Infant mortality and epidemic diseases. Wartime Finnmark in a comparative perspective

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Introduction

Finnmark is the largest (48,616 km^2) and northernmost county in Norway, but its population (approximately 56,000 in 1940) is the most scattered. The natural environment is generous in the sense that the sea provides food and employment, but the climate is harsh, and it is hard to succeed with extensive farming. Historically, living conditions have often been more demanding in Finnmark than in the rest of the country, and infant mortality has been higher (Mølmann 2004).

Kirkenes town and the wider geographical area stretching to Vadsø, Vardø and the Varangerfjord in the easternmost part of Norway, was the first area in Finnmark to be occupied by the Germans in 1940. They called it "Festung Kirkenes", and close to 100,000 German-Austrian soldiers, sailors and marines were stationed there simultaneously in 1944 (Hauglid et al. 1985, 14, 22). The eastern part of Finnmark was particularly affected by its proximity to the Litza front, but the German presence was marked also in the western part of Finnmark. As an example, 4,000–5,000 men were stationed in the town Hammerfest (Gamst 1984, 140). Prisoners of war were also numerous, and were placed in camps scattered across Finnmark. According to historian Michael Stokke, there were 110 camps and 14,000 prisoners in Finnmark[1]. Thus, the population of Finnmark was multiplied by German invaders and their prisoners of war. This caused a strain on the available resources for everyday life, and made it hard to maintain the pre-war standard of health care and impossible to improve the services.

The Second World War will be referred to with the abbreviation WW2 in this paper. As discussed below, the national infant mortality rate in Norway decreased during the war. In Finnmark, however, infant mortality increased to a level much higher than before the war. Epidemic diseases increased both in scale and mortality. When Finnmark was evacuated and demolished in late 1944, the negative developments in health and living conditions cumulated, and the population suffered in many ways, both physically and mentally.

Problems for discussion

The aim of this article is to present and discuss the general development of some selected indicators of population health and living conditions in Finnmark during

[1] http://www.nrk.no/nordnytt/14.000-straffanger-i-finnmark-1.11222876

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the years 1940–1944. We will not account for the forced evacuation in 1944 in detail, as this event and its consequences for the population were so dramatic and severe that they need to be discussed separately. The situation in Finnmark at that point was complex, as the easternmost districts were liberated only a few days before the forced evacuation began. Parts of the population escaped the forced evacuation by hiding in the mountains.

Our primary indicator of the living conditions and population health is infant mortality rate. The national statistics concerning infant mortality of Norway, Sweden and Finland have been used. Infant mortality during the war in Finnmark is compared with the Norwegian average during the same period, as well as with infant mortality in the northernmost counties in Finland (Lapland) and Sweden (Norrbotten). The intention is to study Finnmark in a broader perspective, by shedding light on similarities and differences with neighbouring areas as well as comparing with Norway in general.

Other indicators of living conditions and population health are the incidence of three selected communicable diseases, scabies, gastro-enteritis and diphtheria. We consider these diseases to be highly relevant indicators of the development of general health conditions, resistance towards epidemic diseases and hygienic conditions.

The development of these selected indicators during the period is discussed in the historical context of civilian society during the war in Finnmark. Although health statistics is used extensively, the emphasis of this article is not on the validity of the indicators, nor on infant mortality and epidemics as such. By discussing their development against other historical sources and previous research, we aim at exploring how WW2 affected health and living conditions for the population in Finnmark, by answering the following questions:

1. How did the infant mortality rate and the incidence of diphtheria, gastroenteritis and scabies develop in Finnmark 1940–1944, compared with the national average? How does the development of infant mortality rate in Finnmark compare with that of Finnish Lapland and Swedish Norrbotten during the same time period?
2. May changes in these health indicators be explained from changes in living conditions in Finnmark caused by WW2?

Literature and previous research

The literature can roughly be divided into three categories: medical, historical and biographical.

Medical and nursing literature

As discussed in detail below, some articles are written shortly after the events, while others are written several years after the war with an analytical approach. Authors in social medicine and medical history, Isak Forsdahl, Sivert Svane, Jon Jonson and

Jon Bjørnson describe and discuss specific events, often with detailed information which provides an understanding of how medical emergencies were attended to with limited resources during the war. [2] All of the authors have shed light on an epidemic of paratyphus that occurred in Kirkenes in 1943. Svane has also written two articles about civilian health and the efforts of social health workers in the eastern part of Finnmark during the war. One of these articles focuses on Sør-Varanger and Vadsø, the other on Vardø and Gamvik.

Axel Strøm has written several scientific articles on health conditions in Norway during the war from a medical point of view.[3] His articles are of particular interest in order to gain an overview of the health situation in Norway during the war. He focuses on the national level. Anders Gogstad is also an important contributor in a national context.[4] His presentation is more detailed than that given by Strøm regarding specific districts in Norway. He gives an overview of the organization of public health services during the occupation, and the consequences for the civilian population. Gogstad discusses the development of infant mortality and epidemic diseases, and criticizes the widespread idea that general public health in Norway improved during the war.

Ingrid Immonen has conducted a study on nursing in Finnmark during WW2, combining interviews with the use of archives.[5] She sheds light on living conditions and challenges in the practical care of patients and communities. In many ways, her work complements Svane, Forsdahl, Jonson and Bjørnson from a female perspective.

Scientific historical literature on health and living conditions in Finnmark during the war

Finnmark is in general underrepresented in the national dissemination on WW2 in Norway. Finnmark and Northern Troms, where the forced evacuation and total destruction took place received, however, considerable attention in the years immediately after WW2. "Krigen i Norge" by Willy Brandt was published as early as 1945.[6] In two volumes, he describes the war and the events in Finnmark 1944/45 including the liberation of eastern Finnmark, the forced evacuation and the destruction of Finnmark and Northern Troms. However, Brandt's work is more descriptive than analytical, which is typical for this period. No analytical studies on the general consequences of WW2 on health and living conditions in Finnmark have been carried out, and the northern part of Norway is often insignificantly discussed in national studies.

[2] Forsdahl (1990), Svane (2000), Jonson (1945), Bjørnson (1965).

[3] Strøm (1954), (1974)

[4] Gogstad (1995)

[5] Immonen (1999)

[6] Brandt (1945)

One example is the national historical study of public healthcare in Norway 1603–2003, vol. 2, written by historian Aina Schiøtz. [7] The national broad outlines are well described in this volume, but it is surprising that the events in the northernmost part of the country have not received more attention, in particular the forced evacuation and total destruction of Finnmark and Northern Troms. Schiøtz's volume is interesting as it in many ways reflects the minor role Finnmark has in the national presentation of the history of WW2. Schiøtz has based her work mainly on secondary sources, and she refers briefly to Immonen. The dramatic events in Finnmark have not been put into perspective with public health and living conditions for the civilian population. It seems reasonable to expect that the living conditions in Finnmark and Northern Troms during the war differed so much from the Norwegian average that a generalisation including this area must be deceptive.

Two historical publications about Finnmark and Northern Troms during WW2 highlight the forced evacuation and the consequences for the civilian population: "Til befolkningen" by Hauglid, Jensen and Westerheim was published in 1985, and Arvid Petterson's "Fortiet fortid" in 2004.

Biographical literature

After the liberation in May 1945, there seems to have been considerable interest in the conditions in Finnmark and Northern Troms, as this part of the country had suffered the most severe consequences of WW2. Approximately 50,000 of a population of 75,000 were forced to evacuate. About 30,000 ended up in the southern part of Troms and Nordland, but all counties were obliged to accept "evacuees", as they were commonly referred to in Norway (Fosnes 1974, 76). Institutions and private homes were requisitioned to house evacuees. The destiny of Finnmark had consequences all over the country[8].

The first collections of stories told by the people who lived the war, the forced evacuation and the destruction of Finnmark and Northern Troms were published in 1949 and 1950 (Hellesnes 1949, 1950). In recent decades a great number of yearbooks, memoirs and other non-scientific literature have emerged that describe different aspects of civilian life during the war. The reprinted letters and diaries, originally written during the war and aftermath, are particularly interesting because they are primary contemporary sources. The present situation is expressed without the knowledge of what was going to happen. These primary sources should be read with focus on the intended audience. They may be political documents, or the content may be coloured by censorship. In their publication, *"From reliable sources. An introduction to historical methods"*, the historians Howell and Prevenier discuss how people may be lacking skills to understand their own

[7] Schiøtz (2003)

[8] Stenvold, Heidi: under work.

observations. War is mentioned specifically as a complex time where people may lose their objectivity, so that every rumour is taken seriously – regardless of how absurd the rumours may be (Howell and Prevenier 2001, 67-68).

Sources

The main basis for the statistical calculations of infant mortality rate and incidence of epidemic diseases are official figures published by Statistics Norway. We have used their annual National medicinal publications, "Sunnhetstilstanden og medisinalforholdene". These publications are based on reports from county medical officers, which again are based on reports from local medical officers. They cover main issues of public health and social hygiene, and contain compiled statistics on mortality and contagious diseases. We have also used statistics from Statistics Finland and Statistics Sweden on infant mortality rate for the two countries and their northernmost counties.

Our primary historical sources are the general health reports from individual districts signed by the medical officers, as well as reports for the county written by the county's chief medical officer. These reports are rich sources on many aspects of the society, and a main primary source on living conditions. We have focused on topics concerning public hygiene and everyday life, such as nutrition, housing, water supply, renovation, sanitary conditions and sewage. It is, however, important to keep in mind that these sources are based on reports written by individual doctors. The reports reflect how the doctors understood and communicated the communities in which they worked and lived. Some doctors stayed for many years, other served for a limited amount of time. As the annual medical reports were the doctor's official opportunity to voice their concerns for their districts and the needs of their patients, they may be interpreted as political documents. This has to be kept in mind, but we find the reports credible compared with other sources from the same period. The reports also make sense when read together with medical statistics. The concerns of the doctors often seem genuine and necessary. Many Norwegian physicians were concerned with public and social aspects of medicine, and medical officers of Finnmark in particular were experienced in preventive tuberculosis work[9]. Several reports reflect a belief in adequate living conditions as a basis for improving the health of the population, and preventing illnesses and diseases.

