 (document analysis). This is followed by a summary and discussion of the resulting empirical material in section 3.6.

Table 1 Data collection methods and their correspondence to the units of analysis and research questions

Unit of analysis	Elderly	Municipality
Method	Focus groups	Semi-structured interviews
		E-mail interviews
		Document analysis
Addressed research question	1, 2, 4, 5	3, 4, 5

3.3 Focus groups with elderly

A focus group is a “structured group conversation” (Wibeck, 2000) where a number of participants interact around a topic chosen by the researcher. The method is suitable when researching how people act as well as how they motivate their actions in an exploratory manner and thus well in harmony with the aim of studying coping strategies by citizens (Bryman, 2016; Wibeck, 2000).

The advantages of focus groups stem from group dynamics and its potential to render rich material with little involvement of the researcher (Esaiasson et al., 2017). Through its potential synergistic effects, the group dynamics might lead to the participants asking questions amongst themselves, and consequently bringing up aspects of the issue in question that the researcher otherwise would not have thought of (Cameron, 2016; Wibeck, 2000). The success of a focus group is consequently dependent on how well the group members interact (Wibeck, 2000). The quality of the interaction, in turn, depends on aspects such as group

composition, group size, the group moderation, and the environment where the focus group takes place (Wibeck, 2000).

Compatible groups interact better, and thus creates better results. It has been argued that it is therefore advantageously to assemble participants that are somewhat similar in terms of social or physiological attributes (Wibeck, 2000). In a group of acquainted people there are better chances for a relaxed atmosphere amongst the participants. Accordingly, 16 members from a senior organization were recruited for participation in the focus groups of this study. In addition to their membership in the organization, the participants were recruited based on their age (65+) and geographic location (Trelleborg) and thus through a process of “purposive sampling” (Cameron, 2016). The sampling process moreover sought to render a diverse group of elderly, with age stretching up beyond 75 years of age, and with a mix of male and female participants. The recruitment of the sample was done in collaboration with a contact from inside the senior organization, who recruited and assembled the 16 participants in three focus groups based on instructions provided by the researcher. There are many different advices on what group size is appropriate (Bryman, 2016; Cameron, 2016; Wibeck, 2000). Expected characteristics of some elderly people (e.g. hearing problems) was taken into consideration when deciding on a number of participants in the lower end of these advices. This resulted in three groups of five to six individuals each (see table 2).

The focus group sessions were conducted in a semi-structured fashion, where the moderation primarily served to facilitate the group interaction around pre-constructed questions/themes (See appendix 1) (Cameron, 2016; Denscombe, 2018). These were inspired by Krueger’s (1998) categorization of questions in; opening question, introductory questions; transition questions, key questions and ending questions. Wibeck’s (2000) advice was followed, and the moderation actively sought to; establish a relaxed atmosphere amongst the participants; create a basis for the conversation from which it was easy for the participants to understand their role; responsively manage disparate behaviour within the group; downplay the “expert” role of the researcher and underline the value of any answer the participants might provide. The latter was done in order to handle the *interviewer effect*, which essentially means that the identity of the researcher influences the respondents in subtle ways (Denscombe, 2018). For example, respondents might alter their answers in response to feelings of wanting to say the right thing and thus distorting the results of the study.

Additionally, since using existing groups might result in a *too* comfortable social context, where for example information might not be shared because it is implicitly understood amongst the group members, the moderator was also responsive to such tendencies (Wibeck, 2000). In order to benefit a discussion without disruptions and distractions, the session was, upon consent given by the participants, recorded and subsequently transcribed (Bryman, 2016).

Generally, it is good to choose a location where the participants feel “at home”, rather than inviting them to some stiff university setting which might make them feel uncomfortable (Wibeck, 2000). During the planning of this study, the opportunity of situating the group sessions in an environment where the

respondents usually spend time arose and thus seemed like a good idea. The spatial arrangement of the conversation space affects the group dynamic and needs to be considered in the planning of the sessions. These sessions were done with the group members sitting on opposite sides of a rectangular table with the moderator sitting on the short side.

3.4 Semi-structured interview with municipality officials

Semi-structured interviews with appropriate municipal officials were performed in order to study the municipal management of the elderly's health risk in the context of the 2018 summer heat wave. The aim of a semi-structured interview is to acquire answers to certain questions, but in a flexible interview process where the respondent is allowed to develop her/his answers (Denscombe, 2018). Thus, it is appropriate when the researcher seeks to generate detailed answers to questions (Denscombe, 2018). The interview procedure for the interviews conducted for this study followed an interview guide (see appendix 2) which was more of a checklist than of a chronological procedure. The questions were constructed to reflect the research questions and to allow for the respondents to speak as freely as possible. It should be noted that the concepts relating to climate change adaptation cannot be expected to reside in the ordinary vocabulary, why measures to handle for example heat stress rendered by climate change is not necessarily labelled this way by municipality officials (Cornes & Cook, 2018). Thus, in order to make the questions easily graspable, it was attempted to use as "ordinary" a vocabulary as possible. As with focus groups, the interview methodology is concerned with the *interviewer effect* described in 3.3 (Denscombe, 2018). In this case, the interviews are complementary to a document analysis, and not of a particularly sensitive nature, and thus the interviewer effect should not be a major problem.

The semi-structured interviews were conducted with municipality officials identified through a "subjective selection" (Denscombe, 2018) that started off with the help of a "gatekeeper" - the climate strategist of the municipality. Key individuals with knowledge of the municipal management of heat generated health risk to elderly was identified. While conducting the interviews, the selection was expanded per a snowball-effect (Bryman, 2016), and finally led to a total of nine interviews.

3.5 Document analysis

In order to complement the interviews, the study has also made use of a number of documents that provide information on the issues in focus. These consist mainly

of official documents that provide insight in the municipal adaptational strategies and will thus be helpful in answering the research questions. Generally, official documents are regarded as being unbiased and trustworthy, thus making out valuable research data (Denscombe, 2018).

The documents were selected on recommendation from the municipal officials that was interviewed for the study.

3.6 Material

The focus group participants have in common their membership in this senior organization, living in Trelleborg, as well as being over 65 years old. That said, there is also a heterogeneity within the groups. The participants live in houses as well as apartments. An array of medical conditions is represented amongst the participants. Amongst them heart (heart failure), skin (cancer), and lung (asthma) diseases. In addition, the age span covers ages between 69 and 80. Beyond the intended implications for group compatibility described in 3.3, the choice of recruiting elderly from within an organization will have had implications for the material of the study. Elderly individuals that are engaged in civil society will for example be lonely to a lesser extent than individuals not engaged in civil society. As a consequence, the sample might exclude lonely individuals that are known to be extra susceptible to risk of mortality and morbidity due to heat exposure (Folkhälsomyndigheten, 2015; Klinenberg, 2002). On the other hand, elderly people are generally vulnerable to heat, and thus every single elderly individual can make important contributions to such a discussion. Also, any important aspects of the issue rendered from the focus group sessions should at least partially be transferable to the elderly population as a whole.

The nine interviews that was conducted covers different angles of the issues in question. With the exception of a health care worker, the respondents are working at the strategic levels in the municipality, and thus not on the operative level. This was thought of as appropriate in order to investigate the strategic management of heat but might be considered as a weakness of the study as a stronger focus on the operative level likely would have improved the overall insight on the topic. That said, the interviewees were selected on advice from the climate strategist of the municipality and are thus likely make out the most relevant information with regards to strategic managing of heat.

