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Laustsen, Birgitte Hamann

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OCCUPATIONAL ASTHMA AND ALLERGY IN THE GREENLANDIC FISH PROCESSING INDUSTRY

BY
BIRGITTE HAMANN LAUSTSEN

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ILISIMATUSARFIK
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PhD supervisor: PhD Jakob Hjort Bønløkke, MD
Aalborg University, Denmark

Assistant PhD supervisors: Prof. Emeritus Øyvind Omland
Aalborg University, Denmark

PhD Else Toft Würtz
Aarhus University Hospital, Denmark

Prof. Martin Miller
University of Birmingham, UK

PhD, DrSci Michael Lynge Pedersen, MD, GP
University of Greenland, Greenland

PhD committee: Professor Lene Seibæk (chair)
University of Greenland, Greenland

Professor Monika Raulf
University of Bochum, Germany

Researcher Randi Jacobsen Bertelsen
University of Bergen, Norway

PhD Series: Faculty of Medicine, Aalborg University

Department: Department of Clinical Medicine

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CV

Born in 1982, Denmark.

Education:

2003-2011 Medical Doctor, Aarhus University, Denmark

Current positions:

2017-2022 Medical doctor at Department of Occupational and Environmental Medicine, Aalborg University Hospital

2019-2022 Research assistant and PhD student at the Department of Clinical Medicine, The Faculty of Medicine, Aalborg University

2019-2022 PhD student at the Institute of Nursing & Health Science, Ilisimatusarfik, University of Greenland, Greenland.

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ENGLISH SUMMARY

Background

The seafood-processing industry is the largest industrial sector in Greenland, employing approximately 16% of the active workforce in Greenland. Studies from especially Canada have shown a high prevalence of occupational asthma (OA) and occupational allergy among seafood-processing workers. Furthermore, occupational diseases in the musculoskeletal system and dermatological occupational diseases are also prevalent in these sectors. With the size of the seafood-processing industry in mind, it is noteworthy that only a few cases of occupational diseases related to this industry in Greenland are reported to the Danish Labour Marked Insurance each year. Hence, underreporting of occupational diseases is suspected. Furthermore, occupational accidents lead to health problems in this industrial sector but neither the prevalence of occupational diseases, nor occupational accidents have been investigated before. During the past decades, selenium levels have been declining in the Greenlandic population while the prevalence of allergic airway disease among the Greenlandic population has risen. The association between asthma and selenium has been investigated before, but results have been conflicting and the potential association remains unclear.

Aims

The objectives of this dissertation were to measure human serum selenium (s-Se) levels in Greenlandic seafood-processing workers, to compare these levels with previous measurements in Greenland and to examine the potential association between s-Se and asthma and lung function. Further objectives were to assess the prevalence of occupational diseases and accidents in the Greenlandic seafood-processing industry, including OA, occupational rhino conjunctivitis (ORC), musculoskeletal diseases (MSD) and work-related skin diseases. Additional objectives were to examine the association between job exposures and OA and ORC and to describe sensitisation to snow crab, shrimp, fish and the fish parasite, *Anisakis simplex (A. simplex)* in terms of the type and degree of exposure. Finally, the development in sickness among the Greenlandic seafood-processing workers was examined.

Materials and methods

Data from 382 seafood-processing workers were gathered during 2016 to 2018. Data included a questionnaire or a clinical interview, spirometry with reversibility test, skin prick test (SPT), serological tests for s-Se and specific immunoglobulin E (IgE) to cod and *A. simplex* by ImmunoCap, and clinical examinations. Exposure levels of particles, endotoxin and total protein were assessed by personal inhalable dust

samples and stationary dust measurements. Accident risk was evaluated by work site observations and safety walks. For all analyses, $p < 0.05$ was considered the level of significance.

Results

Mean s-Se was 96.2 µg/l. No association was found between s-Se and asthma. S-Se was higher among non-smokers and workers from small factories and a positive association was found between s-Se and forced expiratory volume in 1 second (FEV_1) values. Among the entire population, the prevalence of probable OA was 5.5% and the prevalence of probable ORC was 4.6%. Regarding sensitisation, 18.1% were sensitised to snow crab, 13.6% to shrimp, 1.4% to fish and 32.6% to the fish parasite, *A. simplex*. A dose response effect was found between years of exposure to snow crab and fish and the risk of being sensitised to snow crab and *A. simplex*, respectively. Exposure levels were highest in shrimp production followed by snow crab production and fish production. The point prevalence of eczema on hands or arms was 6.8%, and 17-22% complained of pain in the upper extremities. Regarding accidents, the annual incidence rate per 100 workers was 10.3%. During follow-up, FEV_1 z-score and forced vital capacity (FVC) z-score declined significantly. Reported lower airway symptoms did not change. A few more workers were sensitised to snow crab at follow-up than at baseline and conversely for shrimp sensitisation.

Conclusion

Selenium levels appear to continue to decline in Greenland, especially among men and in the larger cities, probably due to a more Westernised lifestyle with less intake of traditional selenium-rich Inuit food. No association between s-Se and asthma was found but an association between s-Se and lung function, smoking and work site was found. Hence, the health effects of selenium remain unclear. However, a continued focus on the possibility to consume traditional Inuit food is important. Workers in the seafood-processing industry in Greenland showed a high prevalence of sensitisation to snow crab, shrimp and *A. simplex*; a high prevalence of OA and ORC and a high incidence of occupational accidents. High exposure levels were measured in the factories. Hence, this indicates a considerable degree of underreporting of occupational diseases to the Danish Labour Marked Insurance. Lung function declined markedly during a two-year follow-up concurrently with workers continuing their employment in the seafood-processing industry in spite of having health problems. Thus, preventive measures are required and, prospectively, it is important to inform leaders, workers and health professionals about the health problems in the seafood-processing industry and about the law of worker’s compensation.

DANSK RESUME

Baggrund

Fiske- og skaldyrsindustrien er den største industrielle sektor i Grønland, og sektoren beskæftiger ca. 16% af den tilgængelige arbejdsstyrke. Studier fra især Canada har vist høje forekomster af arbejdsbetinget astma og allergi hos ansatte i fiske- og skaldyrsindustrien. Herudover er der også set høje forekomster af arbejdsbetingede sygdomme fra muskuloskeletalsystemet og hudsygdomme i dette erhverv. I betragtning af fiske- og skaldyrsindustriens størrelse er det bemærkelsesværdigt, at der årligt kun anmeldes få erhvervssygdomme til Arbejdsmarkedets Erhvervssikring. Man må således mistænke underrapportering af erhvervssygdomme. Herudover tyder det på, at arbejdsulykker udgør et helbredsproblem i dette erhverv, men hverken forekomsten af erhvervssygdomme eller arbejdsulykker er tidligere blevet belyst. I løbet af de seneste årtier har selenniveauerne været faldende hos den grønlandske befolkning samtidig med, at forekomsten af allergiske luftvejssygdomme har været stigende. Sammenhængen mellem astma og selen er blevet undersøgt tidligere men med modstridende resultater, og den potentielle sammenhæng er stadig uklar.

Formål

Formålet var at måle humane serum selen (s-Se) niveauer hos grønlandske fiske- og skaldyrs arbejdere, at sammenligne med tidligere målinger i Grønland samt at undersøge den potentielle sammenhæng mellem s-Se, astma og lungefunktion. Øvrige formål var at undersøge forekomsten af erhvervssygdomme og arbejdsulykker hos arbejdere i den grønlandske fiske- og skaldyrsindustri inkl. arbejdsbetinget astma (AA), arbejdsbetinget rhinoconjunctivitis (ARC), muskuloskeletale sygdomme og hudsygdomme. Yderligere formål var at undersøge sammenhængen mellem jobeksponeringer, AA og ARC samt at sammenligne sensibilisering for snekrabbe, reje, fisk og fiskeparasitten, *Anisakis simplex (A. simplex)* med type og størrelse af eksponering. Endelig skulle sygdomsudviklingen hos grønlandske fiske- og skaldyrsarbejdere undersøges.

Materialer og metoder

Data fra 382 fiske- og skaldyrsarbejdere blev indsamlet i løbet af 2016 til 2018. Data inkluderede et spørgeskema eller et klinisk interview, spirometri med reversibilitetstest, hudpriktest, serologiske prøver med måling af s-Se og specifik IgE for torsk og *A. simplex* via ImmunoCap samt objektive undersøgelser. Eksponeringsniveauer af partikler, endotoksin og totalt protein blev målt ved hjælp af personlige indåndingsstøvprøver og stationære støvmålinger. Ulykkesrisiko blev vurderet via observationer på arbejdspladsen og gennemgang af arbejdspladsens arbejdsmiljø. $P<0{,}05$ blev betragtet som signifikansniveauet i alle analyser.

Resultater

Gennemsnitligt s-Se var 96,2 µg/l. Der blev ikke fundet en sammenhæng mellem s-Se og astma. S-Se var højere hos ikke-rygere og ansatte på de små fabrikker, og der blev fundet en positiv association mellem s-Se og forceret ekspiratorisk volumen i 1. sekund (FEV_1). Prævalensen af sandsynlig AA var 5,5% og 4,6% for sandsynlig ARC hos den samlede population. 18,1% var sensibiliseret for snekrabbe, 13,6% for reje, 1,4% for fisk og 32,6% for fiskeparasitten, *A. simplex.* Der blev fundet en dosis-responssammenhæng mellem antallet af års eksponering for henholdsvis snekrabbe og fisk og risikoen for at blive sensibiliseret for snekrabbe og *A. simplex.* Eksponeringsniveauerne var højest i rejeproduktionen efterfulgt af snekrabbeproduktionen og fiskeproduktionen. Punktprævalensen af eksem på hænder og arme var 6,8%, og 17-22% klagede over smerter i overekstremiteterne. Den årlige incidens-rate for ulykker var 10,3% pr. 1.000 arbejdere. I løbet af followup perioden faldt FEV_1 z-score og forceret vital kapacitet (FVC) z-score signifikant. Rapporterede nedre luftvejssymptomer viste ingen ændring. Lidt flere arbejdere var sensibiliseret for snekrabbe ved followup end ved baseline, mens det modsatte gjorde sig gældende for rejesensibilisering.

Konklusion

Selenniveauerne synes fortsat at være faldende i Grønland især blandt mænd og i de større byer, hvilket formentlig skyldes en vestliggjort levevis med mindre indtag af traditionel selenrig inuitkost. Der blev ikke fundet nogen sammenhæng mellem s-Se og astma, men der blev fundet en sammenhæng mellem s-Se og lungefunktion, rygning og arbejdsplads. Helbredseffekterne af selen er dermed fortsat uklare. Imidlertid er det fortsat vigtigt at have fokus på muligheden for at indtage traditionel inuitkost. Ansatte i den grønlandske fiske- og skaldyrsindustri havde en høj prævalens af sensibilisering for snekrabbe, reje, fisk og *A. simplex,* en høj prævalens af AA og ARC samt en høj incidens af arbejdsulykker. Der blev målt høje eksponeringsniveauer på fabrikkerne, hvilket indikerer en betydelig grad af underrapportering af erhvervssygdomme til Arbejdsmarkedets Erhvervssikring. Lungefunktionen faldt betydeligt i løbet af de to års opfølgning samtidig med, at arbejderne fortsat var ansat i fiske- og skaldyrsindustrien på trods af helbredsproblemer. Således er det vigtigt at introducere forebyggende foranstaltninger, og fremadrettet er det vigtigt at informere ledere, ansatte og sundhedsansatte om helbredsproblemerne i fiske- og skaldyrsindustrien og om arbejdsskadelovgivningen.

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Birgitte Hamann Laustsen

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ABBREVIATIONS

AA	Allergic asthma
ATS	American Thoracic Society
A. simplex	*Anisakis simplex*
BMI	Body mass index
COPD	Chronic obstructive pulmonary disease
CI	Confidence interval
EU	Endotoxin unit
ECRHS	European Community Respiratory Health Survey
ERS	European Respiratory Society
PBS	Phosphate-buffered saline
FEV_1	Forced expiratory volume in 1 second
FVC	Forced vital capacity
GPX-1	Glutathione peroxidase 1
ICPMS	Inductively coupled plasma – mass spectrometry
IgE	Immunglobulin E
HMW	High-molecular weight agents
LOD	Limit of detection
LMW	Low-molecular weight agents
MSD	Musculoskeletal diseases
N	Number included
NOSACQ 50	The Nordic Occupational Safety Climate Questionnaire
OA	Occupational asthma
OR	Odds ratio
ORC	Occupational rhino conjunctivitis
PEF	Peak flow
PBS	Phosphate-buffered saline
RAST	Radio-allergo-sorbent test
ROS	Reactive oxygen species
Rpmi	Rounds per minute
Se	Selenium
s-Se	Serum selenium
SH/S	Sitting height to standing height
SPT	Skin prick test
SD	Standard deviation
SPSS	Statistical Package for Social Sciences
Th2	T helper 2
VIF	Variance inflation factor

1. INTRODUCTION

The seafood-processing industry is the largest industrial sector in Greenland, employing approximately 16% of the active work force. Thus, it is noteworthy that in 2014, only two occupational diseases were reported for the category “agriculture, hunting, forestry and fishing industry”. This suggests a considerable degree of under-reporting of occupational diseases. Knowledge regarding work exposure and health issues in the seafood-processing industry in Greenland is very limited; such knowledge is necessary to create an overview of work environment safety problems and launch preventive measures. Hence, this project will seek to investigate the extent to which occupational diseases and accidents occur in the Greenlandic seafood-processing industry. The overall prevalence of occupational diseases and accidents in the Greenlandic seafood-processing industry will be examined in a cross-sectional study. The association between selenium (Se) levels and asthma among the workers in the Greenlandic seafood-processing industry will be examined. The prevalence of occupational diseases and accidents in the Greenlandic seafood-processing industry will be examined in a cross-sectional study. The prevalence of occupational asthma (OA) and occupational rhino conjunctivitis (ORC) will be analysed in relation to type of exposure in a cross-sectional study. A follow up study will examine how sickness evolves among workers. The project will provide valuable research-based knowledge regarding the working environment and health conditions in the seafood-processing industry in Greenland. The purpose of the project is to enhance this knowledge among health care professionals and relevant authorities and to prevent occupational diseases and accidents in this industrial sector. The results may enable us to present recommendations to the companies on how to improve the working environment to create safer working conditions and thereby improve worker’s health status.

2. BACKGROUND

2.1. THE SEAFOOD-PROCESSING INDUSTRY IN GREENLAND

The fishing industry and the seafood-processing industry are the largest industrial sectors in Greenland. In 2019, they employed 4,402 people which is equivalent to approximately 16% of the active work force, including agriculture, counting a total of 26,991 people (1). The economic activity in Greenland is dominated by a few large industries. The fishing and the seafood-processing industry are responsible for approximately one third of the revenue generated by the companies (1). The total catch of snow crab, shrimp and different fish species constituted 117 kT in 2020, of which snow crab constituted 2.5 kT and shrimp 54.4 kT (1). The commercial catch of snow crab (*Chionoecetes opilio*) began in the mid-1990's and reached a peak in 2001. Since 2004, the catch of snow crab has been regulated to stop the downward trend in the population of snow crab. Now, the catch of snow crab is centred along the west coast of Greenland and snow crab is processed in a few land-based factories (2,3). The commercial catch of shrimp (*Pandalus borealis*) began in the 1950s and by seagoing trawlers in 1975 (2,4). Commercial fishing is undertaken partly by inshore fishing with local landing factories, primarily along the west coast, partly by fishing in open sea by seagoing factory trawlers (2,5).

The number of reported occupational diseases in Greenland is relatively small and variable over the years with 100 reported occupational diseases in 2016 (2). The diagnoses reported correspond poorly to what you would expect in proportion to the occupational structure in Greenland with asthma and allergy representing 12% in 2016 (2). Only a few of the reported occupational diseases concern industry and fishing with only two cases reported for "agriculture, hunting, forestry and fishing industry" in 2014 (6). The 2015-2020 period saw 39 notified cases of OA and occupational rhinitis in Greenland (information from the Labour Market Insurance, Copenhagen). The number of reported occupational accidents in Greenland is much higher with 691 cases reported in 2016 (2). Only 25 cases concerned "agriculture, hunting, forestry and fishing industry" in 2014 (6). The number of reported occupational diseases in Denmark excluding Greenland is relatively equal throughout the years and amounted to 20,575 cases in 2020 (7). In relation to the population, this is approximately twice as high as the number of cases reported in Greenland. The number of occupational accidents in relation to the population is conversely relatively high in Greenland compared with Denmark. In 2020, 24,186 cases were reported in Denmark, which is approximately one third of the cases reported in Greenland (7). In general, knowledge regarding occupational diseases and accidents in Greenland is limited. To my knowledge, no studies investigating this issue in Greenland have been performed, either in the seafood-processing industry specifically, or in the industries in general. We only have the official statistics to rely on, and the above-mentioned official statistics indicate that the number of reported occupational diseases is lower than expected and a considerable degree of under-reporting is suspected.

2.2. OCCUPATIONAL ASTHMA AND ALLERGY IN THE SEAFOOD-PROCESSING INDUSTRY

Asthma is a disease characterised by chronic airway inflammation and variable expiratory airway limitation. Symptoms include wheezing, shortness of breath, chest tightness and cough which vary over time and in intensity (8). The prevalence of asthma is estimated to affect 3.6% of the world's population (9). It is estimated that 21.5% of adult-onset asthma is work-related (10). Work-related asthma includes OA caused by workplace exposures and work-exacerbated asthma characterised by worsening of pre-existing asthma by workplace conditions. OA is defined as asthma symptoms and reversible airway obstruction caused by exposures at the workplace. Causes are sensitisers (approximately 90% of cases) or irritants (5-18% of cases) (10). More than 400 occupational agents have been identified and proven to be respiratory sensitisers. Occupational agents are divided into high-molecular weight agents (HMW) or low-molecular weight agents (LMW) (11). OA in the seafood-processing industry have been described since the 1970s and 1980s (12,13). A review from 2010 stated that 2-36% of workers in the seafood-processing industry suffered from OA (14) and 5-24% from occupational allergic rhinitis (15). Mason *et al.* found a 24 times higher incidence of OA in the seafood-processing industry in the UK than in the other industrial sectors examined altogether (16). Risk factors associated with the development of sensitisation and OA include atopy, smoking and possibly pre-existing rhinitis (15,17,18). It has been demonstrated that OA and occupational rhinitis often appear in the same individuals (19) and a natural history of the development of OA has been described which includes the stages, occupational exposure leading to allergic sensitisation, rhinitis and OA (15). Often, a latency period of approximately two years exists from occupational exposure until OA develops, which makes it important to diagnose OA early in order to remove the allergen and prevent further aggravation of the disease (15). It has been found that lung function improves within a year after removal from exposure and bronchial reactivity within two years which is followed by a subsequent plateau (20–22). The short latency period increases the risk of a healthy worker effect in the mainly cross-sectional studies performed earlier since the sick workers are assumed to leave the industries shortly after employment (23). The range of allergic diseases associated with occupational exposure to snow crab is well characterised, whereas the evidence is somewhat limited for some other seafood species (23).

Snow crab

Research-based knowledge regarding OA and occupational allergy in the snow crab processing industry primarily derives from Canadian studies. Most studies have a cross-sectional design and only a few follow-up studies have been conducted. Several studies performed from 1984 to 2010 have shown a prevalence of OA among workers exposed to snow crab in the range of 15.6% to 18% (24–28). Occupational allergy among workers exposed to snow crab has shown a prevalence ranging from 14.9% to 18% (26–28). Sensitisation towards snow crab has a prevalence range of 18.4% to 25% (24,28–30). In 1984, Cartier *et al.* found a 15.6% prevalence of OA among 303 exposed workers and 21.8% were sensitised to snow crab by skin prick test (SPT) (24). Later, in 2004 Cartier *et. al.* found similar results with 18% of 215 exposed workers diagnosed with certain or highly probable OA, and the prevalence of occupational allergy was highly likely in 18% (27). In 2010, Gautrin *et al*. found that 15.8% of 215 exposed workers had almost certain or highly probable OA (28). Gautrin *et al.* also found that cumulative exposure to snow crab allergens is positively associated with OA and occupational allergy in a dose-response manner (28). The first follow-up study with exposure to snow crab was performed in 1985 showing that 12 of 31 workers with OA caused by snow crab were asymptomatic at follow-up one year after cessation of exposure (31). Longer exposure tended to cause more, long-lasting symptoms from the lower airways and a greater need of medication. Early diagnosis and removal from the harmful exposure were shown to be important (21,31). OA can have serious consequences among crab processing workers, and they can remain symptomatic for prolonged periods, even if they are removed from the exposure (21,31).

Shrimp

Sensitisation to shrimp among workers occupationally exposed to shrimp has shown a prevalence range from 12.5% to 20.3% (32–34). In the few studies performed, the high sensitisation prevalence did not correspond to a high prevalence of occupational allergy and/or asthma with only a few cases and a low prevalence of OA of 2% to 3.1% suggesting a healthy worker effect (32–34). In 1995, Desjardins *et al.* found only one subject out of 56 workers occupationally exposed to shrimp with OA and 14% had increased specific immunoglobulin E (IgE) antibodies to shrimp (32). Later, in 2005, Bang *et al.* conducted a large study in Norway. All workers were exposed to airborne allergens from the processed species, including shrimp, and had an increased prevalence of work-related airway symptoms compared with office workers. Hence, 20.3% of 225 exposed workers were sensitised to shrimp, measured by increased specific IgE antibodies to shrimp. However, the increased prevalence of symptoms did not correspond to an increased prevalence of OA or occupational allergy, suggesting a healthy worker effect (33). In 2006, Kalogeromitros *et al.* found that 12.5% of 64 exposed workers were sensitised to shrimp. Only 3.1% of 64 exposed workers were diagnosed with OA (common to different seafood species, including crab, shrimp, fish etc.), also suggesting a healthy worker effect (34). Longer exposure to shrimp increases the risk of finding high titre-IgE antibodies against shrimp (35).

Fish

There is limited knowledge regarding OA among workers exposed to different fish species. Two studies have found a prevalence of 1.8% and 8.2%, respectively (22,36). The prevalence of fish allergy has been shown to vary between 2.6% and 6.3% (36,37). Other studies have found a sensitisation prevalence varying from 0% to 10.3% to different fish species (33,34,38,39). In 1995, Douglas *et al.* found a prevalence of OA of 8.2% among 291 workers exposed to salmon. Follow-up showed that transferring the workers with OA to low-exposure areas improved symptoms among 11 workers and symptoms disappeared among the remaining 13 workers after leaving employment (22). Later, in 2008, Jeebhay *et al.* found a 1.8% prevalence of probable OA among 594 workers exposed to saltwater fish. The prevalence of fish allergy was 2.6%, and 7% were sensitised to different fish species (36).

Only one pilot study from 2012 including 20 workers examined the prevalence of OA and occupational allergy in the Greenlandic seafood-processing industry (40). The study showed that 11% and 22% of the workers were classified with probable or possible OA, respectively, and 22% with possible occupational allergy. Regarding sensitisation measured by SPT, 40% were sensitised to snow crab, 20% to shrimp and 10% to cod (40). The study showed that OA and occupational allergy might represent a health problem in the Greenlandic seafood-processing industry, but more research is needed to confirm this.