Death certificates of infants for all districts in Finnmark in the period from 1940 to 1947 have been examined. The certificates provide information beyond that of individual deaths. It is often possible to deduct information about the parents' nationality, father's occupation, cause of death, whether a doctor had examined the child and the place of birth and death. Registration of place of birth and death is

[9] Elstad and Hamran (2006): p.37, 401-437. During the 1930s and 1940s, however, tuberculosis specialists laid less emphasis on improving living conditions as a preventive strategy (Ryymin 2009, ch. 4).

useful because it indicates that the death was registered in the county where the parents belonged, *not* where they were evacuated to. As an example, an infant belonging to Hammerfest was born during the forced evacuation, and died in Tromsø in January 1945. The death is registered in Hammerfest.

Method

Quantitative and statistical analyses from public statistics and archival material have been used. Public, descriptive archival material from the period is interpreted and analysed. It has been important to ensure that data from different levels and sources are interpreted against each other. Statistical tendencies need to be discussed and understood in the social and historical context of living conditions during the war. The method is in part comparative, in that Norway, Finland and Sweden are compared on a national as well as regional level, based on the official statistics available in each country.

Incidence of epidemic diseases is only available as absolute numbers of cases in each county. To be able to study the regional development and do comparative research regionally as well as nationally, we have calculated the population of Norway and the county of Finnmark. The census due in 1940 was not carried out because of the war. We used the figures from the census of 1946, and deducted the excess of births for each year. To calculate the population for 1945, the excess births for 1945 were deducted from the 1946 census. For 1944, the excess births for 1944 were deducted from the number found for 1945, and so on. Several factors remain unknown. These factors include migration, emigration and deaths abroad, and consequently the estimated population numbers may be inaccurate. This method was suggested by Statistics Norway, and was chosen after we had contacted The National Archives, The Norwegian Historical Data Centre as well as Statistics Norway in search of accurate population figures. Neither of the above mentioned institutions were able to provide estimated population figures between 1930 and 1946.

Wilhelm Fosnes used another method to calculate the population of Finnmark and Northern Troms in his master thesis about the evacuation of Finnmark and North Troms: Fosnes seems to have used a rationing census from 1939 in addition to an ordinary census. [10] He does not specify which census he refers to. We have contacted the National Archives in an attempt to access the material he refers to, but it was not found. By his method, Fosnes calculated the population of Finnmark to 62,795 for October 1st 1944, and 60,382 for October 7th 1939. As table 1 underneath shows, our method resulted in a smaller population both in 1944 and 1939.

[10] "Rasjoneringstellingen i 1939"; Fosnes (1974, 106).

Table 1. Estimated population of Finnmark, Troms, Nordland and Norway in 1939–1946 according to the method used in this article

	Finnmark	Troms	Nordland	Norway
1939	54,909	105,024	199,391	3,002,534
1940	55,677	105,974	201,351	3,019,267
1941	56,464	106,892	203,044	3,035,165
1942	57,109	107,908	204,687	3,049,031
1943	57,756	109,310	207,301	3,070,205
1944	58,349	110,791	210,046	3,095,871
1945	58,479	112,371	212,942	3,125,473
1946	58,790	113,722	215,972	3,157,257

Source: Statistical Yearbooks of Norway: (1942), (1943–1945), (1946–1948), Norwegian Population Census 1946

We would argue that the method we have chosen is the most reliable available, short of studying each district individually, which would be extremely time-consuming. It is, however, an inevitable fact that the figures for Finnmark in 1944 and 1945 are unrealistic in the sense that the majority of the population were not currently resident *in* Finnmark. They did, however, belong to the county of Finnmark. In 1944, the order of the forced evacuation was proclaimed and carried out. Some hid in caves and turf huts, but the majority of the population was in fact forced to evacuate to other parts of Norway. The same is true for the northern part of Troms. People began to return to Finnmark after the war ended in the spring of 1945, but it took several years before everybody had the opportunity to return. The number of people actually *present* in Finnmark was considerably lower than the number *registered* as belonging to the county during and after WW2. The years of 1944 and 1945 stand out in this respect. It is essential to highlight the methodical challenges for this particular material and it will be discussed later in this article.

General health conditions in Norway during the war

Axel Strøm's study provides a comprehensive national overview of the health situation in Norway during the war. He claims that at the start of the war, the national health-related preparedness was as poor as the military preparedness (Strøm 1974). From studies of mortality in the population, Strøm concludes that children between the ages of five and nine suffered the most during the war. According to Strøm, the primary cause of poorer health during the war was infectious diseases. *"It is a well known experience that war and catastrophes are followed by epidemics of infectious diseases, and that children suffer the most."* (*Ibid*, 10). The national general mortality increased somewhat during the war, but

the increase was most pronounced for people under the age of 20, and the mortality for the 5–9 year age group was remarkably high. The number of violent deaths increased during the war, but death due to acute infectious diseases constituted the major increase of the mortality rate (Strøm 1954, 24). The total mortality from acute infectious diseases doubled during the war, and the mortality rate was higher in cities than in districts (*Ibid*). The occurrence of nearly all contagious diseases increased, but the increase in the incidence of diphtheria was most pronounced.

Strøm points out that the possibility of spreading infections increased during the war, due to movements in the population, poor living conditions, collection of large groups in camps, and reduced resistance due to inadequate diet. According to Strøm, the diet was qualitatively adequate, but quantitatively inadequate. The variations were, however, considerable throughout the country. Rationing of certain products and food was introduced as early as 1939, and preschool children and pregnant women were favoured, in theory. Having a coupon for milk or butter did not necessarily mean that you would be able to buy the product. You still had to be able to pay for it, but most importantly, it had to be available. According to Strøm, the population in urban areas suffered more than in the rural areas, and people whose occupation involved hard physical labour received far from sufficient calories to maintain their weight. *"With the exception of pre-school age children and pregnant women, the rations were inadequate, and the question of sufficient diet depended on the opportunities of the individual to obtain a supplement of the foods."* (*Ibid*, 3)

A national survey on school children showed a steady growth in height and weight until 1940, when it came to a stop, and even declined (Strøm 1974). The surveys showed that children were actually shorter than before the war; they were also thinner and in poorer general condition. *"Even though there are relatively few children that would be characterized as being in poor or miserable condition, there is no doubt that the physical standard in general has deteriorated. The children are paler, more flaccid, and have less subcutaneous fat and less well developed muscles than before the war. There are fewer superior physical specimens, more inferior ones, and the quality has on the whole deteriorated markedly."* (*Ibid*)

Strøm finds that despite the difficult food situation, diseases related to malnutrition and undernourishment did not increase notably during the war. He argues, however, that the food situation indirectly resulted in reduced immune response. His analysis is supported by Gogstad (1991, ch. 14).

Not only food was scarce during the war. Other commodities, such as soap, cleaning utensils, cloths, shoes, firewood, fine combs, medicine and even water, were rationed as well. The German army requisitioned public buildings and private homes. Strøm describes health issues during the war in a national perspective, pointing out risk factors that had an impact on health and mortality. The conditions, however, varied throughout the country, and there were significant differences between the north and the south.

Strøm has also accounted for improvement of health conditions during the war. He points out that mortality from circulatory diseases decreased significantly during 1940–1945. Mortality from diabetes decreased during the war, starting in 1941, with a minimum in 1944–1945 (Strøm 1954, 34). Westlund (1966) finds the same decrease of incidence of diabetes type 2 in Oslo during the war. Strøm considers that the change of diet in these aspects had a positive effect on people's health, and points to the decrease of calories as the main reason, and possibly reduction of fat as a contributing cause (Strøm 1954, 39).

Gogstad published "Helse og Hakekors" in 1991, a study in social medicine during the war. Gogstad emphasises that living conditions during the war were characterized by war and destruction, limited resources for health care and sanitation, as well as insufficient nourishment and physical and mental stress. These conditions would be expected to affect public health. He claims that the years between 1940 and 1945 became an unpremeditated natural experiment in social medicine. The problems started in 1941. The state of nutrition deteriorated noticeably towards the end of the year, and simultaneously the extensiveness of epidemic and other infectious diseases increased rapidly (Gogstad 1991, 272). In 1943, the national epidemic outline was characterized by diphtheria. Gogstad does not contradict Strøm's view that the lower calorie and fat diet may have had positive extended effects, but he states that a diet that was in many ways destructive should not be idealized. He also claims that the decrease in cardiovascular diseases and arteriosclerosis, discussed by Strøm, may just as well be caused by errors of registrations and classification (*Ibid*., 303).

Contrary to Strøm who focuses on national lines, Gogstad also discusses regional differences. Gogstad finds pronounced correlations between infectious diseases, mortality and external factors in everyday life, and points out typical variations throughout the country, geographically and socially. Lowered resistance in the population was a major problem, and Gogstad describes a connection between inadequate nutrition, poor sanitary conditions, overcrowding and movement of people. He also points out that vulnerable groups in the population were particularly exposed to physical as well as mental stress. He mentions lack of sleep and rest, explosions, shipwrecks, stays in lifeboats, imprisonment, torture, long-term undernourishment, sickness, tension and terror as major strains (*Ibid*., 283).