The six documents make out the written official documents that are strategically relevant to managing health risks from extreme heat. Consequently, they make out relevant documents to study strategic measures. These are; the Climate adaptation plan for Trelleborg (Trelleborgs kommun, 2018c); the Trelleborg plan for heat waves (Trelleborgs kommun, 2018a); General advice to elderly and their relatives (Trelleborgs kommun, 2018e); The Contingency plan for heat waves (Malmberg et al., 2014) ; The Comprehensive plan for Trelleborg

(Trelleborgs kommun, 2018b); and the Detailed comprehensive plan for the city of Trelleborg (Trelleborgs kommun, 2014).

The data-collection resulted in the qualitative material outlined in table 2 below. The accounting of quotes and excerpts throughout the presentation of the results is meant to be illustrative of the main patterns in the empirical material, and thus not to be exhaustive.

Table 2 Summary of main material

Elderly		
Method	Participants gender/age	Details
Focus group	Female: 71, 75, 80 Male: 80, 70	70 minutes
Focus group	Female: 68, 74, 74, 81 Male: 69, 73	60 minutes
Focus group	Female: 67, 69, 71, 86 Male: 73	60 minutes
Municipality		
Interview	Head of emergency services	30 minutes
Interview	Security manager	30 minutes
Interview	Public health strategist (region)	Phone, 60 minutes
Interview	Climate strategist	Phone, 30 minutes
Interview	2 environmental inspectors	45 minutes
Interview	Health care worker	15 minutes
Interview	Chief of elderly care	30 minutes
Interview (email)	Public health strategist (local)	-
Interview (email)	Spatial planner	-
Document	Trelleborg adaptation plan	-
Document	Trelleborg plan for heat waves	-
Document	General advice to elderly and their relatives	-

Document	The contingency plan and warning system for heat waves	-
Document	The comprehensive plan for Trelleborg	-
Document	The detailed comprehensive plan for the city of Trelleborg	-

3.7 Analytical approach

The analysis was conceived through elaboration of the empirical material in relation to the theoretical framework, as per the interplay described in section 3.2. This was done through multiple readings of the material during which relevant quotes and excerpts were coded and clustered according to recurrent and relevant themes, adaptation activities and interactions (Bryman, 2016). Regarding the elderly's perceptions the emerging themes were; conflicting feelings, concerns of climate change, vulnerable but not vulnerable; and no escape from the heat. Coping strategies / management of heat were categorized according to the adaptation activities outlined in section 2.1; hazard reduction/avoidance; vulnerability reduction, preparedness for response, preparedness for recovery; and risk assessment. Moreover, the adaptation activities showed a differentiation between two groups of elderly (within/outside of the elderly care system) that became a relevant factor in the discussion. Adaptation interactions were categorized according to the concepts explained in section 2.2; collaboration; compliance; contestation; and choice. However, all of the adaptation activities / interactions were not represented in the empirical material and are therefore not assigned their own sections.

Technically, the analysis was accomplished with the aid of the software tool NVivo 12, in which the empirical material was inserted and coded.

3.8 Ethical considerations

This study addressed individuals identified on the basis of their vulnerability to heat stress, which created some ethical problems. Firstly, it might feel offensive to the individual to be exposed as vulnerable, and secondly, the vulnerability of these individuals may be previously unknown to them. However, the wider aim of the study was to strengthen these people's defence against future crises and through a cautionary approach this purpose should outweigh these ethical problems. In order

to protect the individuals, the Science Council's four research ethics principles - the information requirement, the consent requirement, the requirement for confidentiality and the requirement for use, was applied during the research process (Vetenskapsrådet, 2002). This essentially means that the purpose and conditions were made clear to all participants, including their ability to interrupt their participation if and when they so wish. It also means that the study will rest on their consent and the assurance that the empirical were used only to fulfil the purpose of the study (see appendix 1).

4 The elderly's perception of the summer of 2018

This chapter of the analysis addresses research question 1: How was the hot weather during the summer of 2018 perceived by the elderly population in Trelleborg, in terms of its health risks? The chapter is structured based on recurring parts of the empirical material generated from the focus groups which consists of four major themes; conflicting feelings (4.1); concerns of climate change (4.2); vulnerable but not vulnerable (4.3); and no escape from the heat (4.4). After running through the elderly's perceptions, the chapter ends with a discussion (4.5).

4.1 Conflicting feelings

In the foreground of the elderly's perceptions were conflicting feelings, mediating both a strong love for sunny weather but at the same time a fear of the impacts of the heat and its causal factors. This double-ness was evident between the elderly in the group as well as in the individuals themselves. There was a palpable reluctance amongst many of the participants to recognize the hot weather as a threat, although some did. For example, the summer was described as "health-wise difficult" (male, 81) and as "the *worst* summer I have experienced in terms heat" (female, 71). One participant explained the feeling of the heat as impairing her mind: "I think it feels like the brain is floating out somewhere else and I think that is very unpleasant." (Female, 74). Some were less decided in their verdict, describing the summer as "terribly warm, but nice as well" (Female, 74).

However, many of the elderly respondents described the summer of 2018 as being "absolutely wonderful" (female, 74) or "warm and comfortable" (female, 75). Explaining their statements, a 73-year-old male participant described how he enjoys heat: "I can lie well for fourteen days on the holiday under a palm. But I don't lie directly in the sun. But I want the heat". A 71-year-old female participant described the conflict in relation to the experience of the "ordinary" Swedish summer: "We want warmth, we open windows and say, 'finally it gets warm', and then it rains on midsummer. So, we have a completely different view of this." She went on to say that "To sit inside with drawn shutters in the summer, it feels odd

because you want to get out in the heat” thus touching on a conflict between adaptive behaviour and a wish to enjoy the unusually warm weather.

4.2 Concerns of climate change

Most of the focus group participants were concerned about the impacts of the heat as well as its causal factors and spoke of a “growing worry” for the future (Male, 80). The discussions in the focus groups were constantly shifting to the more conspicuous impacts of the warm weather, such as the forest fires in northern Sweden that dominated much of the media coverage of the abnormal temperatures, and a fear of what would happen if the landscapes surrounding Trelleborg would start burning. The Polish fire-fighters that passed Trelleborg on the way to help extinguish the northern fires were brought up as a topic again and again. Concerns about ground water levels and dying gardens were also prevalent, as well as opinions on the temporary “barbeque ban” that was introduced by the county administration to reduce the risk of forest. There are also explicit mentions of climate anxiety. Particularly the female focus group participants were significantly concerned of the bigger issue of climate change of which they expressed great concern. For example, consider these quotes from a 74- and a 69-year-old female participant.

I also think that eventually it came, at least for me, this concern. "what is happening to the earth". I started to think big. What is really happening? Because it wasn't normal of course. There was a lot of concern that started coming the longer this heat progressed. Evenings were fantastic and enjoyed as well. (Female, 74)

I find it very worrying. I feel that extreme weather, it worries me. Where are we going? I have children and grandchildren. It does not feel good. These were my main reactions more than enjoying the weather. (Female, 69)

4.3 Vulnerable but not vulnerable

While the focus group participants thought of themselves as vulnerable to heat, they did not necessarily think of themselves as more vulnerable than others. Instead they generally seemed to exclude themselves through “othering” particularly vulnerable elderly people. These were referred to as “they” rather than “me”. For example, a 74-year-old female participant stated that “[the heat] is

stressful for everyone with heart problems and such chronic diseases, many elderly people who have impaired immune system and are weak.”

4.4 No escape from the heat

Rather than complaining about spikes in temperature, the main complaint about the direct experience of the warm weather was that it never seemed to end. As the days and nights went by, it continued all around the clock. The elderly described the situation with the heat as unpleasant particularly due to the fact that it was unescapable. Those not fortunate enough to have well air-conditioned homes or lukewarm cellar stories, described the heat as partially uncomfortable, rendering a more or less desperate need for a break of recovery. For example, an 80-year-old male provided this reflection:

In retrospect I think that what was most problematic was that you never got a break from the heat. Even though I lived in a stone house that was relatively better than what some others had, you still got no break and the days went by, the weeks went by. Then the desperation started to come: "Should it never end?" That was how I experienced it.

