Katrine Høyer Holgersen

Survivors in their third decade after the North Sea oil rig disaster of 1980

Long-term perspectives on mental health

Thesis for the degree of Philosophiae Doctor

Trondheim, February 2011

Norwegian University of Science and Technology
Faculty of Medicine
Department of Neuroscience

NTNU – Trondheim
Norwegian University of
Science and Technology

Prosjektet er
støttet av
ExtraStiftelsen
Helse og Rehabilitering
med EXTRA-midler

NTNU
Norwegian University of Science and Technology

Thesis for the degree of Philosophiae Doctor

Faculty of Medicine
Department of Neuroscience

ISBN 978-82-471-2570-0 (printed ver.)
ISBN 978-82-471-2571-7 (electronic ver.)
ISSN 1503-8181

Doctoral theses at NTNU, 2011:26

Printed by NTNU-trykk

Norsk sammendrag
Overlevende 27 år etter Alexander L. Kielland ulykken i 1980 – deres psykiske helse i et langtidsperspektiv

Etter Alexander L. Kielland ulykken på Ekofisk feltet 27.mars 1980, der 123 mennesker mistet livet, ble det erklært landesorg. Hendelsen er fortsatt blant de største katastrofer som har rammet Norge i fredstid. Nasjonale markeringer er siden blitt avholdt jevnlig i Stavanger, senest 30 års markeringen i mars 2010. Av de 212 oljearbeiderne ombord da plattformen gikk rundt, berget 89 livet. Denne avhandlinga er del av et større forskningsprosjekt som har fulgt de 75 norske overlevende i nesten 30 år. Det er benyttet intervjuer og/eller spørreskjema i 1980, 1981, 1985 og sist i 2007. En sammenligningsgruppe med 92 nordsjøansatte ble inkludert fra 1985; de var ikke med i ulykken.

Hensikten med denne avhandlinga er å belyse utviklinga av stress plager og den psykisk helse over et tidsrom på nesten tre tiår. Sammenhengen mellom tidlige reaksjoner og senere utfall er særlig vektlagt. Videre er angivelse av positive livsendringer undersøkt.

Kielland-undersøkelsene har fått høy oppslutning på grunn av stor velvilje fra de overlevende og fra sammenligningsgruppa. Av de 57 oppsporbare og gjenlevende norske overlevende i 2007 deltok 51 i en eller flere deler av undersøkelsen. Data fra 70 ble benyttet i analysene av forløpet over tid. I 2007 deltok 62 av 78 mulige fra sammenligningsgruppa.

Arbeidet som her presenteres omfatter tre vitenskaplige artikler. De bygger særlig på standardiserte spørreskjema om ulike typer stressplager, psykisk helse, personlighet og posttraumatisk vekst. I tillegg ble informasjon om alder, sivilstatus, arbeidsforhold og eventuelle senere katastrofer eller ulykker tatt med.

I 1985 viste de overlevende betydelig mer tegn på stress og psykiske plager enn sammenligningsgruppa. I 2007 var forskjellene mindre, men samlet sett var det fortsatt noe mer stressplager hos de overlevende. Høyt og vedvarende nivå av stress de første ukene rett etter ulykka viste seg å gi mer stress plager etter fem og 27 år.

Den psykiske helsa varierte over tid. Etter sine ulike forløp kunne de overlevende deles i fire grupper. De fleste (61%) kan karakteriseres som motstandsdyktige eller resiliente. De hadde noe stress plager i starten, men de forsvant ganske raskt etter ulykka. Senere hadde de få psykiske plager. De tre andre gruppene hadde høye, vedvarende stress plager rett etter ulykka, men i de neste tre tiårene var forløpene deres nokså forskjellige. En gruppe fikk gradvis mindre psykiske vansker; de ble bedre og bedre med tiden (14%). En annen gruppe ble stadig verre med tilbakefall (13%). Den tredje gruppa hadde kroniske, varige plager (11%). Personligheten til den enkelte påvirket også utfallet.

De som i 2007 uttrykte at Kielland-ulykken hadde ført til positive livsendringer, altså posttraumatisk vekst, var samtidig også sterkt psykisk plaget.