2.3. SEAFOOD ALLERGENS AND IGE-SENSITISATION

A strong association between a positive SPT and RAST (radio allergo sorbent test) with snow crab allergen and the presence of OA was first found in 1986 (24,25). The study showed that OA was associated with elevated IgE-antibody to snow crab (24,25). Later, in 1997, a study showed that air-borne snow crab derived proteins, released during the boiling process in the plants, cause immunological reactivity and OA to snow crab (41). A few years later, in 1999, a study found that aerosolised snow crab allergen was present throughout the whole plant, not only during the boiling process (29). Aerosolised seafood allergens have been identified as primarily HMW (42). In shellfish, different allergens have been identified, including tropomyosin (muscle protein) and arginine kinase (enzyme) (42,43). In bony fish, the allergen parvalbumin (muscle protein) has been identified as a major allergen in addition to the fish parasite *Anisakis Simplex (A. simplex)* (42,43). Cross-reactivity between different shellfish and between different fish species has been identified, especially caused by parvalbumin. However, no certain cross-reactivity has been identified between shellfish and fish (43,44). The allergenicity of some of the seafood allergens, especially tropomyosin, can change during boiling or freezing, thus resulting in a higher IgE reactivity (17,45). In addition to the seafood allergens, non-seafood contaminants such as chemical preservatives and spices may also induce allergic and respiratory symptoms (18). Hence, several different seafood allergens have been identified, but more research is needed to investigate the association of allergens with OA and occupational allergy in the seafood-processing industry.

2.4. ANISAKIS SIMPLEX

Anisakis (A.) is a marine nematode (roundworm) (46). At least nine different *Anisakis* species of which three are known to be harmful to humans exist (47). These include the *A. simplex* complex; *A. simplex sensu stricto* (*A. simplex* B), *A. pegreffli* (*A. simplex* A) and *A. berlandi* (*A. simplex C*) (46). At least 12 allergens have been identified from *A. simplex*; Ani s 1 to Ani s 12, of which Ani s 1 and Ani s 7 are the major allergens recognised in over 50% of patients analysed (48). The geographical distribution of *A. simplex* is from the arctic circle (66° 33° 46° N) to 50° S latitude (46), thereby including the sea around Southern Greenland. The primary hosts of adult *Anisakis* worms are marine mammals, including whales, dolphins, seals, and sea lions, but also aquatic birds and turtles. Adult *Anisakis* worms produce eggs in the intestine of the cetaceans (aquatic mammals). The eggs are expelled into the sea via the faeces. Stage-one larvae embryonate and develop in the eggs and become free-living stage-two larvae when the eggs hatch. Stage-two larvae are ingested by tiny crustaceans, including krill, and develop to stage-three larvae. Stage-three larvae are ingested by larger crustaceans, squid and fish, which are finally ingested by marine mammals allowing *Anisakis* stage-three larvae to enter its definitive host where they become adult worms. Humans become accidental hosts when ingesting fish containing stage-three larvae. The larvae do not develop in humans (47). Upon the primary exposure the larvae are ejected rapidly by the onset of vomiting and diarrhoea; a disease called anisakiasis, or they are destroyed by the immune system within three weeks (47). Anisakiasis is characterised by an inflammatory response in the gastro-intestinal tract. Symptoms are mild to severe abdominal pain, nausea, vomiting and/or diarrhoea which often leads to expulsion of the parasite. In addition to this, the larvae can trigger a T helper 2 (Th2) response to the parasite, such as urticaria, angioedema, bronchospasm and anaphylactic shock. *Anisakis* proteins can also cause allergic reactions in the absence of acute infection by inhalation or direct contact in the domestic or occupational environment while handling fish, leading to asthma, rhino-conjunctivitis and dermatitis (48). It is believed that live larvae are required for both the initial sensitisation and subsequent gastrointestinal reactions, but evidence suggests that proteins from dead larvae are enough to trigger allergic reactions in already sensitised individuals like fish-processing workers inhaling *Anisakis* protein (47). The first cases of gastric anisakiasis were observed in the Netherlands in 1960 (49). In the year 2000, Purello-D’Ambrosio *et al.* reported the first cases of sensitisation to *A. simplex* in the fishing industry. They found 50% of cases sensitised to *A. simplex* and nobody sensitised in the healthy control group (50). In 2006, Nieuwenhuizen *et al.* confirmed that fish-processing workers were at increased risk of becoming sensitised to *A. simplex* and showed that fish-processing workers sensitised to *A. simplex* were at higher risk of reporting allergic disease (51). In 2012, Mazzucco *et al.* indicated that the risk of sensitisation to *A. simplex* increased with length of employment, though the results were not statistically significant (52). A systematic review from 2018 summarised that sensitisation levels among occupationally exposed workers ranged from 11.7% to 50%, as documented by specific IgE, and 8% to 46.4%, as documented by SPT (53). A later study from 2020 by Jerončić *et al.* showed that 1.8% of fish-processing workers in Croatia were sensitised to *A. simplex* as opposed to 0% of controls. However, the highest risk associated with sensitisation was fishing in leisure time as opposed to work exposure (54). Knowledge regarding sensitisation towards *A. simplex* has never been examined in Greenland, either in the general population or among fish-processing workers.

2.5. EXPOSURE LEVELS IN THE SEAFOOD-PROCESSING INDUSTRY

Exposure measurement data from the seafood industry are sparse. Particle and endotoxin levels have been measured in a limited number of studies, while total protein levels have been measured more frequently. Bang *et al.* found endotoxin levels ranging from 0-1350 EU/m^3 among different job groups in the shrimp- and fish-processing industry in Norway with the lowest levels in shrimp production and the highest levels among production workers in herring production (33). Dahlman-Høglund *et al.* showed that the particle and endotoxin levels among workers processing herring on fully encapsulated machines were 0.12-0.72 mg/m^3 particles and 3-92 EU endotoxin/m^3 (55). Shiryaeva *et al.* measured endotoxin and total protein levels in salmon processing in Norway, showing endotoxin levels ranging from 0.3-29 EU/m^3 and total protein levels ranging from 0.76-12.62 µg/m^3 (56). Dahlman-Höglund *et al.* found endotoxin levels ranging from 1.6-7.1 EU/m^3 among workers in the Swedish salmon processing industry (39). Total protein concentration has previously been measured in edible crab processing in the U.K. showing levels ranging from 0.71-5.16 µg/m^3 (57). Furthermore, in a large study of bony fish and lobster workers that included fishmeal production, total protein reached levels of maximum 11.50 µg/m^3 and levels above 5 µg/m^3 were rarely observed (58). Thomassen *et al.* measured total protein with mean levels of maximum 12.9 µg/m^3 and endotoxin mean levels of maximum 72 EU/m^3 featuring a wide range depending on measurements of raw or boiled king crab or edible crab and work task (45). Heidelberg *et al.* measured total protein and endotoxin levels aboard Norwegian fishing trawlers showing total protein levels of 0-9.1 µg/m^3 and endotoxin levels <16 EU/m^3 in fish-meal production. Total protein levels were lower aboard the older trawlers than aboard the newer trawlers (59). Several factors are able to affect the levels of bioaerosols, e.g. sampling, elution and analysis factors including type of filters used; and peak exposures may be more clinically important than mean exposure level over a work shift (55). The amount of water used in the fish-processing process and the degree of encapsulation of the machines can also affect the particle levels measured (55). Furthermore, the type of fish, factory size, handling procedures of fish, ventilation, amount of fish processed and equipment used are factors that can affect the levels of bioaerosols (56).

2.6. OTHER OCCUPATIONAL DISEASES AND ACCIDENTS IN THE SEAFOOD-PROCESSING INDUSTRY

Knowledge regarding occupational dermatological diseases in the seafood-processing industry is limited with only a few studies having been published. Most studies are single-case-studies. Aasmoe *et al.* found that 55.6% of the workers in the seafood-processing industry in Norway complained of symptoms from the skin, most often located to the hands and forearms (60). In general, a review showed that the prevalence of protein contact dermatitis in the seafood-processing industry ranges between 3-11%. Seafood is among the most frequently reported causes of contact urticaria (23,61). A few more studies regarding occupational musculoskeletal diseases (MSD) in the seafood processing industry have been published. One of the first studies published showed a prevalence of disorders in the upper extremities of 15-30% among fish-processing workers in Taiwan (62). The prevalence of disorders in the upper extremities reached 10-35% among women in the Swedish fish-processing industry (63). In the Norwegian seafood-processing industry, 39-65% complained of pain in the upper extremities, 39% in the lower extremities, and 56% in the back. These numbers were even higher among workers who often felt cold at work (64). The prevalence of pain among women in the Indian fish-processing industry reached 17-27% in the upper extremities, 13-35% in the lower extremities and 33-54% in the upper and lower back (65). The overall prevalence of MSD in the Indian fish-processing industry reached 77% (66). In the Thai seafood industry, the prevalence of MSD, especially in the lower back and upper extremities, reached 45% (67). In several studies, women were found to complain of pain and disorders in the upper extremities more often than men due to different work tasks (62,68,69). Risk factors associated with MSD are repetitive work, use of force, awkward postures, lack of recovery periods, especially when combined; and working hours, job experience and extreme temperature conditions (66,70). Regarding occupational accidents and injuries in the seafood-processing industry, most knowledge originates from factory trawlers in the Alaskan seafood-processing industry. During 2001-2012, the incidence of non-fatal injuries was 43 per 1,000 workers per year and 35 per 1,000 workers per year depending on the type of trawler investigated (71). During 2010-2015, 304 nonfatal injuries were identified among offshore seafood processors in Alaska (72). During the period 2007-2013, 24 worker’s compensation disabling claims per 1,000 workers per year were registered among offshore seafood processing workers in Oregon, US (73). During the period 2014-2015, 63 worker’s compensation disabling claims per 1,000 workers per year were registered among onshore seafood processing workers in Oregon, US, also including illnesses (74). Sprains, strains and tears in the upper extremities were the most prevalent injuries registered (73,74). A recent study concluded that training of managers and workers, including reducing language barriers, better safety culture, application of ergonomic principles, and reducing work hours and changing work shifts, could potentially improve occupational safety and health in the seafood-processing industry (75).

2.7. LUNG FUNCTION, ASTHMA AND ALLERGY IN GREENLAND

Knowledge regarding allergy and asthma in the Greenlandic population is limited. The first records of allergic diseases originate from the 1940s where asthma and allergy in Greenland appeared to be extremely rare (76). More recent data suggest an increasing number of asthmatic children in Greenland. Thus, 4.2% of Greenlandic children aged 0-14 years were prescribed anti-asthmatic drugs in 1991 as opposed to 10.9% in 2001, representing a 155% increase (77). Although this seems like a large increase in the prevalence of asthmatic disease, drug prescription may also be due to new prescription practises (77). However, a 100% increase in the prevalence of atopy against common aeroallergens was also found from 1987 to 1998, suggesting an increasing prevalence of allergic diseases in Greenland (78). Some studies have indicated that traditional Greenlandic lifestyle, including the ingestion of fish, has a protective effect on lung function and allergic disease (79–81). Schoolchildren living in Greenland have a two-fold lower prevalence of atopy than Danish children living in Denmark. The low prevalence of atopy may be due to several factors, including low genetic susceptibility to atopy, less allergen exposure and other living conditions in the Arctic (79). Also, adult Inuit living in Greenland have a lower prevalence of atopy than Inuit living in Denmark. This may be due to different allergen exposure levels and lifestyle factors, including educational level, stress and ethnic self-identification (82). Furthermore, Greenlandic children are known to have higher lung function levels than Danish children. The higher lung function is only seen among individuals who are higher than 130 cm, suggesting that the shorter and broader Inuit body build compared with that of Danes may explain their higher lung function (83). Furthermore, studies have shown that adult Inuit have shorter legs and shorter stature than Danes, resulting in a higher sitting height to standing height ratio (SH/S) among Inuit, Inuit (0.54) versus Europeans (0.52), which may have an impact on measurements like Body Mass Index (BMI) and lung function (84,85). However, a study has shown that lung function was higher among Inuit living in settlements than among Inuit living in a larger town, Sisimiut, suggesting that traditional lifestyle may be a protective factor to lung function (83). The latter has also been suggested in another study showing that the prevalence of asthma is lower among Greenlanders living in the arctic area (8.6% in larger towns versus 5.5% in settlements) than among Greenlanders living in Denmark (9.5%) (80). A higher asthma prevalence among Inuit living in Denmark has been rediscovered in a relatively new study showing that Inuit living in Greenland had an asthma prevalence of 3.6% as opposed to 9% among Inuit living in Denmark. Furthermore, adipose tissue inflammation was increased among Inuit living in Denmark, possibly because of dietary changes (86). Overall, though Inuit may be protected against developing allergic diseases owing to genetic and environmental factors, the prevalence of atopy and asthma is increasing among the Inuit population in Greenland (87). The change in atopy and asthma prevalence in Greenland has co-occurred with the urbanisation in Greenland where the Greenlandic population is adapting to a more Westernised lifestyle (88,89). From the 1950s to the

2000s, the proportion of the population living in settlements decreased by more than 30%, and the percentage of local food ingested also decreased to an average of 20% in the 2000s (89). Traditional Inuit food mainly consists of sea mammals, fish, local land mammals and berries opposed to the Danish/imported products which consists of meet, bread, rice, pasta, potatoes, fruit, vegetables, sweets, and junk food (89). It is known that traditional food constitutes a larger part of the diet in the settlements than in the larger towns, supporting statements regarding increasing atopy and asthma prevalence being due to a more Westernised lifestyle (90,91).

2.8. SELENIUM LEVELS IN GREENLAND

Se is a natural mineral absorbed in the body through ingestion of Se rich food. Se is found in several food items, including fish, entrails, vegetables and grains (92). Se serves as a cofactor in the enzymatic antioxidant, glutathione peroxidase 1 (GPX-1), which plays an important role in scavenging reactive oxygen species (ROS) in the lungs. ROS is believed to be one of several aetiological factors in the development of asthma (93). Hence, Se has been suspected to protect against the development of asthma (92). This potential association between Se and asthma has been investigated previously, but with conflicting results which have been reported in several reviews and meta-analyses (93–103). Se has been found to exercise a protective role in asthma in several studies (104–112), but just as many studies have failed to show an association (113–122). Additionally, one study has shown higher Se levels in asthma cases (123). Also, newer studies have shown conflicting results. In a study from 2020, children with asthma were fund to have lower serum Se (s-Se) than healthy controls, and s-Se was lower in children with severe asthma than in children with mild asthma (124). In a study from 2022, s-Se was also higher among asthmatics although not significantly so when adjusting the results for age and gender (125). A meta-analysis by Chen *et al.* from 2019 (95) showed a different result than the meta-analysis from 2018 by Mao *et al.* (103). While Mao *et al.* failed to show an association between Se and asthma, Chen *et al.* found lower Se levels in the asthma group than in the control group (95,103). Several suggestions for the conflicting result have been made, including different study designs, sample size, the multifactorial nature of asthma making it difficult to find an association with just one factor and other immunological mechanisms, e.g., T-helper responses in the lungs, perhaps resulting in lack of a simple dose-response relationship between Se and asthma (93,100). The traditional Inuit diet consists primarily of food of marine origin, meat from reindeer, seabirds and polar bears and berries (126). Hence, traditional Inuit food is Se rich and has contributed with a considerable proportion of the Inuit Se intake. In recent decades, the Inuit population of Greenland has adopted a more Westernised lifestyle with a higher intake of Se poor foods (91,127). At the same time, Se levels have been measured in both humans and the marine environment in Greenland. Measurements have shown a decreasing tendency of Se levels since the 1980s. In that decade, measurements of whole blood Se levels ranged between 803 µg/l and 3,100 µg/l in Northwest Greenland (127). Measurement from the year 1999 to 2004 showed mean levels ranging from 149 µg/l to 743 µg/l. The highest levels were described in close relation to ingestion of Muktuk whale skin (126,127). The lowest levels were measured in 2010-2015 among pregnant women in the Disco Bay region showing mean levels of 72.9 µg/l (128). In a newer study from 2021, Long *et al.* compared organic pollutants and metals in Greenlandic Inuit from 1994 to 2015. They found a declining trend of Se in women from Nuuk, the capital of Greenland, and in men across all Greenland, but an increasing trend of Se among women from Ilulissat, a minor town than Nuuk, and among women across all Greenland. The difference is likely caused by different contributions from traditional food and other sources (129). Thus, Wielsøe *et al*. showed that Inuit women eat more fruit and vegetables than males (91). Se levels in the marine environment are shown to remain stable, indicating that the cause of decreasing Se levels in humans should be found in lesser intake of Se-rich traditional food (127,129). Thus, it is likely that the cause of decreasing Se levels in humans in Greenland is a result of a more Westernised lifestyle (127,129). In the same period, the asthma incidence seems to have been rising in Greenland (77,87,130); a change that has cooccurred with the shift towards a more Westernised lifestyle (88,89). This is supported by findings in a previous study by Backer *et al.* who found that Inuit living in settlements with a more traditional lifestyle had a lower frequency of asthma than Inuit living in towns where the lifestyle was more Westernised (80). The potential association between Se and asthma has never been assessed in Greenland, nor do we know the Se status among the work force in Greenland.

3. HYPOTHESES AND AIMS

The overall aim of the thesis is to investigate the extent to which occupational diseases and accidents occur in the Greenlandic seafood-processing industry with a primary focus on OA and occupational allergy.

We hypothesised that workers in the seafood-processing industry in Greenland had an OA and occupational allergy prevalence comparable to workers in other parts of the world.

The specific aims for the included original research articles or manuscripts in this thesis are specified for each included article; Paper I-IV:

Paper I — The aim was to measure human s-Se among seafood-processing workers in Western Greenland, to compare these levels with levels recorded in previous decades and to establish if s-Se is associated with asthma or lung function.

Paper II — The aim was to describe the prevalence of work-related respiratory symptoms, allergy, musculoskeletal symptoms, and occupational accidents among workers in the seafood-processing industry in Greenland.

Paper III — The aim was to examine the associations between job exposures and OA and ORC among workers in the seafood processing industry in Greenland and to compare the prevalence of sensitisation by type and degree of exposure to snow crab, shrimp, fish and the fish parasite, *A. simplex*.

Paper IV — The aim was to examine how sickness develops among seafood-processing workers employed in the seafood-processing industry in Greenland.

4. MATERIALS AND METHODS

4.1. STUDY DESIGN AND ETHICS

The study is comprised of three cross-sectional studies and one follow-up study. The studies are based on data collected in the period 2016 to 2018 among seafood-processing workers in Greenland (131–133). The geographical setting was the Disco Bay region of Western Greenland (Figure 4.1). The workers were employed in seafood-processing factories located in the three largest cities in Greenland, Nuuk, Ilulissat and Sisimiut, nearby smaller settlements and large factory trawlers which set off from Nuuk and Sisimiut (131–133). The largest city in Greenland, Nuuk, has 14,719 residents; the second- and third largest cities are Sisimiut and Ilulissat with 5.344 and 4.512 residents, respectively (134).

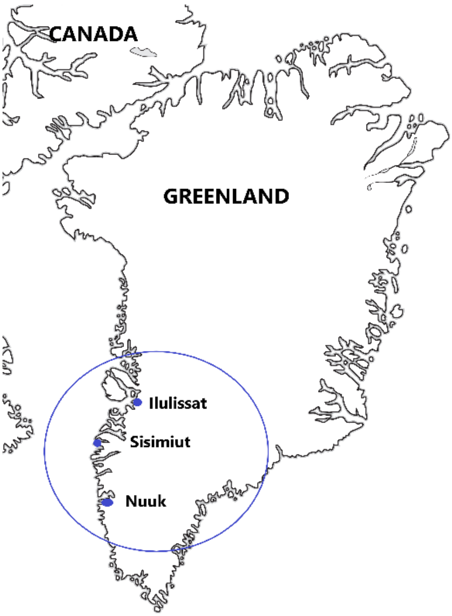

Figure 4.1: Geographical setting of the study. Greenland with the three largest cities Nuuk, Ilulissat and Sisimiut highlighted. The circle illustrates Western Greenland around the Disco Bay Region where the study was set.

All four studies were performed in accordance with the Helsinki Declaration; and the project was approved by The Danish Data Protection Agency, the Central Denmark Region (2012-58-006), The Scientific Ethical Committee for Greenland (2015-11317) and the Human Research Ethics Committee for James Cook University, Australia

(H8114). Written and oral informed consent was obtained from each participant (131–133).

4.2. STUDY POPULATION

4.2.1. BASELINE

Data collection occurred in four sittings by the same team of physicians specialised in occupational medicine (Table 4.1).

Date	**Examined (n)**
October – November 2016	311
September – October 2017	25
May – June 2018	41
September 2018	9
Total	386

Table 4.1: Number of workers examined in 2016, 2017 and 2018.

Hence, the complete study population consisted of 386 employees in the Greenlandic seafood-processing industry (131–133). Participants employed in three large factories, four small factories and four factory trawlers were included. The large factories were in the larger towns Nuuk, Sisimiut and Ilulissat; and the small factories were in nearby settlements. The trawlers set off from Nuuk and Sisimiut. Employees at the trawlers originated from both Greenland and the Faroe Islands, though most of the workers probably originated from the larger towns, Nuuk and Sisimiut. The large factories had 60-118 employees, the small factories 12-40 employees and the trawlers 11-34 employees (131–133). All employed workers in the seafood-processing factories and factory trawlers were invited to participate in the study. The precise size of the workforce could not be estimated since several workers were seasonal workers or were in the process of being hired or leaving their jobs. An approximate workforce size was estimated after going through employment lists and by talkings with the management. Hence, approximately 457 employees were invited. Of the invited workers, approximately 84% participated in the study. Of the workers present on the examination days, 99% participated (131–133). The flow-chart (Figure 4.2) illustrates which part of the study population was included in the individual papers, Paper I to IV. The study population included in Paper I was workers examined in 2016 and 2017 (n=336) of whom 12 had missing data and were excluded from the analyses. Hence, the study population available for analyses in Paper I was n=324. The study population included in Paper II was the workers examined in 2016 (n=311). The study population included in Paper III was the workers examined in 2016, 2017 and 2018 (n=386). Of these, four workers from a different facility were excluded. Hence, the study population available for analyses in Paper III was n=382.

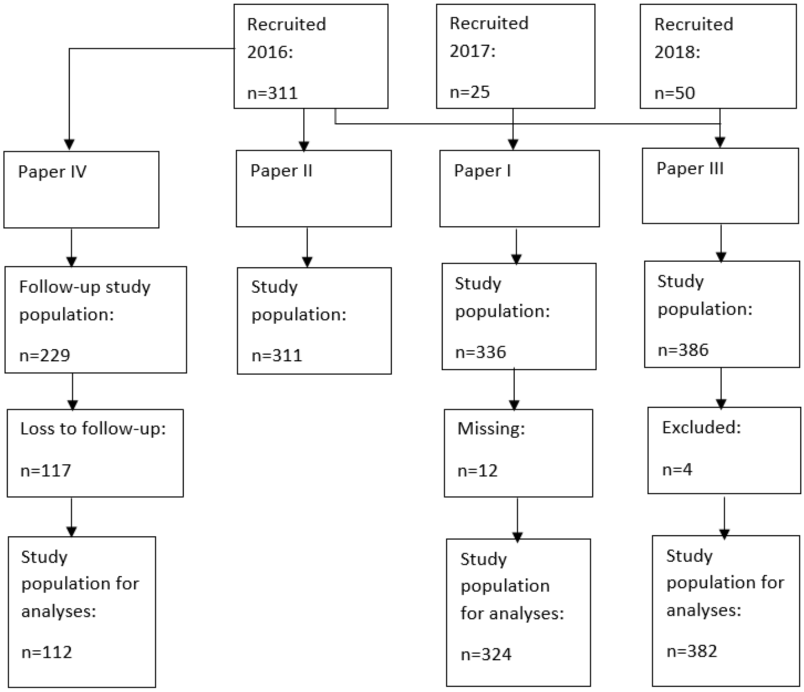

Figure 4.2: Flow-chart of the study population and an overview of the populations included in Paper I to IV in the thesis.