Gogstad presents a survey of counties where the mortality rate increased during the war, and Finnmark is worst off with an increase from 10.7 per 1,000 inhabitants (1936–1940) to 14.4 during the war (1941–1945). He uses figures presented in Historical Statistics 1968, published by Statistics Norway in 1978. He did not calculate population figures. Finnmark stands out with the highest mortality rate in the country, as well as the most severe increase of 3.7 per thousand (*Ibid*., 291). Gogstad suggests that the variation in mortality between counties may be explained by a number of circumstances such as living conditions, extensiveness of infectious

diseases, local economy, availability of health services, lack of medical professionals and acts of war (*Ibid.*, 292). He mentions the role of a preventative health programme for mother and child, which was a priority but still with variations of availability for the population. Interestingly, the infant mortality rate was higher in rural areas than in urban areas, with the exception of Tromsø where the infant mortality rate increased until 1946. Gogstad tries to explain this increase in Tromsø with the forced evacuation of the population from Finnmark and the retreat of the German troops, and the difficult circumstances followed by these major events. The high mortality rate generally and infant mortality in Finnmark during and after the war is not discussed specifically.

Like Strøm, Gogstad concludes that the national high child and young adult mortality is caused by infectious diseases, in particular poliomyelitis, diphtheria, scarlet fever and cross-infections. Statistics Norway divide in age-groups 1–5, 6–9, 10–14 and 15–19. As mentioned earlier children between the age of 5 to 9 suffered the most.

One of the headlines in Gogstad's book refers to epidemics, evacuation and failing hygiene. Surprisingly, he does not refer to the forced evacuation of Finnmark in 1944, but instead to the city of Bergen in 1940 when 40–60,000 people were evacuated for a short time from the city to the surrounding districts, and epidemics of typhoid and paratyphoid occurred. Mortality does not seem to have increased considerably in the area. The chapter is symptomatic in national discourse on the war in Norway – relatively little emphasis has been put on what happened in Finnmark.

Finnmark during the war

The living conditions in Finnmark during WW2 became tight in many aspects, and overcrowding became a social as well as a health-related problem. Diseases were easily transmitted. At the same time the health institutions diminished in capacity, because the Germans requisitioned hospitals and hospital wards, orphanages, old people's homes, sanatoriums, schools, and public baths. Several hospitals were bombed, and the health workers needed both ingenuity and vitality to maintain basic services for the population (Immonen 1999; Svane 1998). The national scarcity of physicians and nurses was pronounced in Finnmark.

Because the civilian population in Finnmark was outnumbered by far by the German soldiers, they interacted on a daily basis for almost five years, living side by side, facing many of the same everyday challenges. This was particularly the case in Sør-Varanger and Porsanger. Families had to share their homes with soldiers, others were forced to move out of their homes. Because of the large numbers of German troops, the negative consequences of the occupation were intensified in the north. In Hammerfest, 800 private rooms had been requisitioned by the occupants by February 1944, and within the same period the local population

in Hammerfest had increased by approximately 800 people[11]. The houses were crowded, there were sea mines and land mines, and the eastern part of Finnmark suffered heavy bombings. Kirkenes suffered the second heaviest bombing of any European town at the end of the war. Vardø and Vadsø also suffered numerous air raids and were in the end of the war totally destroyed, and other places were also targeted.

During these bombings, the Germans and the civilians in Finnmark lived in fear side by side. Russians executed the air raids, and the German bases were the targets. The bombs did not distinguish civilians from soldiers, private homes from military posts, and headquarters from hospitals. This is reflected vividly in memoirs, interviews with witnesses, literature on local history and scientific literature. Terror was always present. It seems reasonable to assume that both the physical and the psychological strain contributed to reduced immune response.

Transport and supply

In order to understand the impact of WW2 in Finnmark, it is essential to consider the factors of transport and supply. Geographically Finnmark is far north in Norway, far from the central area of Norway and Europe. The sea was the main transport route for supplies of foods and commodities, as well as passengers, both healthy and ill. The coastal traffic in Finnmark came to a halt with the beginning of the war, and the regular route of the coastal steamer to the eastern part of Finnmark was suspended and replaced by smaller boats. The solution was not ideal, but it kept up the communication in Finnmark to a certain degree (Balsvik 1989, 206). Fuel for boats and vehicles was rationed for official use only. Finnmark is a vast county with a scattered population, and people used to travel to centres and towns to buy commodities, consult a doctor, go to hospital or attend to official business. A long period of difficult and unstable transportation to, from and within Finnmark was initiated when the route to eastern Finnmark closed down.

The sea was also the livelihood for a large part of the population. Fish and fish products were the staple food and source of income. As the waters of the coast were laid with mines, fishing became a highly hazardous occupation. Acts of war resulted in tragedies when seagoing vessels went down and lives were lost. These tragedies affected people directly, and many were scared to travel. The medical reports contain many complaints about the difficulties related to transport. Travelling to visit patients in the rural areas was challenging, and it was also difficult to transport patients to the hospitals. In 1941, the medical officer in Gamvik complained about these difficulties. *"The impossible situation with transportation has exceedingly complicated the transport of surgical cases, emergency cases, to hospitals."*[12]

[11] Letter from mayor Berg to the department of trade 1944. Hammerfest kommunale arkiv. IKAF

[12] Annual medical report from the district of Gamvik, 1941.

In 1942, the medical officer in Lebesby also reported about challenges regarding transport, including direct references to apprehensions and fear connected to transportation. *"The bad communications and danger of war have resulted in that sick people refuse to travel to the county hospital or specialists, unless it is a case of desperate need. The substitutes for the coastal steamers are few and unstable, and have often refused to take sick people on board. The voyage from Kjøllefjord to the hospital in Hammerfest in the best case scenario takes two days, and then the waiting time in Kjøllefjord is not taken into account."*[13]

The majority of functioning cottage hospitals and nursing homes were run by missions and humanitarian organisations, had trouble getting supply of food, medicine and equipment. It was often mentioned that it was impossible to get hold of the essential foods to keep patients on recommended diets.

Improvement of housing also came to a sudden end. It was difficult to get hold of materials to build, renovate and even maintain houses. Lastly, the supply of clothes, bed-clothes and shoes became a great and increasing problem for all households.

Infectious diseases

Strøm and Gogstad have accounted for the increase in infectious diseases on a national level. Both refer to general living conditions as a major factor. Gogstad does, however, criticise Strøm's generalizations, claiming that local differences in, for example, food supply and proximity to health care were essential. We have used three infectious diseases to document and illustrate regional differences with focus on Finnmark.

Scabies

"Scabies is an itchy skin infection caused by mite. Scabies is common" (Jervell 1941, 397-398).

Infectious diseases related to reduced possibilities for keeping the person and their belongings clean increased dramatically from the beginning of the war, and became an affliction in the whole country. Extensiveness of scabies exploded in Norway, and was hard to overcome due to the lack of medicine and ointments. Incidence of scabies is used as an indicator of living conditions because it reflects both the overall conditions related to personal hygiene as well as accessibility of treatment. Scabies was not generally a lethal disease, but it was nasty and unpleasant. It is, however, possible that massive attacks of scabies would lower resistance in infants who, along with old and sick people, generally suffered most. Incidence of other dermatological diseases, such as impetigo contagiosa and erysipelas also increased.

[13] Annual medical report from the district of Lebesby, 1942.

The medical officers in Finnmark despaired over insuperable problems with scabies and lice during the war. Finnmark was overcrowded, and cleanliness was a daily challenge for the population. In 1942, there were 56 public baths. Many of them were, however, requisitioned by the German army. The medical officer in Hammerfest mentioned in 1942 that the population in Hammerfest needed a public bath, as both the bath at the hospital and a "Kven bath" (e.g. a sauna) had been closed because of lack of firewood. In Måsøy, no public baths were available, and the medical officer blamed the insufficient supply of water for the non-existent use of the baths in the schools. In Kolvik there were only a few private saunas. There was a public bath with sauna in Kolvik, but in 1942 it had been closed down for undisclosed reasons.

Very few households had running water. The difficulties of access to clean water, which is discussed later in the article, led to a situation where people saved water. The lack of soap and cleaning equipment was present and a daily challenge. There was a shortage of dishcloths, scrubbing brushes, brooms and fine combs. Many medical officers reported that the shortage of changes of clothes, especially underwear, was pressing, and contributed to the situation. Some people did not have a single spare set of clothes. The shortage of bed linen lead to more infrequent washing, and scabies as well as lice was often transmitted by the bedclothes. It is certain that the numbers of cases of scabies reported for Finnmark are lower than the reality, as many who were affected did not consult a doctor for the condition. People were aware that the supply of medicine and ointments was very limited, the doctor was often far away and transportation risky.

The deteriorating hygienic conditions are mirrored in the rapidly increasing cases of scabies in the county. In 1940 there were 319 reported cases of scabies in Finnmark, in 1941 the number was 444, and in 1942 – 963. By 1943 there were 2,884 reported cases of scabies in Finnmark[14]. District nurses were to teach the population how to fight the disease, but that did not help as long as the means were lacking.