4.5 Summary and discussion

The results show that the elderly’s experiences of the summer were contradictory. The heat was perceived as comfortable and scary at the same time, but notably not so much in terms of a threat to their own health. The elderly’s perceptions make out aspects of what is often referred to as risk perception, which is an important aspect as it might correlate adaptive behaviour. For example, there are studies suggesting that experiencing severe weather events increases the concern about climate change (Bergquist et al., 2019; Demski et al., 2017) ultimately leading to a higher perception of risk and thus also increases in adaptive behaviour (Akompab et al., 2013; Demski et al., 2017). The risk perception of vulnerable groups is also important since it will matter for what measures instances such as a municipality should focus on. As suggested for example by Akerlof et al. (2015), when risk awareness is high within a vulnerable group, interventions should shift focus from informational campaigns to protective actions (see also Kunz-Plapp et al., 2016). Hence, the perceptions of the elderly are likely to influence the way they cope with / manage the health risks that comes with extreme heat events as well as inform the design of adaptational measures on the municipal level.

It seems clear that the summer in question has led the elderly to discover the fragility of their society and that issues such as forest fires, ground water levels, and climate change are much more worrisome to them than the direct threats that

the heat poses to their own health and wellbeing. This echoes the findings of Akerlof et al. (2015), who found the same tendency in elderly people in London and Norwich, UK. The fact that the elderly do not view heat as a health risk to themselves, but maybe to other elderly, supports the findings of previous studies (K. L. Akerlof et al., 2015; Bittner & Stossel, 2012). This tendency might be attributed to difficulties in recognizing heat as the causal factor of death, which is the reason why it is often described as a “silent killer” (Gupta et al., 2012; Luber & McGeehin, 2008). Whether or not the elderly’s concerns of climate change are attributable to the direct experience of the warm summer of 2018 is not clear, as the awareness of climate change and its effects remain generally high in Sweden overall (Poortinga et al., 2018), and the media coverage increased significantly in 2018, supposedly as a consequence of the warm summer and the influence of a certain Great Thunberg (Retriever, 2019).

The finding that the elderly are moving back and forth between enjoying the weather and worrying about it corroborates what is described in an article in the local newspaper (S. Bergström, 2018). This tendency might be understandable for a couple of reasons. Obviously, there is the cultural aspect that Swedes spend significant amounts of money and time on vacation trips to such places as the Mediterranean, why it might seem like a luxury to get that weather at home instead. The interview with the regional health strategist suggested that this might tamper the efforts to inform the citizens of the health risks due to heat exposure:

It is a little difficult to communicate because the general picture in Sweden is that warmth, it is something that we long for, and you always get happy, you see if nothing else in the newspaper runs "finally the summer heat here" and all that it called. Even on the TV news, one always speaks very positively about heat. (regional health strategist)

As measures to stay safe from heat often regards staying out of it, it makes this cultural aspect an issue. Such cultural aspects are known to influence risk perceptions (Weber & Hsee, 1999). Another possible explanation to why elderly enjoys warm weather is that, due to phenomena such as decreases in the metabolic rate and the thinning of skin that comes with age, elderly people are often sensitive to cold (Guergova & Dufour, 2011).

The unescapable character described by the elderly in relation to the heat wave corroborates results by the Public health authority (J. Bergström et al., 2018). The constantly present character of heat distinguishes it from other kinds of climate related events. A landslide for example, or a heavy downpour of rain, are escapable in the sense that they have a more local character. With a heat wave, moving away might be more problematic, or dependent on the access to an air-conditioned area. Such areas are not available to everyone.

5 Coping strategies by the elderly

This chapter of the analysis addresses research question 2: *How did the elderly population of Trelleborg cope with the hot weather during the summer of 2018?* The chapter is structured based on recurring parts of the empirical material generated from the focus groups which consists of four major themes; creating a different rhythm of life; amending food and drinks; seeking shade and; being passive. After running through the measures taken by the elderly, the chapter ends with a discussion and a summary of the measures structured in a table and categorized according to the analytical framework based on Wamsler (2014).

5.1 Creating a different rhythm of life

A recurring theme during the discussions was the mentioning of a more southern lifestyle as a reference to how summer-life during 2018 differed in relation to “ordinary” summers. The elderly explained how they adapted a Mediterranean lifestyle of siesta naps during the day and stayed up later in than usual in the evenings.

The schedule was different. The mornings were so lovely that you got so early mornings. And evenings and nights were wonderful. I lived a bit of Spanish life, with siesta. Even if you did not sleep, you withdrew and rested.
(Female, 81)

You could not do anything in the middle of the day. You got to do things in the evenings instead. It became a different rhythm of life than one normally expects, with interventions that one did not choose for himself, but which the weather forced upon you. (Female, 69)

5.2 Amending food and drinks

In the same vein the elderly modified their food and drink intake that included a lot more water, but some also mentioned eating salty things such as olives or Mediterranean salad in order to stay healthy. A 71-year-old female participant explained the need to drink water with reference to a hospitalized friend:

I have a neighbour who went to hospital because she had been drinking too little, and another friend had the same thing. So, it is also that one has to make sure that one gets enough liquid. But it belongs to the heat and it is like we ... yes, we should drink.

5.3 Seeking shade

Generally, many mentioned how they tried to stay in the shade as much as possible as well as delaying visits in air-conditioned places such as shopping malls or the car.

You were looking for shade all the time. One kept track of the shadows. Where you could sit in the shade, so that was where you sat. Otherwise, it is the opposite, like "where is the sun?" Now it was the shadow (Female, 81)

For my part, it was incredibly hot, but I live on the seventh floor and I could not be upstairs in the apartment. One had to go down and sit outside in the shade. (Female, 86)

5.4 Being passive

The elderly makes witness of losing all their energy, causing very passive days where ordinary things such as shopping for groceries become obstacles. "One couldn't cope with everyday life", a 75-year-old female said and explained that as opposed as when you are on vacation and you can just relax, it's special to experience the heat in the daily life because in the daily life you have things to take care about. Thus, exposing another difficulty for elderly people. The summer also created an asocial behaviour with some of the elderly, who cancelled trips, avoided travel, became passive and spent time in the least warm place they could find.

I also think that I abstained from a lot. "No today it is too hot then I have to stay at home". Sit on the terrace. I did that. Refrained from much, traveling and such things. (Female, 74)

You didn't get much done. Everything stood still, which was the most necessary. The effects still remain. (Male, 70)

5.5 Summary & Discussion

The coping strategies of the elderly are outlined in table 3. As a logical sequence to their low risk perceptions, they are exclusively ad hoc, namely, taken in response to the hazard when it occurred (Wamsler, 2014). As such, they all fall in the category of vulnerability reduction, and all but one strategy is labelled as a behavioural measure. Such measures are arguably “simple, immediate and cost-effective way[s] of addressing certain issues” and should therefore not be underestimated (Hendel et al., 2017). Most of the elderly agree with statements such as “this summer has never happened before”, which probably explains why proactive coping strategies cannot be expected to have occurred, at least not on the initiative of the elderly. That said, while the coping strategies of the elderly were not labelled as such by the elderly themselves, the summer had a fundamental influence on the daily lives of the respondents. It affected their movements, their food intake, their sleep and their social life. These strategies appear as unreflected and spontaneous reactions to discomfort brought on by the hot weather rather than deliberate actions rendered by a high awareness of health risk. Neither did it seem to have been brought on by specific information campaigns. As it was expressed by one of the focus group participants:

[...] it was nothing that you had prepared for by thinking "this summer we should have this". It was resolved gradually. (Male, 69)

Such seemingly commonsensical management is significant in reducing health risks (Cornes & Cook, 2018). As are the positive effects of for example delaying bedtime (Hendel et al., 2017). Therefore, the strategies should not be underestimated as banal, but understood as highly relevant.