4.2.2. FOLLOW-UP

The follow-up study population consisted of 229 of the workers examined at baseline in 2016 of whom 112 were re-examined at follow-up in 2018. Hence, the participation rate at follow-up was 49%. Only 229 of the 311 workers examined in 2016 were included due to a restriction to workers employed in the large factories in Nuuk, Ilulissat and Sisimiut. In addition to workers at the large factories, two workers from a small factory and one trawler-worker happened to be available for examinations and were also included in the study. The workers were either contacted by phone or at their worksite prior to the examinations. Since the remaining 117 workers could not be reached, we are unaware of the reasons why they did not participate in the follow-up study. Hence, the study population included in Paper IV was part of the workers examined in 2016 (n=229). Of these, 117 workers were lost to follow-up, leaving 112 workers available for analyses (Figure 4.2).

4.3. CLASSIFICATIONS

4.3.1. DATA

Baseline data consisted of a self-administered questionnaire, medical examinations, including physical examination, spirometry, SPTs and venous blood samples (131–133). All workers who agreed to participate in the study received a questionnaire. The baseline questionnaire included questions regarding ethnicity; smoking; work history; health including symptoms from the skin, upper and lower airways, and the musculoskeletal system, diet; and work accidents during the entire employment history and at the present workplace during the past month and year. Questions regarding sick leave because of the accident and immediate triggers of the accident were also included (131–133). The respiratory part of the questionnaire was a modified version of the European Community Respiratory Health Survey (ECRHS) II lung function questionnaire translated into Danish and Greenlandic (135). Standardised questions combining pain intensity and restriction in daily activity on a 10-point scale ranging from 0 to 9 were used to assess symptoms from the musculoskeletal system. A cut off point of > two was used for moderate or greater pain severity (133,136). These questions were a modified version of the ones used by Von Korff *et al.* (137). In 2016, additional questions regarding safety climate and safety culture from the Nordic Occupational Safety Climate Questionnaire (NOSACQ 50) were included (138). This encompassed a 13-item battery on management safety climate measuring the prioritisation of safety among the local plant managers and safety officers. The management safety climate was measured by two dimensions: management safety empowerment by seven items and management safety justice by six items. Our findings were benchmarked against a large database pool from other industries (44,034 workers) and the different subsectors like manufacturing (12,356 workers) with results from other studies in Scandinavia and a few other European countries (138). The worker's own safety attitude was measured on three questions of so-called convenience violations like ignoring safety rules to make the work done in an easier way (139). All safety questions were scored on a one-to-four-point Likert scale (133). If the participants were experiencing problems filling out the questionnaire themselves, they were offered help from Danish-Greenlandic-speaking medical students who instead performed a clinical interview (131–133). The 2016 questionnaire is included in Appendix A, page 83 (in Danish and Greenlandic). The baseline questionnaire used in 2017 and 2018 is included in Appendix B, page 111 (in Danish and Greenlandic). The physical examinations included a focused clinical examination of upper extremities and the skin on hands and forearms. A dermatologist diagnostically evaluated photos of any eczematic changes. In addition to the questionnaire, ergonomic exposure and accident risk were evaluated by work site observations and safety walks conducted by experienced specialists in occupational medicine (133).

The follow-up data were collected approximately two years after the baseline data and consisted of a less comprehensive questionnaire, spirometry and SPTs. The follow-up questionnaire is included in Appendix C, page 137 (in Danish and Greenlandic).

4.3.2. SPIROMETRY AND REFERENCE VALUES

Pulmonary function tests were performed using a spirometer. For data collection in 2016 and 2017, the MIR Spirobank II spirometer was used; for data collection in 2018, including follow-up data collection, the Easy-One® NDD Medical Technologies, Zurich, Switzerland was used (131–133). Lung function was measured by FEV_1 and FVC. FEV_1 and FVC were measured and registered as the best out of minimum three acceptable blows. A reversibility test with 0.2 mg of the β_2-agonist Salbutamol was performed after 15 to 20 minutes if the FEV_1/FVC ratio was reduced by 20% or more in proportion to the expected value. If FEV_1 and/or FVC improved by more than 12% or at least a 200 ml increase after inhalation of Salbutamol, the reversibility test was considered positive (131–133,140). According to the European Respiratory Society (ERS)/American Thoracic Society (ATS) guidelines, a dataset was created (141). Predicted values, lower limits of normal and z-scores for spirometric indices were calculated using the Quanjer GLI-2012 regression equations for Caucasians using the Statistical Package for Social Sciences (SPSS) macro (142,143). Since no reference material for Inuit exists, we were constrained to use reference values for Caucasians (131–133,144). FEV_1 and FVC values were read as z-scores as recommended by the ATS and the ERS since z-scores are free of bias due to their adjustment for age, height, sex and ethnic group. z-scores indicate how many standard deviations (SD) a measurement is from its predicted value, i.e., the Caucasian reference value (143). Monitoring of lung function by peak-flow (PEF) measurements for two weeks was attempted among 30 participants, but these measurements could not be incorporated in the analyses due to lack of compliance (131,132).

To attempt to adjust the lung function measurements to true Inuit values, an SH/S correction of the FEV_1 and FVC z-scores was created multiplying the FEV_1 and FVC z-scores by the SH/S ratio 0.52/0.54 (84,85,131).

4.3.3. SKIN PRICK TEST

SPTs were performed on the ventral aspect of the forearm with the Danish standard prick test panel (Soluprick, ALK-Abelló, Hørsholm, Denmark) and specifically in-house generated seafood allergens. The Danish standard prick test panel includes birch, grass mix, mug wort, horse, dog, cat, house-dust mite (*D. farinae, D. pteronyssimus*) and mould (*Alternaria, Cladosporium*). The in-house generated seafood allergens were prepared from extracts from nine seafood allergens, including

Snow crab (*Chionoecetes opilio*) (minced entire crab with entrails, shell, mouth, etc., raw meat, cooked meat, cooking water), Northern prawn (*Pandalus borealis*) (raw meat, cooked meat, cooking water), Greenland cod (*Gadus ogac*) (raw meat) and Greenland turbot (*Reinhardtius hippoglossoides*) (raw meat) (131–133). The extracts were prepared by the method described by Abramovitch *et al.* (145). In brief, the extracts were blended with phosphate-buffered saline (PBS) pH 7.2 using an ULTRA-TURRAX®. Extracts were then left for 2 hours before centrifugation twice; first for 30 min at 4,500 rounds per minute (rpmi), then 30 min at 45,000 rpmi in an ultra-centrifuge. The supernatant was collected, and the filter sterilised before storage at -80° in aliquots. The protein concentration of each extract was determined using the Bradford assay kit (Bio-Rad Laboratories, Hercules, CA) using bovine gamma globulin as a standard (145). Reactions were read after 15 minutes, and a positive test result was considered when the largest wheal diameter was ≥ 3 mm with a positive reaction to histamine phosphate (1 mg/ml) and a negative reaction to saline (131,133). Atopy was defined as a positive reaction to at least one common aeroallergen (131,133).

4.3.4. BLOOD SAMPLES

Venous blood samples were analysed in Denmark and Australia depending on the analyses requested. Serum samples were analysed at Odense University Hospital, Denmark to measure s-Se levels. Se in serum samples was measured using inductively coupled plasma – mass spectrometry (ICP-MS) on an iCAP-Qc ICP-MS instrument (Thermo Fisher, Winsford, UK). ICP-MS measures chemical elements in each sample that ionise when the sample material gets in contact with the plasma source. The ions are separated and quantified using a mass spectrometer. The software program Qtegra is used to control which elements are detected. In the present study, the isotope ^{78}Se was used. The ICP-MS is quality assured for use by both internal and external controls and is accredited in accordance with ISO15189 (132). Venous blood samples were analysed at the Molecular Allergy Research Laboratory, Australian Institute of Tropical Health and Medicine, James Cook University, Australia to assay for IgE-specific antibodies to cod (f3) and *A. simplex* (p4) by ImmunoCAP (Thermo Fisher Scientific, Waltham, Mass, USA) (131,133). The ImmunoCap method is an *in-vitro*-automated laboratory detection test used to quantify the amount of allergen-specific IgE in a patient's serum. The method involves a fluoroenzyme immunoassay using the sandwich type technology in which the solid phase ensures binding of all relevant antibodies. Patient serum was mixed with a solid-phase-matrix-antigen-bound substrate (ImmunoCap allergen, f3 and p4), permitting allergen-specific IgE to complex if the serum contained the allergen-specific IgE. The complexed substrate was then mixed with an enzyme-IgE conjugate forming a secondary immune complex. Non-specific IgE was removed by washing. Fluorescent-labelled anti-IgE was applied to the secondary immune complex resulting in the formation of a fluorescent secondary immune complex. The fluorescence was read using a fluorometer and compared to a standard curve. The read quantity correlates with the quantity of patient IgE (146,147). The IgE test was considered positive if IgE antibody exceeded 0.10 kU/L (131,148).

4.3.5. ASTHMA

Four outcomes were defined within the asthma category: symptoms from the lower airways, asthma, allergic asthma (AA) and OA.

Symptoms from the lower airways were defined from questionnaire answers regarding symptoms from this area, i.e., cough (during exercise, cold air or strong odour), shortness of breath (during exercise, cold air or strong odour), and wheezing (during nights, exercise, cold air, strong odour or in relation to animals). Participants were classified with symptoms from the lower airways if they reported minimum two symptoms of cough and minimum two symptoms of shortness of breath or minimum two symptoms of wheezing within the past 12 months (131,132).

Asthma was defined from questionnaire answers regarding symptoms from the lower airways, history of asthma diagnosed by a doctor and chronic bronchitis (morning cough with sputum for at least 3 months during the previous year), in addition to results from the reversibility test. Participants were classified with asthma if they were classified with symptoms from the lower airways as defined above (symptoms equal to asthma) or reported a former doctor diagnosis of asthma; if they answered yes to questions regarding symptoms of chronic bronchitis and did not perform a positive reversibility test, they were excluded from the asthma classification (131,132).

AA was defined as asthma as defined above in combination with a positive SPT to common aeroallergens (131,132).

OA was defined from questionnaire answers regarding lower airway symptoms at work (cough, shortness of breath and wheezing at work), sensitisation to work allergens (positive SPT for snow crab, northern prawn, Greenland cod and Greenland turbot and positive IgE test for cod) and reversibility test (131). OA was classified into four categories according to Gautrin *et al.* (28,131):

i. Probable OA: Minimum one symptom from the lower airways at work with improvement of symptoms outside work or a positive reversibility test and sensitisation to minimum one work allergen.
ii. Possible OA: Minimum one symptom from the lower airways at work with improvement of symptoms outside work and no sensitisation to any work allergen.
iii. Unlikely OA: No symptoms from the lower airways at work and sensitisation to minimum one work allergen.
iv. Negative (no OA): No symptoms from the lower airways at work and no sensitisation to work allergens.

An alternative OA definition was constructed to perform sensitivity analyses. In this definition, the participants were also classified into four OA categories: Probable, possible, unlikely, and negative OA. The main condition to be fulfilled to be classified with OA was already to be classified with asthma as defined above. In addition to an already existing asthma classification, the alternative OA definition included questionnaire answers regarding lower airway symptoms at work (cough, shortness of breath and wheezing at work), sensitisation to work allergens (positive SPT for snow crab, northern prawn, Greenland cod, and Greenland turbot and positive IgE test for cod) and reversibility test:

i. Probable OA: Asthma and minimum one symptom from the lower airways at work with improvement of symptoms outside work and sensitisation to minimum one work allergen or a positive reversibility test.
ii. Possible OA: Asthma and minimum one symptom from the lower airways at work with improvement of symptoms outside work and no sensitisation to work allergens.
iii. Unlikely OA: Asthma and no symptoms from the lower airways at work and sensitisation to minimum one work allergen.
iv. Negative (no OA): Asthma and no symptoms from the lower airways at work and no sensitisation to work allergens or no asthma regardless of lower airway symptoms at work and sensitization status.

4.3.6. RHINO CONJUNCTIVITIS

ORC was defined from questionnaire answers regarding upper airway symptoms at work (runny nose, sneezing, irritation in eyes, and/or throat), lower airway symptoms at work (cough, shortness of breath and wheezing at work) and sensitisation to work allergens (positive SPT for snow crab, northern prawn, Greenland cod, and Greenland turbot and positive IgE test for cod) (131). ORC was classified into four categories according to Gautrin *et al.* (28,131):

i. Probable ORC: Minimum one symptom from the upper airways at work and sensitisation to minimum one work allergen.
ii. Possible ORC: Minimum one symptom from the upper airways at work and minimum one symptom from the lower airways at work and no sensitisation to any work allergen.
iii. Unlikely ORC: Minimum one symptom from the upper airways at work and no symptoms from the lower airways at work and no sensitisation to any work allergen.
iv. Negative (no ORC): No symptoms from the upper airways at work regardless of sensitisation to work allergens.

4.3.7. EXPOSURE

The workers were either directly employed in the production unit or had daily tasks in the production unit. Depending on their work tasks in the factories, they were exposed to snow crab, shrimp and/or fish. The type of exposure in every work task was decided by the researchers based upon inspections in the factories and at the trawlers (Table 4.2). The workers were each engaged in one to three work tasks on a daily basis (131).

Work task		**Exposure**		
		Snow crab	Shrimp	Fish
Work tasks in land-based factories	Fish handling			X
	Shrimp handling		X	
	Snow crab handling	X		
	Cold store work	X	X	X
	Cleaning	X	X	X
	Management			
	Office work			
	Work at the laboratory	X	X	X
	Packing			
	Service			
	Landing			
Work tasks at trawlers	Work on deck			
	Factory processing		X	X
	Work at the bulk		X	X

	Work at the bridge			
	Cook			
	Engine room work			
	Work at the trawlbass			

Table 4.2: Type of exposure in every work task in the factories and at the trawlers.

The current and former employment length and exposure to snow crab, shrimp and fish were assessed for every worker based upon questionnaire answers regarding periods of employment in different factories, work tasks and exposure to snow crab, shrimp and fish in current and former employments. Additionally, exposure in current work tasks as described in Table 4.2 were included in the assessment of current employment (131):

i. Current employment length: Years employed in current facility.
ii. Exposure in current employment: Years employed in current facility* average time spent on each work task with exposure to snow crab, shrimp or fish.
iii. Former employment length: Total number of years while previously employed in the seafood-processing industry.
iv. Exposure in former employment: Total number of years previously employed in the seafood-processing industry earlier*average time spent in facilities with exposure to snow crab, shrimp or fish.

Exposure to *A. simplex* was suspected to be most common in connection with exposure to fish. Hence, *A. simplex* exposure was calculated as above using number of years of fish-processing in the calculations (131).

Shrimp processing occurs all year while snow crab processing and fish processing is both seasonal activities. Both shrimp and fish processing include landing and packing. While shrimp are maturated in big vessels followed by boiling and manual and mechanical removal of the shell, fish are decapitated and degutted followed by fileting and freezing. Snow crab are slaughtered manually followed by boiling, freezing and packing (131). Bioaerosol exposure in the factories was measured by stationary measurements and personal inhalable dust samples. Personal inhalable dust samplers were placed in the breathing zone and an unexposed control filter was included. The samples were collected on 37 mm Teflon filters (Whatman International Ltd, Maidstone, UK) using a GSP sampling head (Conical Inhalable Sampler plastic adaptation; JS Holdings, Stevenage, UK) and an AirChek XR5000 pump (SKC Inc., Eighty-Four, PA, USA) at flow rates of 2.0 or 3.5 l/min. The weight of the collected dust on the filters was determined by pre- and post-sampling weighing with a Mettler UMT2 analytical balance (Mettler-Toledo Ltd, Greifensee, Switzerland) with a 0.1 µg precision after a desiccation period of at least 24 hours in an acclimatised weighing room. Particle weight concentration were calculated from the difference in pre- and post-sampling weighing of filters in mg/m^3 air. Following gravimetric analysis, the filters were halved, and each half was weighed again. Of the material, 50% was used for endotoxin analyses and 50% for protein extraction, which was analysed by standard methods as described by Bønløkke *et al.* (133,149). In brief, filters were extracted, samples quaked, centrifuged and a Limulus Amboecyte Lysate test was used for quantification of duplicates comparing with a standard *E. coli* reference curve with a range of 0.01 to 25 EU/ml. The limit of detection (LOD) was 0.0137 EU/ml and the results calculated as EU/m^3 air. All concentrations below the LOD were assigned a 2/3 value of the corresponding LOD (149). Protein from the air filter was extracted using 1 mL of phosphate-buffered saline (PBS) added with 0.5% Tween 20 on a rotation shaker for two hours. The resultant extract was centrifuged at 10,000 g for five minutes and transferred to a new Nunc-ImmunoMinisorp tube (Nunc, USA) to minimize the protein loss due to adsorption on the tube walls. The total protein concentration in the filter extracts was analysed by Pierce™ BCA Protein Assay Kit (Thermo) and measured using a spectrophotometer at 562 nm. Filter extraction and protein analyses were performed at the Molecular Allergy Research Laboratory, Australian Institute of Tropical Health and Medicine, James Cook University, Australia.

4.4. STATISTICS

Statistical analyses were performed using Stata version 15.1 (StataCorp LLC, College Station, Texas). For all analyses, $p<0.05$ was considered the level of significance. IBM SPSS Statistics version 25 was used for the predicted lung function value calculations (www.ibm.com (Accessed September 18, 2020)). Mean values were compared with two-sample t-test if the dependent variables were continuous and normally distributed. For not normally distributed data, Mann-Whitney U-test was used. For follow-up data, paired t-test was used to compare mean values at baseline and follow-up. For categorical variables, Pearson Chi^2 test or Fisher's exact test was used depending on sample size. To compare mean values among more than two groups, one-way ANOVA was used if the data were continuous. Post-hoc analyses including Bonferroni's test for multiple comparisons and Bartlett's test for equal variances were used. In Paper I, multiple linear regression analyses were used to assess associations between s-Se and asthma, allergic asthma, symptoms from the lower airways at work and lung function measurements with adjustment for potential confounders, including age, sex, smoking and workplace. In Paper III, logistic regression analyses adjusted for age, sex, smoking, and atopy were used to assess associations between duration of exposure to seafood and sensitisation. A dose-response relationship was assessed by using the trend test assessing linear effects across different levels of exposure. The nptrend test was used after stratifying exposure groups to atopy and age. In Paper IV, multiple linear regression analyses were used to assess associations between lung function at baseline and at follow-up with adjustment for potential confounders, including smoking, atopy, sensitisation to work allergens, work length and primary work tasks. Multicollinearity was tested by the variance inflation factor (VIF) showing no severe collinearity between the confounders.

5. RESULTS

The results from each Paper (I, II, III and IV) are summarised in the following section. Additional results that have not been presented in the appended papers (appendix D-H, page 145) are presented as well.

5.1. PAPER I

Selenium levels

Mean s-Se was 96.22 µg/L, ranging from 66.50 µg/L to 164.94 µg/L. We observed that s-Se levels were lower among smokers, workers from large factories in the larger towns and workers reporting symptoms from the lower airways. We did not find an association between s-Se and asthma or s-Se and AA. We observed higher lung function values with higher s-Se levels (132).

Diet including additional analyses

One third of the participants answered the questions regarding diet. Of these, all but two participants worked at the large factories in the larger towns (132). All participants, who answered the questionnaire, ingested traditional food a minimum of once a month. Likewise, all participants, who answered the questionnaire, ingested imported food a minimum of once a month. Fish was ingested a minimum of once a month by 94% of the participants (132). In general, a large proportion of the participants ingested meat of traditional origin, including both land-living mammals and seafood. Berries were also ingested by two thirds of the participants. Different types of imported food were ingested a minimum of once a month by 95% to 99% of the participants. Fast food was ingested a minimum of once a month by 84% of the participants. S-Se levels were not significantly different between those ingesting traditional food more than once a week and those ingesting such food once a week or less (132). Nor did we find significantly different s-Se levels between those ingesting traditional food two, three, four or five times a week and with those ingesting traditional food to a lesser extent. On the contrary, we found significantly higher s-Se levels among those ingesting fish once a week or more than among those ingesting fish to a lesser extent. No association between s-Se level and FEV_1-z-score was found when restricting analyses to the study population answering the questions regarding diet (132) (Table 5.1).

	Coefficient	**SE**	**95% CI**
FEV_1 z-score	-0.13	1.08	-2.29-2.01
Workplace	16.53	9.82	-2.96-36.01
Fish intake	7.70	3.21	1.33-14.07
Constant	90.88	2.08	86.75-95.00

Table 5.1: Multiple linear regression analyses showing the association between s-Se and FEV_1 z-score when adjusting for workplace and fish intake and restricting the data to the part of the study population who answered the questions regarding diet.

5.2. PAPER II

Study II represents an overview of occupational diseases based on the part of the study population examined in 2016 and 2017.

Exposure levels

Exposure levels were measured by total concentration of particles, endotoxin and protein. The highest levels were measured in the shrimp production followed by the snow crab production and the fish production (133).

Occupational diseases

We found a prevalence of 5.2% for probable OA. Regarding sensitisation towards work allergens, 16.1% were sensitised to snow crab, 10.1% to shrimp and 0.3% to fish. The point prevalence of eczema on hands or arms was 6.8%. We found that 17-22% complained of pain in the upper extremities (133).

Occupational accidents

Regarding occupational accidents, the incidence rate was 10.3% pr. 100 workers pr. year (133).

5.3. PAPER III

Exposure

We found that 39.4% were currently exposed to shrimp followed by 19.2% to snow crab and 15.0% to fish (131).

Occupational asthma, rhino conjunctivitis and sensitisation

We found a prevalence of 5.5% for probable OA and 4.6% for ORC. Regarding sensitisation towards work allergens, 18.1% were sensitised to snow crab, 13.6% to shrimp and 1.4% to fish. Participants sensitised to *A. simplex* constituted 32.6% of the population. We found a dose-response relationship between years exposed to snow crab and sensitisation to snow crab. We also found a dose-response relationship between years exposed to fish and sensitisation to *A. simplex* (131).

Lung function

Lung function measurements assessed by z-score were above zero regarding both FEV_1 z-score (0.5, 95% CI (0.4-0.6)) and FVC z-score (0.8, 95% CI (0.6-0.9)). The FEV_1/FVC z-score was below zero (-0.4, 95% CI (-0.5 - -0.3)). Applying the SH/S correction led to a FEV_1 z-score of -0.2 (95% CI -3.4-4.6) and a FVC z-score of 0.1 (95% CI -2.9-4.2). The corrected Inuit FEV_1 z-score was compared with the FEV_1 z-score among Danish participants by using the t-test (p=0.931). The corrected Inuit FVC z-score was also compared to the FVC z-score among Danish participants; again using the t-test (p=0.051) (131).

Additional analyses

In the study, a detection limit of 0.1 kU/L was used for detection of IgE-specific antibodies to cod and *A. simplex.* Earlier studies have used a detection limit of 0.35 kU/L (52). When using the higher detection limit, 26.1% were sensitised to *A. simplex*; 0.6%, to fish (131). Applying the marginally lower sensitisation levels to the original OA definition and the ORC definition did not change the prevalence of probable OA (5.5%) and probable ORC (4.6%). The dose-response effect for *A. simplex* when adjusted for atopy, age, smoking and sex was also significant when using the higher detection limit. Increasing duration of exposure to *A. simplex*, compared with 0–<0.1 year of exposure to fish, was associated with increasing odds of participants being sensitised to *A. simplex*: for 0.1–<1 year, OR = 1.82 (95% CI: 0.71-4.63); for 1–<5 years, OR = 1.65 (95% CI: 0.78–3.51); and for ≥5 years, OR = 2.61 (95% CI: 1.27–5.36). The p for trend was 0.02.

Sensitivity analyses exploring the prevalence of OA using the alternative asthma definition described earlier produced a probable OA prevalence of 2.3% (Table 5.2). The alternative definition of OA was somewhat stricter than the original definition since a previous asthma diagnosis (from questionnaire answers) was included in the definition. Hence, fewer were classified with OA based on the alternative definition, though this was not significantly different from the original OA prevalence of 5.5% (p<0.05).