Avhandlinga viser at selv om Alexander L. Kielland ulykken gjorde inntrykk på de fleste overlevende i tiden like etter, kom om lag to tredjedeler seg nokså raskt. For et mindretall, ca en fjerdedel, satte hendelsen dypere spor. Deres psykiske helse var enten preget av tilbakefall eller kroniske plager. For å forebygge negative følger etter sivile katastrofer eller ulykker kan tidlig kartlegging og vurdering av stress-plager i den første tiden gi en nyttig pekepinn om hvem som står i fare på lengre sikt.

Kandidat: ***Katrine Høyer Holgersen***
Institutt: ***Institutt for Nevromedisin***
Veileder: ***Are Holen***

Finansieringskilde: ***Extra Stiftelsen Helse og Rehabilitering gjennom Rådet for Psykisk Helse***

Ovennevnte avhandling er funnet verdig til å forsvares offentlig
for graden PhD i klinisk medisin
Disputas finner sted i Auditoriet, Medisinsk teknisk forskningssenter
Torsdag 03.02.2011, kl. 12.15

Acknowledgements

This study is part of a larger project that has been following-up over almost three decades the survivors from the North Sea oil rig disaster. I want to express my thanks to the survivors and to the members of the comparison group for their willingness to share their experiences over so many years.

Moreover, I want to convey my gratitude to all those who have supported me throughout this time. First and foremost I owe great thanks to my supervisor Are Holen, M.D., Ph.D, Professor at the Department of Neuroscience, for including me in the latest part of the North Sea oil-rig project. His invaluable encouragement and always friendly support in all phases of the process has been of major importance, and so has his never failing ability to look for opportunities, and not for limitations.

Also, I have greatly appreciated the sharing of ideas and thoughts about this work with Hans Jakob Bøe, clinical psychologist and my fellow Ph.D student in the project.

Thanks to Lars Weisæth, M.D. and Ph.D, who organized the first data collections after the oil rig disaster for his encouragement and scientific contributions as a co-author. Great thanks also to Christian A. Klöckner Ph.D, who has given important help in the statistical realm of this work. His through, but always patient and friendly, introduction to the world of statistical complexities has been valuable. Also, I wish to thank Stian Lydersen, Ph.D and Professor in applied statistics for his clear and well-considered advice.

The work was made possible by the EXTRA funds from the Norwegian Foundation for Health and Rehabilitation (Helse og Rehabilitering) through the Norwegian Council for Mental Health (Rådet for Psykisk Helse) and by funding from the Department of Neuroscience (INM), Faculty of Medicine, NTNU.

Thanks to and the staff at INM and fellow PhD students for the important support in everyday working life. I also want to express gratitude to my colleagues at Tiller Department, Division of Psychiatry, St. Olav's University Hospital, for their encouragement, inspiration and energy through the clinical work in the last phases of the work.

Family and friends have been of tremendous importance during this time, and I owe great thanks to all of them. Specially, I would like to thank my parents for their continuous support. Finally, thanks to Henrik for being there, also during the up-hills, and to Theo and Olaf for spreading joy and for reminding me that the most important priorities of life are outside the office.

Trondheim, September 2010

Katrine Høyer Holgersen

List of papers

Paper I:
Katrine Høyer Holgersen, Hans Jakob Bøe, Christian A. Klöckner, Lars Weisæth, Are Holen
Initial stress responses in relation to outcome after three decades
J Nerv Ment Dis 2010; 198(3):230-233.

Paper II:
Katrine Høyer Holgersen, Christian A. Klöckner, Hans Jakob Bøe, Lars Weisæth, Are Holen
Disaster survivors in their third decade – trajectories of initial stress responses and long-term course of mental health *(accepted for publication in J Trauma Stress; the submitted version in this dissertation has later been revised)*

Paper III:
Katrine Høyer Holgersen, Hans Jakob Bøe, Are Holen
Long-term perspectives on posttraumatic growth in disaster survivors
J Trauma Stress 2010; 23(3): 413-416.