In 1942, the medical officer in Lebesby reported that there were 72 new cases of scabies in the last four months of the year. He claimed that rationing of soap, oil for lamps and clothing were important factors regarding both the cause and the fight against the epidemic. The medical officer was hopeful that the problem would be solved with ointments and the district nurse who had been instructed to help the situation both in schools and homes. He was relieved that scabies finally had been included in the Public Health Act. The situation was, however, about to get much worse. In 1944, the scabies epidemic declined in Finnmark, but was still on the rise in Troms and Nordland, and in Norway in general. The forced evacuation in the autumn of 1944 depopulated large parts of Finnmark. For those who fled to hide in caves and huts, there were no doctors to consult. The whole county was in a state

[14] Sunnhetstilstanden og medisinalforholdene: (1939), (1940), (1941), (1945), (1946)

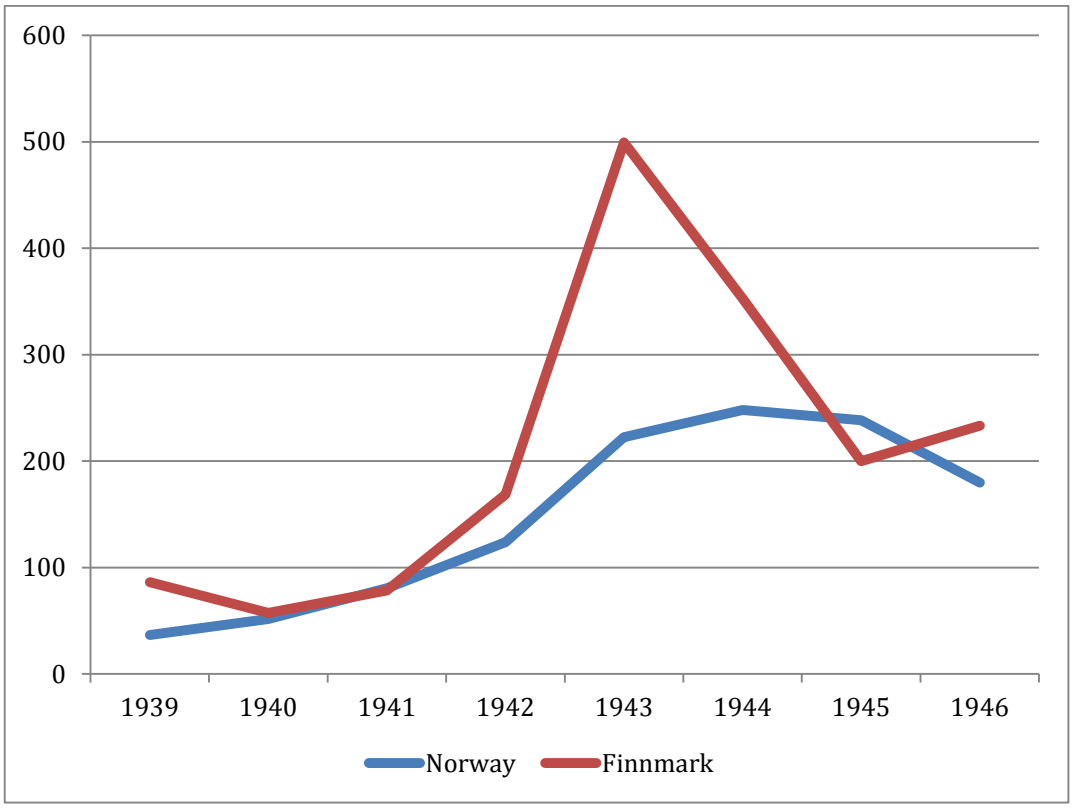
of emergency. There are no medical reports available for Finnmark for 1944 either on district or county level. The data available from Finnmark year 1944 in this article is collected from different publications by Statistics Norway. The increase of scabies in Troms and Nordland in 1944 was possibly caused by increased crowdedness and contagion caused by the great influx of evacuees from Finnmark and Northern Troms.

Table 2. Incidence of Scabies in Norway and Finnmark 1939–1946. Reported cases in absolute numbers

	Norway	Finnmark
1939	**11,048**	**474**
1940	**15,564**	**319**
1941	**24,500**	**444**
1942	**37,794**	**963**
1943	**68,328**	**2,884**
1944	**76,784**	**2,058**
1945	**74,497**	**1,169**
1946	**56,773**	**1,371**

Source: Sunnhetstilstanden og medisinalforholdene (1939), (1940), (1941), (1945), (1946)

Figure 1. Incidence of Scabies in Norway and Finnmark, 1939–1946. Reported cases per 10,000 inhabitants



Source: Sunnhetstilstanden og medisinalforholdene (1939), (1940), (1941), (1942–44), (1945), (1946), estimated population calculated in Table 1.

Figure 1 illustrates the number of cases of scabies per 10,000 inhabitants in Norway and Finnmark reported by the medical officer. If scabies is a representative indicator of living conditions, one can say that the unfavourable consequences of the war were by far most perceptible in Finnmark. The reservation concerning the calculation of the population in Finnmark for the years 1944 and 1945 is, however, confirmed. The number of reported cases seem to be among the people present in Finnmark, but by then most of the population was evacuated to other parts of Norway.

Acute gastroenteritis

Acute gastroenteritis includes a variety of illnesses related to the stomach and small intestine. Common symptoms are vomiting, stomach pains and diarrhoea. The illnesses were transmitted in different ways. Some bacteria were transmitted through spoilt foods or contaminated drinking water. In 1943, an entire family in Vadsø became ill after eating canned whale meat, and three of them died. The factory and distributors were notified, and the commodity was declared unsafe for

human consumption[15]. Other varieties were transmitted through human contact. The rise in acute gastroenteritis during the war affected the whole country. Contrary to scabies, acute gastroenteritis could be fatal, especially combined with other diseases and reduced immune response. The situation was worse in the north than in the south. The sick needed bed rest and a diet of boiled water and soups until the condition had improved. In hospital, patients were tested for typhoid and measures to prevent transmission were observed.

Several interacting factors exposed the population to acute gastroenteritis. Unsatisfactory water supply, sanitation and sewage were significant. Overcrowding also played an important part.

Variable standards of water supply

Water supply varied throughout the county. The annual medical report for the county of Finnmark for 1942 mentioned that the access to drinking water was inadequate and random in many districts. The towns had waterworks, but in the countryside the population was reliant on wells. These wells were often described as being in poor condition, and unprotected from trickle of water and surface water. The annual reports from the medical officers illustrate the regional differences. In 1942 the conditions are described as follows: *"The question of water supply is for most homes not solved in a satisfactory way (water pipeline from closed well) – on the contrary, water is collected in buckets from open waterholes, wells or small creeks. Every winter an acute lack of water supply takes place, and the water has to be collected even further away, … the result is that people are saving water. Public waterworks do not exist apart from a couple of wells, where water can be retrieved from water pump."*[16]

In Måsøy the medical officer complained that the wells were unsatisfactory, and that the drinking water contained too much iron. In Kjøllefjord a planned improvement was halted due to the lack of pipe material to finish the job. Around 30–40 homes were attached to the water pipes**,** but the rest of the population had unsatisfactory water supply. The consequence was that the water had to be transported, and in some cases carried, a long way.

Drinking water in Hammerfest town is referred to as very satisfactory. The same is the case for other towns and fishing villages in the county. The differences are noticeable between the countryside and the centres of towns and villages when it comes to water supply and sewage. In Loppa, the medical officer related the gastroenteritis of the summer directly to the poor quality of the drinking water. The same doctor reported that the scarcity of water during the wintertime also had a negative effect on cleanliness and hygiene.

[15] Sunnhetstilstanden og medisinalforholdene. Hovedresultatene 1942–1944.Statistisk sentralbyrå (1948): p.48

[16] Annual medical report from the district of Loppa, 1941

During WW2 most work associated with maintaining and improving infrastructure came to a halt or even was reversed.

Sewage and waste disposal

Public systems of sewage and waste disposal were rare, and the increase in population due to soldiers and prisoners of war put an extra strain on the communities. Many medical officers complained that public regulations regarding waste disposal were not followed. *"Sewage and waste disposal is still unsatisfactory, as waste and slops are disposed of just outside the front door. In many places lavatories are not in use"*[17].

Descriptions of this kind are common in the annual medical reports from Finnmark during the war. In most districts, improvement of sanitary conditions came to an end with the war. It was difficult to provide resources and material to renovate sewage and waste disposal systems, and pressure on the existing resources was increasing. *"Due to lack of transportation waste disposal has been unsatisfactory. Boxes with ashes and waste have been overloaded, and outside the military camps waste is placed in the middle of the street."*[18]

Lavatories were not common in Finnmark during the war, and the population had to share the existing outdoor privies with the German occupants. They also shared available baths.

Incidence of acute gastroenteritis increased dramatically with WW2. Both Strøm and Gogstad refer to the change in diet caused by the inadequate and unstable food supply as a contributory factor. The protein and fat content in the general diet decreased, while the use of carbohydrates increased. This change combined with extensive use of food substitutes that were of inferior quality, resulted in digestive problems, such as constipation, oedema, heavy and swollen sensation of body and lowered basal metabolism (Strøm 1954; 1974). Oedema can be caused by lack of vitamin C, scurvy, and there were cases of scurvy registered in Finnmark. Inadequate diet lowered resistance to infectious acute gastroenteritis, transmitted through drinking water or droplet infection. The number of reported cases in Finnmark increased from 324 in 1939 to 2,256 in 1943.

Diet and nutrition deficiencies are accounted for in the annual medical reports for Finnmark. In 1942 it is reported that the diet is unbalanced, and that milk and products of milk are lacking. The same is true for supply of potato and vegetables. In addition some potatoes and vegetables were damaged by frost that year. Other difficulties are mentioned, but surprisingly the report concludes that "despite the challenging circumstances none of the districts report of diseases related to diet[19]", but then the report lists a number of the symptoms mentioned above. The same is the case for 1943. It may be necessary to consider if the reports are characterized

[17] Annual medical report from the district of Måsøy, 1941

[18] Annual medical report from the district of Hammerfest, 1942

[19] Annual Medical report from Finnmark, 1942.

by poor expectations to good health. Gogstad claims that differences in opinion on what is considered to be a health problem will influence how sick someone has to be before they react and do something about it (Gogstad 1991, 19). Cases where a doctor was not consulted were not always registered.

A comparison between Finnmark, Troms and Nordland reveals the same tendencies as regarding scabies. The number of reported cases of acute gastroenteritis declined drastically in Finnmark in 1944, and increased in Troms and Nordland. This is expected as Finnmark was depopulated in 1944 and the population in Troms and Nordland increased with evacuees.