	Original definition of OA[1]	**Alternative definition of OA**[2]
	N (%)	N (%)
Probable OA	20 (5.5)	7 (2.3)
Possible OA	29 (8.0)	6 (2.0)
Unlikely OA	62 (17.1)	11 (3.6)
Negative OA	252 (69.4)	282 (92.2)
Total	363	306

Table 5.2: The prevalence of OA based on the alternative definition of OA. [1]Nineteen individuals are missing from the total study population due to either missing data from questionnaire answers regarding lower airway symptoms or missing data regarding SPTs or IgE tests. [2]Another 57 are missing due to missing answers in the questionnaire regarding lack of a minimum of one answer to questions on lower airway symptoms.

To investigate if the shift of spirometers from data collection in 2016-2017 to 2018 played a significant role, FEV_1 z-score and FVC z-score among those examined in 2016-2017 were compared with the corresponding scores examined in 2018. Both FEV_1 z-score and FVC z-score were significantly different ($p<0.01$) with lower z-scores in 2018. FEV_1 was estimated to be 4% lower in 2018 than in 2016-2017. FVC was estimated to be 7% lower in 2018 than in 2016-2017.

5.4. PAPER VI

The mean follow-up time was 21 months. The only difference between workers included in the follow-up population (n=112) and workers not examined at follow-up (n=117) was employment length. Lung function expressed by FEV_1 z-score and FVC z-score declined significantly from baseline to follow-up. In absolute measures, FEV_1 declined by 0.33 l and FVC by 0.39 l. Overall, the decline in lung function was affected only by work task (snow crab production and packing), and this only applied to FEV_1. Smoking did not affect the outcome. A few more participants were sensitised to snow crab at follow-up (n=11) than at baseline (n=10). On the contrary, fewer participants were sensitised to shrimp at follow-up (4) than at baseline (6).

Additional analyses

Additional analyses in Paper III revealed that there was a risk of underestimating FEV_1 and FVC by 4% and 7%, respectively, when using a different spirometer in

2018. Applying the 4% and 7% underestimation to FEV_1 and FVC at follow-up in Paper IV, revealed that FEV_1 decreased by 194 ml and FVC by 88 ml in absolute numbers during the two-year follow-up. The decrease of both FEV_1 and FVC were still significant tested by paired t-test. When performing the same analyses on FEV_1 z-score and FVC z-score, FEV_1 was still significantly lower at follow-up, but FVC was not. Examining the change in lung function by linear regression adjusted for smoking, atopy, sensitisation to work allergens, work length and primary work tasks revealed that both FEV_1 z-score and FVC z-score decreased significantly during the two-year follow-up, even when incorporating the potential measurement error.

6. DISCUSSION

6.1. MAIN FINDINGS IN THE LIGHT OF OTHER STUDIES

6.1.1. PAPER I

The mean s-Se was 96.22 µg/l (132). This is lower than earlier measurements obtained in Greenland (126,127) but higher than measurements from 2010-2015 among pregnant Greenlandic women (128). Overall, comparison of the measurements indicates that Se levels are declining in Greenland, especially among men and in the capital of Greenland, Nuuk, (129) due to a more Westernised lifestyle with a less frequent intake of a Se-rich diet (89,91). In continuation hereof, we found lower s-Se levels among workers from large factories in the larger towns than among workers from smaller factories in smaller settlements (132). It is known from other studies that Se levels vary between geographical regions of Greenland, and Se levels are declining in Nuuk, probably because of a more Westernised lifestyle in the larger cities (89,129). Se levels were lower among smokers than among non-smokers (132), which was expected from findings in earlier studies (116). The most likely cause is that smokers in general have an unhealthier lifestyle than non-smokers (150,151). Additionally, smoking induces oxidative stress in the airways, thus lowering antioxidant levels (150,151). We failed to show a significant association between s-Se and asthma (132). Earlier studies have also failed to show an association (113–122,125), but just as many studies have shown an association (104–112,124,152). Several factors may explain the lack of association in the present study. We did establish a positive association between s-Se and symptoms from the lower airways among the workers and between s-Se and FEV_1 (132). Thus, the Se level may reflect the degree of inflammation in the lungs rather than the asthma diagnosis itself (105). The mean s-Se level was higher than 90 µg/L which has been accepted as a sufficient Se level for optimal function of GPX-1 (117,121). Thus, in the present study we may not have been able to establish an association between asthma and S-Se because the oxidative defence was functioning adequately, and because the cause of asthma should be found elsewhere. Earlier studies have shown that the association between Se and asthma is not a simple dose-response relationship (94,96,113). Hence, in the present cross-sectional study with only one Se measurement per participant, it is possible that we did not establish an association between s-Se and asthma due to the lack of a simple linear relation. Among the participants answering the questions regarding diet, we did not find an association between different s-Se levels and the frequency of traditional food intake (132). This is likely because of the homogeneity of participants answering these questions with all but two living in the larger towns. On the contrary, we found significantly higher s-Se levels among those ingesting fish once a week or more than among those ingesting fish to a lesser extent (132). The positive association between fish-intake and Se is known from previous studies (153,154). No association between s-Se level and FEV_1 was found when restricting the analyses to the study population answering the questions regarding diet. Hence, fish intake may explain the association between s-Se and FEV_1 found in the entire study population, though it was not possible to adjust for fish intake in the entire study population because only one third answered the questions regarding diet.

6.1.2. PAPER II

Exposure levels

The highest exposure levels of particles, endotoxin and protein in the air were found in shrimp production, specifically in areas with sorting, peeling and packing (133). Exposure levels were also elevated in snow crab production and fish production (133). In the present study, particle and endotoxin levels were lower than among workers processing herring on fully encapsulated machines who were exposed to 0.12-0.72 mg/m^3 particles and 3-92 EU endotoxin/m^3 (55). The endotoxin levels in our study were closer to levels observed in salmon processing in Norway (0.3-29 EU/m^3) (56) and Sweden (1.6-7.1 EU/m^3) (39). The protein concentrations measured in the present study were high compared with those previously observed in crab processing in the UK with levels ranging from 0.71-5.16 $\mu g/m^3$ (57,133). Furthermore, in a large study of bony fish and lobster workers, total protein above 5 $\mu g/m^3$ was rarely observed (58); and among salmon workers in another study, total protein did not exceed 12.6 $\mu g/m^3$ (56) – all well below the mean of 50 $\mu g/m^3$ we observed in shrimp processing (58,133). A possible explanation for the higher protein levels in our study compared with edible crab and bony fish processing is the boiling of shrimp and crab that took place in all the facilities we visited, combined with inadequate ventilation.

Occupational diseases

We found a prevalence of 5.2% for probable OA (133). This prevalence is within the range of 2-36% observed in previous studies (42). Workers sensitised to work allergens reached a sensitisation level of 16.1% to snow crab, 10.1% to shrimp and 0.3% to fish (133). Earlier studies have shown sensitisation levels among workers in the seafood-processing industry towards snow crab, shrimp, and fish between 0-25% with the highest levels towards snow crab and the lowest towards fish (24,28–30,32–34,38,39). Thus, the findings in the present study are within the range of previous findings. Although exposure levels were highest in shrimp production, sensitisation levels, however, were highest among snow crab production workers (133). A possible explanation is that snow crab allergens are more potent and more readily to cause sensitisation. This invites the conclusion that snow crab allergens are more likely to cause allergy and asthma than shrimp allergens (17,42). However, the processing methods may also explain the contradictory findings since the researchers gathering the data observed considerably more aerosol splashing during slaughtering of snow crab than during handling of shrimp. More exposure data are needed to confirm this observation.

Fewer workers complained of eczema on hands and forearms and MSD than expected in a working environment characterised by monotonous, repetitive work and wet work (60,133,136). A study from the seafood-processing industry in north Norway reported a 55.6% prevalence of work-related eczema. The Norwegian study included more localisations of skin symptoms than our study did. Still, in Norway, the prevalence was higher than in our study as most symptoms were on hands and forearms in the Norwegian study (60). However, clinical signs of contact dermatitis were found in numbers comparable to those seen in other sectors with wet work exposure (155). MSD were less prevalent than reported in other studies in the seafood-processing industry, showing a prevalence of pain of up to 65% and of MSD of up to 77% (62–64,66,67). The prevalence of pain was comparable to the prevalence of pain among women in the Indian fish-processing industry of 17-27% in the upper extremities (65).

Occupational accidents

A high proportion of the participants had suffered occupational accidents and injuries (133). The international literature on these sectors is sparse and mainly features older low-quality studies, so comparison with the fishing and seafood-processing industry in other countries is difficult. It appears that the reported injuries were more severe than those described in Danish studies of manual workers experiencing occupational injuries (156,157). The safety climate, both among the workers and the management, appeared to be worse than what is expected from Danish industries.

6.1.3. PAPER III

Though more workers were currently exposed to shrimp than snow crab (39.4% versus 19.2%), a higher proportion was sensitised to snow crab than shrimp (18.1% versus 13.6%) (131). This controversial finding is in line with the findings regarding exposure levels and sensitisation levels reported in Paper II (133). Again, a possible explanation is that snow crab allergens are more potent and more readily to cause sensitisation (17,42). However, as stated earlier, the processing methods may also explain the contradictory findings. In general, sensitisation levels regarding snow crab, shrimp and fish were in line with previous findings in the seafood-processing industry (24,28–30,32–34,38,39). Sensitisation levels towards *A. simplex* (32.6%) (131) were also in line with previous findings, showing levels between 1.8% and 50% (53,54). We rediscovered a dose-response effect between exposure to snow crab and fish and the risk of being sensitised to snow crab and *A. simplex* (17,42,52,131). Sensitivity analyses exploring the effect of using a higher detection limit of IgE-specific antibodies to *A. simplex* as used in the previous study by Mazzucco *et al.* did not change the dose-response relationship (52). The prevalence of probable OA (5.5%) (131) was within the range of previous findings in the seafood-processing industry (2-36%) (42). Sensitivity analyses exploring the effect of using a different and somewhat stricter OA definition yielded a probable OA prevalence of 2.3%. This was also within the range of previous findings (42). The prevalence of probable ORC (4.6%) (131) was also equal to previous findings ranging from 5-24% (42).

FEV_1 z-score and FVC z-score were both above zero, indicating that the Inuit lung function is higher than the Caucasian reference value (131). A Caucasian reference material was used since no Inuit lung function reference material exists. Applying the SH/S correction ratio of 0.52/0.54 to the measured FEV_1 and FVC values and comparing them to FEV_1 z-score and FVC z-score among Danish participants led to similar results, i.e., results that were not significantly different between Inuit and Caucasians. This may indicate that the cause of the high Inuit lung function is genetic. However, the cause may also be that of a healthy worker effect.

6.1.4. PAPER IV

Lung function declined more than expected from baseline to follow-up. The expected age-related decline was 30-40 ml/year among non-smokers and approximately double of this size among smokers (158,159). Thus, the decline in lung function in the present study was four to eight times higher than expected. Smoking was expected to affect lung function, though this was not obvious in the present study. Smoking did seem to affect lung function among women which is known from earlier studies (160). Occupational exposure, especially from work tasks including snow crab production and packing, affected lung function. A decline in FEV_1 of 100 ml/year among workers exposed to various agents has been shown before (161). Thus, the decline in lung function combined with the age-related expected decline among primary smokers in the present study is still larger than expected in spite of an environment with exposure to massive amounts of aerosols. When comparing measurements of FEV_1 z-score and FVC z-score in the entire population in Paper III (n=382), we found that the estimated lung function was 4-7% lower in 2018 than in 2016-2017. Thus, the shift in spirometer from baseline to follow-up may explain some of the decline in lung function from baseline to follow-up. Incorporating this potential measurement error in sensitivity analyses showed that FEV_1 decreased by 194 ml and FVC by 88 ml in absolute numbers. Hence, FEV_1 still decreased more than expected, while FVC decreased by the expected age-related decline in a primarily smoking population. Furthermore, the sensitivity analyses showed that FEV_1 z-score and FVC z-score both decreased significantly from baseline to follow-up, even when the potential measurement error was considered. An increasing number of participants sensitised to work allergens was expected because of continued exposure to work allergens, though only one more participant was sensitised to snow crab at follow-up than at baseline (162). For snow-crab, a change in work tasks was able to explain a fair share of the change in sensitisation status from baseline to follow-up. We did not expect fewer participants to be sensitised to shrimp, but numbers are small, and consequently, interpretation can be difficult. We know that almost all the workers ingest shrimp in their leisure time

(132), which may interfere with the results. Also, variation in the SPTs at baseline and follow-up may interfere with the results. For shrimp, a change in work task could only explain the shift in sensitisation status among two participants, and leisure time exposure to shrimp may also explain the shift in sensitisation status.

6.2. METHODOLOGICAL CONSIDERATIONS

6.2.1. STRENGHTS OF THE STUDY

We managed to examine almost 10% of the active workforce in the Greenlandic seafood-processing industry. Furthermore, we managed to include approximately 85% of the potentially eligible workers. Hence, a high participation rate in combination with the broad approach in the Greenlandic seafood-processing industry is considered to insure a high external validity in the seafood-processing industry, both in Greenland and in the Arctic where similar occupational exposures are seen. Data were gathered using questionnaires. However, many of the participants had problems filling out the questionnaires. Therefore, clinical interviews were performed based on the questionnaires to minimise the risk of misunderstandings and missing data. Clinical interviews were performed by Danish-Greenlandic speaking medical students to overcome language barriers.

6.2.2. LIMITATIONS OF THE STUDY

Papers I-III have a cross-sectional design. A cross-sectional study can tell us something only about associations, not causation. Further limitations are discussed in the following sections.

6.2.3. ASTHMA CLASSIFICATION

A risk of misclassification in the present study may exist. The gold standard for diagnosing OA in epidemiological studies is a bronchial challenge test preceded by a questionnaire and an allergy test (SPT or RAST). Often, serial PEF measurements at and away from work are almost as valuable (19). However, in the present study, it was not possible to perform bronchial challenge tests due to constraints in time. PEFs were not possible due to compliance problems among the participants. Thus, the asthma diagnosis relied on self-reported answers in the questionnaire in combination with lung function measurements, reversibility tests and allergy tests towards specific work allergens. This might lead to both a low sensitivity and a low specificity in diagnosing the participants correctly. In general, a low sensitivity will cause underestimation of the results, while a low specificity will lead to overestimation. We excluded those with symptoms of chronic obstructive pulmonary disease (COPD) and hence sought to eliminate the risk of a type one mistake. However, we may not have diagnosed everyone with OA due to the lack of a bronchial challenge test. Thus, the risk of a type two mistake remains and with this the risk of attenuation of the results.

However, a combination of objective evidence of asthma plus a positive SPT or the verification of specific IgE by serological tests to the suspected agent has a high predictive value for OA (19).

6.2.4. SPIROMETRY

Two different spirometers were used in the study. For data collection in 2016 and 2017, the MIR Spirobank II spirometer was used; for data collection in 2018, including follow-up data collection, the Easy-One® NDD Medical Technologies, Zurich, Switzerland was used. Thus, in Paper III, the participants' lung function was measured with two different spirometers; and in Paper IV, two different spirometers were used at baseline and follow-up. No studies have compared the two different spirometers but they have both been compared to pneumotachographs, which showed that they both underestimate the FEV_1 and FVC by approximately 6% (163,164). However, comparing FEV_1 z-score and FVC z-score measurements in 2016-2017 to measurements obtained in 2018 indicated that the later were 4-7% lower than the former. In Paper III, this is unlikely to represent a problem, since only 50 participants were measured with another spirometer; and FEV_1, FVC and OA prevalences are similar in Paper II and Paper III. Some of the participants examined in 2018 may have shown lower FEV_1 and FVC than expected. In theory, this could lead to more participants having a reversibility test conducted although the condition for performing the reversibility test is a FEV_1/FVC ratio reduced by 20% more than expected. However, only two participants examined in 2018 had a reversibility test performed. Thus, it is unlikely that the shift in spirometers would affect the asthma classification in Paper III in which the results from the reversibility tests were used. In Paper IV, the risk of differential measurement error may exist. Shifting from the MIR spirometer to the Easy-One® spirometer from baseline to follow-up may have underestimated FEV_1 and FVC at follow-up by 4-7%. The difference could be caused by interobserver variability since it was not the same researchers who performed the analyses in 2016, 2017 and 2018. It could also be caused by the spirometer brand. Calibration ought not to be of significance since the spirometers were calibrated beforehand.

6.2.5. INFORMATION BIAS

A risk of non-differential misclassification may exist, both regarding reporting of health problems and exposure. Regarding health problems, both respiratory symptoms, skin problems and musculoskeletal pain may be experienced quite differently among the participants. Inuit are used to outdoor work and leisure time activities in a demanding environment, often in extreme cold. This may lead to underreporting of symptoms due to cultural issues, thus attenuating the results. Regarding exposure data, we relied on the participants' self-reported answers regarding work task and time frame in both previous and present jobs. Due to the risk of recall bias, this will often lead to non-differential misclassification, thus attenuating the results. However, including the researchers' expert assessment regarding exposure based on factory inspection probably reduced potential information bias. On the contrary, a risk of differential misclassification cannot be completely eliminated. The participants knew why the researchers were present at the work sites which may have resulted in a tendency to exaggerate their symptoms because it is common knowledge in the community that present exposure is associated with the risk of disease. However, self-reported questionnaire answers often underestimate symptoms and exposure. Thus, the most likely misclassification is non-differential, leading to conservative risk estimates.

6.2.6. SELECTION BIAS

The participation rate was approximately 85%, which is equivalent to a loss of 15% of potential participants. Only workers present at the workplace on the examination day were examined, and we are not aware of their reasons for not showing up at work. Several reasons may exist, including lack of work for the entire workforce at the factories on the days of our investigation or engagement in social activities. It is also possible that those with poor health did not show up for examinations. Thus, a risk of selection bias may exist. However, we expect this bias to be of limited significance due to the size of the study, the modest loss of 15% of the potential respondents and a high level of homogeneity among the participants. Furthermore, we have no reason to suspect that the loss was related to both exposure and outcome. A healthy worker effect cannot be ruled out. Since we are not aware of potential participants' reasons for not showing up at work, a risk of underreporting of symptoms exists if those with the poorest health were absent. This would be relevant to the study, both if they did not show up for work at the examination day and if they left the industry completely due to poor health. In Paper IV, we have no data to explain the low recruitment of 49% at follow-up, but a resistance against further examinations may exist, some might have moved and some might be engaged in other activities. The researchers were present at the facilities only for a few days, which restricted the opportunity for some workers to be examined. Thus, a risk of selection bias at follow-up cannot be ruled out and the extent of bias is unknown. Lung function at follow-up may also be affected by a healthy worker effect if those with the lowest lung function at baseline left the industry or were lost to follow-up. However, analyses of the participants at baseline comparing participants included in follow-up and those lost to follow-up, indicate that the population in Paper IV is unselected. Thus, participants included at follow-up can be expected to reasonably represent the baseline population. In general, a healthy worker effect would tend to attenuate the results, since the sickest workers would be absent.

6.2.7. CONFOUNDING

Data were collected at seafood-processing factories that were within a manageable reach from Nuuk. Selecting workplaces based on convenience is likely to introduce some degree of bias. However, we included a large proportion of the active workforce in the Greenlandic seafood-processing industry and visited some of the largest factories in Greenland in combination with both small factories and factory trawlers. We sought to overcome potential confounding by adjusting for potential confounders, including age, sex, smoking, atopy, sensitisation to work allergens and different work variables depending on the specific analyses. Regarding lung function, bias was overcome by using z-scores, which were already adjusted to age, height, sex and ethnic group. However, no Inuit reference material exists, and the use of a Caucasian reference material may have introduced some degree of bias. Overall, thorough preparation and adjusting for relevant confounders will reduce the risk of unmeasured confounding.

7. CONCLUSION AND FUTURE PERSPECTIVES

7.1.1. PAPER I

Compared to previous studies of Se in Greenland, findings suggest that Se levels are declining in Greenland, especially among men and in the larger cities. The declining Se levels is likely caused by the shift towards a more Westernised lifestyle in Greenland with intake of food with low Se content contrary to the traditional Se-rich Inuit diet. The health effects of lower Se intake remain unclear. We found an association between s-Se level and symptoms from the lower airways and s-Se and lung function but no association between s-Se and asthma (132). It is likely that Se levels in Greenland are high enough to uphold a normal physiological function of GPX-1, thus showing no association to asthma. Prospectively, it is important to maintain focus on traditional Inuit lifestyle and maintain the opportunity to consume traditional Inuit food. If the shift towards a Westernised lifestyle continues, a concern may be that the lack of ingestion of Se-rich Inuit traditional food will lead to lower Se levels, which may potentially have negative health effects.

7.1.2. PAPER II, III AND IV

This is the first study to examine the prevalence of occupational diseases and accidents in the seafood-processing industry in Greenland. Findings suggest that the prevalence of sensitisation to snow crab and shrimp, OA and ORC is high and in line with findings in other countries. In addition to this, a dose-response relationship was found between the duration of exposure to snow crab and fish and the risk of being sensitised to snow crab and the fish parasite, *A. simplex*, respectively. The two-year follow-up showed a considerable decline in lung function, although the use of different spirometers may explain part of the decline. Levels of exposure to particles, endotoxin and total protein in particular were highest in shrimp production. Levels of exposure to snow crab were lower, however snow crab was associated with the highest sensitisation levels. The cause of this contradiction may be due to snow crab being more potent as a sensitiser, but it may also be caused by massive aerosol exposure during the slaughtering and boiling of snow crab in facilities without proper ventilation. Future studies should survey exposure levels in different production sites and factories to further explore this issue. Furthermore, large prospective follow-up studies should explore changes in lung function and sensitisation levels in a larger population, counting workers both leaving and continuing in the seafood-processing industry. In addition to the respiratory occupational diseases, we investigated occupational dermatological diseases and MSDs. The study showed a lower than expected prevalence of both, and these diseases were not further examined. Lung function measurements expressed as z-score using a Caucasian reference material showed higher FEV_1 and FVC than expected. Hence, Inuit may genetically have higher lung function than Caucasians. An Inuit lung function reference material should be developed to interpret the Inuit lung function measurements better, both in the clinic and in future research. Occupational accidents were more prevalent than expected, and the degree of severity of these accidents was high. Workers and leaders had a poor safety culture. Knowledge regarding the less severe and more prevalent occupational accidents was sparse. Thus, future studies should explore these issues further and practical tools for systematic work with safety should be introduced at the factories.

The high prevalence of respiratory occupational diseases suggests a considerable degree of underreporting of occupational diseases in Greenland. Hence, workers, leaders and health professionals should be informed of the health problems in the seafood-processing industry and the law on worker's compensation. Preventive measures are important, and the fact that the workers continue their employment in the seafood-processing industry despite of health problems makes this even more important. Both removal and reduction of exposure have been shown to improve outcomes among those with OA. However, the drawbacks of job loss should be weighed against the potential benefits of discontinuing exposure (19,165,166). Hence, in the present study, workers continued employment despite of health problems. This indicates that removal from exposure is not an option in this population, probably because of the lack of other job opportunities. The following preventive measures are suggested:

- Information to workers and leaders about potential health problems.
- Better ventilation, extraction devices and machinery encapsulation.
- Personal safety equipment, i.e., respiratory protective devices and gloves.
- Health surveillance of workers including use of spirometry and SPT or measuring specific IgE by serological tests, especially within the first two years of employment.