Abbreviations and acronyms

ASD	Acute stress disorder
BIC	Bayesian information criteria
CES	Centrality of event scale
CFI	Comparative fit index
Cov	Covariation
DSM	Diagnostic statistical manual of mental disorders
FIML	Full information maximum likelihood
GHQ	General health questionnaire
GMM	Growth mixture modeling
ICD	International classification of diseases
IES	Impact of event scale
KZ syndrome	Concentration camp syndrome
LGM	Latent growth modeling
M	Mean
n.s.	Non-significant
NEO-FFI	NEO Five-factor inventory
NEO-PI-R	NEO Personality inventory – Revised
PTG	Posttraumatic growth
PTGI	Posttraumatic growth inventory
PTSD	Posttraumatic stress disorder
PTSS	Posttraumatic stress scale
RMSEA	Root mean square error of approximation
SD	Standars deviation
SE	Standard error
TLI	Tucker Lewis index
U	Mann Whitney U-test
B	Unstandardized beta
β	Standardized beta
α	Cronbach's alpha
r	Pearson's correlation coefficient
ρ	Spearman's rho
χ^2	Chi- square

Errata:

Paper 3: page 416, 1st column, line 12: J.P.W.B.Raphael (Ed.), should be J.P. Wilson & B. Raphael (Eds.)

Summary

Background and objective: In March 2010, a 30 years' memorial assembly related to one of Norway's worst disasters ever was held. The oil rig named after the Norwegian author, Alexander L. Kielland, capsized in the North Sea on the 27th March, 1980. Of the 212 men onboard, 89 survived. This doctoral thesis is a part of a larger longitudinal project which has been following-up the Norwegian survivors across four waves of data collections, in 1980, 1981, 1985 and 2007. A matched reference group of oil-rig workers from the same field, Ekofisk, was included in 1985. The objective of the present thesis was to study mental health outcomes after almost three decades of this civilian disaster.

Methods: Of the 75 Norwegian survivors in 1980, data sets from 70 were stored for the longitudinal analyses. In 2007, 57 survivors were still alive and traceable. Of these, 51 participated. Of the 92 men in the comparison group included in 1985, 62 took part in 2007. The study draws on self-reports collected at all four waves. Longitudinal measures covered posttraumatic stress (Impact of Event Scale; IES-15), general manifestations of stress (Posttraumatic Stress Scale; PTSS-10) as well as the detection of general mental health problems (General Health Questionnaire; GHQ-20). Included in the data collection of 2007 were a version of the General Health Questionnaire (GHQ-28), a personality inventory (NEO Five Factor Inventory; NEO-FFI), and a measure of positive psychological changes (Posttraumatic Growth Inventory; PTGI). Demographic information was also included.

Results: Five years after the North Sea oil rig disaster, the survivors clearly reported more suffering than the comparison group. In 2007, however, the difference had faded. A tendency to report more stress symptoms was still found for the survivors. Moreover, high stress scores

in the very first days post disaster and a slow recovery during the initial weeks were both associated with long-term suffering.

When combining the initial recovery and the long-term course of mental health, four latent trajectories were identified: the resilient (61%), recovering (14%), chronic (11%), and relapsing (13%). The two thirds classified as resilient, showed a moderate starting point of stress. Subsequently, they had a rapid decline across the first eight weeks. Their long-term scores on mental health problems remained low. The trajectories of those in the recovery, chronic or relapse groups had initially high, stable stress scores, while their long-term course of mental health problems differed. A personality style with high scores on neuroticism was associated with the chronic and the relapsing trajectories.

Strong positive associations were found between reported posttraumatic growth and concurrent levels of posttraumatic stress 27 years post disaster. Weaker or no associations between growth and posttraumatic stress of the past were found. Decades after the disaster, general mental health problems coexisted with the higher levels of reported posttraumatic growth, but the associations were mediated by the concurrent posttraumatic symptoms.

Conclusions: Roughly two thirds of the survivors after the North-Sea oil rig disaster bounced back into adequate good mental health within the first two months. Another 14 % reported initial suffering, but recovered more slowly. Hence, in a long-term perspective three out of four remained mentally healthy. A minor part (24%) demonstrated chronic or relapsing courses of mental health problems. A high load of initial stress manifestations which did not decline during the first weeks, was associated with various patterns of suffering in the following three decades. Self-reports about posttraumatic growth after almost three decades did not indicate less mental suffering. Early screening may identify those who are at risk of long-term post-traumatic suffering.