Some of the elderly were, with the summer of 2018 in fresh memory, considering proactive measures for the future. For example, as in following quote by an 86-year-old female participant: “One must think in advance now and prepare. Because there is no end to this.”

Table 3 Coping strategies by the elderly

Activity	Measure	Type
Hazard-reduction & avoidance	-	-
Vulnerability reduction	Drink	Behavioural
Vulnerability reduction	Keep water bottle in sight (so not to forget to drink)	Behavioural
Vulnerability reduction	Wear hat	Behavioural

Vulnerability reduction	Close curtains / sun blinds	Behavioural
Vulnerability reduction	Bring water bottles outside	Behavioural
Vulnerability reduction	Drink rehydration drinks (resorb, with salt/lemon)	Behavioural
Vulnerability reduction	Siesta	Behavioural
Vulnerability reduction	Eat salty things	Behavioural
Vulnerability reduction	Stay inside	Behavioural
Vulnerability reduction	Do nothing	Behavioural
Vulnerability reduction	Seek out and spend time in air-conditioned places (car or mall)	Behavioural
Vulnerability reduction	Avoid travel	Behavioural
Vulnerability reduction	Obtain fan	Grey
Preparedness for response	-	-
Preparedness for recovery	-	-

6 Measures by the municipality

This chapter of the analysis addresses research question 3: *How does the municipality of Trelleborg strategically manage the health risks to its elderly population due to heat exposure?* The chapter begins with an account of the relevant content in the climate adaptation plan of the municipality (6.1), which is followed by the actual measures structured based on the adaptational activities previously outlined in section 2.1; risk assessment (6.2); preparedness for response (6.3), and vulnerability reduction (6.4). After running through the strategical measures taken by the municipality, the chapter ends with a discussion and a summary (6.5).

6.1 Heat in the climate adaptation plan

The 2018 Climate adaptation plan for Trelleborg (Trelleborgs kommun, 2018c) is neither legally binding nor an operational manual, but rather an expression of ambition and will. Thus, it is not a measure in itself. The list of suggested adaptational measures is dense, containing a lot of ambition, much of which are directly related to the health risk to its citizens due to heat exposure. For example, it stresses the need for working on communication towards the citizens during hazards by improving the communicative quality of the municipality website as well as updating the systems for how the municipality can spread information on nature-related events. It points to a number of measures on the topic of cooling buildings, including; providing economic aid to home owners to install ventilation; expansion of district cooling; new municipal properties being built with the buildings cooling properties in mind; creating an inventory of buildings with regard to their cooling properties; and observing the need for cooling when remodelling housing. City planning is underlined through proposed measures including; the introduction of adaptational aspects in overview and detail plans and the creation of shady environments through for example the conservation and planting of new trees. The Climate adaptation plan also lists some measures that has been implemented since the last adaptation plan, most of which are responses to hydrological effects of climate change such as sea level rise and increased rainfall. The implemented measures that touch upon the topic of the direct health threat of heat waves, are “Review of properties with regard to how an increased cooling requirement can be met with reduced energy use”, “Warning system for heat waves” and “Checklist for heat waves”. The Climate adaptation plan also

notes that the contingency plan for heat waves should continue to be implemented.

6.2 Risk assessment

The security department of Trelleborg conducts a risk and vulnerability analysis, which is the fundamental to the work of mitigating risks, as it points out where to focus (interview, Security manager). The analysis is however classified, why it can't be analysed here. However, it is categorized as a "risk assessment" activity (Wamsler, 2014).

6.3 Preparedness for response

The Trelleborg plan for heat waves (Trelleborgs kommun, 2018a) is the centrepiece of the security departments work on mitigating the health risks due to heat exposure (interview, security manager), highly influenced by the rich material provided by the regional council (Malmberg et al., 2014). One of the opening statements in the plan reads:

In order to get a good readiness for and management of heat waves, we need to change the view of heat wave as a crisis that rarely occurs to instead get the readiness for heat waves in the annual cycle of seasonal events, like the fact that we know that the flu, winter sickle sickness comes every winter and that healthcare facilities, as well as the public, are prepared for their management.

This introduction is obviously a textbook case of how to mainstream climate change adaptation. It identifies the elderly population as a particularly vulnerable group, which is targeted throughout the contents of the plan. There are two themes to the contents; partially it is made up of information and tools to personnel and bosses within the elderly care system, and partially it concerns various aspects of the spreading of information to all citizens.

It points to five examples of information to the citizens; weather warning for heat wave; general advice on heat waves; information about risk-groups; advice to the vulnerable themselves; advice on food intake during heat wave. Following this, the heat wave plan outlines a number of channels through which information can be communicated, including; the municipality website; social media; the municipal information function; the municipal information centre; the media; press releases; and press conferences. Furthermore, the heat wave plan lists appropriate preparations for the spreading of information; including checklists in electronic and printed form; specific information to private care actors; and the use of meeting points for elderly people for information spreading. The plan

emphasizes information and suggests four groups as recipients; personnel within the municipality; the vulnerable themselves and their relatives; volunteers with contacts with risk groups; and house owners.

Most of the measures in the heat wave plan, however, regards the elderly care system, actualizing collaboration with the social department, which is the department responsible for handling the elderly care system. The heat wave plan is aiming a lot of its information towards the managers of the different units of elderly care, calling on these to hold preparational meetings with the staff, providing them with the information. When the summer is approaching, the personnel should identify vulnerable individuals and buildings, be ready to reprioritize efforts, inform the vulnerable individuals and their relatives and establish plans for how to care for the most vulnerable individuals if an extreme heat event occurs. The operational personnel within retirement homes and home care should; pay attention to the indoor temperature; encourage fluid-intake; use curtains and such tools to arrange a cool environment and put the elderly personnel where the environment is as coolest; encourage reduced physical activity during the hottest hours of the day; use cooling measures such as cold showers or wet towels; pay attention to the general condition of individuals and call on nurses if something seems off. The heat wave plan includes checklist to help the staff to monitor certain vulnerable individuals by identifying them prior to the summer and following them to ensure their safety. The security manager explains that:

[I]t is a question of identifying who we have that can be sensitive to high temperatures, so that you know how to help them as well. You give them a list: have you drunk? Where are you in your home? Are you in the cool rooms? [...] So, there are plans for it. What to think about.

However, according to the chief of elderly care, in order to handle hazards such as heat waves, monitoring those living in retirement homes are easier than those receiving elderly care in their homes. Those elderly receiving care in their homes are subject to what the chief of elderly care refer to as “traditional advice” such as the care personnel encouraging them to drink and help out to provide shade from the sun by pulling down curtains and such things, through visits in their homes 2-3 times a day. In the retirement homes on the other hand, the conditions are different, because the personnel are present all the time. On the other hand, the elderly living in retirement homes are generally in worse condition and require more help. The conditions also vary between retirement homes, as they are housed in different types of buildings constructed to house different type of activities.

General advice to elderly and their relatives (Trelleborgs kommun, 2018e) is a document published on the Trelleborg website, basically made up of “traditional advice”. It is referred to when heat warnings are published.