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APPENDICES

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Appendix A. 2016 questionnaire

Spørgeskema

Grønland | 2016

Arbejde og helbred i fiskeri og fiskeindustri i Grønland

Dansk | Grønlandsk

Forord

Dette er den første samlede undersøgelse af arbejdsmiljø og helbred i fiskeri og fiskeindustri i Grønland. Undersøgelsens formål er:

At belyse påvirkninger i arbejdet fra håndtering af skaldyr og fisk, fysiske påvirkninger som tunge løft samt risikoen for arbejdsulykker.

At belyse hvilke helbredsgener og symptomer det kan give anledning til

At bruge denne viden til at forbedre arbejdsmiljøet og forhindre at medarbejderne bliver syge af deres arbejde

De oplysninger vi indsamler vil blive behandlet fortroligt – kun de læger der gennemfører undersøgelsen har adgang til materialet. I de resultater der kommer ud af undersøgelsen kan man ikke genkende den enkelte person.

Undersøgelsen er godkendt af de grønlandske myndigheder.

Det er frivilligt at deltage i undersøgelsen.

Vejledning

Vi vil bede dig svare på alle spørgsmålene så godt du kan. Er du i tvivl om noget kan du spørge en af os i kantinen. Er der noget du vil uddybe eller forklare nærmere, vil du få mulighed til at fortælle det til lægerne når du bliver indkaldt til undersøgelse en af de kommende dage.

Venlig hilsen
Lægerne arbejdsmedicinsk klinik i Herning, Ålborg og København
Århus Universitet.

Personbeskrivelse

INUMMIK ALLAATIGINNINNEQ

LBNR: ______

1. Dato: ____________
Ulloq

2. CPR - Nr: ____________
Inuup normua

3. Efternavn: ____________
Naggat

4. Fornavn: ____________
Ateq

5. Adresse: ____________
Najugaq

6. Telefon: ____________
Telefon

7.Hvor er du født: ____________
Sumi inunngorpit

8. Køn:
Suiaassuseq

☐ Mand (Angut) 1
☐ Kvinde (Arnaq) 2

9. Etnisk oprindelse:
Inuiaassuseq

☐ Grønlandsk (kalaaleq) 1
☐ Dansk (danskeq) 2

Dit arbejde

Suliat

10. Hvor længe har du været på nuværende arbejdsplads
Qanoq sivisutigisumik massakkut suliffigisanni sulivit

Antal år: ________
Ukiuni qassini

11. Hvad er din tilknytning til nuværende arbejdsplads?
Massakkut suliffigisannut qanoq attuumassuteqarpit?

☐ Fast Arbejde (Aalajangersimasumik Sulisartoq) 1
☐ Sæsonarbejde (Ukiup ilaatigut sulisartoq) 2

12. Hvor mange timer om ugen arbejder du i dit nuværende job?
Massakkut suliffigisanni sapaatip akunneranut akunnerni qassini sulisarpit

Antal timer: ________
akunnerit

Symptomer fra huden

Eksem viser sig ved du bliver rød og irriteret i huden

Ammikkut ersiutit

Eksemeqaruit tamanna amminnik aappillersitsisimassaaq imaluunniit paamititsilluni

13. Har du nogensinde haft eksem på hænderne
Siornatigut assakkut eksemeqarnikuuit

☐ 1 Ja (Aap) ☐ 2 Nej (Naamik)

14. Har du nogensinde haft eksem på underarmene?
Assaatikkut eksemeqarnikuuit

☐ 1 Ja (Aap) ☐ 2 Nej (Naamik)

15.Hvornår havde du sidst eksem på hænder eller underarme? Assakkut assaatikkullu qanga kingullermik eksemeqarpit?	Hænder (assakkut)	Underarm (assaatikkut)
Jeg har det i øjeblikket (Massakkut)	☐ 1	☐ 1
Ikke i øjeblikket, men indenfor de sidste 3 måneder (massakkuunngitsoq, kisianni qaammatini kingullerni pingasuni)	☐ 2	☐ 2
Mellem 3 og 12 måneder siden (Qaammatit pingasut aamma 12-it akornanni)	☐ 3	☐ 3
Mere end 12 måneder siden (Qaammatit 12-it sinnerlugit)	☐ 4	☐ 4
Hvilket år var sidste gang du havde eksem (Ukioq suna kingullermik eksemeqarpit)	______	______ **(årstal)** (ukioq)

16. Har du bemærket om dit eksem bliver værre, når du arbejder med skaldyr, fisk, kemikalier eller andre produkter?
Qalerualinnik, aalisakkanik, akuutissanik nioqqutissianilluunniit allanik suliaqaraangavit eksemippit ajortinneri malugisarpigit?

	Eksem på hænder Assakkut eksemit	Eksem på underarme assaatikkut eksemit
Ja Aap	☐ 1	☐ 1
Nej Naamik	☐ 2	☐ 2

Hvis ja; hvilke ting drejer det sig om (skriv): ________________________
Aappeeruit; suut suliarigaangakkit (allaguk):

____

____

17. Bliver dit eksem bedre når du holder fri fra dit arbejde (f.eks. weekender og ferier)?
Suliffinniit freeraangavit (soorlu assersuutigalugu sap. akunnerata naanerani feriarninni) eksemerit pitsanngortarpa?

	Eksem på hænder Assakkut eksemit	Eksem på underarme assaatikkut eksemit
Ja, som regel Aap, tamatigut	☐ 1	☐ 1
Ja, undertiden Aap, ilaanneeriarlutik	☐ 2	☐ 2
Nej Naamik	☐ 3	☐ 3
Ved ikke Naluara	☐ 0	☐ 0

18. Har du nogensinde haft nældefeber eller kløende udslæt? (hævede røde områder på huden som eventuelt kan være kløende - ligner myggestik)?
Siornatigut sapigaqarnikkut anillattoortarpit imaluunniit paaminnartunik anillattoortarpit (ippernat kiggiinut assingusunik)?(ammikkut aappillernerit pullattut imaluunniit anillannerit ungilattut)?

☐ 1 Ja
Aap

☐ 2 Nej
Naamik

Symptomer fra næse og luftveje

Nuværende symptomer (de sidste 12 mdr.)

Sorlukkut torlukkullu malunniutit
Massakkut malunniutit (qaammatini 12-ini kingullerni)

19. Har du i de sidste 12 måneder haft <u>hoste</u> når du:
Qaammatini kingullerni 12-ini quersortarpit:

	Ja Aap	Nej Naamik	Ved ikke Naluara
Dyrker motion Timersortillutit	☐ 1	☐ 2	☐ 0
Laver anstrengende arbejde Assoroornartumik suliaqartillutit	☐ 1	☐ 2	☐ 0
Er i meget kold luft Nillertorujussuarmiitillutit	☐ 1	☐ 2	☐ 0
Er forkølet eller har influenza Nuatsillutit imaluunniit nuallullutit	☐ 1	☐ 2	☐ 0
Ved stærke lugte (maling, tobak, parfume eller andet) Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit)	☐ 1	☐ 2	☐ 0

20. Har du i de sidste 12 måneder haft <u>piben/hvæsen</u> fra din vejrtrækning når du:
Qaammatini kingullerni 12-imi uinngialasumik/iggiinngasumik anersaartortarpit:

	Ja Aap	Nej Naamik	Ved ikke Naluara
Dyrker motion Timersortillutit	☐ 1	☐ 2	☐ 0
Laver anstrengende arbejde Assoroornartumik suliaqartillutit	☐ 1	☐ 2	☐ 0
Er i meget kold luft Nillertorujussuarmiitillutit	☐ 1	☐ 2	☐ 0
Er forkølet eller har influenza Nuatsillutit imaluunniit nuallullutit	☐ 1	☐ 2	☐ 0
Ved stærke lugte (maling, tobak, parfume eller andet) Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit)	☐ 1	☐ 2	☐ 0

21. Har du i de sidste 12 måneder <u>følt pressen for brystet eller været kortåndet</u> når du:
Qaammatini kingullerni 12-ini sakissakkut naqisimaneqarnermik imaluunniit anernikilliornermik misigisaqartarpit:

	Ja Aap	Nej Naamik	Ved ikke Naluara
Dyrker motion Timersortillutit	☐ 1	☐ 2	☐ 0
Laver anstrengende arbejde Assoroornartumik suliaqartillutit	☐ 1	☐ 2	☐ 0
Er i meget kold luft Nillertorujussuarmiitillutit	☐ 1	☐ 2	☐ 0
Er forkølet eller har influenza Nuatsillutit imaluunniit nuallullutit	☐ 1	☐ 2	☐ 0
Ved stærke lugte (maling, tobak, parfume eller andet) Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit)	☐ 1	☐ 2	☐ 0

22. Når du er i kontakt med husstøv (rengøring, støvsugning, sengeredning) har du da sommetider nogle af disse symptomer?

Illup iluani pujoralammik najuussigaangavit (eqqiaajnermi, støvsugernermi, siniffilerinermi) malunniutit makku malugisarpigit?

	Ja Aap	Nej Naamik
Hoste Quersorneq	☐ 1	☐ 2
Piben/hvæsen Inngialasumik/iggiinngasumik anerneqalerneq	☐ 1	☐ 2
Føler trykken for brystet Sakissakkut naqisimaneqarneq	☐ 1	☐ 2
Bliver kortåndet Anernikilliorneq	☐ 1	☐ 2
Får løbende eller stoppet næse Kakkilertalerneq sorlunnilluunniit milinngatitsineq	☐ 1	☐ 2
Får nyseanfald Tangajoqattaarneq	☐ 1	☐ 2
Får kløende eller løbende øjne Isikkut ungillerineq qulliliornerluunniit	☐ 1	☐ 2

23. Hoster du normalt slim op om morgenen? (For eksempel ved din første cigaret eller når du første gang går udenfor. At rømme sig/klare halsen tæller ikke med)
Ullaakkut quersorlutit nuammik nalinginnaasumik aniatitsisarpit? (Soorlu assersuutigalugu cigareti siulleq siullermilluunniit silamut anigaangavit. Iggiarissarneq tassani ilaatinneqassanngilaq)

☐ Ja (Aap) 1 ☐ Nej (Naamik) 2

Hvis **nej**, gå til spg. 25
NAAGGAARUIT apeqqummut 16-imukarit

24. Har du hostet sådant slim op de fleste morgener i mindst 3 måneder i et år eller mere?
Ikinnerpaamik qaammatini pingasuni, ukiup ataatsip iluani amerlanerusuniluunniit ullaakkut amerlanertgut quersornikkut nuakoortarpit?

☐ Ja (Aap) 1 ☐ Nej (Naamik) 2

Hvis **ja**, i hvor mange år?: ______________ år (Ukiut)
AAPPEERUIT, ukiuni qassini?

25. Hvilke af følgende udsagn passer bedst på din vejrtrækning i de sidste 12 måneder?
Qaammatini 12-ini kingullerni ataani allassimasut anersaartorninnut tulluarneruppat?

☐ 1 Jeg har sjældent problemer med min vejrtrækning
Anersaartornera qaqutigut ajornartorsiutigisarpara

☐ 2 Jeg har sommetider problemer med min vejrtrækning
Anersaartornera ilaanneeriarlunga ajornartorsiutigisarpara

☐ 3 Jeg har ofte problemer med min vejrtrækning
Anersaartornera akulikitsumik ajornartorsiutigisarpara

☐ 4 Min vejrtrækning er altid dårlig
Anersaartornera ajortuaannarpoq

Tidligere symptomer
Siusinnerusukkut malunniutinik ersittoqartarpa

26. Har du nogensinde haft høfeber (hermed menes nyseanfald med løbende eller stoppet næse, kløende næse, kløende eller løbende øjne, som kommer på specielle årstider)?
Naasuneersunik sapigaqartarnikuuit (tamatumani pineqarpoq tangajoqattaarneq kakkilertanermik imaluunniit sorlunnik militsitsisoq, qinngakkut ungilatitsineq, isikkut ungalitsitsineq qulliliornerluunniit ukiup ilaani aalajanersimasuni takkuttartunik)?

☐ Ja (Aap) 1
☐ Nej (Naamik) 2

Hvis **JA**, hvilken årstid?
AAPPEERUIT, ukiu qanoq ilinerisigut?

☐ Forår (Upernaakkut) 1
☐ Sommer (Aasakkut) 1
☐ Efterår (Ukiakkut) 1
☐ Vinter (Ukiukkut) 1

27. Har din læge nogensinde fortalt dig, at du havde astma?
Nakorsap astmaqarnerit ilinnut oqaatiginikuuaa?

☐ Ja (Aap) 1
☐ Nej (Naamik) 2

Hvis **JA**, Hvor gammel var du, da en læge første gang fortalte dig du havde astma? _________ år. (Ukiut)
Nakorsap siullermeerluni astmaqarnerit qassinik ukioqatutit oqaatiginikuuaa

Symptomer på arbejdet

De næste spørgsmål handler om de symptomer du måtte have når du arbejder på fabrikken
SULINERMI MALUNNIUTIT
Apeqqutit tulliuttut fabrikkimi sulininni sunniutaasinnaasuupput.

28. Når du arbejder på fabrikken får du da ofte:

Fabrikkimi sulininni akulikitsumik:

	Ja Aap	Nej Naamik
Løbende eller stoppet næse Kakkilertasarpit qinngalluunniit milittarpa	☐ 1	☐ 2
Nyseanfald Tangajukulalersarpit	☐ 1	☐ 2
Kløende eller løbende øjne Isikkut ungilliisarpit qulliliulerlutilluunniit	☐ 1	☐ 2
Kløe eller rødt udslæt på huden Ungilliilersarpit imaluunniit ammikkut aappalaartunik anillattarpit	☐ 1	☐ 2
Føler hæshed eller får ondt i halsen Iggiarlulersarpit imaluunniit toqqusaarlullutit	☐ 1	☐ 2
Føler dig utrolig træt Qasoqqarujussuartarpit	☐ 1	☐ 2
Hovedpine Niaqorluttarpit	☐ 1	☐ 2
Symptomer der ligner influenza Nualluummut assingusunik malunniuteqartarpit	☐ 1	☐ 2
Hoste Quersortarpit	☐ 1	☐ 2
Hvæsen eller piben for brystet Sakissakkut iggiinngasumik uingialuttumilluunniit nipinittarpa	☐ 1	☐ 2
Kortåndethed eller trykken over brystet Anertikkalerneq imaluunnit sakissakkut naqinneqartutut misigisimaneq	☐ 1	☐ 2

Hvis **ja**
Aappeeruit

29. Hvad arbejdede du med, da symptomerne startede?__________________
Malunniutit takkuteqqaarmata suna suliaraajuk?

30. Hvilket år startede symptomerne?_____________
Ukioq suna malunniutit aallartippat

31. Plejede de at forsvinde, når sæsonen hvor du arbejdede på fabrikken var ovre?
Fabrikkimi sulineq ukiup ilaatigut unitsinneqaraangat malunniutaaruttarpit?

☐ 1 Ja (Aap) ☐ 2 Nej (Naamik) ☐ 3 I Nogen grad (Ilaanneeriarlutik)

32. Hvilket af følgende udsagn beskriver bedst din vejrtrækning, når du arbejder på fabrik?
Fabrikkiani suligaangavit ataani sorliit anersaartorninnut assingunerusuuppat?

☐ 1 Jeg har sjældent problemer med min vejrtrækning
Anersaartornera qaqutigut ajornartorsiutigisarpara

☐ 2 Jeg har sommetider problemer med min vejrtrækning
Anersaartornera ilaanneeriarlunga ajornartorsiutigisarpara

☐ 3 Jeg har ofte problemer med min vejrtrækning
Anersaartornera akulikitsumik ajornartorsiutigisarpara

☐ 4 Min vejrtrækning er altid dårlig, når jeg arbejder på fabrikken
Fabrikkimi suligaangama anersaartornera ajornartorsiutigiuaannartarpara

Familie

Ilaquttat

33. Din nært beslægtede familie (far, mor, bedsteforældre, børn): lider nogen af dem nu, eller har de tidligere lidt, af følgende helbredsproblemer:

Ilaquttatit qaninnerpaat (ataatat, anaanat, aanakkutit aatakkutillu, meeqqat): taakku ilaat massakkut siusinnerusukkulluunniit peqqissutsimikkut makkuninnga ajornartorsiuteqartarpat:

	Ja Aap	Uddyb, hvem der havde lidelsen Kiap nappaateqarnera itisileruk	Nej Naamik
Astma Astma	☐ 1		☐ 2
Høfeber Naasunik sapigaqarneq	☐ 1		☐ 2
Børneeksem Meeraallutik eksemeqartut	☐ 1		☐ 2
Kløende udslæt Ungilannartunik anillannerit	☐ 1		☐ 2

Rygning
PUJORTARTARNEQ

34. Har du nogensinde røget?
Pujortarnikuuit

☐ 1 Ja / Aap ☐ 2 Nej (gå til spørgsmål 39) / Naamik (apeqqut 31-mukarit)

35. Er du holdt op med at ryge?
Pujortarunnaaravit

☐ 1 Ja / Aap ☐ 2 Nej (gå til spørgsmål 37) / Naamik (apeqqut 29-mukarit)

36. Hvis ja, hvor gammel var du, da du holdt op? ______________ **år.**
Aappeeruit, qassinik ukioqarlutit pujortassaappit?

37. Hvor meget ryger du eller røg du i gennemsnit?
Qassit pujortartarpigit imaluunniit siornatigut pujortartarpigit - agguaqatigiissillugit?

______cigaretter om dagen
ullormut cigaretsit qassit

______cerutter eller cigarer om dagen
Cigaavaqqat cigaallunniit ullaakkut

______pibestop om dagen
Pujortaat ullormut qasseriarlugu

______snus/skrå
Sunoorsi/sukulooq

38. Hvor gammel var du, da du begyndte at ryge? _______**år**
Qassinik ukioqarlutit pujortartalerpit? init

Gener fra arme, skuldre, nakke og ryg

Tallikkut, tuikkut, pukutsukkut qitikkullu akornutit

Spørgsmålene handler om besvær *(smerter og gener)* i nakke, ryg, skuldre, albuer og hænder. For hvert spørgsmål skal du afkrydse ét felt i hver linje. Du skal sætte et kryds der passer bedst med hvor ondt du har - feks svarer 0 til at du slet ikke har besvær, 9 svarer til værst mulige smerter og 4-5 til smerter midt imellem. Afkryds det tal på skalaen der passer bedst til dig

Apeqqutini pineqarput pukutsukkut,, qitikkut, tuikkut,, ikutsikkut assakkullu anniaatit akornutillu..
Apeqqutit immikkoortut titarnerni tamani ataasiinnarmik krydsiliiffigissavatit. Anniarnippit sakkortussusaanut naapertuuttoq krydsilissavat – soorlu assersuutigalugu akornuteqanngilluinnaruit 0 krydsilissavat, 9 anniarnerpaaffinnut naapertuuppoq, 4-5-ilu akunnattumik anniarnermut naapertuupput. Uuttuummi kisitsit ilinnut tulluarnerpaaq krydsilissavat.

Nakke

Pukusuk

39. Angiv graden af besvær (smerte eller ubehag) i nakken

Pukutsukkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)

Dit værste besvær inden for de sidste 3 mdr.:
Qaammatini pingasuni kingullerni akornutiginerpaasat.:

↓ **Slet intet besvær** (Akornutaanngilluinpoq) … ↓ **Maksimalt besvær** (Akornutaamerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Hvor meget har besvær fra nakken hæmmet din aktivitet (arbejde eller fritid) de sidste 3 mdr.:
Qaammatini piingasuni kingullerni pukutsukkut ilungersuanerit qanoq annertutigisumiksuliniarninnut akornusiitigiva (sulininni imaluunniitsulinngiffeqarninni):

↓ **Har slet ikke hæmmet** (Kigaalaarutiginngilara) … ↓ **Har hæmmet mest muligt** (Kigaalaaarutaanerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Højre skulder
Tui talerperleq

40. Angiv graden af besvær (smerte eller ubehag) i højre skulder
Tuikkut talerperlikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)

Dit værste besvær inden for de sidste 3 mdr.:
Qaammatini pingasuni kingullerni akornutiginerpaasat.:

↓ Slet intet besvær (Akornutaanngilluinpoq) — ↓ Maksimalt besvær (Akornutaamerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Hvor meget har besvær i højre skulder hæmmet din aktivitet (arbejde eller fritid) de sidste 3 mdr.:
Qaammatini pingasuni kingullerni tuikkut talerperlikkut ilungersuanerit qanoq annertutigisumik sulininnut akornusiitigiva (sulininni imaluunniit sulinngiffeqarninni):

↓ Har slet ikke hæmmet (Kigaalaarutiginngilara) — ↓ Har hæmmet mest muligt (Kigaalaarutaanerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Venstre skulder
Tui saamerleq

41. Angiv graden af besvær (smerte eller ubehag) i venstre skulder
Tuikkut saamerlikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)

Dit værste besvær inden for de sidste 3 mdr.:
Qaammatini pingasuni kingullerni akornutiginerpaasat:

↓ Slet intet besvær (Akornutaanngilluinpoq) — ↓ Maksimalt besvær (Akornutaamerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Hvor meget har besvær i venstre skulder hæmmet din aktivitet (arbejde eller fritid) de sidste 3 mdr.:
Qaammatini pingasuni kingullerni tuikkut saamerlikkut ilungersuanerit qanoq annertutigisumik akornusiitigiva (sulininni sulinngiffeqarninnilu):

↓ Har slet ikke hæmmet (Kigaalaarutiginngilara) — ↓ Har hæmmet mest muligt (Kigaalaarutaanerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Højre albue
Ikusik talerperleq

42. Angiv graden af besvær (smerte eller ubehag) i højre albue
Ikutsikkut talerperlikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit

Dit værste besvær inden for de sidste 3 mdr.:
Qaammatini pingasuni kingullerni akornutiginerpaasat:

Slet intet besvær (Akornutaanngilluinpoq) → Maksimalt besvær (Akornutaamerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Hvor meget har besvær i højre albue hæmmet din aktivitet (arbejde eller fritid) de sidste 3 mdr.:
Qaammatini pingasuni kingullerni tuikkut talerperlikkut ilungersuanerit qanoq annertutigisumik akornusiitigiva (sulininni sulinngiffeqarninnilu):

Har slet ikke hæmmet (Kigaalaarutiginngilara) → Har hæmmet mest muligt (Kigaalaaarutaanerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Venstre albue
Ikusik saamerleq

43. Angiv graden af besvær (smerte eller ubehag) i venstre albue
Ikutsikkut saamerlikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)

Dit værste besvær inden for de sidste 3 mdr.:
Qaammatini pingasuni kingullerni akornutiginerpaasat.:

Slet intet besvær (Akornutaanngilluinpoq) → Maksimalt besvær (Akornutaamerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Hvor meget har besvær i venstre albue hæmmet din aktivitet (arbejde eller fritid) de sidste 3 mdr.:
Qaammatini pingasuni kingullerni ikutsikkut saamerlikkut ilungersuanerit qanoq annertutigisumik akornusiiva (sulininni sulinngiffeqarninnilu):

Har slet ikke hæmmet (Kigaalaarutiginngilara) → Har hæmmet mest muligt (Kigaalaaarutaanerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Højre hånd/håndled
Assak/paffik talerperleqa

44. Angiv graden af besvær (smerte eller ubehag) i højre hånd/håndled
Assakkut/paffikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)

Dit værste besvær inden for de sidste **3 mdr.:**
Qaammatini pingasuni kingullerni akornutiginerpaasat.:

Slet intet besvær (Akornutaanngilluinpoq) → Maksimalt besvær (Akornutaamerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Hvor meget har besvær i højre hånd/håndled **hæmmet din aktivitet** (arbejde eller fritid) **de sidste 3 mdr.:**
Qaammatini pingasuni kingullerni assakkut/paffikkut talerperlikkut ilungersuanerit qanoq annertutigisumik akornusiiva (sulininni sulinngiffeqaarninnilu).:

Har slet ikke hæmmet (Kigaalaarutiginngilara) → Har hæmmet mest muligt (Kigaalaarutaanerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Venstre hånd/håndled
Assak/paffik saamerleq

45. Angiv graden af besvær (smerte eller ubehag) i venstre hånd/håndled
Assakkut/paffikkut saamerlikkut nalileruk (anniarneq iluaagisarluunniit

Dit værste besvær inden for de sidste **3 mdr.:**
Qaammatini pingasuni kingullerni akornutiginerpaasat.:

Slet intet besvær (Akornutaanngilluinpoq) → Maksimalt besvær (Akornutaamerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Hvor meget har besvær i venstre hånd/håndled **hæmmet din aktivitet** (arbejde eller fritid) de sidste 3 mdr.:
Qaammatini pingasuni kingullerni assakkut/paffikkut saamerlikkut ilungersuarnerit qanoq annertutigisumik akornusiiva (sulininni sulinngiffeqarninnilu).:

Har slet ikke hæmmet (Kigaalaarutiginngilara) → Har hæmmet mest muligt (Kigaalaarutaanerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Føleforstyrrelser i fingrene
Inussat misigissusaatigut ippigisat

46. Sker det, at du har sovende, snurrende eller prikkende fornemmelser i fingrene (bortset fra, når du har siddet eller ligget forkert med armene)?
Sinitsillutit inussakkut misigisaarunnermik, kakillaalutsitsinermik kaportuusinermilluunniit malugisaqartarpit (issianerlunnak imaluunniit tallitit iluatsumik innangavigisimagaangakkit)?