Introduction

Adverse events and health

The interest in the human response to adverse or traumatic events has often been described to have its roots in the antique literature and philosophy as well as in the pioneers of medicine and psychology (Calhoun & Tedeschi, 2006; Monson, Friedman, & LaBash, 2007; van der Kolk, 2007; van der Kolk, Weisaeth, & van der Hart, 1997; Weisaeth, 2002). Three decades ago, the attention increased considerably both among researchers and clinicians after the introduction of Posttraumatic stress disorder (PTSD) as a diagnosis in the DSM-III (American Psychiatric Association, 1980).

From the 1980s, the research oriented trauma literature has burgeoned (D. J. Stein et al., 2009). Today, several specialized journals are dedicated to the field, such as the "Journal of Traumatic Stress", "Psychological Trauma: Theory, Research, Practice and Policy", "Australasian Journal of Disaster and Trauma Studies", "Traumatology, the International Journal" etc. Also, international and national research societies as well as resource centers for people exposed to trauma have been established around the world. In Norway, the National Centre for Violence and Traumatic Stress Studies was founded in 2004.

Within the field of traumatic stress studies, considerable knowledge has been derived from combat-related experiences. Wars tend to encompass reiterated trauma exposures. Their impact on health may last longer and be more pervasive than after a single traumatic event in civilian life such as in motor vehicle accidents and its likes. The study of abuse represents another major area of research. Scientific research on civil trauma represents a challenge to methodological rigorousness as the events often include just one or a few survivors. To draw conclusions from a sample of diverse accidents and contexts may be cumbersome as each

event varies considerably. An important alternative is to study conjointly the survivors of one disaster. Such populations are usually clearly defined by the particular event. Usually, the population is a selection of regular people. The scope of this thesis is the long-term follow-up of one civilian disaster; the North Sea oil rig disaster of 27th March, 1980.

A brief history of traumatic stress studies

Several publications have presented the early history of traumatic stress studies (e.g., Healy, 1993; Kinzie & Goetz, 1996; Monson, et al., 2007; van der Kolk, 2007; van der Kolk, et al., 1997; Weisaeth, 2002). Below, a brief summary is given.

In addition to the observations from the battlefields across time, the very early recognition of civilian events has been ascribed to the increasing occurrence of accidents during the industrial revolution (Caplan, 1995; Weisaeth, 2002). In historical overviews, the British surgeon Erichsen has been credited to have started the train of thoughts and observations related to posttraumatic stress. In the second half of the nineteenth century, he introduced the concept of the "railway spine" to describe the complaints after severe railway accidents (Erichsen, 1866). Some decades later, Page drew attention to how mental causes could explain the general shocks that often were seen, despite no bodily injuries (Page, 1883).

Works on how mental issues presumably influence the nervous system after trauma has amongst others been ascribed to Herman Oppenheim and Jean-Martin Charcot (e.g., Healy, 1993; Weisaeth, 2002). By the end of the 1880s, Pierre Janet's work on dissociation and Sigmund Freud's views of the unconsciousness, repression and fixation have been described to have brought the models of explanation further into the psychological realm (e.g., van der Kolk & van der Hart, 1989; Weisaeth, 2002). The repeated mental images of neurotic patients were the focus of concern, rather than the physical pathology or moral failing of the individual (Healy, 1993).

War experiences have brought out much of the knowledge that we today have about human responses to adverse events. Several designations have been applied to describe human horror from wars. “Shell shock” was used for soldiers of World War I suffering from nervous collapse and exhaustion (Myers, 1915). Additionally, “the irritable heart of soldiers”, “combat neurosis”, or “war neurosis” appeared in the times of war (e.g., Gersons & Carlier, 1992).

Abram Kardiner began his career treating traumatized U.S. World War I veterans. During World War II, he described the responses which closely resembled those of today’s PTSD (Monson, et al., 2007; van der Kolk, 2007). Included were increased feelings of irritability and outbursts of anger, auditory hypersensitivity, fixation on the trauma, disrupted personality functioning, and disturbed dreams (Kardiner, 1941). Observations of other categories of survivors from World War II, such as the concentration camp survivors (Eitinger, 1964) and the war sailors (Askevold, 1976/77) expanded the body of research.