The contingency plan and warning system for heat waves (Malmberg et al., 2014) is document produced within the frame of the regional project Klimatsamverkan Skåne to provide information on how to handle heat waves,

with big emphasis on health care and health risks to elderly. It functions as an extensive knowledge base and has much in common with the heat wave plan.

Central to the heat wave preparedness of Trelleborg is the national weather warning system, which is provided by the Swedish meteorological institute (SMHI) (Interview, security manager). In order to help society prepare for potentially dangerous heat, SMHI issues two different classes of heat warnings; a class one heat warning is issued when the temperature is expected to reach at least 30 degrees Celsius three days in a row; a class 2 heat warning is issued when following a class 1 if the temperature is expected to reach at least 30 degrees five days in a row, or if temperatures above 33 degrees is expected three days in a row (MSB, 2018). These warnings work as to activate the measures in the heat wave plan, such as the spreading of information, and thus make out a central part of the heat wave preparedness. The 24th of July, the Swedish meteorological institute (SMHI) issued a class 1 warning concerning "very high temperatures" in Scania, which was published on the Trelleborg website as a warning of heat (Trelleborgs kommun, 2018d).

6.4 Vulnerability reduction?

In regard of climate adaptation, issues connected to rising sea levels figure prominently in the comprehensive plan (Trelleborgs kommun, 2018b), and the related detailed comprehensive plan for the city of Trelleborg (Trelleborgs kommun, 2014). However, any mention of heat related climate change adaptation issues is absent in both documents.

6.5 Summary & Discussion

The Climate adaptation plan lists a large range of potential measures relating to the mitigation of heat related risk to elderly, and it is therefore obvious that adaptational work is not short of ideas. However, while indicating ambition, ideas and know-how are as most meaningful when implemented, and as of now most of these measures remain good ideas on paper (interview, Climate strategist).

The measures to counter health threats from heat is outlined in table 4. It is made up of measures categorized as "preparedness for response" (Wamsler, 2014). Neither the degree of flexibility nor inclusiveness of adaptational measures to counter health risks from heat is therefore high. There is room particularly for green and grey measures of hazard reduction/avoidance and vulnerability reduction. "Preparedness for recovery" is not a relevant activity with regard to the characteristics of adverse health effects of heat. There are multiple potential reasons for a city not being successful in implementing sufficient adaptational measures. For example, infrastructure, economy and institutional structures

influence capacity (Carmin et al., 2012; McCarthy et al., 2001). An internal document on the progress of climate change adaptation in Trelleborg from 2014, lists a number of success factors, amongst which aspects such as political will, ambition from the level of the town council and engaged co-workers and department heads and insufficient mainstreaming in the municipality (Ljung, 2014). Difficulties of wide implementation of adaptation has also be attributed to insufficient national work (Juhola & Westerhoff, 2011). Reflecting on the summer of 2018, the regional health strategist says that it “confirmed what we have warned about”. In contrast to that comment, some of the municipal officials use expressions like “caught off guard” to describe their feelings towards the summer of 2018. That response is probably at least partially due to the diffuseness of climate change which is more often than not a phenomenon perceived as “abstract, large scale [and] slow” (Bergquist et al., 2019), and how that diffuseness suddenly became reality. Additionally, the largest risks and struggles regarding the health of elderly has previously taken place during the colder seasons of the year (interview, Chief of emergency services; interview, Chief of elderly care). It is probably reasonable to assume that several of these aspects negatively influence the possibility of implementing the full range of adaptational measures. Certainly, the economic aspect is likely significant, as confirmed by the regional health strategist.

In regard of the municipal measures to counter health risk to elderly population from heat, the empirical material shows that the measures are heavily biased towards preparedness for response through behavioural measures such as information and contingency plans for the elderly care system. As the most ambitious measures of are aimed at the latter, the municipality consequently fundamentally differentiates between two groups of elderly: those receiving some form of elderly care (living in retirement homes or receiving home care) and those elderly that are not.

Naturally, the elderly care system has a well-developed system of interactions between the elderly and the care-workers, which can be adjusted to include measures to counter health risk from heat (or other hazards for that matter). Such measures are supported as relevant in the literature (Andersson et al., 2012; Fernandez Milan & Creutzig, 2015). As we have seen, monitoring of vulnerable elderly individuals in the elderly care system is a part of Trelleborgs heat wave plan. The heat wave plan contains multiple behavioural and informational measures to be applied both proactively and reactively. It is important to mention that there are significant differences within the elderly care system as well. The elderly people living in retirement homes are not as autonomous as elderly living at home, they generally do not make choices to the same extent which provides a significantly different condition for working to mitigate their health risk due to heat stress (Interview, Chief of elderly care). The monitoring of vulnerable individuals particularly stands out amongst the measures. The low amount of “deaths” in retirement homes of Trelleborg last summer, could indicate that these measures are active and successful (Interview, chief of elderly care). The role of the social care sector is generally considered of vital importance when it comes to managing the health risks brought on by heat, with interventions that often prove

highly effective in protecting citizens (Fernandez Milan & Creutzig, 2015; Jonsson & Lundgren, 2015). However, with respect to the hard-working personnel of the elderly care system¹, structural implementation of “the traditional advice” might be considered low hanging fruits.

Most of the elderly population outside the elderly care system can be expected to interact with the health care system at least on an occasional basis. When they do it is clear that the regional health care actor Skåne regional council provides a range of measures to support the health care system to counter the health threats of heat, in the context of climate change. Such ambitions is reflected in an array of projects carried out within the frame of Klimatsamverkan Skåne (Malmberg et al., 2014).

Thus, for the part of the elderly population not within the elderly care system, the primary instrument of proactive measures is information in various shapes and forms. Information is, particularly with respect to the relation between risk awareness and adaptive behaviour, an important way of protecting citizens (Bittner & Stossel, 2012; Folkhälsomyndigheten, 2015; Pisello et al., 2017), which is also often welcomed by the vulnerable themselves (Abrahamson et al., 2009). Though, as suggested by Rhoades (2016) study, it should be carefully designed to meet the needs and preferences of the elderly population. Nationally, a survey found that 97 percent of the population thought that heat wave information was easily accessible during the summer of 2018, which is a convincing number (J. Bergström et al., 2018).

The literature widely shows that the health risks due to heat exposure for elderly are exacerbated by physiological factors such as pre-existing health conditions, particularly cardiovascular and respiratory diseases (Astrom et al., 2011; Åstrom et al., 2013), physical factors such as living on the top floor (Semenza et al., 1996) and social factors such as loneliness (Canoui-Poitrine et al., 2006; Jonsson & Lundgren, 2015; Klinenberg, 2002). However, none of these factors automatically qualify an elderly individual to the elderly care system. For example, a heart disease that makes an elderly particularly vulnerable to heat does not automatically qualify this person to the elderly care system. Moreover, due to the fact that the thermoregulatory and physiologic heat-adaptation ability deteriorates with age (Khosla & Guntupalli, 1999), the elderly, particularly those whose age exceeds 75, is generally susceptible to heat. Consequently, particularly vulnerable persons can be left without the monitoring and extra help that they would need in the case of another summer like 2018. On the other hand, studies

¹ The care-system is dealing with proactive as well as reactive aspects of climate related hazards, and thus, the personnel that works with the vulnerable individuals of society is also suffering from the indirect risk of an increasingly tense situation, which should furthermore be understood within the context of a social care system already under pressure from deficits of finance (Jonsson & Lundgren, 2015).

support the notion that people in need of home services indeed are the *most* vulnerable (Semenza et al., 1996). Limited means could probably excuse such distortion, since it often argued that it is accurate to target the most vulnerable (Jonsson & Lundgren, 2015; Mees et al., 2015). However, adaptation interventions does not always come at an extra cost, particularly not when accounting for avoided harm to infrastructure and citizens (Watkiss, 2007).