☐ 1 Ja (Aap) ☐ 2 Nej (Naamik)

47. Hvor ofte har du inden for de sidste 3 måneder haft soven, snurrende og prikkende fornemmelser i fingrene?
Qaammatini pingasuni kingullerni inussavit misigisaarunneri, kikillaalunneri koportuusineriluunniit misigisarpigit?

	Højre hånd Assak talerperleq	Venstre hånd Assak saamerleq
Aldrig Misiginngisaannarpara	☐ 1	☐ 1
Sjældent Qaqutigut	☐ 2	☐ 2
Mindst 1 gang om måneden Ikinnerpaamik qaammammut ataasiarlunga	☐ 3	☐ 3
Mindst 1 gang om ugen Ikinnerpaamik sap. akunneranut ataasiarlunga	☐ 4	☐ 4
Dagligt Ullut tamaasa	☐ 5	☐ 5

Lænderyggen
Makisik

48. Angiv graden af besvær (smerte eller ubehag) i lænderyggen.
Makitsikkut erloqissutivit annertussusai allakkit (anniarneq iluaalliornerluunniit).

Dit værste besvær inden for de sidste 3 mdr.:
Qaammatini pingasuni kingullerni akornutiginerpaasat:

↓ Slet intet besvær (Akornutaanngilluinpoq) — ↓ Maksimalt besvær (Akornutaamerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

Hvor meget har lænderygbesvær hæmmet din aktivitet (arbejde eller fritid) de sidste 3 mdr.:
Qaammatini pingasuni kingullerni makitsikkut ilungersuanerit qanoq annertutigisumik akornusiiva (sulininni sulinngiffeqarninnilu):

↓ Har slet ikke hæmmet (Kigaalaarutiginngilara) — ↓ Har hæmmet mest muligt (Kigaalaaarutaanerpaavoq)

0	1	2	3	4	5	6	7	8	9

(Sæt kryds i den rubrik, der passer bedst for dig. Sæt ét kryds for hvert spørgsmål)
(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Apeqqut ataasiinnarmik krydsilissavat)

49. Sikkerhed
Isumannaarineq

Sæt **ét** kryds ud for hvert spørgsmål
Apeqqutit tamaasa ataasiinnarmik krydsilissavatit

	Meget uenig Isumaqatiginngilluinnarpara	Uenig Isumaqatiginngilara	Enig Isumaqataavunga	Meget enig Assut isumaqataavunga
Ledelsen bestræber sig på at tilrettelægge sikkerhedsrutiner, som er meningsfulde og velfungerende Aqutsisoqarfissi ilungersuullugu pingaarutilinnik isumannaarinermut sungiusimasanik iluamik ingerlatitsipput	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen sikrer, at alle og enhver har indflydelse på sikkerheden i deres arbejde Aqutsisut suliffiup isumannaatsuunissaanu sunniuteqaqataanissaq qularnaarpaat	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen opmuntrer medarbejderne til at deltage i beslutninger, som påvirker deres sikkerhed Aqutsisut sulisut isumannaarneqarnissaannut sunneeqataanissaminnik aalajangeeqataanissaannik kaammattortarpaat	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen tager aldrig hensyn til medarbejdernes forslag vedrørende sikkerhed Aqutsisut isumannaarneqarnissaminnut siunnersuutaat aqutsisut soqutigineq ajorpaat	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen bestræber sig på, at alle på arbejdspladsen opnår høje kompetencer hvad angår sikkerhed og risici Aqutsisut suliffimmiittut tamarmik isumannaarinissamut navianartoqarnissamullu piginnaaneqarluarnissaat anguniagaraat	☐ 1	☐ 2	☐ 3	☐ 4

Ledelsen spørger aldrig om medarbejdernes mening, inden den træffer beslutninger vedrørende sikkerhed Isumannaarineq pillugu aalajangiisoqannginnerani aqutsisut sulisumi isumaat apeqqutigineq ajorpaat.	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen inddrager medarbejderne i beslutninger vedrørende sikkerhed Isumannaarineq pillugu aalajangiinerni sulisut ilannguttarpaat.	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen indsamler nøjagtige informationer i forbindelse med ulykkesanalyser Ajutoortoqarneranik misissueqqissaarnermi aqutisut paasissutissanik eqqortunik katersuisarput.	☐ 1	☐ 2	☐ 3	☐ 4
Frygt for sanktioner (negative konsekvenser) fra ledelsen afskrækker medarbejdere fra at rapportere nærulykker Sulisut ajoquserni najuuttut ajoqusernermik nalunaaruteqarnissartik annilaangagisarpaat, aqutsisuniit kingunenerlutsitsisoqarnissaa annilaangagalugu.	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen lytter omhyggeligt til alle, som har været involveret i en ulykkeshændelse Ajutoornernik pisoqartillugu aqutsisut peqqissaartumik ajoqusernermi ilaasut tusarnaartarpaat.	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen søger efter årsager, ikke skyldige personer, når en ulykke indtræffer Ajutoortoqartillugu aqutsisut ajoqusernermut peqqutaasut ujartortarpaat, ajutoornermut pisuutitassanik ujaasinatik.	☐ 1	☐ 2	☐ 3	☐ 4

	Meget uenig Isumaqatiginngilluinnarpara	Uenig Isumaqatiginngilara	Enig Isumaqataavunga	Meget enig Assut isumaqataavunga
Ledelsen giver altid medarbejderne skylden for ulykker Aqutsisut ajutoornerni tamani sulisut pisuutitaarpaat.	☐ 1	☐ 2	☐ 3	☐ 4
Ledelsen behandler medarbejdere retfærdigt, hvis de indblandes i en ulykke Sulisut ajoqusernermi peqataasimappata aqutsisut sulisut naapertuilluartumik oqaloqatigisarpaat.	☐ 1	☐ 2	☐ 3	☐ 4

Beskriv hvordan du selv håndterer sikkerhed

Isumannaallisaaneq illit nammineq qanoq atorsinnaanerlugu nassuiaruk

	Meget uenig Isumaqatiginngilluinnarpara	Uenig Isumaqatiginngilara	Enig Isumaqataavunga	Meget enig Assut isumaqataavunga
Jeg bøjer nogle gange sikkerhedsreglerne, så jeg kan gøre arbejdet lettere og bedre Isumannaallisaanermut maleruaqqusaat ilaanneeriarlunga avaqqutilaartarpakka sulineq oqinnerulersinniarlugu pitsaanerulersillugulu.	☐ 1	☐ 2	☐ 3	☐ 4
Ved at ignorere sikkerhedsregler glider arbejdet nogle gange lettere. Isumannaallisaanermut maleruaqqusat soqutinngitsuusaarnerisa suliaq ilaannikkut oqinnerulersittarpaa.	☐ 1	☐ 2	☐ 3	☐ 4
Jeg overtræder sikkerhedsreglerne hvis jeg føler det ikke betyder nogen øget sikkerhedsrisiko. Isumannaallisaanermut maleruaqqusat unioqqutittarpakka isumaqaruma tamanna isumannaallisaanermut annertunerusumik navianaateqanngitsoq.	☐ 1	☐ 2	☐ 3	☐ 4

Arbejdsulykker
Sulisilluni ajoqusernerit

Arbejdsulykker er begivenheder der sker pludseligt, f.eks hvis man skærer sig på en kniv eller bliver ramt af en genstand der falder ned. Arbejdsulykker kan give anledning til du må holde en pause i arbejdet, eller være mere alvorlige så du må behandles hos læge/på sygehuset. Arbejdsulykker kan også give anledning til du må sygemeldes.

Sulisilluni ajoqusernerit tassaapput tassanngaannaq pisut, soorlu assersuutigalugu savimmut kileraanni imaluunniit atortussianik nakkarfigitinnermi. Sulisilluni ajoqusernerit suliunnaarallarnissannik kinguneqarsinnaapput, imaluunniit ima annertutigisinnaapput nakorsamit/napparsimmavimmi passunneqarnissamik kinguneqarsinnaalluti. Aamma sulisilluni ajoqusernerit sulinngiffeqarallarnissannik kinguneqarsinnaapput

50. Har du været udsat for en arbejdsulykke på din nuværende arbejdsplads?
(ulykken skal som minimum have givet anledning til du måtte holde pause i arbejdet, mens du selv eller en anden på arbejdspladsen behandlede skaden)
Massakkut suliffigisanni sulisillutit ajoqusernikuuit?
(ajoquserneq sulininnik unitsitsigallarnissamik kinguneqarsinnaavoq, nammineerlutit imaluunniit suliffinni allamik ajoqusernerit passunneqarsimappat)

☐ 1 Ja
Aap

☐ 2 Nej
Naamik

Hvis **ja**

☐ 1 Indenfor den sidste måned
qaammatip siuliani pisimappat

☐ 2 Indenfor det sidste år
ukiumi kingullermi pisimappat

51. Gav arbejdsulykken anledning til du blev sygemeldt?
Sulisillutit ajoqusernerit sulinngiffeqarnermik kinguneqarpa?

☐ Ja (1) Aap ☐ Nej (2) Naamik

Hvis **ja**, skriv antal dage du var sygemeldt: ____________ dage
Aappeeruit, ulluni qassini sulinngiffeqarsimanerit allassavat

52. Hvordan skete ulykken?
(man må gerne sætte flere kryds)
Qanoq ajoquserpit?
(arlalinnik krydsiliisinnaavutit)

Jeg skar mig på en kniv Savimmut kilerama	☐ 1
Jeg skar mig på en anden skarp genstand atortussiamut allamut ipittumut kilerama	☐ 1
Jeg stødte ind i en maskine eller andet maskiinamut allamulluunniit aporama	☐ 1
Jeg fik fingrene i klemme Inussakka kiggippakka	☐ 1
Jeg blev ramt af en genstand der faldt ned atortussiamik nakkartumik eqqortikkama	☐ 1
Jeg blev slynget mod en maskine eller andet (ulykke på et skib) Maskiinamik allamilluunniit igeriussaagama (angallammi ajoquserneq)	☐ 1

Skete ulykken på en anden måde (skriv) ________________________________
Ajoquserneq allatut pivoq (allaguk)

53. Hvilken skade skete der?
(man må gerne sætte flere kryds)
Ajoquserneq suna pineqarpa?
(arlalinnik krydsiliisinnaavutit)

Jeg fik et sår der skulle behandles på sygehuset Napparsimmavimmi passunneqartarialimmik kilerpunga	☐ 1
Jeg fik et mindre snitsår annikitsumik kilerpunga	☐ 1
Jeg fik et pludseligt smæld i lænderyggen i forbindelse med et løft kivitsinikkut tassanngaannaq makisiga seqqorpoq	☐ 1
Jeg fik en klemning af fingre eller andet inussakka allalluunniit kiggippakka	☐ 1
Jeg brækkede en finger inuaga napivoq	☐ 1
Jeg brækkede et ribben najungasora napivoq	☐ 1

Var der tale om en anden type skade? (skriv hvilken): ______________________
Allatut ittumik ajoquserpit? (suunersoq allaguk):

54. Har du på et tidspunkt fået anmeldt en sygdom til Arbejdsskadestyrelsen?
Nappaammik Arbejdsskadestyrelsemut nappaammik nalunaaruteqarnikuuit?

☐ 2 Nej Naamik

☐ 1 Ja AAP — Årstal ________ Ukioq — Skade ______________________ Nappat

Årstal ________ Ukioq — Skade ______________________ Nappat

55. Har du på et tidspunkt fået anmeldt en arbejdsulykke til Arbejdsskadestyrelsen?
Sulisillutit ajoquserninnik Arbejdsskadestyrelsemut nalunaaruteqarnikuuit?

☐ 2 Nej Naamik

☐ 1 Ja Aap — Årstal ________ Ukioq — Type ulykke ______________________ Ajoqusernerup annertussusaa

Årstal ________ Ukioq — Type ulykke ______________________ Ajoqusernerup annertussusaa

BEMÆRKNINGER

***Tak for din medvirken*. Hvis du har flere oplysninger om dit helbred, eller hvis der er andet du vil fortælle os, så skriv her:**

Qujanaq peqataagavit. Peqqissutsit pilllugu amerlanerusunik paasissutissaateqaruit imaluunniit allamik oqaluttuukkusukkutsigut uani allagit:

Appendix B. Baseline questionnaire

Mistanke om astma? _____ Ja _____ Nej

Symptomer på allergi i spørgeskema? _____ Ja _____ Nej

Positiv priktest for flg.? ____

Eksem? ____ Ja _____ Nej

Mistanke om arbejdsbetinget lidelse? ____ Ja _____ Nej
Anmeldt? ____ Ja _____ Nej

Apeqqutit

Grønland|2017

Kalaallit Nunaanni aalisakkanik nioqqutissiornermi sulineq peqqissuserlu

Grønlandsk | Dansk

Siulequt

Misissuineq una tassaavoq Kalaallit Nunaanni aalisakkanik nioqqutissiornermi suliffimmi isumannaallisaanikkut pissutsit peqqissuserlu pillugit ataatsimoortumik misissuineq siulleq. Misissuinermi siunertaapput:

• Qalerualinnik aalisakkanillu sulinermi timikkut sunnerneqaatit, soorlu oqimaatsunik kivitsinerit kiisalu sulisilluni ajoqusernernut navianartorsiornerit paasinarsarniarnissaat.

• Tamatuma peqqissutsikkut ippinniuutinik takussutissanillu sunik kinguneqarsinnaanerisa paasinarsarniarnissaat.

• Tamatumunnga ilisimasalikkat suliffimmi isumannaallisaanikkut pissutsit kiisalu sulisut suliffimminni napparsimalinnginnissaat pillugit pitsanngorsaanernut atorneqarnissaat.

Paasissutissat katersukkagut allanut oqaatigineqassanngillat – taamaallaalli nakorsat misissuinermik ingerlartsisut paasissutissanut isersinnaatitaapput. Misissuinerit kingunerini inuit ataasiakkaat kikkuuneri takuneqarsinnaassanngillat.

Misissuineq Kalaallit Nunaanni pisortaqarfinnit akuerineqarpoq.

Misissuinermi peqataanissaq kajumissuseq naapertorlugu peqataaffigineqassaaq.

Ilitsersuut

Vi vil bede dig svare på alle spørgsmålene så godt du kan. Er du i tvivl om noget kan du få hjælp af en af os. Er der noget du vil uddybe eller forklare nærmere, vil du få mulighed til at fortælle det til lægerne.

Inussiarnersumik inuulluarit

Nakorsat sulinermi nakorsaanermut ilinniarsimasut Herningimi, Ålborgimi aamma København Århusimilu Universitetimeersut

Inummik allaatiginninneq

Personbeskrivelse

LBNR: ______

1. Ulloq: ____________
Dato

2. Inuup normua: ____________
CPR

3. Naggat: ____________
Efternavn

4. Ateq: ____________
Fornavn

5. Najugaq: ____________
Adresse

6. Telefon: ____________
Telefon

7.Sumi inuungorpit: ____________
Hvor er du født?

8. Suiaassuseq:
Køn

☐ Angut (Mand) 1
☐ Arnaq (Kvinde) 2

9. Inuiaassuseq:
Etnisk oprindelse

☐ Kalaaleq (Grønlandsk) 1
☐ Danskeq (Dansk) 2
☐ Allamiuuit (Andet) 3

Suliat

Dit arbejde

10. Qanoq sivisutigisumik massakkut suliffigisanni sulivit?
Hvornår startede du på nuværende arbejdsplads?

Ukioq: ________ Måned: ________
År

11. Massakkut suliffigisannut qanoq attuumassuteqarpit?
Hvad er din tilknytning til nuværende arbejdsplads?

☐ 1 Aalajangersimasumik Sulisartoq
Fast arbejde

☐ 2 Ukiup ilaatigut sulisartoq / taarteq
Sæsonarbejde / vikar

12. Massakkut suliffigisanni sapaatip akunneranut akunnerni qassini sulisarpit?
Hvor mange timer om ugen arbejder du i dit nuværende job?

Akunnerit: ________
Antal timer

12b. Massakkut suliffigisanni sulerisuuit? Hvad er dine opgaver i dit nuværende job?	**12c. Suliatit assigiinngissusaat nikerarpa?** Hvor stor en del af din arbejdstid gør du det (%)?
________________________	________ %
________________________	________ %
________________________	________ %
________________________	________ %
________________________	________ %
________________________	________ %
________________________	________ %

Siornatigut sumi sulinikuuit? (Sumi suliffeqarnikuuit?)

Siornatigut suliffigisimasatit imaluunniit namminersortutut piniartuunikuuit? Aalisartuunikuuit?

Hvor har du tidligere arbejdet? Tidligere ansættelser og arbejde som selvstændig fanger eller fisker anføres med start og sluttidspunkt, titel, funktion. Der spørges specifikt til udsættelse for fisk og skaldyr (hvilke slags?).

Ulloq, qaammat, ukioq suna aallartippit Fra ar/måned	Ulloq, qaammat, ukioq suna taamatippit Til år/måned	Sulititsisut Arbejdsgiver	Atorfippit aqqa? Sulerisuuit? Din titel og funktion?	Aalisakkat? Assagiarsuit? Fisk/skaldyr?
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			
/	/			

Ammikkut ersiutit

Eksemeqaruit tamanna amminnik aappillersitsisimassaaq imaluunniit ungilalluni
Symptomer fra huden
Eksem viser sig ved du bliver rød og irriteret i huden

13. Siornatigut assakkut eksemeqarnikuuit
Har du nogensinde haft eksem på hænderne?

☐ 1 Aap (Ja) ☐ 2 Naamik (Nej)

14. Assaatikkut eksemeqarnikuuit
Har du nogensinde haft eksem på underarmene?

☐ 1 Aap (Ja) ☐ 2 Naamik (Nej)

15. Assakkut assaatikkullu qanga kingullermik eksemeqarpit? ?Hvornår havde du sidst eksem på hænder eller underarme	Assakkut hænder	Assaatikkut underarm
Massakkut Jeg har det i øjeblikket	☐ 1	☐ 1
Massakkuunngitsoq, kisianni qaammatini kingullerni pingasuni Ikke i øjeblikket, men indenfor de sidste 3 måneder	☐ 2	☐ 2
Qaammatit pingasut aamma 12-it akornanni Mellem 3 og 12 måneder siden	☐ 3	☐ 3
Qaammatit 12-it sinnerlugit Mere end 12 måneder siden	☐ 4	☐ 4
Ukioq suna kingullermik eksemeqarpit Hvilket år var sidste gang du havde eksem	______	______ (ukioq) (årstal)

16. Qalerualinnik, aalisakkanik, akuutissanik nioqqutissianilluunniit allanik suliaqaraangavit eksemippit ajortinneri malugisarpigit?
Har du bemærket om dit eksem bliver værre, når du arbejder med skaldyr, fisk, kemikalier eller andre produkter?

	Assakkut eksemit Eksem på hænder	Assaatikkut eksemit Eksem på underarme
Aap Ja	☐ 1	☐ 1
Naamik Nej	☐ 2	☐ 2

Aappeeruit; suut suliarigaangakkit?: ____________________
Hvis ja; hvilke ting drejer det sig om

____

____

17. Suliffinniit freeraangavit (soorlu assersuutigalugu sap. akunnerata naanerani feriarninni) eksemernerit pitsanngortarpa?
Bliver dit eksem bedre når du holder fri fra dit arbejde (f.eks. weekender og ferier)?

	Assakkut eksemit Eksem på hænder	Assaatikkut eksemit Eksem på underarme
Aap, tamatigut	☐ 1	☐ 1
Aap, ilaanneeriarlutik Ja, undertiden	☐ 2	☐ 2
Naamik Nej	☐ 3	☐ 3
Naluara Ved ikke	☐ 0	☐ 0

18. Siornatigut sapigaqarnikkut anillattoortarpit imaluunniit paaminnartunik anillattoortarpit? (ammikkut aappillernerit pullattut imaluunniit anillannerit ungilattut - ippernat kiggiinut assingusunik).
Har du nogensinde haft nældefeber eller kløende udslæt? (hævede røde områder på huden som eventuelt kan være kløende - ligner myggestik)

☐ 1 Aap (Ja) ☐ 2 Naamik (Nej)

Sorlukkut torlukkullu malunniutit

Massakkut malunniutit (qaammatini 12-ini kingullerni)

Symptomer fra næse og luftveje
Nuværende symptomer (de sidste 12 mdr.)

19. Qaammatini kingullerni 12-ini quersortarpit:
Har du i de sidste 12 måneder haft hoste når du

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐ 1	☐ 2	☐ 0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐ 1	☐ 2	☐ 0
Nillertorujussuarmiitillutit Er i meget kold luft	☐ 1	☐ 2	☐ 0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐ 1	☐ 2	☐ 0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit) Ved stærke lugte (maling, tobak, parfume eller andet)	☐ 1	☐ 2	☐ 0

19b. Qaammatit isikkaneq marlut iluanni sininnerpit nalaani quersornerit pissutaalluni itertitaasarnikuuit?
Er du blevet vækket af et hosteanfald på noget tidspunkt i de seneste 12 måneder?

☐ 1 Aap
Ja

☐ 2 Naamik
Nej

19c. Ukiuutillugu ullaakkut quersoqqajaasarpit?
Hoster du sædvanligvis som det første om morgenen om vinteren?

☐ Aap (Ja) 1 ☐ Naamik (Nej) 2

20. Qaammatini kingullerni 12-imi uinngialasumik/iggiinngasumik anersaartortarpit?
Har du haft pibende eller hvæsende vejrtrækning på noget tidspunkt i de sidste 12 måneder?