The increased attention to posttraumatic responses in the 1980s has often been ascribed to the thousands of returning U.S. Vietnam veterans (Friedman, Resick, & Keane, 2007). In the 1970s, studies of civilian victims such as children and women also started to emerge (van der Kolk, et al., 1997). Leonore Terr demonstrated early the mental consequences for children as much as four years after a major trauma (1981, 1983). Goldine Gleaser, Bonnie Green, Carolyn Winget and their colleagues published the early studies on the survivors after the Buffalo Creek dam collapse (Gleser, Green, & Winget, 1981).

At about the same time, Mardi Horowitz’ ground breaking book on the stress response syndromes was published (Horowitz, 1976). In his work, he outlines the typical patterns of intrusive and avoidant mental processes often seen in traumatized persons. His work was a major forerunner on the North American continent to the diagnosis of posttraumatic stress of 1980.

Traumatic stress studies can still be seen as divided into those that focus on war and those that are targeting civilian events. Within the latter, disaster studies represent a specialized field.

Disaster studies – opportunities and challenges

A disaster has been defined as "a potentially traumatic event that is collectively experienced, has an acute onset, and is time-delimited; disasters may be attributed to natural, technological, or human causes" (McFarlane & Norris, 2006, p. 4). Even though Edvard Stierlins work from 1910/1911 often has been described as the first published disaster study (van der Kolk, et al., 1997), books on the topic did not appear until the late 1970s (Quarantelli, 1978; Raphael, 1986). The first textbook on disaster psychiatry appeared only recently (Ursano, 2007).

Disasters have always been a part of man's existence; they occur time and again around the world. In the U.S. national representative study of mental health, 19% of the men and 15% of the women reported to have been exposed to a natural disaster such as fire or flood etc. For accidents, the exposure rate was 25% for men and 14% for women (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). In a representative sample from Australia, those reporting involvement in natural disasters amounted to 20% for men and 13% for women. For life threatening accidents, the rates were 28 % and 14%, respectively (Creamer, Burgess, & McFarlane, 2001).

Disasters have been recognized to provide unique opportunities for studies of the effects on mental health after adverse events in a hale and hearty, randomly selected population (Raphael, 1986). Genetic influence on the occurrence of every-day life events such as marital incompatibility and work difficulties, financial problems or illnesses has been demonstrated (Plomin, 1994). In contrast, exposure to most disasters is not a direct consequence of personality. The importance of understanding major traumas is highly

acknowledged. Nevertheless, ethical committees would not allow experimental or laboratory testing of such events. Accordingly, researchers in the field depend on the study of survivors from naturalistic settings.

In terms of challenges, the unpredictability of such events represents one. Much of the disaster research has been motivated by a sense of urgency and concern (Norris, Galea, Friedman, & Watson, 2006). Rigorous research requirements are often hard to meet for neat and thorough planning of the desirable number of participants from power-estimations, and the careful development of suitable inventories. When disasters strike, the researcher has to draw on previous knowledge and experience. Accordingly, if the impact of major stress is to be studied, the settings have to be naturalistic, and the research paradigm must be different from those in the experimental designs (Holen, 1990).

As for trauma research in general, the interests in disasters have been growing in the last decades (Norris & Elrod, 2006). Several meta-analyses have concluded that such events have major implications for health (Katz, Pellegrino, Pandya, Ng, & DeLisi, 2002; Neria, Nandi, & Galea, 2008; Norris, Friedman, & Watson, 2002). The longitudinal effects of disasters, however, remains obscure. Carefully conceived studies exploring the long-term course of distress after disasters have been called for (Galea, Nandi, & Vlahov, 2005; Neria, et al., 2008; Norris, 2006; Norris, Friedman, & Watson, 2002).

Disaster research in Norway

In Norway, disaster studies have their origin in long traditions. In a review by Malt and Weisæth (1989), the focus on the effects of adverse events emerged in the first half of the 20th century, but the breakthrough has been ascribed to the international works on WW II concentration camp survivors by Leo Eitinger and Axel Støm (Eitinger, 1964; Eitinger & Strøm, 1973). Eitinger's interest in human responses to horror was deeply rooted in his personal, Jewish background. He was trained as a medical doctor in former Czechoslovakia.