Lastly, the summer might have brought a momentum for climate change adaptation. Like the elderly in the focus groups, the city officials mention how the summer has raised their personal awareness of how vulnerable society seems to be in the face of climate-related hazards, as in this quote by the chief of the elderly care in Trelleborg: "You notice fluctuations in the climate in a way that makes you discover how incredibly vulnerable we are". A number of projects are also in the pipeline, for example a green plan, and a detailed comprehensive plan for the city of Trelleborg (interview, City planner; Climate strategist). These are expected to further integrate climate change adaptation, and the issue of heat waves specifically.

Table 4 Measures by the municipality

Activity	Measure	Type
Hazard-reduction & avoidance	-	-
Vulnerability reduction	-	-
Preparedness for response	Warning system	Grey
Preparedness for response	General advice to elderly and their relatives	Behavioural
Preparedness for response	Heat wave plan	Behavioural
Preparedness for response	Contingency plan and warning system for heat waves	Behavioural
Preparedness for recovery	-	-
Risk assessment	Risk-vulnerability analysis	-

7 Elderly-municipality interactions

This chapter of the analysis addresses research question 4: *How does the elderly population and the municipality of Trelleborg interact on mitigating the health risks to elderly due to heat exposure?* The chapter begins with an account of the relevant content in the climate adaptation plan of the municipality (7.1), which is followed by the interactions structured according to the categories outlined in 3.2; collaboration (7.2); and compliance and choice (7.3). After running through the interactions, the chapter ends with a discussion and a summary (7.4).

7.1 Notes on citizen participation in the climate adaptation plan

The need of involving citizens in enhancing climate change adaptation of the municipality is underlined throughout the Climate adaptation plan (Trelleborgs kommun, 2018c), which specifically mentions the importance of citizen participation. It lists a number of measures on this topic, for example the establishment of a communication plan for how the municipality can engage in dialogue with the local residents on adaptation issues and the creation of a forum where citizens can submit ideas about which climate adaptation measures that are needed according to their experience. It also lists a number of measures aiming to help citizens through counselling. For example, through; establishing advice on climate adaptation; continuous information dissemination with local residents and; energy counselling being expanded with advice on measures to cope with cooling in an energy-efficient manner. However, despite being in the pipeline, such interventions have not materialized as of yet (interview, Climate strategist).

7.2 Collaboration

A citizen-municipality collaboration on the topic of indoor temperature is made possible by the environmental law, which is enforced by the environmental inspectors at the civil administration. The environmental inspectors are responsible for implementing environmental law according to the Swedish environmental code through oversight, which is done either through oversight projects or as response to complaints. Thus, elderly complaining on temperatures can make out a collaborative interaction between the municipality and elderly.

The summer of 2018 registered one complaint from an elderly citizen regarding high indoor temperature (interview, Environmental inspectors).

There are recommended values regarding indoor temperatures – between 20-23 degrees Celsius – with which house owners must comply, or they might be sued for “inconvenience to human health” (Socialstyrelsen, 2005). However, “reasonability assessments” (Söderqvist et al., 2015) makes it is hard if not impossible to enforce demands of a good thermal indoor environment during extreme weather events as such demands would be deemed excessive in terms of the economic investments needed (interview, Environmental inspectors). Thus, the Swedish environmental code is basically toothless when it comes to spur reactive measures to counter extreme heat. However, although much of the work is based on complaints coming in to the department, as suggested by the informants of the study, a proactive drive towards house owners could be made through an oversight project.

7.3 Compliance & choice

General advice to elderly and their relatives (Trelleborgs kommun, 2018e), and other similar informational measures outlined in chapter 6 make out a citizen-municipality interaction on the topic of mitigating health risks of heat. As this interaction is merely made up of recommendations, and thus is not mandatory, it is categorized as “choice”.

The measures aimed at keeping the elderly within the elderly care system cool makes out adaptation interactions. For example, when personnel urge the elderly to drink more or to stay in the cooler parts of their living spaces. Due to varying degrees of autonomy among the elderly within the elderly care system, these interactions can appropriately be categorized both as compliance and as choice (interview, Chief of elderly care).

7.4 Discussion

Three types of interactions were identified in the study: compliance, choice and collaboration. That the adaptation interactions were so few should be understood in relation to the delimited risk context addressed in the study (health risks to elderly citizens due to heat exposure). Moreover, it can be understood as a consequence of insufficient means of the municipality, which is confirmed by the regional health strategist. The resource aspect is significant and there are not enough resources to be in contact with the elderly population on these issues (Interview, regional health strategist).

The results show that while ideas of including the citizens of Trelleborg in the management of health risks of heat are on paper, they have not been implemented

as of yet. In that sense, the findings are well in line with the conclusions of previous studies (Brink & Wamsler, 2018; Fagan-Watson & Burchell, 2016). It does seem however that there is a potential to further collaborative interactions within the frame of already established interaction-points: the discussion club of the elderly organization and the elderly days.

8 Increasing the resilience of the elderly to heat waves

This chapter of the analysis addresses research question 5: *With respect to the answers of questions 1-4, how can the municipality of Trelleborg improve the flexibility of its adaptational measures regarding health risks to elderly?* The chapter makes use of the results previously accounted for in chapters three to six as well as additional material in order to elaborate on suggestions that might further strengthen the heat wave adaptation. The chapter is structured based on the suggested measure and related adaptation activity; hazard avoidance/reduction through urban heat island mapping (8.1); preparedness for response through heat escape/evacuation (8.2); vulnerability reduction through urban planning (8.3) preparedness for response through enhanced communication (8.4); and citizen participation (8.5). It ends with a summary (8.6).

8.1 hazard avoidance/reduction through urban heat island mapping

Measures that lead to avoidance or reduction of heat-related hazards were absent from the measures of the municipality. One question is how can a municipality accomplish avoidance or reduction of heatwaves? Climate change mitigation is a form of hazard reduction that might seem very abstract due to the geographical and temporal scale it works on. However, due to it being more of a local phenomenon, the urban heat island effect might be more conceivable, but still highly relevant as a target (Li & Bou-Zeid, 2013). The urban heat island might be reduced through modification of the factors causing it (i.e. by transforming the activities and materials dominating cities). Another form of hazard avoidance would be to avoid the urban heat island itself, as suggested by Malmberg et al. (2014). There is the possibility of using models that map geographical variations in the intensity of urban heat island of cities, which presumably could be used in order to dissuade elderly citizens of moving into the hottest areas of cities, thus realizing a measure of “hazard avoidance” (interview, Regional health strategist). According to the regional health strategist, urban heat island-mapping could inform recommendations on what parts of the municipality susceptible citizens, such as the elderly, should not live.

8.2 Preparedness for response through heat escape/evacuation

As previously noted, one of the elderly's main concerns regarding the summer was that they never got any break from the heat, which was inescapable and seemed never ending. According to their own accounts, breaks from the heat were significant for their well-being. Those who could, used cool places such as cellars, cars or shopping malls to get that break. With respect to such experiences as well as research on the topic (Luber & McGeehin, 2008; Semenza et al., 1996), vulnerability reduction through heat escape or evacuation, can be relevant to reduce heat induced mortality and morbidity. Helping the elderly escape the heat can be done either by controlling the temperatures in their home environment or by setting up well conditioned places where they can be evacuated to during extreme heat events.