☐ Aap (Ja) 1 ☐ Naamik (Nej) 2

Qaammatini kingullerni 12-imi uinngialasumik/iggiinngasumik anersaartortarpit:
Har du i de sidste 12 måneder haft pibende eller hvæsende vejrtrækning når du:

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐ 1	☐ 2	☐ 0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐ 1	☐ 2	☐ 0
Nillertorujussuarmiitillutit Er i meget kold luft	☐ 1	☐ 2	☐ 0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐ 1	☐ 2	☐ 0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit) Ved stærke lugte (maling, tobak, parfume eller andet)	☐ 1	☐ 2	☐ 0
Er i kontakt med dyr Er i kontakt med dyr	☐ 1	☐ 2	☐ 0

21. Qaammatini kingullerni 12-ini <u>sakissakkut naqisimaneqarnermik imaluunniit anernikilliornermik misigisaqartarpit:</u>
Har du i de sidste 12 måneder følt pressen for brystet eller været kortåndet når du:

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐ 1	☐ 2	☐ 0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐ 1	☐ 2	☐ 0
Nillertorujussuarmiitillutit Er i meget kold luft	☐ 1	☐ 2	☐ 0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐ 1	☐ 2	☐ 0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit tikki) Ved stærke lugte (maling, tobak, parfume eller andet)	☐ 1	☐ 2	☐ 0

21b. Qaammatit isikkaneq marlut iluanni sinitsillutit iternikuuit sakissakkut naqinneqartutut misigalutit?
Er du vågnet med en fornemmelse af trykken for brystet på noget tidspunkt i de sidste 12 måneder?:

☐ 1 Aap Ja   ☐ 2 Naamik Nej

21c. Qaammatit isikkaneq marlut iluanni ullup ingerlarerani eqqissisimagaluarlutit anernikillioriasaarnermik misigisaqarnikuuit?
Har du haft et anfald af åndenød i løbet af dagen, når du var i hvile på noget tidspunkt i de sidste 12 måneder?:

☐ 1 Aap Ja   ☐ 2 Naamik Nej

21d. Qaammatit isikkaneq marlut iluanni sinitsillutit anernikillioriasaarnermit pissutaasumit itertitaanikuuit?
Er du blevet vækket af et anfald af åndenød på noget tidspunkt i de sidste 12 måneder?:

☐ 1 Aap Ja   ☐ 2 Naamik Nej

22. <u>Illup iluani pujoralammik</u> najuussigaangavit (eqqiiaanermi, støvsugernermi, siniffilerinermi) malunniutit makku malugisarpigit?
Når du er i kontakt med husstøv (rengøring, støvsugning, sengeredning) har du da sommetider nogle af disse symptomer?

	Aap Ja	Naamik Nej
Quersorneq Hoste	☐ 1	☐ 2
Inngialasumik/iggiinngasumik anerneqalerneq Piben/hvæsen	☐ 1	☐ 2
Sakissakkut naqisimaneqarneq Føler trykken for brystet	☐ 1	☐ 2
Anernikilliorneq Bliver kortåndet	☐ 1	☐ 2
Kakkilertalerneq sorlunnilluunniit milinngatitsineq Får løbende eller stoppet næse	☐ 1	☐ 2
Tangajoqattaarneq Får nyseanfald	☐ 1	☐ 2
Isikkut ungillerineq qulliliornerluunniit Får kløende eller løbende øjne	☐ 1	☐ 2

23. Ullaakkut quersorlutit nuammik nalinginnaasumik aniatitsisarpit? (Soorlu assersuutigalugu cigareti siulleq pujortaraagakku silamut anigaagavit. Iggiarissarneq tassani ilaatinneqassanngilaq)
Hoster du normalt slim op om morgenen? (For eksempel ved din første cigaret eller når du første gang går udenfor. At rømme sig/klare halsen tæller ikke med)

☐ 1 Aap (Ja)   ☐ 2 Naamik (Nej)

Naaggaaruit apeqqummut 25-imukarit
Hvis NEJ gå til spørgsmål 25.

24. Ikinnerpaamik qaammatini pingasuni, ukiup ataatsip iluani amerlanerusuniluunniit ullaakkut amerlanertigut quersornikkut nuammik piiagaqartarpit?
Har du hostet sådant slim op de fleste morgener i mindst 3 måneder i et år eller mere?

☐ 1 Aap
Ja

☐ 2 Naamik
Nej

Aappeeruit, ukiuni qassini? ________________Ukiut
Hvis JA, i hvor mange år?

25. Qaammatini 12-ini kingullerni ataani allassimasut anersaartorninnut tulluarneruppat?
Hvilke af følgende udsagn passer bedst på din vejrtrækning i de sidste 12 måneder?

☐ 1 Anersaartornera qaqutigut ajornartorsiutigisarpara
Jeg har sjældent problemer med min vejtrækning

☐ 2 Anersaartornera ilaanneeriarlunga ajornartorsiutigisarpara
Jeg har sommetider problemer med min vejrtrækning

☐ 3 Anersaartornera akulikitsumik ajornartorsiutigisarpara
Jeg har ofte problemer med min vejrtrækning

☐ 4 Anersaartornera ajortuaannarpoq
Min vejrtrækning er altid dårlig

Siusinnerusukkut ippiuutinik ersittoqartarpa

Tidligere symptomer

26. Naasuneersunik sapigaqartarnikuuit (tamatumani pineqarpoq tangajoqattaarneq kakkilertan-ermik imaluunniit sorlunnik militsitsisoq, qinngakkut ungilatitsineq, isikkut ungalitsitsineq qulliliornerluunniit ukiup ilaani aalajagersimasuni takkuttartunik)?

Har du nogensinde haft høfeber (hermed menes nyseanfald med løbende eller stoppet næse, kløende næse, kløende eller løbende øjne, som kommer på specielle årstider)?

☐ Aap (Ja) 1 ☐ Naamik (Nej) 2

27a. Anertikkarnernik nappaateqarpit? Astma-qarpit?

Lider du af astma?

☐ Aap (Ja) 1 ☐ Naamik (Nej) 2

Aappeeruit, Qassinik ukioqarlutit anernikillioqqaarpit? ________ år. (Ukiut)

Hvor gammel var du, da du havde dit første astmaanfald?

27b. Nakorsap astmaqarnerit ilinnut oqaatiginikuuaa?

Har en læge nogensinde fortalt dig, at du havde astma?

☐ Aap (Ja) 1 ☐ Naamik (Nej) 2

Aappeeruit, nakorsap siullermeerluni astmaqarnerit qassinik ukioqatutit oqaatiginikuuaa? ________ år. (Ukiut)

Hvis ja, hvor gammel var du, da en læge første gang fortalte dig du havde astma

27c. Anernikilliornerit pissutaalluni nakorsaatinik atugaqarpit?

Bruger du medicin mod astma (f.eks. inhalator, spray eller piller)?

☐ Aap (Ja) 1 ☐ Naamik (Nej) 2

Sulinermi malunniutit/ippiuutit

Apeqqutit tulliuttut fabrikkimi sulininni sunniutaasinnaasuupput.
Symptomer på arbejdet
De næste spørgsmål handler om de symptomer du måtte have når du arbejder på fabrikken

28. Fabrikkimi sulininni akulikitsumik:
Når du arbejder på fabrikken får du da ofte:

	Aap Ja	Naamik Nej
Kakkilertasarpit qinngalluunniit milittarpa Løbende eller stoppet næse	☐ 1	☐ 2
Tangajukulalersarpit Nyseanfald	☐ 1	☐ 2
Isikkut ungillerisarpit qulliliulerlutilluunniit Kløende eller løbende øjne	☐ 1	☐ 2
Ungillerisarpit imaluunniit ammikkut aappalaartunik anillattarpit Kløe eller rødt udslæt på huden	☐ 1	☐ 2
Iggiarlulersarpit imaluunniit toqqusaarlullutit Føler hæshed eller får ondt i halsen	☐ 1	☐ 2
Qasoqqarujussuartarpit Føler dig utrolig træt	☐ 1	☐ 2
Niaqorluttarpit Hovedpine	☐ 1	☐ 2
Nualluummut assingusunik malunniuteqartarpit Symptomer der ligner influenza	☐ 1	☐ 2
Quersortarpit Hoste	☐ 1	☐ 2
Sakissakkut iggiinngasumik uingialuttumilluunniit nipinittarpa Hvæsen eller piben for brystet	☐ 1	☐ 2
Anertikkalerneq imaluunnit sakissakkut naqinneqartutut misigisimaneq Kortåndethed eller trykken over brystet	☐ 1	☐ 2

28-imi angersimaguit aamma una akissavat. Naaggaaruit apeqqummut 32-imukarit:
Hvis ja gå til spørgsmål 29, ELLERS 32

29. Malunniutit takkuteqqaarmata suna suliaraajuk?_______________
Hvad arbejdede du med, da symptomerne startede?

30. Ukioq suna malunniutit aallartippat?___________
Hvilket år startede symptomerne

31. Fabrikkimi sulineq ukiup ilaatigut unitsinneqaraangat malunniutaaruttarpit?
Plejede de at forsvinde, når sæsonen hvor du arbejdede på fabrikken var ovre??

- ☐ Aap (Ja) 1
- ☐ Naamik (Nej) 2
- ☐ Ilaanneeriarlutik (I nogen grad) 3

31b. Allami sulilernikuuit timikkut ippiuutitit pissutaallik?
Skiftede du job pga. symptomerne?

- ☐ Aap (Ja) 1
- ☐ Naamik (Nej) 2

31c. Aappeeruit, Timikkut ippiuutitit annikilliallappat allamik suliaqaleravit?
Har det forbedret dine symptomer?

- ☐ Aap (Ja) 1
- ☐ Naamik (Nej) 2
- ☐ Ilaanneeriarlutik (I nogen grad) 3

32. Fabrikkiani suligaangavit ataani sorliit anersaartorninnut assingunerusuuppat?
Hvilket af følgende udsagn beskriver bedst din vejrtrækning, når du arbejder på fabrik?

- ☐ 1 Anersaartornera qaqutigut ajornartorsiutigisarpara
  Jeg har sjældent problemer med min vejrtrækning
- ☐ 2 Anersaartornera ilaanneeriarlunga ajornartorsiutigisarpara
  Jeg har sommetider problemer med min vejrtrækning
- ☐ 3 Anersaartornera akulikitsumik ajornartorsiutigisarpara
  Jeg har ofte problemer med min vejrtrækning
- ☐ 4 Fabrikkimi suligaangama anersaartornera ajornartorsiutigiuaannartarpara
  Min vejrtrækning er altid dårlig, når jeg arbejder på fabrikken

Ilaquttat

Familie

33. Ilaquttatit qaninnerpaat (ataatat, anaanat, aanakkutit aatakkutillu, meeqqat): taakku ilaat massakkut siusinnerusukkulluunniit peqqissutsimikkut makkuninnga ajornartorsiuteqartarpat:

Din nært beslægtede familie (far, mor, bedsteforældre, børn): lider nogen af dem nu, eller har de tidligere lidt, af følgende helbredsproblemer:

	Aap Ja	Kiap nappaateqarnera itisileruk Uddyb, hvem der havde lidelsen	Naamik Nej
Astma Astma	☐ 1	______	☐ 2
Naasunik sapigaqarneq Høfeber	☐ 1	______	☐ 2
Meeraallutik eksemeqartut Børneeksem	☐ 1	______	☐ 2
Amikkut ungilannartunik anillannerit Kløende udslæt	☐ 1	______	☐ 2

Pujortartarneq
Rygning

34. Pujortatarnikuuit?
Har du røget før?t

☐ [2] **Naamik** (apeqqut 39-mukarit) — Nej (gå til spørgsmål 39)
☐ [1] **Aap** — Ja

35. Pujortartarpit?
Ryger du nu?

☐ [1] **Naamik** unitsinnikuuara — Nej jeg er holdt op
☐ [2] **Aap** (apeqqut 37-mukarit) — Ja (gå til spørgsmål 37)

36. Naaggaaruit, qassinik ukioqarlutit unitsippiuk? ____________ **init** (år)
Hvis nej, hvor gammel var du, da du holdt op?

37. Qassit pujortartarpigit imaluunniit siornatigut pujortartarnikuvigit - agguaqatigiissillugit?
Hvor meget ryger du eller røg du tidligere - i gennemsnit?

_____ Ullormut cigaretsit qassit
cigaretter om dagen

_____ Cigaavaqqat cigaallunniit qassit
cerutter eller cigarer om dagen

_____ Pujortaat ullormut qasseriarlugu
pibestop om dagen

_____ Sunoorsi/sukulooq
snus/skrå

38. Qassinik ukioqarlutit pujortartalerpit? _______ **init** (år)
Hvor gammel var du, da du begyndte at ryge?

Talikkut, tuikkut, pukutsukkut qitikkullu akornutit

Gener fra arme, skuldre, nakke og ryg

Apeqqutini pineqarput pukutsukkut,, qitikkut, tuikkut,, ikutsikkut assakkullu *<u>anniaatit akornutillu.</u>* Apeqqutit immikkoortut titarnerni tamani ataasiinnarmik krydsiliiffigissavatit. Anniarnippit sakkortussusaanut naapertuuttoq krydsilissavat – soorlu assersuutigalugu akornuteqanngilluinnaruit 0 krydsilissavat, 9 anniarnerpaaffinnut naapertuuppoq, 4-5-ilu akunnattumik anniarnermut naapertuupput. Uuttuummi kisitsit ilinnut tulluarnerpaaq krydsilissavat.

Spørgsmålene handler om besvær (smerter og gener) i nakke, ryg, skuldre, albuer og hænder.
For hvert spørgsmål skal du afkrydse ét felt i hver linje. Du skal sætte et kryds der passer bedst med hvor ondt du har - feks svarer 0 til at du slet ikke har besvær, 9 svarer til værst mulige smerter og 4-5 til smerter midt imellem. Afkryds det tal på skalaen der passer bedst til dig.

Pukusuk

Nakke

39. Pukutsukkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)

Angiv graden af besvær (smerte eller ubehag) i nakken

Qaammatini pingasuni kingullerni **akornutiginerpaasat.:**
Dit værste besvær inden for de sidste 3 mdr.:

↓ **Akornutaanngilluinpoq** Slet intet besvær — ↓ **Akornutaamerpaavoq** Maksimalt besvær

0	1	2	3	4	5	6	7	8	9

(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Ataasiinnarmik krydsilissavat)
(Sæt kryds i den rubrik, der passer bedst for dig. Sæt kun ét kryds)

Tui talerperleq

Højre skulder

40. Tuikkut talerperlikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)

Angiv graden af besvær (smerte eller ubehag) i højre skulder

Qaammatini pingasuni kingullerni **akornutiginerpaasat.:**
Dit værste besvær inden for de sidste 3 mdr.:

↓ **Akornutaanngilluinpoq** Slet intet besvær — ↓ **Akornutaamerpaavoq** Maksimalt besvær

0	1	2	3	4	5	6	7	8	9

(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Ataasiinnarmik krydsilissavat)
(Sæt kryds i den rubrik, der passer bedst for dig. Sæt kun ét kryds)

Tui saamerleq
Venstre skulder

41. Tuikkut saamerlikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)
Angiv graden af besvær (smerte eller ubehag) i venstre skulder

Qaammatini pingasuni kingullerni **akornutiginerpaasat.:**
Dit værste besvær inden for de sidste 3 mdr.:

↓ **Akornutaanngilluinpoq** Slet intet besvær — ↓ **Akornutaamerpaavoq** Maksimalt besvær

0	1	2	3	4	5	6	7	8	9

(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Ataasiinnarmik krydsilissavat)
(Sæt kryds i den rubrik, der passer bedst for dig. Sæt kun ét kryds)

Ikusik talerperleq
Højre Albue

42. Ikutsikkut talerperlikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)
Angiv graden af besvær (smerte eller ubehag) i højre albue

Qaammatini pingasuni kingullerni **akornutiginerpaasat.:**
Dit værste besvær inden for de sidste 3 mdr.:

↓ **Akornutaanngilluinpoq** Slet intet besvær — ↓ **Akornutaamerpaavoq** Maksimalt besvær

0	1	2	3	4	5	6	7	8	9

(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Ataasiinnarmik krydsilissavat)
(Sæt kryds i den rubrik, der passer bedst for dig. Sæt kun ét kryds)

Ikusik saamerleq
Venstre albue

43. Ikutsikkut saamerlikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)
Angiv graden af besvær (smerte eller ubehag) i venstre albue

Qaammatini pingasuni kingullerni **akornutiginerpaasat.:**
Dit værste besvær inden for de sidste 3 mdr.:

↓ **Akornutaanngilluinpoq** Slet intet besvær — ↓ **Akornutaamerpaavoq** Maksimalt besvær

0	1	2	3	4	5	6	7	8	9

(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Ataasiinnarmik krydsilissavat)
(Sæt kryds i den rubrik, der passer bedst for dig. Sæt kun ét kryds)

Assak/paffik talerperleq
Højre hånd/håndled

44. Assakkut/paffikkut akornutigisat nalileruk (anniarneq iluaagisarluunniit)
Angiv graden af besvær (smerte eller ubehag) i højre hånd/håndled

Qaammatini pingasuni kingullerni **akornutiginerpaasat.:**
Dit værste besvær inden for de sidste 3 mdr.:

↓ **Akornutaanngilluinpoq** Slet intet besvær									↓ **Akornutaamerpaavoq** Maksimalt besvær
0	1	2	3	4	5	6	7	8	9

(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Ataasiinnarmik krydsilissavat)
(Sæt kryds i den rubrik, der passer bedst for dig. Sæt kun ét kryds)

Assak/paffik saamerleq
Venstre hånd/håndled

45. Assakkut/paffikkut saamerlikkut nalileruk (anniarneq iluaagisarluunniit)
Angiv graden af besvær (smerte eller ubehag) i venstre hånd/håndled

Qaammatini pingasuni kingullerni **akornutiginerpaasat.:**
Dit værste besvær inden for de sidste 3 mdr.:

↓ **Akornutaanngilluinpoq** Slet intet besvær									↓ **Akornutaamerpaavoq** Maksimalt besvær
0	1	2	3	4	5	6	7	8	9

(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Ataasiinnarmik krydsilissavat)
(Sæt kryds i den rubrik, der passer bedst for dig. Sæt kun ét kryds)

Makisik
Lænderyggen

48. Makitsikkut erloqissutivit annertussusai allakkit (anniarneq iluaalliornerluunniit).
Angiv graden af besvær (smerte eller ubehag) i lænderyggen.

Qaammatini pingasuni kingullerni **akornutiginerpaasat.:**
Dit værste besvær inden for de sidste 3 mdr.:

↓ **Akornutaanngilluinpoq** Slet intet besvær									↓ **Akornutaamerpaavoq** Maksimalt besvær
0	1	2	3	4	5	6	7	8	9

(Ungalusaq ilinnut tulluarnerpaaq krydsileruk. Ataasiinnarmik krydsilissavat)
(Sæt kryds i den rubrik, der passer bedst for dig. Sæt kun ét kryds)

Sulisilluni ajoqusernerit
Arbejdsulykker

Sulisilluni ajoqusernerit tassaapput tassanngaannaq pisut, soorlu assersuutigalugu savimmut kileraanni imaluunniit atortussianik nakkarfigitinnermi. Sulisilluni ajoqusernerit suliunnaarallarnissannik kinguneqarsinnaapput, imaluunniit ima annertutigisinnaapput nakorsamit/napparsimmavimmi passunneqarnissamik kinguneqarsinnaalluti. Aamma sulisilluni ajoqusernerit sulinngiffeqarallarnissannik kinguneqarsinnaapput.
Arbejdsulykker er begivenheder der sker pludseligt, f.eks hvis man skærer sig på en kniv eller bliver ramt af en genstand der falder ned. Arbejdsulykker kan give anledning til du må holde en pause i arbejdet, eller være mere alvorlige så du må behandles hos læge/på sygehuset. Arbejdsulykker kan også give anledning til du må sygemeldes.

50. Massakkut suliffigisanni sulisillutit ajoqusernikuuit?
(Kajoquserneq sulininnik unitsitsigallarnissamik kinguneqarsinnaavoq, nammineerlutit imaluunniit suliffinni allamik ajoqusernerit passunneqarsimappat)
Har du været udsat for en arbejdsulykke på din nuværende arbejdsplads?
(ulykken skal som minimum have givet anledning til du måtte holde pause i arbejdet, mens du selv eller en anden på arbejdspladsen behandlede skaden)

☐ 1 Aap (Ja)   ☐ 2 Naamik (Nej)

Aapperuit

☐ 1 Qaammatip siuliani pisimappat (indenfor den sidste måned)   ☐ 2 Ukiumi kingullermi pisimappat (indenfor det sidste år)

51. Sulisillutit ajoqusernerit sulinngiffeqarnermik kinguneqarpa?
Gav arbejdsulykken anledning til du blev sygemeldt?

☐ 1 Aap
Ja

☐ 2 Naamik
Nej

Aappeeruit, ulluni qassini sulinngiffeqarsimanerit allassavat ____________
Hvis ja, skriv antal dage du var sygemeldt

52. Qanoq ajoquserpit?
(arlalinnik krydsiliisinnaavutit)
Hvordan skete ulykken
(man må gerne sætte flere kryds)

Savimmut kilerama Jeg skar mig på en kniv	☐ 1
Atortussiamut allamut ipittumut kilerama Jeg skar mig på en anden skarp genstand	☐ 2
Maskiinamut allamulluunniit aporama Jeg stødte ind i en maskine eller andet	☐ 3
Inussakka kiggippakka Jeg fik fingeren i klemme	☐ 4
Atortussiamik nakkartumik eqqortikkama Jeg blev ramt af en genstand der faldt ned	☐ 5
Maskiinamik allamilluunniit igeriussaagama (angallammi ajoquserneq) Jeg blev slynget mod en maskine eller andet (ulykke på et skib)	☐ 6

Ajoquserneq allatut pivoq (allaguk) ______________________
Skete ulykken på en anden måde (skriv)

53. Ajoquserneq suna pineqarpa?
(arlalinnik krydsiliisinnaavutit)
Hvilken skade skete der?
(man må gerne sætte flere kryds)

Napparsimmavimmi passunneqartarialimmik kilerpunga Jeg fik et sår der skulle behandles på sygehuset	☐ 1
Annikitsumik kilerpunga Jeg fik et mindre snitsår	☐ 2
Kivitsinikkut tassanngaannaq makisiga seqqorpoq Jeg fik et pludseligt smæld i lænderyggen i forbindelse med et løft	☐ 3
Inussakka allalluunniit kiggippakka Jeg fik en klemning af fingre eller andet	☐ 4
Inuaga napivoq Jeg brækkede en finger	☐ 5
Najungasora napivoq Jeg brækkede et ribben	☐ 6

Allatut ittumik ajoquserpit? (suunersoq allaguk): ______________________
Var der tale om en anden type skade? (skriv hvilken):

54. Sulisilluni Ajoqusernerit pillugit Sullissivik (Arbejdsskadestyrelsemut) nappaammik nalunaaruteqarnikuuit?
Har du på et tidspunkt fået anmeldt en sygdom til Center for Arbejdsskader (Arbejdsskadestyrelsen)?

☐ Naamik (Nej) 2

☐ Aap (Ja) 1 Ukioq ________ (Årstal) Akornuserneq ______________________ (Skade)

Ukioq ________ (Årstal) Akornuserneq ______________________ (Skade)

55. Sulisillutit ajoquserninnik Sulisilluni Ajoqusernerit pillugit Sullissivik (Arbejdsskadestyrelsemut) nalunaaruteqarnikuuit?
Har du på et tidspunkt fået anmeldt en arbejdsulykke til Center for Arbejdsskader (Arbejdsskadestyrelsen)?

☐ Naamik (Nej) 2

☐ Aap (Ja) 1 Ukioq ________ (Årstal) Ajoqusernerup annertussusaa ______________________ (Type ulykke)

Ukioq ________ (Årstal) Ajoqusernerup annertussusaa ______________________ (Type ulykke)

Apeqqut sutortarnernik
Spørgsmål om hvad du spiser

56. Qaammatip ataatsip iluani qasseriarlutit kalaaliminertortarpit?
Hvor mange gange om måneden spiser du traditionel grønlandsk mad?