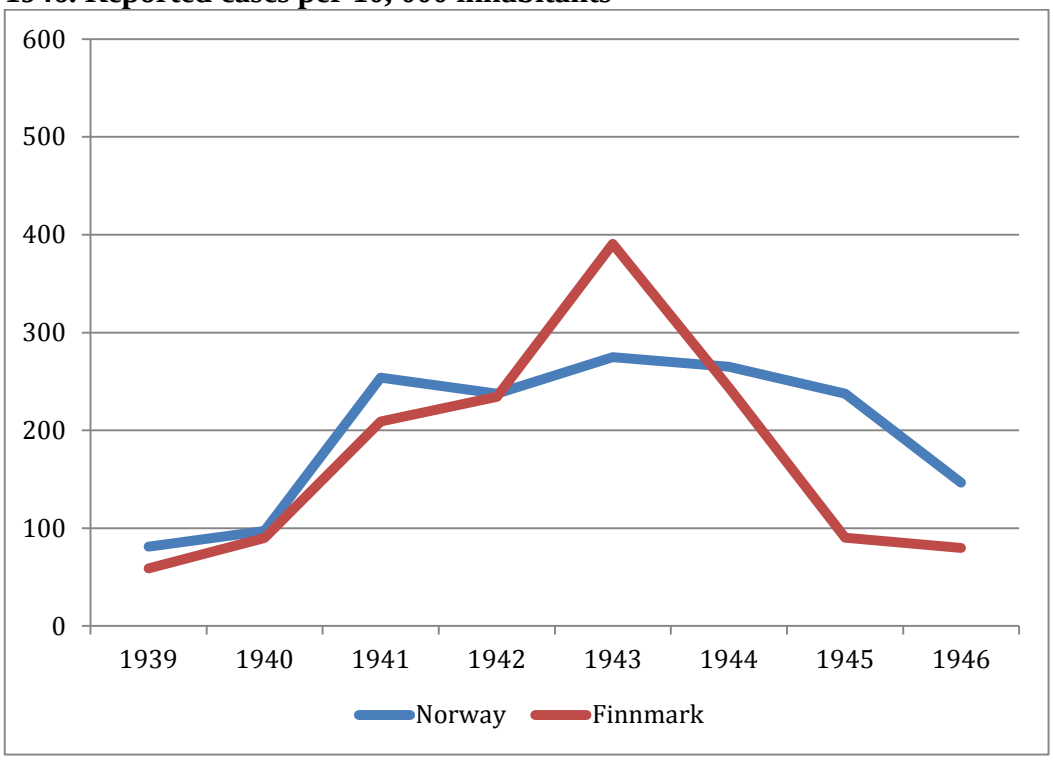
In Troms 1944, acute malignant enteritis affected both the evacuees and the resident population. Most probably, the figures for Finnmark in 1944/45 are unrealistically low because of the forced evacuation. Finnmark was struck by an epidemic in 1943, but until then the situation was similar to the rest of the country.

Table 3. Incidence of Acute Gastroenteritis in Norway and Finnmark, 1939-1946. Reported cases in absolute numbers

	Norway	Finnmark
1939	**24,335**	**324**
1940	**29,316**	**501**
1941	**77,083**	**1,181**
1942	**72,429**	**1,338**
1943	**84,371**	**2,256**
1944	**82,014**	**1,422**
1945	**74,217**	**528**
1946	**46,324**	**469**

Source: Sunnhetstilstanden og medisinalforholdene: (1939), (1940), (1941), (1942–44), (1945), (1946)

Figure 2. Incidence of Acute Gastroenteritis in Norway and Finnmark, 1939–1946. Reported cases per 10, 000 inhabitants



Source: Sunnhetstilstanden og medisinalforholdene (1939), (1940), (1941), (1942–44), (1945), (1946), estimated population calculated in Table 1.

Different factors contributed to the extensiveness of contagious gastroenteritis during the war, and the population in Finnmark was exposed in different ways. German soldiers, prisoners of war and the civilian population depended on the same infrastructure of water, sewage and waste disposal. Contaminated foods and water, overcrowding, poor sanitary conditions and low resistance in the population exposed the communities to different varieties of gastroenteritis.

Kirkenes 1943 – an example

In 1943 there was an extensive epidemic of paratyphoid in Kirkenes, originating from the local water reservoirs. Situated around the reservoirs were German barracks and a Russian prison camp (Svane 2000). Isak Forsdahl, Jon Jonson and Sivert Svane have accounted for the situation in detail. An accurate diagnosis was essential in order to treat the patients, as well as protect the surrounding population. Isolation of contagious patients was necessary, but finding space for epidemic field hospitals was very hard due to the requisitions of private homes and public buildings. In 1943, cooperation with the occupants was necessary for both sides to manage the epidemic in Kirkenes that threatened both the Norwegians and the Germans. The German laboratory was used to analyse samples, and with joint

resources of equipment and medical staff, a temporary epidemic field hospital was established in requisitioned private homes and barracks in Jakobsnes outside Kirkenes. After a while, the local school and community hall were requisitioned as well. The Germans provided furniture, equipment and medicine. The staff consisted of Norwegian legionnaire nurses and German sanitary soldiers[20].

Civilian patients were asked to bring pyjamas and bed linen, and even a bed if they could. Isak Forsdahl was the chief medical officer in Kirkenes during WW2. He got authority to requisition Germans' ambulances in order to transport patients, their beds and other personal belongings. He described a chaotic situation where patients often arrived before their beds. Electricity was provided by a generator from the local school, and water was carried from the school to the other buildings. The epidemic field hospital had no baths at its disposal. The lack of equipment was so severe that 50 patients shared one washbasin. All water had to be boiled before it could be used for drinking or cooking. All equipment that could be boiled had to be boiled. The process was extremely time-consuming. In the beginning it was not possible to carry out disinfection of cutlery and kitchenware through boiling, but this was solved by using a very strong disinfection called Sagotan. The toilet situation was a challenge with at the most 220 patients. Bedpans were emptied in a pit and covered with chloride of lime. Doorknobs were covered with cloths moistened with solution of Sagotan. Bed linen and pyjamas were also put in solution of Sagotan before being washed. Preventive precautions were carried out in the community. Gatherings were prohibited, and people were informed that proper hand, toilet and general hygiene was very important. Carriers were isolated, and forced vaccination was carried out.

Different general precautions were initiated. Kirkenes was closed off from all traffic short of vital situations. Public meeting places were temporarily closed, and it was prohibited to visit the patients. Total isolation was almost impossible to carry out, as Kirkenes experienced continuous air-raid alerts. Everybody gathered in bomb shelters, both the sick and the healthy. At the end of the epidemic, a temporary laboratory was established with a medical student in charge. Compulsory testing of faeces was introduced for everybody.

By November 9th 1943, 255 cases of Paratyphus A were reported, but Forsdahl claimed that all were probably not diagnosed correctly. Only one death was reported, but several patients suffered severely with complications such as bleeding from intestines and periostitis.

The situation in Kirkenes was a large-scale epidemic, where the challenges in Finnmark peaked. This example demonstrates that it was difficult to avoid infections, treat patients and put an end to an epidemic once it had reached a community. It was an extensive process that required a variety of resources that were hard to come by during the war.

[20] Annual medical report from the district of Kirkenes 1943.

Diphtheria

"Diphtheria is induced by the bacillary bacteria of diphtheria bacterium. The incubation period is 2–5 days. The expiration may come about as a mild throat infection or as a very pernicious throat infection followed by an extensive general reaction. Between these extremes all stages will appear. The symptoms are fever, which in general is not very high, and a sore throat. (…) Simultaneously, an external swelling of the throat will appear." (Jervell 1941, 117-118)

During WW2, Norway experienced the most extensive epidemic of diphtheria in the country's history. In 1939, only 72 cases of diphtheria were reported in Norway. However, in 1943, 22,732 people were diagnosed with the disease. Diphtheria cases and exposed persons were treated with antitoxin serum. This treatment was usually successful when administered early in the course. Strøm explains the epidemic with reduced resistance in the population. The years before the war were characterized by extraordinary low frequency of infectious diseases. This may have resulted in low immunity in the population. "Thus the conditions for the occurrence of severe epidemics were present, provided the contagions were imported" (Strøm 1954; 1974). Vaccination against diphtheria had been practiced in Europe for 20 years when the war broke out, but Norway had not participated in this vaccination, as the disease had become rare in Norway. Diphtheria was before the war very uncommon in the northern part of Norway, with no cases in Finnmark in 1939. The population had suffered unfortunate side effects from smallpox vaccination during the 1920-30s, involving cases of meningitis, some of them lethal. This experience made both the public and many doctors sceptical toward vaccines in general. According to Strøm, it would have been impossible to carry out a mass vaccination due to reluctance in the population (*Ibid.*).

When the epidemic of diphtheria was a reality, it was too late to obtain the quantity of vaccines necessary, and the epidemic ran its course. According to Strøm, diphtheria arrived with the German soldiers, who were obliged to be vaccinated. These soldiers were carriers of diphtheria even if they were not sick themselves (*Ibid*.). The population in Norway had reduced specific immunity, and the disease turned into an epidemic. Whether Strøm is right about the theory of reduced specific immunity may be questioned. Gogstad explains that low immunity caused by undernourishment, together with generally deteriorating living conditions and overcrowding, was the cause of the explosion of diphtheria during the war.

According to Schiøtz, diphtheria, exanthematous typhus, paratyphoid and acute gastroenteritis were all diseases that were very rare in Norway before the war, but that increased during the war (Schiøtz 2008, 293). It may be argued that this is a simplification. Gastroenteritis is a collective term for a range of diseases, some serious, others not. Exanthematous typhus had become rare in Norway, and the few cases that occurred during and after the war were met with great alarm. Paratyphoid was not common, but it did occur, spreading through infected foods and animals.

The above-mentioned diseases were different in scale and fatality. Diphtheria was severe in both aspects.