Cooling the homes of susceptible individuals actualizes a number of potential approaches. Housing adjustment allowances, for example, could be used in order to heat-adapt apartments with curtains and temporary air conditioning systems (Regional health strategist). Putting more emphasis on inspections of the thermal condition of buildings is an option with regard to the environmental inspectors. Although we know that it is hard to demand buildings can uphold adequate air temperatures during extreme events. One idea discussed by an elderly in the focus-groups was to install air-conditioning in the bedroom only. Air-conditioning in a bedroom creates both a resort for hot spells during the day, as well as a comfortable space to spend the night in order to recover during a good night's sleep (Lee & Shaman, 2017). This might be an option which may be possible with reference to cost and energy intensity, which makes out significant obstacles to the air-condition solution (Brown & Walker, 2008). Instead of refurbishing or air-conditioning whole buildings which is likely to equal to a large demand in energy, this might also be a good option in regard of climate mitigation, since energy production is associated with greenhouse gas emission (Gupta et al., 2012).

Establishing specific places to recover from hot weather is mentioned throughout the empirical material. The security manager made references to discussions made during the summer, when a deal of using empty rooms in a local mall was considered. Vacant premises could be set up to temporarily house elderly people in an area tailored to meet the specific need of elderly people (Rhoades, 2016). The regional health strategist also mentioned such organizational measures as desirable. Specific thresholds for heat evacuations has been calculated for Scania, and should occur when indoor temperature exceed 26 degrees Celsius (Malmberg et al., 2014).

8.3 Vulnerability reduction through urban planning

Urban planning is central to climate change adaptation. However, it works at an extended timeframe, which makes its effects less apparent and therefore less attractive to implement (Fernandez Milan & Creutzig, 2015). This might partially explain the lack of such measures in Trelleborg. Any mentioning of mitigating adverse effects of heat are absent in the major planning documents of the municipality (Trelleborgs kommun, 2014, 2018b) which are heavily biased towards hydrological issues such as sea-level rise and heavy rain. This is understandable due to the palpability of such threats in Scania and in a coastal city such as Trelleborg, which in a Swedish context is particularly exposed to sea-level rise (Hall et al., 2015). Concerns of water-related hazards are also arguably dominating the global adaptation discourse among planners (Carmin et al., 2012). That said, the flexibility of measures that reduces the vulnerability of citizens in Trelleborg against extreme heat events are needed to strengthen resilience.

Green measures should be implemented. Not least as they might mitigate the urban heat islands effect, and thus lead to hazard avoidance/reduction (Li & Bou-Zeid, 2013). More generally, green measures are often “multifunctional”, as they work synergistically to tackle multiple problems (Hall et al., 2015). For example, the occurrence of trees and other green structures in a city can provide multiple benefits such as shade during heat waves, mitigation of water flows during heavy rains (Armson et al., 2013), reduction of carbon dioxide from the atmosphere (Besir & Cuce, 2018; Nowak et al., 2013) increased biodiversity (Mant et al., 2014), not to mention the cultural services of making cities more attractive for its citizens (Haase et al., 2014). The deployment of green roofs or facades are known to stabilize indoor climate and is therefore an option to implement in order to make buildings and its residents withstand heat waves in good health (Besir & Cuce, 2018). Green solutions not only carry such crossover potentials, but might also be the most economically sound option to manage climate change risks (Elmqvist et al., 2015). Thus, establishing a variety of green solutions, including trees, green facades and roofs, should be promoted by the municipality.

The elderly participants of the study point at some urban planning related measures that would increase their coping abilities, including; more shaded places to sit down and rest outside; deployment of drinking water fountains or; a more accessible coast where one could go in order to cool down in the sea. As one 74-year-old female participant says:

Then these extreme summers become more accessible so to speak. And it becomes an asset instead of something negative for us who are older if we can go down and walk in the shoreline. We can lower the temperature just because we go there in the water all the time along nature and feel the sea breeze. So, then we get the temperatures down.

8.4 Preparedness for response through enhanced communication

Information is considered as a key aspect of climate change adaptation, as small changes in behaviour can reduce associated risks (Semenza et al., 1996). For one thing, as suggested by this study, the health risks attributable to climate change is not necessarily well known among citizens (K. Akerlof et al., 2010; Stoutenborough et al., 2015). Making people recognize heat as a threat is therefore relevant in itself. This is supporting the focus on information in the heat wave plan. However, although the survey by the Public health authority shows that information was available (J. Bergström et al., 2018), the focus group participants of this study offered a somewhat different image. As previously underlined in section 4.3, they did not demonstrate a high degree of awareness regarding the risks to their own health. Nor did they mention receiving any information.

The chief of emergency services is humble before the fact that communication is of central importance and that some focus should be on letting the people that “who knows it best” deal with the issues (Interview, Chief of emergency services). Previous studies underline that that generic solutions runs the risk of excluding those that are most vulnerable (Jonsson & Lundgren, 2015; Mees et al., 2015), and that information to elderly should be distributed with close attention to the characteristics of the recipient (Rhoades, 2016). With respect to the phenomenon of a digital divide between elderly and young generations (Datta et al., 2019; Zambianchi et al., 2019), information on the municipality website or in social media might not be the best option. Drawing on the conversations of the focus groups study, the elderly seems to vouch for tv-ads rather than information on websites.

While monitoring of susceptible elderly people is being done within the elderly care system of Trelleborg, this study has previously argued that while being a strong measure, susceptible elderly individuals might be left out. Monitoring is a prominent feature in the heat action plan of France (Cadot et al., 2007). Here, variations of medical surveillance, or monitoring, of vulnerable individuals are thought of as effective to mitigate mortality and morbidity from extreme heat events (Cadot et al., 2007; Luber & McGeehin, 2008). Unlike the Trelleborg heat wave plan however, this medical surveillance is aimed at all individuals, rather than only those within the elderly care system. Such measures are brought up by the focus group participants themselves and seems broadly supported in this group. As opposed to the passive communication of putting up notes and ads, active communication, such as phone-calls or text-messages could underline the severity of the situation. One possibility is conducting “reverse 911:s” or a “sign-up drive[s]”, as suggested by the elderly in the study by Rhoades (2016).

8.5 Citizen participation

The results of the study show that there are few citizen-municipality interactions on mitigating health risks due to heat exposure. Far from the “formal, ongoing relationships” on the topic or the co-production of heat wave plans suggested by Fagan-Watson and Burchell (2016). However, some potential, already existing structures for such interactions appear throughout the study. For example, discussion clubs are mentioned in the focus groups as well as on the security department (interview, Chief of emergency services).

Some of the focus group participants expressed a need of discussing climate related issues such as the topic of this thesis. They mentioned a discussion club under the direction of their organization that works like a forum for topics they choose. The discussion club continuously invite municipal officials from “all positions” to take part in discussions, where the members of the organization leave their opinions on certain topics. Though some of them expressed disbelief in the public administration as a system being capable of, or willing to, see to their needs. A 69-year-old male participant, for example, said that the response from the officials are good at the meetings, adding “but then what happens when this official leaves through the door, I don’t know.” A 74-year-old female participant says in the same vein that “You need to see concrete results otherwise you get tired. It doesn’t seem to pay off or how to say”.

The emergency services attends “elderly-days”, using the meeting points of the Social Department (interview, Security manager). Although it has not been done so far, the emergency department see a possibility of using these meeting points to discuss heat related health risks or other climate adaptation related issues (Interview, Chief of emergency services).

Public participation in the planning process is required by, and regulated in, the Planning and Building Act (interview, Spatial planner). During the development of comprehensive and detailed development plans, citizens are invited to submit opinions on plan proposals. As such, the planning process is a possible interaction point where elderly people can collaborate with the municipality on the inclusion of heat mitigating elements in the plans.