Aalisakkat missiliorlugit_______ qasseria qaammamut pisarpigit
Fisk

Raajat missiliorlugit_______ qasseria qaammamut pisarpigit
Rejer

Assagiarsuit missiliorlugit ______ qasseria qaammammut pisarpigit
Krabber

Puisip neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Sæl

Aarrup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Hvalros

Qilalukkap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Hval

Timmissap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Søfugle

Tuttup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Rensdyr

Nannup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Isbjørn

Umimmaap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Moskus

Savap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Lam

Nunap paarnai missiliorlugit ______ qasseria qaammammut pisarpigit
Bær

57. Qaammammut qasseriarlutit tikisitanik nerisassanik nerisarpit?
Hvor mange gange om måneden spiser du importeret mad??

Neqi tikisitaq missiliorlugit ______ qasseria qaammammut pisarpigit
KødG

Naatsiiat tikisitat missiliorlugit ______ qasseria qaammammut pisarpigit
KartoflerG

Naatitat tikisitat missiliorlugit ______ qasseria qaammammut pisarpigit
Grønt

Timmissat (soorlu kukkukuut) missiliorlugit ______ qasseria qaammammut pisarpigit
Frugt

Grillikkanik, burgerinik, hotdogs-nik, pizza-nik missiliorlugit ______ qasseria qaammammut pisarpigit
Grillmad og fastfood

Quaasat qaqortut, pastat, qaqortuliamillu missiliorlugit ______ qasseria qaammammut pisarpigit
Ris pasta brød

58. Aalisakkanik assagiarsunnillu nerereernernit ippiuutinik misigisaqarnikuuit?
Har du nogensinde oplevet følgende efter spisning af fisk, rejer eller krabber?

	Aap Ja	Naamik Nej	Naluara Ved ikke
Ungillerineq? Qangup iluani tuqqusaakkulluunniit pulluattuulerneq? Kløe eller hævelse i mund eller hals?	☐ 1	☐ 2	☐ 0
Ungillerineq? Timikkut/ammikkut ungillerineq pullat-toorneq, tinupasuaqqanik naasoorneq? Kløe, hævelse eller udslæt på huden?	☐ 1	☐ 2	☐ 0
Astmarneq? Astma	☐ 1	☐ 2	☐ 0

Peroriartornerni tungasunik apeqqutit
Spørgsmål om din opvækst

59. Sorlermi nunaqarfimmi illoqarfimmiluunniit sivisunerpaamik najugaqarnikuuit?
Hvilken by eller bygd i Grønland har du boet længst tid i?

____

60. Ukiut qassit sivisunerpaaffimmi najugarisanni nunaqarpit?
Hvor længe har du boet i den by eller bygd du har boet længst i?

__________ ukiut (år) __________ qaammat (måneder)

Immikut eqqaarusutat

Bemærkninger

Qujanaq peqataagavit. Peqqissutsit pilllugu amerlanerusunik paasissutissaateqaruit imaluunniit allamik oqaluttuukkusukkutsigut uani allagit:

Tak for din medvirken. Hvis du har flere oplysninger om dit helbred, eller hvis der er andet du vil fortælle os, så skriv her:

Appendix C. Follow-up questionnaire

LBNR og navn udfyldes på forhånd med oplysninger fra første undersøgelse i 2016-17. Resten udfyldes kun med evt. ændringer, som er sket siden.

Inummik allaatiginninneq **LBNR: ____**

Personbeskrivelse

1. Ulloq: ____ Dato

2. Inuup normua: ____ CPR

3. Naggat: ____ Efternavn

4. Ateq: ____ Fornavn

5. Najugaq: ____ Adresse

6. Telefon: ____ Telefon

Siornatigut sumi sulinikuuit? (Sumi suliffeqarnikuuit?)

Siornatigut suliffigisimasatit imaluunniit namminersortutut piniartuunikuuit? Aalisartuunikuuit?

Hvor har du tidligere arbejdet? Tidligere ansættelser og arbejde som selvstændig fanger eller fisker anføres med start og sluttidspunkt, titel, funktion. Der spørges specifikt til udsættelse for fisk og skaldyr (hvilke slags?).

Interview om oplysninger om job og eksponeringer de seneste 5-10 år. Spørg om:

- I hvilken virksomhed er du ansat nu? Eller: Hvor har du sidst været ansat?
- Hvornår blev du ansat?
- Hvad laver du/lavede du i den ansættelse? (Hvad var dit job/dine opgaver?) E
- Var der arbejde med rejer, krabber eller fisk? Evt. nævnes flere opgaver, f.eks. både arbejde i rejeproduktion, krabbekogning, rengøring. Hertil bruges det skema vi laver med billeder af typiske opgaver i fiske- og skaldyrsindustrien.
- Hvor var du ansat før det job du lige har fortalt om? Hvornår blev du ansat dér og hvornår stoppede du? Hvad laver du/lavede du i den ansættelse? (Hvad var dit job/dine opgaver?). Var der arbejde med rejer, krabber eller fisk? Evt. nævnes flere opgaver, f.eks. både arbejde i rejeproduktion, krabbekogning, rengøring.
- Osv.
- Fortsæt evt. på side 2.

Sorlukkut torlukkullu malunniutit

Massakkut malunniutit (qaammatini 12-ini kingullerni)

Symptomer fra næse og luftveje
Nuværende symptomer (de sidste 12 mdr.)

19. Qaammatini kingullerni 12-ini quersortarpit:

Har du i de sidste 12 måneder haft hoste når du

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐ 1	☐ 2	☐ 0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐ 1	☐ 2	☐ 0
Nillertorujussuarmiitillutit Er i meget kold luft	☐ 1	☐ 2	☐ 0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐ 1	☐ 2	☐ 0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit) Ved stærke lugte (maling, tobak, parfume eller andet)	☐ 1	☐ 2	☐ 0

19b. Qaammatit isikkaneq marlut iluanni sininnerpit nalaani quersornerit pissutaalluni itertitaasarnikuuit?

Er du blevet vækket af et hosteanfald på noget tidspunkt i de seneste 12 måneder?

☐ 1 Aap Ja ☐ 2 Naamik Nej

19c. Ukiuutillugu ullaakkut quersoqqajaasarpit?

Hoster du sædvanligvis som det første om morgenen om vinteren?

☐ 1 Aap Ja ☐ 2 Naamik Nej

20. Qaammatini kingullerni 12-imi uinngialasumik/iggiinngasumik anersaartortarpit?
Har du haft pibende eller hvæsende vejrtrækning på noget tidspunkt i de sidste 12 måneder?

☐ 1 Aap
Ja

☐ 2 Naamik
Nej

Qaammatini kingullerni 12-imi uinngialasumik/iggiinngasumik anersaartortarpit:
Har du i de sidste 12 måneder haft pibende eller hvæsende vejrtrækning når du:

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐ 1	☐ 2	☐ 0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐ 1	☐ 2	☐ 0
Nillertorujussuarmiitillutit Er i meget kold luft	☐ 1	☐ 2	☐ 0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐ 1	☐ 2	☐ 0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit) Ved stærke lugte (maling, tobak, parfume eller andet)	☐ 1	☐ 2	☐ 0
Er i kontakt med dyr Er i kontakt med dyr	☐ 1	☐ 2	☐ 0

21. Qaammatini kingullerni 12-ini <u>sakissakkut naqisimaneqarnermik imaluunniit anernikilliornermik misigisaqartarpit:</u>
Har du i de sidste 12 måneder følt pressen for brystet eller været kortåndet når du:

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐ 1	☐ 2	☐ 0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐ 1	☐ 2	☐ 0
Nillertorujussuarmiitillutit Er i meget kold luft	☐ 1	☐ 2	☐ 0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐ 1	☐ 2	☐ 0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit tikki) Ved stærke lugte (maling, tobak, parfume eller andet)	☐ 1	☐ 2	☐ 0

21b. Qaammatit isikkaneq marlut iluanni sinitsillutit iternikuuit sakissakkut naqinneqartutut misigalutit?
Er du vågnet med en fornemmelse af trykken for brystet på noget tidspunkt i de sidste 12 måneder?:

☐ 1 Aap Ja ☐ 2 Naamik Nej

21c. Qaammatit isikkaneq marlut iluanni ullup ingerlarerani eqqissisimagaluarlutit anernikilliori-asaarnermik misigisaqarnikuuit?
Har du haft et anfald af åndenød i løbet af dagen, når du var i hvile på noget tidspunkt i de sidste 12 måneder?:

☐ 1 Aap Ja ☐ 2 Naamik Nej

21d. Qaammatit isikkaneq marlut iluanni sinitsillutit anernikillioriasaarnermit pissutaasumit iterti-taanikuuit?
Er du blevet vækket af et anfald af åndenød på noget tidspunkt i de sidste 12 måneder?:

☐ 1 Aap Ja ☐ 2 Naamik Nej

23. Ullaakkut quersorlutit nuammik nalinginnaasumik aniatitsisarpit? (Soorlu assersuutigalugu cigareti siulleq pujortaraagakku silamut anigaagavit. Iggiarissarneq tassani ilaatinneqassanngilaq)
Hoster du normalt slim op om morgenen? (For eksempel ved din første cigaret eller når du første gang går udenfor. At rømme sig/klare halsen tæller ikke med)

☐ 1 Aap (Ja)   ☐ 2 Naamik (Nej)

Naaggaaruit apeqqummut 25-imukarit
Hvis NEJ gå til spørgsmål 25.

24. Ikinnerpaamik qaammatini pingasuni, ukiup ataatsip iluani amerlanerusuniluunniit ullaakkut amerlanertigut quersornikkut nuammik piiagaqartarpit?
Har du hostet sådant slim op de fleste morgener i mindst 3 måneder i et år eller mere?

☐ 1 Aap (Ja)   ☐ 2 Naamik (Nej)

Aappeeruit, ukiuni qassini? ________________Ukiut
Hvis JA, i hvor mange år?

25. Qaammatini 12-ini kingullerni ataani allassimasut anersaartorninnut tulluarneruppat?
Hvilke af følgende udsagn passer bedst på din vejrtrækning i de sidste 12 måneder?

☐ 1 Anersaartornera qaqutigut ajornartorsiutigisarpara
Jeg har sjældent problemer med min vejrtrækning

☐ 2 Anersaartornera ilaanneeriarlunga ajornartorsiutigisarpara
Jeg har sommetider problemer med min vejrtrækning

☐ 3 Anersaartornera akulikitsumik ajornartorsiutigisarpara
Jeg har ofte problemer med min vejrtrækning

☐ 4 Anersaartornera ajortuaannarpoq
Min vejrtrækning er altid dårlig

Apeqqut sutortarnernik

Spørgsmål om hvad du spiser

56. Qaammatip ataatsip iluani qasseriarlutit kalaaliminertortarpit?

Hvor mange gange om måneden spiser du traditionel grønlandsk mad?

Aalisakkat missiliorlugit_______ qasseria qaammamut pisarpigit
Fisk

Raajat missiliorlugit_______ qasseria qaammamut pisarpigit
Rejer

Assagiarsuit missiliorlugit ______ qasseria qaammammut pisarpigit
Krabber

Puisip neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Sæl

Aarrup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Hvalros

Qilalukkap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Hval

Timmissap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Søfugle

Tuttup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Rensdyr

Nannup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Isbjørn

Umimmaap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Moskus

Savap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Lam

Nunap paarnai missiliorlugit ______ qasseria qaammammut pisarpigit
Bær

57. Qaammammut qasseriarlutit tikisitanik nerisassanik nerisarpit?

Hvor mange gange om måneden spiser du importeret mad??

Neqi tikisitaq missiliorlugit ______ qasseria qaammammut pisarpigit
KødG

Naatsiiat tikisitat missiliorlugit ______ qasseria qaammammut pisarpigit
KartoflerG

Naatitat tikisitat missiliorlugit ______ qasseria qaammammut pisarpigit
Grønt

Timmissat (soorlu kukkukuut) missiliorlugit ______ qasseria qaammammut pisarpigit
Frugt

Grillikkanik, burgerinik, hotdogs-nik, pizza-nik missiliorlugit ______ qasseria qaammammut pisarpigit
Grillmad og fastfood

Quaasat qaqortut, pastat, qaqortuliamillu missiliorlugit ______ qasseria qaammammut pisarpigit
Ris pasta brød

58. Aalisakkanik assagiarsunnillu nerereernernit ippiuutinik misigisaqarnikuuit?
Har du nogensinde oplevet følgende efter spisning af fisk, rejer eller krabber?

	Aap Ja	Naamik Nej	Naluara Ved ikke
Ungillerineq? Qangup iluani tuqqusaakkulluunniit pulluattuulerneq? Kløe eller hævelse i mund eller hals?	☐ 1	☐ 2	☐ 0
Ungillerineq? Timikkut/ammikkut ungillerineq pullat-toorneq, tinupasuaqqanik naasoorneq? Kløe, hævelse eller udslæt på huden?	☐ 1	☐ 2	☐ 0
Astmarneq? Astmat	☐ 1	☐ 2	☐ 0

Peroriartornerni tungasunik apeqqutit

Spørgsmål om din opvækst

59. Sorlermi nunaqarfimmi illoqarfimmiluunniit sivisunerpaamik najugaqarnikuuit?
Hvilken by eller bygd i Grønland har du boet længst tid i?

____

60. Ukiut qassit sivisunerpaaffimmi najugarisanni nunaqarpit?
Hvor længe har du boet i den by eller bygd du har boet længst i?

__________ ukiut (år) __________ qaammat (måneder)

Appendix C. Follow-up questionnaire

LBNR og navn udfyldes på forhånd med oplysninger fra første undersøgelse i 2016-17. Resten udfyldes kun med evt. ændringer, som er sket siden.

LBNR: ____

Inummik allaatiginninneq
Personbeskrivelse

1. Ulloq: ________ (Dato)
2. Inuup normua: ________ (CPR)

3. Naggat: ________ (Efternavn)
4. Ateq: ________ (Fornavn)

5. Najugaq: ________ (Adresse)

6. Telefon: ________ (Telefon)

Siornatigut sumi sulinikuuit? (Sumi suliffeqarnikuuit?)

Siornatigut suliffigisimasatit imaluunniit namminersortutut piniartuunikuuit? Aalisartuuni-kuuit?

Hvor har du tidligere arbejdet? Tidligere ansættelser og arbejde som selvstændig fanger eller fisker anføres med start og sluttidspunkt, titel, funktion. Der spørges specifikt til udsættelse for fisk og skaldyr (hvilke slags?).

Interview om oplysninger om job og eksponeringer de seneste 5-10 år. Spørg om:

- I hvilken virksomhed er du ansat nu? Eller: Hvor har du sidst været ansat?
- Hvornår blev du ansat?
- Hvad laver du/lavede du i den ansættelse? (Hvad var dit job/dine opgaver?) E
- Var der arbejde med rejer, krabber eller fisk? Evt. nævnes flere opgaver, f.eks. både arbejde i rejeproduktion, krabbekogning, rengøring. Hertil bruges det skema vi laver med billeder af typiske opgaver i fiske- og skaldyrsindustrien.
- Hvor var du ansat før det job du lige har fortalt om? Hvornår blev du ansat dér og hvornår stoppede du? Hvad laver du/lavede du i den ansættelse? (Hvad var dit job/dine opgaver?). Var der arbejde med rejer, krabber eller fisk? Evt. nævnes flere opgaver, f.eks. både arbejde i rejeproduktion, krabbekogning, rengøring.
- Osv.
- Fortsæt evt. på side 2.

Sorlukkut torlukkullu malunniutit

Massakkut malunniutit (qaammatini 12-ini kingullerni)

Symptomer fra næse og luftveje
Nuværende symptomer (de sidste 12 mdr.)

19. Qaammatini kingullerni 12-ini quersortarpit:

Har du i de sidste 12 måneder haft hoste når du

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐ 1	☐ 2	☐ 0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐ 1	☐ 2	☐ 0
Nillertorujussuarmiitillutit Er i meget kold luft	☐ 1	☐ 2	☐ 0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐ 1	☐ 2	☐ 0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit) Ved stærke lugte (maling, tobak, parfume eller andet)	☐ 1	☐ 2	☐ 0

19b. Qaammatit isikkaneq marlut iluanni sininnerpit nalaani quersornerit pissutaalluni itertitaasarnikuuit?

Er du blevet vækket af et hosteanfald på noget tidspunkt i de seneste 12 måneder?

☐ 1 Aap Ja ☐ 2 Naamik Nej

19c. Ukiuutillugu ullaakkut quersoqqajaasarpit?

Hoster du sædvanligvis som det første om morgenen om vinteren?

☐ 1 Aap Ja ☐ 2 Naamik Nej

20. Qaammatini kingullerni 12-imi uinngialasumik/iggiinngasumik anersaartortarpit?
Har du haft pibende eller hvæsende vejrtrækning på noget tidspunkt i de sidste 12 måneder?

☐ 1 Aap (Ja)   ☐ 2 Naamik (Nej)

Qaammatini kingullerni 12-imi uinngialasumik/iggiinngasumik anersaartortarpit:
Har du i de sidste 12 måneder haft pibende eller hvæsende vejrtrækning når du:

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐ 1	☐ 2	☐ 0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐ 1	☐ 2	☐ 0
Nillertorujussuarmiitillutit Er i meget kold luft	☐ 1	☐ 2	☐ 0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐ 1	☐ 2	☐ 0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit) Ved stærke lugte (maling, tobak, parfume eller andet)	☐ 1	☐ 2	☐ 0
Er i kontakt med dyr Er i kontakt med dyr	☐ 1	☐ 2	☐ 0

21. Qaammatini kingullerni 12-ini <u>sakissakkut naqisimaneqarnermik imaluunniit anernikilliornermik misigisaqartarpit:</u>
Har du i de sidste 12 måneder følt pressen for brystet eller været kortåndet når du:

	Aap Ja	Naamik Nej	Naluara Ved ikke
Timersortillutit Dyrker motion	☐1	☐2	☐0
Assoroornartumik suliaqartillutit Laver anstrengende arbejde	☐1	☐2	☐0
Nillertorujussuarmiitillutit Er i meget kold luft	☐1	☐2	☐0
Nuatsillutit imaluunniit nuallullutit Er forkølet eller har influenza	☐1	☐2	☐0
Tipit sakkortuut naamagaangakkit (qalipaatit, tupa, tipigissaatit allalluunniit tikki) Ved stærke lugte (maling, tobak, parfume eller andet)	☐1	☐2	☐0

21b. Qaammatit isikkaneq marlut iluanni sinitsillutit iternikuuit sakissakkut naqinneqartutut misigalutit?
Er du vågnet med en fornemmelse af trykken for brystet på noget tidspunkt i de sidste 12 måneder?:

☐ Aap (Ja) 1   ☐ Naamik (Nej) 2

21c. Qaammatit isikkaneq marlut iluanni ullup ingerlarerani eqqissisimagaluarlutit anernikilliori-asaarnermik misigisaqarnikuuit?
Har du haft et anfald af åndenød i løbet af dagen, når du var i hvile på noget tidspunkt i de sidste 12 måneder?:

☐ Aap (Ja) 1   ☐ Naamik (Nej) 2

21d. Qaammatit isikkaneq marlut iluanni sinitsillutit anernikillioriasaarnermit pissutaasumit iterti-taanikuuit?
Er du blevet vækket af et anfald af åndenød på noget tidspunkt i de sidste 12 måneder?:

☐ Aap (Ja) 1   ☐ Naamik (Nej) 2

23. Ullaakkut quersorlutit nuammik nalinginnaasumik aniatitsisarpit?
(Soorlu assersuutigalugu cigareti siulleq pujortaraagakku silamut anigaagavit. Iggiarissarneq tassani ilaatinneqassanngilaq)
Hoster du normalt slim op om morgenen? (For eksempel ved din første cigaret eller når du første gang går udenfor. At rømme sig/klare halsen tæller ikke med)

☐ Aap 1 Ja   ☐ Naamik 2 Nej

Naaggaaruit apeqqummut 25-imukarit
Hvis NEJ gå til spørgsmål 25.

24. Ikinnerpaamik qaammatini pingasuni, ukiup ataatsip iluani amerlanerusuniluunniit ullaakkut amerlanertigut quersornikkut nuammik piiagaqartarpit?
Har du hostet sådant slim op de fleste morgener i mindst 3 måneder i et år eller mere?

☐ Aap 1 Ja   ☐ Naamik 2 Nej

Aappeeruit, ukiuni qassini? ________________Ukiut
Hvis JA, i hvor mange år?

25. Qaammatini 12-ini kingullerni ataani allassimasut anersaartorninnut tulluarneruppat?
Hvilke af følgende udsagn passer bedst på din vejrtrækning i de sidste 12 måneder?

☐ 1 Anersaartornera qaqutigut ajornartorsiutigisarpara
Jeg har sjældent problemer med min vejtrækning

☐ 2 Anersaartornera ilaanneeriarlunga ajornartorsiutigisarpara
Jeg har sommetider problemer med min vejrtrækning

☐ 3 Anersaartornera akulikitsumik ajornartorsiutigisarpara
Jeg har ofte problemer med min vejrtrækning

☐ 4 Anersaartornera ajortuaannarpoq
Min vejrtrækning er altid dårlig

Apeqqut sutortarnernik
Spørgsmål om hvad du spiser

56. Qaammatip ataatsip iluani qasseriarlutit kalaaliminertortarpit?
Hvor mange gange om måneden spiser du traditionel grønlandsk mad?

Aalisakkat missiliorlugit_______ qasseria qaammamut pisarpigit
Fisk

Raajat missiliorlugit_______ qasseria qaammamut pisarpigit
Rejer

Assagiarsuit missiliorlugit ______ qasseria qaammammut pisarpigit
Krabber

Puisip neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Sæl

Aarrup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Hvalros

Qilalukkap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Hval

Timmissap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Søfugle

Tuttup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Rensdyr

Nannup neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Isbjørn

Umimmaap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Moskus

Savap neqaa missiliorlugit ______ qasseria qaammammut pisarpigit
Lam

Nunap paarnai missiliorlugit ______ qasseria qaammammut pisarpigit
Bær

57. Qaammammut qasseriarlutit tikisitanik nerisassanik nerisarpit?
Hvor mange gange om måneden spiser du importeret mad??

Neqi tikisitaq missiliorlugit ______ qasseria qaammammut pisarpigit
KødG

Naatsiiat tikisitat missiliorlugit ______ qasseria qaammammut pisarpigit
KartoflerG

Naatitat tikisitat missiliorlugit ______ qasseria qaammammut pisarpigit
Grønt

Timmissat (soorlu kukkukuut) missiliorlugit ______ qasseria qaammammut pisarpigit
Frugt

Grillikkanik, burgerinik, hotdogs-nik, pizza-nik missiliorlugit ______ qasseria qaammammut pisarpigit
Grillmad og fastfood

Quaasat qaqortut, pastat, qaqortuliamillu missiliorlugit ______ qasseria qaammammut pisarpigit
Ris pasta brød

58. Aalisakkanik assagiarsunnillu nerereernernit ippiuutinik misigisaqarnikuuit?
Har du nogensinde oplevet følgende efter spisning af fisk, rejer eller krabber?

	Aap Ja	Naamik Nej	Naluara Ved ikke
Ungillerineq? Qangup iluani tuqqusaakkulluunniit pulluattuulerneq? Kløe eller hævelse i mund eller hals?	☐ 1	☐ 2	☐ 0
Ungillerineq? Timikkut/ammikkut ungillerineq pullattoorneq, tinupasuaqqanik naasoorneq? Kløe, hævelse eller udslæt på huden?	☐ 1	☐ 2	☐ 0
Astmarneq? Astmat	☐ 1	☐ 2	☐ 0

Peroriartornerni tungasunik apeqqutit
Spørgsmål om din opvækst

59. Sorlermi nunaqarfimmi illoqarfimmiluunniit sivisunerpaamik najugaqarnikuuit?
Hvilken by eller bygd i Grønland har du boet længst tid i?

____

60. Ukiut qassit sivisunerpaaffimmi najugarisanni nunaqarpit?
Hvor længe har du boet i den by eller bygd du har boet længst i?

_________ ukiut (år) __________ qaammat (måneder)

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