In 1939, he fled to Norway, but he was deported to German concentration camps in 1943. Out of about 600 Jews from Norway, he was one of the less than 30 who returned after WW II. He continued his medical profession by specializing in psychiatry, and devoted much of his work to the health consequences of war, for those in the military as well as for those who were civilians and refugees (Sund, 2008). In his work on the long-term consequences of the concentration camps, higher mortality and morbidity was documented. Together with Axel Strøm, Eitinger continued the work with the KZ syndrome, building on a collection of symptoms already described in part in the early fifties by Danish researchers (Helweg-Larsen et al., 1952). A persistent cluster of symptoms was seen, which included fatigue, irritability, depressed mood, headache, restlessness, concentration and memory problems.

The war-sailor syndrome with a similar symptom cluster was later described among World War II sailors who had crossed the Atlantic Sea in convoys under constant threats of being torpedoed by the German submarines (Askevold, 1976/77; Egede-Nissen, 1978). Lasting effects on health from extreme and long-term stress was again demonstrated. Both the KZ syndrome and the later war-sailor syndrome were European forerunners to the diagnosis of PTSD.

The development of traumatic stress studies was facilitated by the establishment of the world's first Chair of Disaster Psychiatry (Malt & Weisaeth, 1989). This was made possible by the collaboration between the Joint Norwegian Armed Forces and the University of Oslo. Arne Sund was the Chief Psychiatrist of the Royal Norwegian Forces. He was also the first professor in Disaster psychiatry. Like Eitinger, Sund had personal war experiences which may have instigated his subsequent interest in psychological trauma. Serving as a medical doctor and surgeon in the Korean war, he was directly exposed to human atrocities. In his later work, he initiated the study of survivors from civilian disasters in Norway (Sund, 2008).

Under his supervision, three doctoral dissertations targeted civilians' responses to adverse events. The contexts were after an industrial disaster (Weisæth, 1984), after motor vehicle accidents (Malt, 1987), and after the North Sea oil-rig disaster (Holen, 1990). Related works were published in international journals and books (Holen, 1991; Malt, 1988; Malt, Blikra, & Hoivik, 1989; Malt & Ugland, 1989; Weisaeth, 1989a, 1989b, 2001).

This thesis, and the parallel thesis by Hans Jakob Bøe, are both based on the very long-term follow-up studies of the survivors from the capsized oil-rig in the North Sea.

In Bergen, the Center for Crisis Psychology was founded in 1988. Its activities includes clinical research, educational activities and research on the impact of stressful events; disaster-related work has also been published (e.g., Dyregrov, Frykholm, Lilled, Broberg, & Holmberg, 2003; Dyregrov & Gjestad, 2003). Moreover, at the University of Bergen, the Trauma Psychology Research Group followed survivors from a bus accident in Western Norway after one, three, five, ten and 20 years (e.g., Winje, 1996; Winje & Ulvik, 1998). The Operational Psychology and Forensic Research Group has also published disaster related studies (e.g., Eid, Johnsen, & Saus, 2005; Eid, Johnsen, & Thayer, 2001; Johnsen, Eid, Lovstad, & Michelsen, 1997).

In 2004, the National Centre for Violence and Traumatic Stress Studies (Nasjonalt kunskapssenter om vold og traumatisk stress; NKVTS) was established in Oslo. The centre is currently running several research projects. Some target disasters, and recently, studies on the tsunami in South Asia (2004) have been carried out (e.g., Hafstad, Gil-Rivas, Kilmer, & Raeder, 2010; Heir, Piatigorsky, & Weisaeth, 2009; Hussain, Weisaeth, & Heir, 2010a, 2010b; Jensen, Dyb, & Nygaard, 2009; Kristensen, Weisaeth, & Heir, 2009; Thoresen, Tonnessen, Lindgaard, Andreassen, & Weisaeth, 2009), also in collaboration with the Swedish National Centre for Disaster Psychiatry at Uppsala University (e.g., Bergh

Johannesson, Lundin, Hultman, Lindam, Dyster-Aas, Arnberg, & Michel, 2009; Heir, Rosendal, Bergh Johannesson, Michel, Mortensen, Weisaeth, Andersen, & Hultman 2010).