The graph below (figure 3) illustrates a comparison between Norway and Finnmark. The incidence of diphtheria shows a drastic increase in Finnmark in 1943. Proportions and severity varied within the county. In Alta, for example, there were 122 cases reported and five deaths from December 1942 to December 1943. In Hammerfest, where the disease progressed quite mildly, a temporary field hospital was established. The majority of the patients were adults, and no deaths were recorded. There were, however, many carriers who spread the infection. The small community of Kistrand was severely stricken by a malignant epidemic in 1943. There were 57 reported cases, and 10 of them died. Forced vaccination was introduced simultaneously with a prohibition to travel and organise gatherings. In Sør-Varanger there were 194 reported cases of diphtheria, 12 of which were lethal[21]. The M.O. in Vardø reported a malignant epidemic of diphtheria in 1943. Gatherings were prohibited, but the epidemic claimed many lives. School children were not vaccinated.

Medical Officer Isak Forsdahl has summarized how diphtheria evolved in Kirkenes during the war in his article "Helseforholdene i Sør-Varanger i krigsårene 1940-44", which was published in 1990 (Forsdahl 1990). The first cases were diagnosed in 1942, and from then on diphtheria was part of the clinical picture in Sør-Varanger. In 1943/44 an extensive malignant epidemic took place. The patients were treated with serum, but the results were disappointing. The serum available was not sufficiently high in concentration. Increasing the dose did not help. The Germans were so worried about the situation that they handed over serum from their own supply. It was an English preparation many times higher in concentration. The results with this serum were successful, provided the patients received treatment before the disease progressed. It was desirable to isolate patients, but it was hard to find available rooms in Kirkenes. Some patients were placed in a temporary field hospital established in a private house, and a few in hospital buildings which also were temporal, but most patients were treated at home. The board of public health instituted a prohibition for people to enter homes with patients suffering from diphtheria and/or paratyphus A. Public places like schools, theatres and other assembly rooms were temporarily closed. Proclamations with general instructions were posted in public places, in both Norwegian and German. Compulsory vaccination was carried out and during the winter of 1943, 1,167 people were vaccinated. Everybody between the ages of 2 and 60 were later revaccinated.

In the neighbour county Troms, an epidemic of diphtheria started in Tromsø town in late 1942, and spread in scale in the spring of 1943. A temporary epidemic ward was established in the autumn of 1942 at the tuberculosis sanatorium of the town. The epidemic was malignant and resulted in many deaths. In the northern part

[21] Sunnhetstilstanden og medisinalforholdene. Hovedresultatene for 1942–1944. Statistisk sentralbyrå (1948)

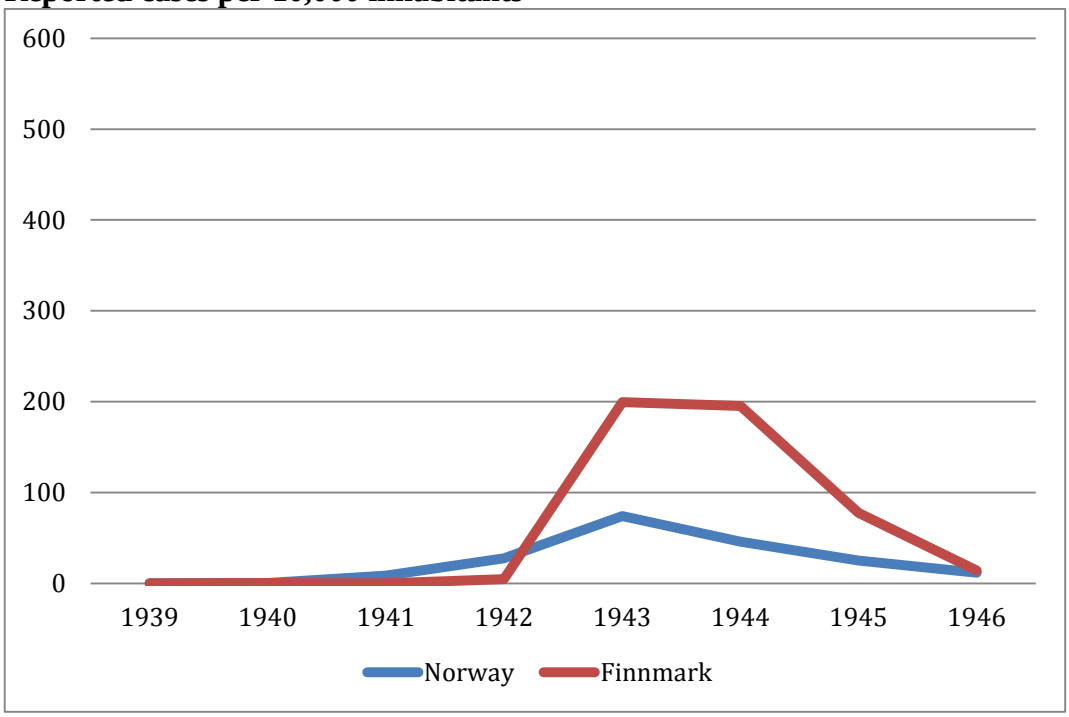
of Troms, compulsory vaccination for children under the age of 18 was introduced. Vaccination for the rest of the population was optional (*Ibid*.).

Table 4. Incidence of Diphtheria in Norway and Finnmark, 1939–1946. Reported cases in absolute numbers

	Norway	Finnmark
1939	**72**	**0**
1940	**149**	**2**
1941	**2,605**	**0**
1942	**8,451**	**27**
1943	**22,732**	**1,152**
1944	**14,202**	**1,139**
1945	**7,850**	**455**
1946	**3,740**	**84**

Source: Sunnhetstilstanden og medisinalforholdene (1939), (1940), (1941), (1942-44), (1945), (1946).

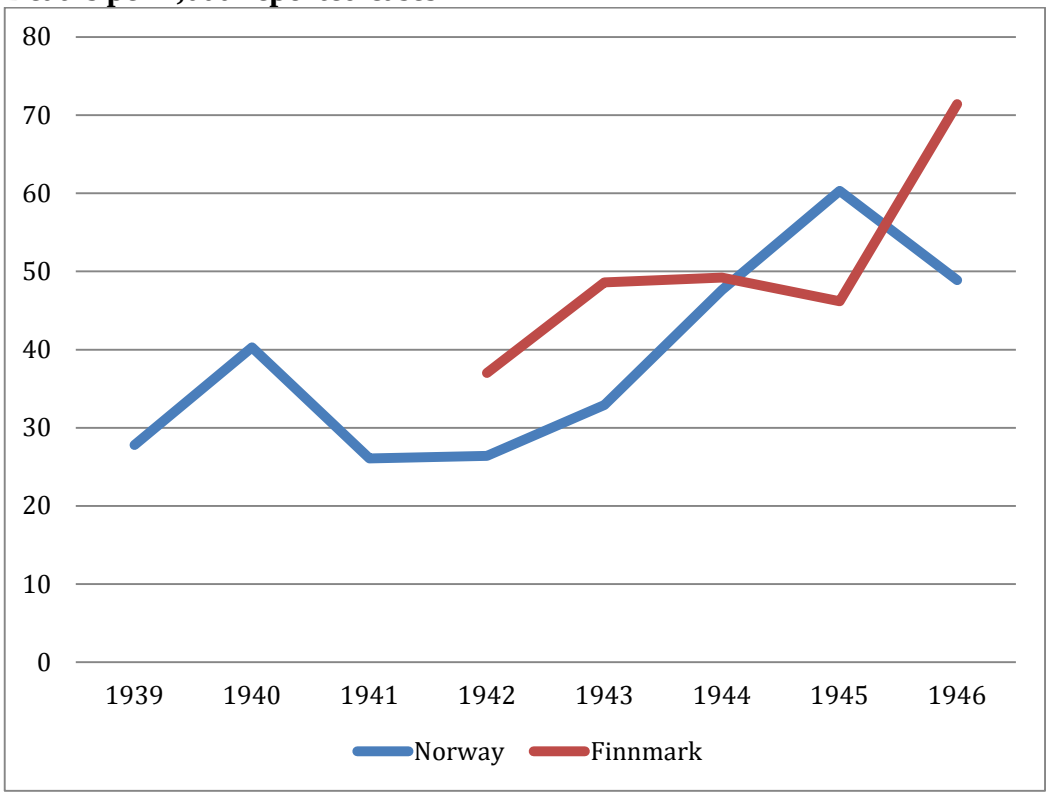
Figure 3. Incidence of Diphtheria in Norway and Finnmark, 1939–1946. Reported cases per 10,000 inhabitants



Source: Sunnhetstilstanden og medisinalforholdene (1939), (1940), (1941), (1942-44), (1945), (1946), estimated population calculated in Table 1.

The graph above (Figure 3) shows that the incidence of the disease was much higher in Finnmark than in the rest of the country from 1943 to 1946. The case fatality rate increased in Finnmark in 1943, and was higher than the nation level until 1944, when the situation changes (figure 4). It is probable that the change is due to the forced evacuation and the registration of cases and case fatalities. The national level is higher than in Finnmark until 1945 when the national level decreases and the level in Finnmark increases.

Figure 4. Case-Fatality Rate Diphtheria in Norway and Finnmark, 1939–1946. Deaths per 1,000 reported cases



Source: Sunnhetstilstanden og medisinalforholdene (1939), (1940), (1941), (1942-44), (1945), (1946), estimated population calculated in Table 1.

Infant Mortality – a comparative view

Infant mortality rate is commonly used as an indicator of the population health and living conditions in a country or area. Infant mortality includes children who die within their first year of life. The infant mortality rate is calculated by dividing the number of deaths within the first year of life by the total number of live births and multiplying this rate by 1000. Infants are the most vulnerable part of the population, and general changes in the environment may appear through changes in the infant mortality rate. Infants are in particular sensitive to changes in social and economic conditions (Backer & Aagenes 1966). Long-term consequences of catastrophes such as war, affect the infants as general living conditions deteriorate, food supply becomes challenging and crowded housing becomes a problem. Historical studies on infant mortality show that these fundamental factors of everyday life are more influential on infant mortality than factors related to medical progress (Mølmann 2004). The mothers' nutrition, health and options for breastfeeding are basic factors of great importance for the infants.