Hence, there exists a number of interaction points, under the direction of the elderly as well as the municipality, that could be used in order to further a collaboration on adaptational issues. As previously stated, there are many potential benefits associated with public participation. Some of those, for example the creation of understanding around issues, are not directly reliant on any certain outcome but on the interaction itself. However, transforming public opinions into actual measures are likely to demand organizational efforts. However, emerging possibilities such as web-based participatory tools might make such organization easier to handle (Bojovic et al., 2015).

Increasing the awareness among the elderly population might increase the collaboration between elderly individuals, indirectly influencing “citizen to

citizen” knowledge transfer (Wamsler 2014:231), which is a way of communication that is popular among elderly citizens (Wicks, 2004)

8.6 Summary

The table below shows the results presented in 6.6 (in black) supplemented by the proposals of this chapter (in red).

Table 5 Heat wave measures including suggestions

Activity	Measure	Type
Hazard-reduction & avoidance	Urban heat island-mapping	Behavioural
Vulnerability reduction	Promote green roofs/facades	Green
Vulnerability reduction	Plant trees for shadowing	Green
Vulnerability reduction	Increase water fountains and places to sit in the city	Grey
Vulnerability reduction	Make the beach more accessible to the elderly	Grey/green
Preparedness for response	Warning system	Grey
Preparedness for response	General advice to elderly and their relatives	Behavioural
Preparedness for response	Contingency plan and warning system for heat waves	Behavioural
Preparedness for response	Heatwave plan	Behavioural
Preparedness for response	Distribute air-conditioners to vulnerable individuals at vulnerable sites	Grey
Preparedness for response	Sign-up drive for more immediate information distribution	Behavioural

Preparedness for recovery	-	-
Risk assessment	Risk-vulnerability analysis	Behavioural

9 Conclusions

How was the hot weather during the summer of 2018 perceived by the elderly population in Trelleborg, in terms of its health risks?

The empirical material shows that the health risks the elderly face due to heat exposure is not a primary concern to them. The focus groups participants demonstrate conflicting feelings towards the heat, which is perceived as comfortable and stressful at the same time. The concerns of the heat are however not directed towards the direct threat that the heat poses to their own health. Rather, it is directed towards the wider phenomenon of climate change, as well as the more palpable issues of the 2018th summer such as forest fires, water shortages and barbeque bans. There is also a reluctance towards recognizing heat as a threat, possibly grounded in a culturally rendered preference for warm weather. This indicates a risk perception that is not entirely in line with the actual health risks, thus suggesting a need to increase awareness on an issue that is poised to grow in the future.

How did the elderly population of Trelleborg cope with the hot weather during the summer of 2018?

In line with their risk perceptions, the elderly had not taken too many measures to counter the threat to their health. At least not proactively. However, it is clear that the heat fundamentally affected their lives during the summer, as it forced them into an array of behaviour changes such as changed circadian rhythms, unusual food intake patterns and such things. These “coping strategies” however, appears as being unreflected and spontaneous rather than deliberate actions of countering an attendant threat.

How does the municipality of Trelleborg strategically manage the health risks to its elderly population due to heat exposure?

The issue of heat related health risks to elderly is mainly treated by the security department of Trelleborg through measures categorized as “preparedness for response”. The heat wave plan, which is a document outlining response measures to reduce the health risk for vulnerable individuals has its primary focus is on the elderly citizens within the elderly care system. In order to stay in good health, these elderly individuals receive assistance per routines listed in the heat wave plan. The elderly citizens not receiving elderly care are primarily targeted by information on how to stay in good health during a heat wave, aimed at themselves and their relatives. While the elderly citizens within the elderly care

system are likely to be *most* susceptible to adverse effects of heat, other vulnerable individuals such as the lonely or people living on the top floor, remain somewhat left “to their own devices”. Consequently, the certain risk context of elderly and heat is not confronted with a flexible adaptational system. Rather, it is short of “hazard avoidance/reduction” and “vulnerability reduction” measures.

How does the elderly population and the municipality of Trelleborg interact on mitigating the health risks to elderly due to heat exposure?

The study shows that there are few elderly-municipality interactions regarding the management of health risks due to heat exposure. Although acknowledged in the Climate adaptation plan, collaboration is represented only in one interaction between a tenant and the environmental inspectors. Other interactions occurred in the shape of elderly care and information to citizens. However, there is a number of potential meeting points where the elderly population interacts with officials from the municipality, although these have not been used to collaborate on heat-related issues to date. There are also places where citizens can submit their opinions and complaints, such as through the citizen participation progress during comprehensive planning.

With respect to the answers of questions 1-4, how can the municipality of Trelleborg improve the flexibility of its adaptational measures regarding health risks to elderly?

The work on mitigating health effects to elderly due to heat exposure would benefit from increased flexibility and inclusiveness of the adaptational system. Suggested improvements include implementation of ecosystem-based adaptation, more focus on the suitable channels of information as well as achieving what is referred to as heat-escape or heat evacuation.

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Appendix 1 - Interview guide - focus groups with the elderly

Project introduction

Moderator – who is he?

- Information about the study/aim
- Information about the participants role
- Information about how the material will be used (RISE)
- Information about the recording procedure
- Information about ethic principles
- No right/wrong answers

Interview

(Opening question, everybody answers in turn)

- What you describe the summer of 2018 in one sentence?

(Introduction questions, open questions about the theme)

- What are your general thoughts about hot weather?
- What are your general thoughts about the summer of 2018?

(Transition questions, to the bigger picture, deeper into experiences)

- What are your thoughts on the health risks associated with hot weather?
- Do you feel that you are sensitive to heat?

(Key questions, most central questions)

- During the summer of 2018, how was your everyday life affected by the hot weather?
- Had you prepared for such hot weather, and if so how?
- Did you take any measures to protect yourself from the hot weather, and if so what?

- Did you have contact with ‘authorities’ regarding heat?
- Were you in contact with anybody else regarding the heat?
- Can you share a specific memory from the summer of 2018 when the heat was particularly palpable to you?
- Have you taken any measures for future heat waves?
- What are your thoughts on how to distribute the responsibility for managing health risks with hot weather?
- What should be done in order to protect the elderly from the health risks of future heat waves?

(Ending question)

- Does anybody want to add anything?

Final points

- Send final report?
- Acquire contact information / birth year?

Appendix 2 - Interview Guide - interviews with public officials

Project introduction

- *Information about the study/aim*
- *Information about the participants role*
- *Information about how the material will be used*
- *Question of RISE*
- *Information about the recording procedure*
- *Information about ethic principles*

Interview

General questions

- What is included in your mission, and what are your responsibilities in relation to health risks to the (elderly) population of Trelleborg due to heat exposure?
- How do you/your department work to reduce the health risks to the (elderly) population of Trelleborg due to heat exposure?
- How do you collaborate with other parts of the municipality on the topic of the health risks to the (elderly) population of Trelleborg due to heat exposure?
- In your opinion, what should be done in order to reduce the health risks to the (elderly) population of Trelleborg due to heat exposure?
- In what ways have you/your department been in contact with the elderly population on the topic of health risks for elderly populations due to heat exposure?
- How do you relate these issues to climate change?
- How do you relate this work to the concept of climate change adaptation?

The summer of 2018

- From the perspective of your professional role, how did you perceive the summer of 2018 in relation to the health risks to the (elderly) population of Trelleborg due to heat exposure?
- How did you/your department manage the health risks to the (elderly) population of Trelleborg due to heat exposure *during* the summer of 2018?
- How has the summer of 2018 affected the work on reducing the health risks to the (elderly) population of Trelleborg due to heat exposure?
- Have you/your department been in contact with the elderly population regarding the health risks of heat exposure they faced during the summer of 2018? If so how?

Final points

- What documents can provide me with information on how the municipality deals with the health risks to the (elderly) population of Trelleborg due to heat exposure?
- Send final report?