To conclude: Disaster studies have had long traditions and deep roots in Norway. The studies in Norway on traumatic stress are still prolific, and they are likely to be continued by new generations of researchers.

Posttraumatic stress disorder (PTSD)

Posttraumatic stress disorder (PTSD) has in general been studied as a possible negative outcome of trauma, and of disasters in particular (Norris, Friedman, & Watson, 2002). The inclusion of PTSD in the diagnostic manual in 1980 provided a new option to classify chronic conditions in people who had developed long-term symptoms after major traumatic events (Yehuda & McFarlane, 1995). A stressor criterion, or the A criterion, is the gate keeper for defining who may fulfill the criteria for the diagnosis. In the current version of the DSM, the stressor is defined: "The person experienced, witnessed or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. The person's response involved intense fear, helplessness, or horror" (American Psychiatric Association, 1994).

Moreover, seventeen items from three symptom clusters are defined in terms of their connection to the A criterion, and they include: 1) Re-experience or intrusions of the trauma (B-criteria), at least one of five symptoms is required; 2) Avoidance and numbing (C-criteria), three of seven criteria are currently required; 3) Hyperarousal (D-criteria), two of five symptoms are required. The disturbance has to last more than one month (E-criteria). The symptoms should have elicited significant clinical distress or impaired the patient's social and/or occupational life or functioning (F-criteria) (DSM-IV; American Psychiatric Association, 1994).

Several studies have demonstrated that the prevalence of PTSD in a population is much lower than the frequency of exposures to traumatic events. Some selected studies are presented in table 1 .

Table 1. Comparing prevalence of exposure to trauma in relation to prevalence of posttraumatic stress disorder in some epidemiological studies

Author (Year)	**N**	**Country**	**Lifetime Exposure**		**Prevalence PTSD**	
			Men	**Women**	**Men**	**Women**
Kessler et.al (1995; 1999)	5877	USA	60.7%	51.2%	5.0% *a* 3.9% *b1*	10.4% *a* 3.9% *b1*
Craemer et.al (2001)	10641	Australia	64.5%	49.5%	1.2% *b*	1.4% *b*
Hapke et.al (2006)	4075	Germany	19.5%	20.0%	0.6% *a* 0.3% *b*	2.2% *a* 1.1% *b*
Stein et.al (1997)	1002	Canada	81.3%	74.2%	1.2% *c*	2.7% *c*

a: lifetime prevalence
b: 12-months prevalence
c: 1 month prevalence
[1] : mean of total sample

The studies differ in the ways the prevalence of PTSD is reported, of a lifetime, during the last year, or currently. Solid comparisons are limited (Creamer, et al., 2001). Nevertheless, the tentative conclusions are firstly that exposure to trauma is quite common. Secondly, that exposure does not inevitably lead to the development of PTSD.

Diversity of posttraumatic stress responses

In the aftermath of trauma, posttraumatic suffering may go beyond the full-blown diagnosis of PTSD. Frequently, comorbidity is found with diagnoses such as depression, anxiety or substance abuse (Kessler, et al., 1995). “Partial” or “subtreshold” PTSD has also been often used in describing victims who are affected by debilitating symptoms, but who fail to meet the full diagnostic criteria of the disorder (Grubaugh et al., 2005; Mylle & Maes,

2004). A Canadian prevalence study found that the 1-month prevalence of partial PTSD did not differ essentially from that of the full-blown PTSD; 3.4% versus 2.7% for women, and 0.3% versus 1.2% for men (M. B. Stein, et al., 1997).

The debilitating effects on health and function with subthreshold PTSD have been widely debated (Amaya-Jackson et al., 1999). Recent studies have shown fairly equal rates of disability and comorbidity between those fulfilling the criteria and those with a partial PTSD (Jeon et al., 2007; van Zelst, de Beurs, Beekman, van Dyck, & Deeg, 2006). Accordingly, the current diagnostic DSM-criteria may be too limited to capture the relevant diversity of the psychopathology after trauma.

Moreover, the development of chronic posttraumatic stress has been described to involve several stages. Initially, the distress is relatively restricted to specific stress symptoms. Thereafter, severe disability may follow, including mental and somatic comorbidities (Davidson, 2001; Yehuda & McFarlane, 1995). In the long-term perspective, wide-ranging mental health consequences have been demonstrated after combat (Solomon, Shklar, Singer, & Mikulincer, 2006). Similar problems were reflected in this sample in 1985 (Holen, 1990), and likewise, in the 10- year follow-up study of the Piper Alpha disaster (Hull, Alexander, & Klein, 2002).