The northernmost counties of Scandinavia – Finnmark, Lapland and Norrbotten – have many factors in common, such as landscape, natural resources, long distances, and a harsh climate with short summers and long dark winters and a scattered population. These factors have impact on everyday life and create options, challenges, benefits and disadvantages.

In statistical yearbooks for Norway, infant mortality rate is usually presented in intervals of five years, but it is possible to deduct the yearly rates from the material. When studying living conditions and health during a shorter period of time, it is useful to examine the infant mortality rate for individual years.

Norway

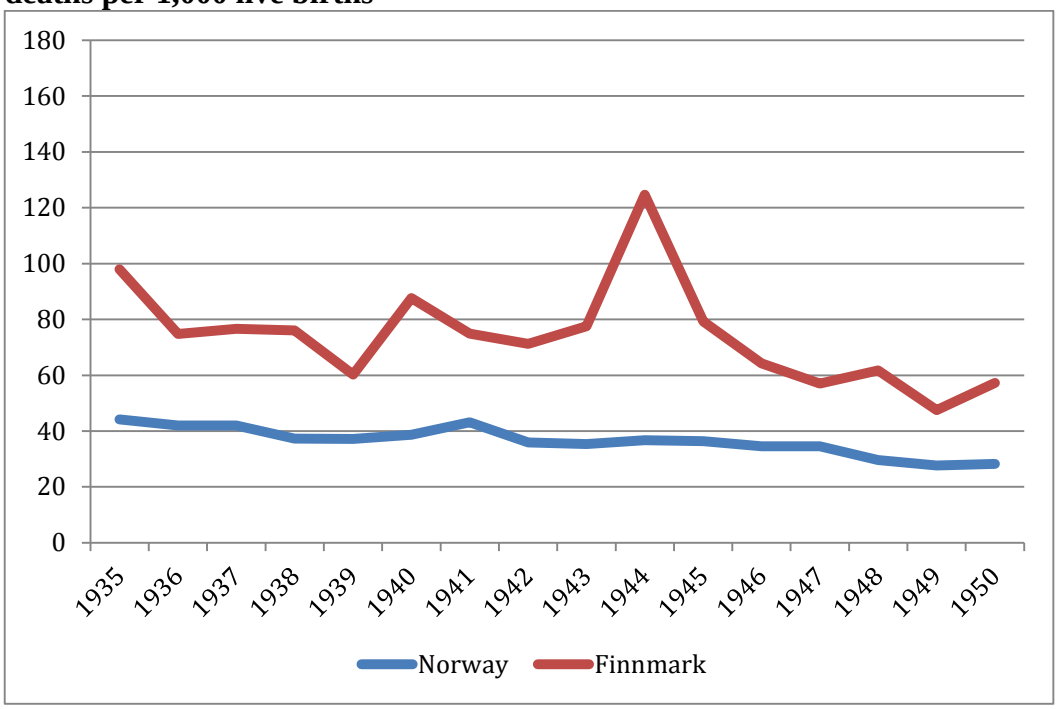
Statistics on infant mortality confirm that WW2 had a different impact on living conditions in Finnmark than in Norway in general. The national infant mortality rate kept declining through the war. Before the war, the infant mortality rate was higher in Finnmark than in the rest of the country. The difference increased both during and after the war. The infant mortality rate in Finnmark increased during the war to more than double the national level. Figure 5 below depicts the infant mortality rate in Finnmark compared with the national level. It shows that unfavourable conditions in Finnmark prior to the war were intensified during WW2.

The Tromsø physician Karoline Mathisen wrote the article "Helsetilstand og dødelighet blant spedbarn i Tromsø by" in 1952. She refers to the infant mortality rate in Finnmark. "*The improvement is least perceptible in the county of Finnmark – naturally caused by the harsh climate, poor housing and above all inadequate medical services when it comes to doctors, nurses and hospitals. The diet is insufficient with underuse of milk, fruit and vegetables, which also affects health conditions and resistance. Child welfare centres for infants have not been*

established as desired in this designated area." (Mathisen 1952, 162)

Mathisen's arguments are general, but it is reasonable to assume that all these factors affected infant mortality in the area. Hospitals and medical help were often far away, and the war made transportation more challenging and dangerous. According to information documented in death certificates, there were 109 infant deaths in Finnmark in 1940. For only 39 of the infants, it was indicated that a medical officer had examined the infant. Consequently, 65% died without getting medical help. It also seems that symptoms, such as stomach cramps, are often listed as cause of death.

Figure 5. Infant Mortality Rate in Norway and Finnmark, 1935–1950. Infant deaths per 1,000 live births

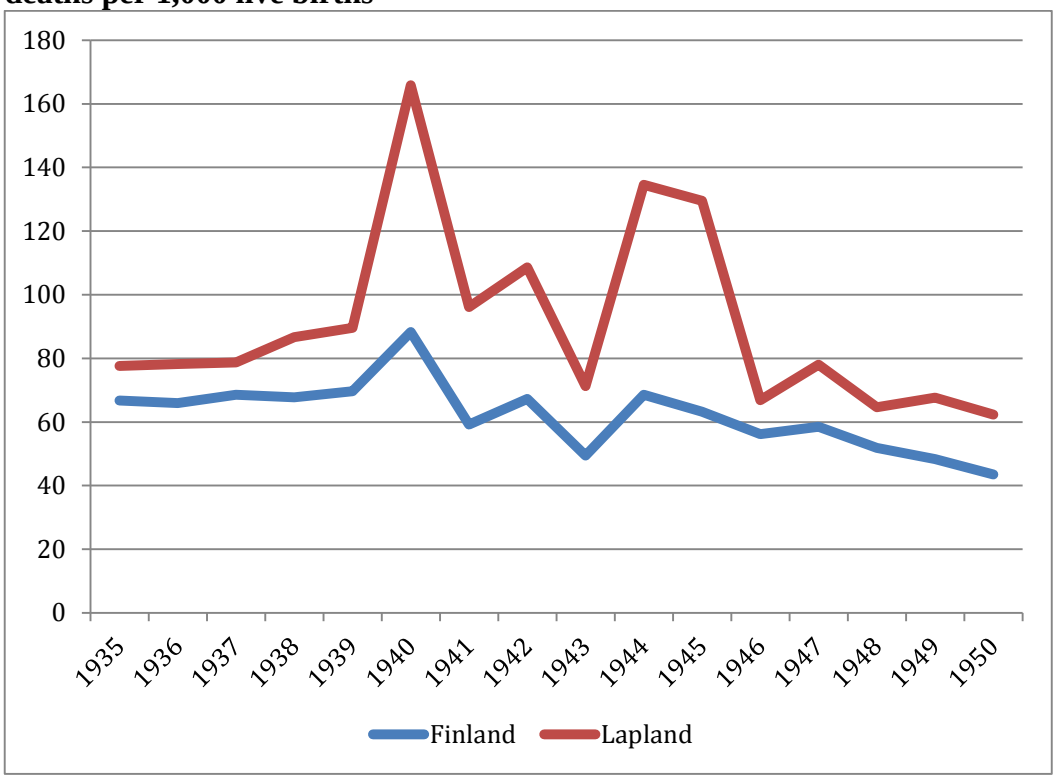


Source: Statistical Yearbooks for Norway (1937), (1938), (1939), (1940), (1941), (1942), (1943-45), (1946-48), (1949), (1950), (1951), (1952)

Finland

The consequences of war for the civilian population of Finland were severe and seem to be mirrored in an increase of infant mortality rate. The majority of the male population served in the Finnish army during the war. The women were left to handle everyday life with children and the household on their own. Finland suffered a loss of an estimated 94,000 soldiers during the war years, and in addition 197,000 were wounded (Tuunainen 2012, 172). Large parts of the population – including the people of Lapland – were evacuated and their homes and communities destroyed (Junila 2012, 193, 223-224.).

Figure 6. Infant Mortality Rate in Finland and Lapland 1935–1950. Infant deaths per 1,000 live births

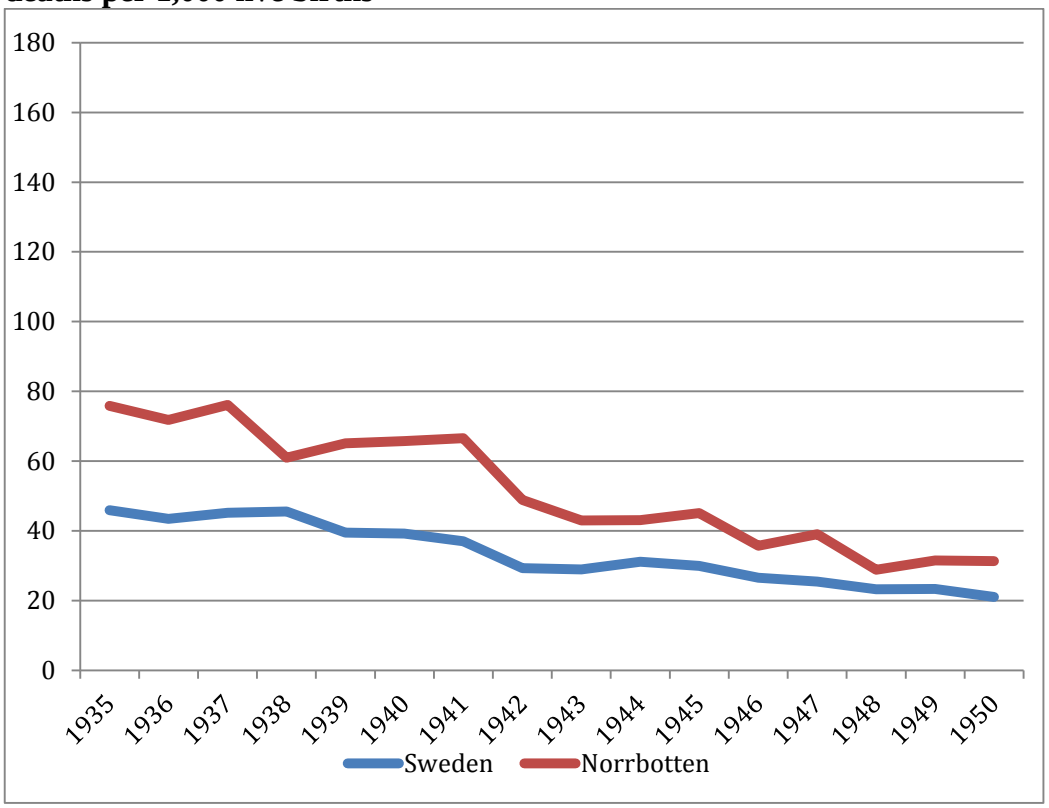


Source: Statistical yearbooks of Finland 1936–1952

Sweden

The situation in Sweden did, of course, differ significantly from that in Finnmark and Lapland as there were no acts of war in Sweden. Of the three northern counties, Norrbotten seems to follow the national trend closer than the neighbouring counties in Norway and Finland. The infant mortality in Norrbotten is nevertheless significantly higher than the national average until the mid-1950s, as shown below (figure 7).

Figure 7. Infant Mortality Rate in Sweden and Norrbotten 1935–1960. Infant deaths per 1,000 live births



Sources: Rates are provided by Statistics Sweden. Based on publications of "Vital Statistics" 1935–1960 and "Population changes" 1965[22].

Despite Sweden's neutrality in the war, the war seems to have had a different impact on infant mortality in Norrbotten than in Sweden generally. Whereas the infant mortality rate was declining in Sweden at the beginning of the war, it was increasing in Norrbotten from 1939, and remained at a high level until 1942, when it declined remarkably. A small increase took place in 1945 and 1947, but the trend is that

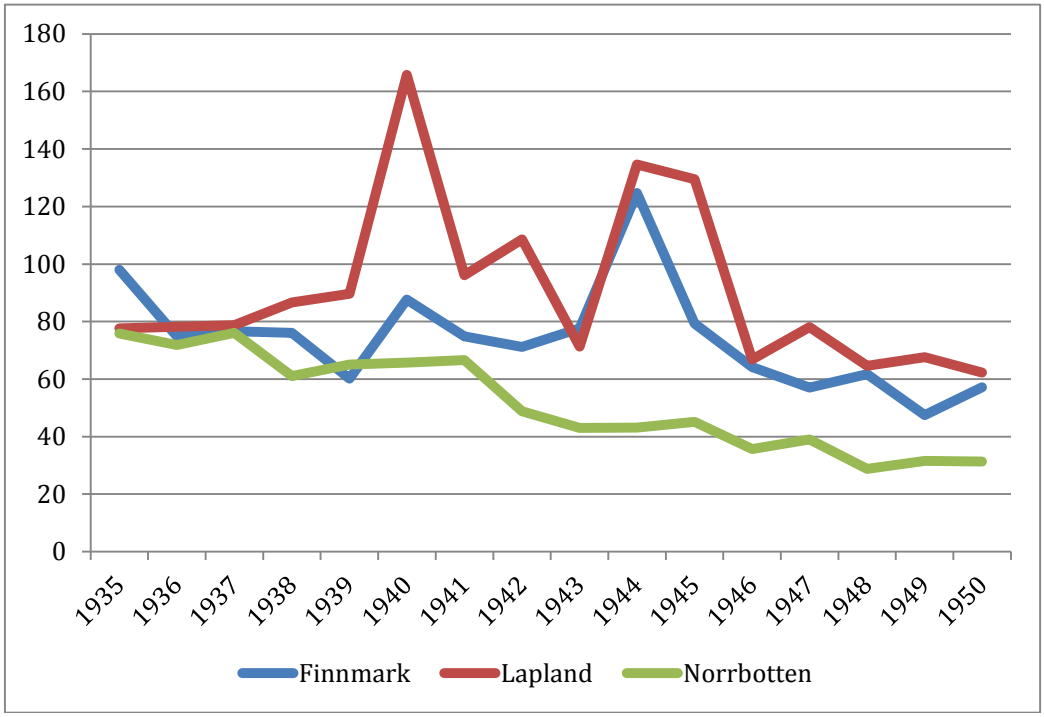
[22] Statistics Sweden provided figures from 1935–1965 with IMR for Sweden and Norrbotten. We have only used the years from 1935 to 1950 in this paper.

infant mortality in Norrbotten showed no dramatic increase during or after the war.

Common factors

The national infant mortality rate in Finland appears to be affected by the war, particularly in Lapland. In Norway and Sweden, the national infant mortality rate kept declining. Lapland and Finnmark both experienced a distinct increase in 1944, as shown in the graph below.

Figure 8. Infant Mortality Rate in Finnmark, Lapland and Norrbotten 1935–1950. Infant deaths per 1,000 live births



Sources: See figures 5–7

Both Lapland and Finnmark were heavily involved in war, and even if their political and military histories differed the events of war are mirrored in the statistics of infant deaths. The variation in the infant mortality rates indicates that living conditions changed drastically both in Finnmark and Lapland during the war.

A methodological note

This article is based on data which are incomplete both from the point of view of history and medical statistics as discussed in the paragraph “Literature and previous research” above. There are considerable problems related to the number of diseased persons, particularly of individuals with the infectious diseases diphtheria,

gastroenteritis and scabies, but as discussed above, the estimation of the population at risk in Finnmark may be even more problematic. We refer particularly to Table 1 and the text related to it. It is probably not possible to ascertain the correct number of diseased persons and the population figures during the chaotic months during the evacuation.

However, we believe that these methodological problems, albeit serious, do not invalidate our main conclusions: that there was a very strong increase in the number of cases of some selected infectious diseases during WW2 in Finnmark (as it was in Norway) and that infant mortality rate increased in Finnmark in contrast to the whole of Norway.

Conclusion

This is the first comprehensive account of the development of health conditions during the war in Finnmark. The statistics on infant mortality and incidence of epidemic diseases clearly indicate geographical differences during and after the war. In terms of the chosen indicators, the civilian population in Finnmark clearly suffered more than the rest of the country during WW2. The tendencies are that Finnmark suffered far more from epidemic diseases, and the infants had a far higher risk of dying during their first year. The differences are significant, they evolve during the war years, and are impossible to explain without investigating how the war affected people in Finnmark.

The sources indicate that circumstances changed during the German occupation of Finnmark. Living conditions deteriorated gradually, and public health followed the same pattern. The situation is complex, but the following three factors recur in a variety of contexts: transport, supply and crowdedness.

Transport and supply are closely connected. Transport was essential to maintain everyday life for the population in Finnmark. People relied on transport to get supply of food, commodities and medicine. Vessels, boats, cars, horses and reindeer were all requisitioned for military purposes, and often their owners as well.

The extending consequences of limited transport and supplies affected families, institutions and communities, as they lacked supply to maintain, let alone improve, their standard of living. Finnmark was not self-supplied with building material. Consequently, building activity stopped abruptly except for barracks for military purposes. The communities became tight in many aspects, and overcrowding became a problem as well as a health risk. Even though the German authorities in Norway were anxious to keep the population healthy, they could not supply the amount and quality of medicine, vaccines and remedies necessary. The situation meant that epidemic diseases easily transmitted from one person to another. Isolation of infectious patients was hard to achieve. In the eastern part of Finnmark,

the situation was particularly difficult as air-raid alerts were common, and there were no separate bomb shelters for infectious patients.

The increased pressure on basic sanitary facilities caused by the sudden population growth further aggravated the situation. Water supply was already limited in some areas, especially during winter, and it was a daily challenge to keep people, bed linen, clothes and homes clean. It is clear that deteriorating hygienic conditions exposed the populations to epidemics.

Health services were under severe pressure during the war, despite great efforts from both public health services and voluntary organisations such as the Red Cross and the Norwegian Women's Public Health Association (the NKS). The majority of hospitals were requisitioned or destroyed by bombing, and had to carry on at improvised sites. There was insufficient supply of medicine, food and bed linen to run institutions satisfactorily. Patients and medical staff were often obstructed from travelling because of actions of war, and, as a consequence, medical attention suffered.

There is no doubt that WW2 in Norway had a negative effect on living conditions and public health that was particularly severe for the population of Finnmark. They lived farthest from Norway's geographical centres of supply and health services, and closest to the crucial events of the Northern Front. The same was true of Finnish Lapland. It is hardly surprising that WW2 in Finnmark caused civilian society both pain and losses, but the correlation between different aspects discovered in contemporary sources provides a wider comprehension of the situation.

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Summary:
The effects of war on the health of the population have never been systematically studied. The article explores the impact of war on the general health condition of Finnmark's population during the war years. The indicators chosen are infant mortality and the epidemic diseases diphtheria, scabies and acute gastroenteritis. The development of the indicators in Finnmark is compared with the averages in Norway and Finnish Lapland. The findings deserve attention. The article discusses the statistical indicators and findings in a social and historical context with a range of sources. The article is a broad as well as penetrating analysis of the war's impact on the health of the civilian population of Finnmark and on their everyday living and survival.

Keywords: epidemic diseases; public health; WW2; living conditions

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Errata

	Original pdf, published December 22, 2015	Corrected pdf (this version), published January 11, 2016
p. 1, section "Introduction", last paragraph, fourth line	illnesses	diseases
p. 2, second paragraph, first line	living condition	living conditions
p. 10, section "Finnmark during the war", second line	health related problem	a health related problem
p. 14, table 2, Source	1939, 1940, 1941, 1945, 1946	(1939), (1940), (1941), (1945), (1946)
p. 18, table 3, row 1, column 2	Norge	Norway
p. 18, table 3, row 3, column 2	2,316	29,316
p. 19, figure 2, caption	(1939,) (1940,)	(1939), (1940),
p. 25, section "Norway", first line	incidence of epidemic diseases	infant mortality