A certain overlap between the scales targeting various aspects of mental health is to be expected. To capture the diversity of the posttraumatic psychopathology, a broad approach to the study of the ensuing mental health problems seems warranted.

Long-term impact of exposure to disaster

Reports on the very long-term effects of exposure to disasters are rare. In the most extensive disaster review so far, only 15% (n = 33) of 225 studies had a follow-up that covered more than one year post-disaster (Norris, 2006; Norris, Friedman, & Watson, 2002). Meta-reviews have concluded that posttraumatic stress among survivors usually declined

rapidly during that first year, but for some, the symptoms persisted (Neria, et al., 2008; Norris et al., 2002).

In research on combat related stress, lasting effects have been shown (Levy & Sidel, 2009) and in epidemiological trauma studies, PTSD did not remit in more than slightly one third of the cases (Kessler, et al., 1995). Suffering over decades is well-documented for war veterans (e.g., Dirkzwager, Bramsen, & van der Ploeg, 2001), for prisoners of war (e.g., Solomon & Dekel, 2005), and for Holocaust survivors (e.g., Amir & Lev-Wiesel, 2003).

As for disasters, longitudinal follow-up studies have showed that some survivors report distress even after a very long time. Posttraumatic problems were reported by 44% two years after the Buffalo Creek Dam collapse, and 28% reported similar distress 14 years later (Green et al., 1990). In the 25-year follow-up study of the Borås hotel-fire in Sweden, two thirds reported suffering two years after, and one fifth did so after ten years. In the latest data collection, approximately 10% reported suffering of posttraumatic stress, while 21% reported that the event still had an impact on their daily lives (Lundin & Jansson, 2007).

Twenty years after childhood exposure to a bushfire, a recent study found only a small direct difference between the frequencies of mental health diagnosess between the survivors and a control group. Nevertheless, 75% of the victims reported some degree of distress in relation to the bushfire (McFarlane & Van Hooff, 2009).

In retrospective studies carried out just once in the wake of disasters, lasting impact on people's lives and well-being has been found. In a ten year follow-up of survivors from the Piper Alpha oil rig disaster, 21% fulfilled the diagnostic criteria for PTSD (Hull, et al., 2002). In a 33-year follow-up of the children from the Aberfan disaster in 1966 in which a coal slag heap collapsed on to a school, 29% were found to suffer from current PTSD (Morgan, Scourfield, Williams, Jasper, & Lewis, 2003). In a 36-year follow-up of survivors from a dam

collapse, the rate of current PTSD was 21% (Favaro, Zaetta, Colombo, & Santonastaso, 2004).

While the studies mentioned above all found the prevalence of lasting suffering to range from 20 to 30%, a study of Greek earthquake survivors found a much higher proportion; fifty years later, most survivors (78%) reported that the natural disaster had a current strong influence upon their lives (Lazaratou et al., 2008).

Long-term studies involving repeated measures of distress in disaster survivors, and in combination with a matched comparison group, are rarely found. Accordingly, the knowledge about the very long lasting effects of single disasters still remains obscure.

Risk factors

Why do some people recover from traumatic events, while others experience lasting posttraumatic suffering? Risk-factors have been extensively studied, but the picture is ambiguous (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003).

In an often cited study by Brewin and colleagues (2000), three risk factors remained uniform across studies; i.e., psychiatric history, childhood abuse and family history. Neuroticism as a personality trait is closely linked to most psychiatric conditions (Costa & McCrae, 1992a). Retrospective studies have called attention to neuroticism as a possible vulnerability factor for the development of PTSD (Fauerbach, Lawrence, Schmidt, Munster, & Costa, 2000; Holeva & Tarrier, 2001; McFarlane, 1988a; Talbert, Braswell, Albrecht, Hyer, & Boudewyns, 1993). Further underpinning for neuroticism as a risk factor has been given through the findings of a national representative U.S sample (Cox, MacPherson, Enns, & McWilliams, 2004) and also, from prospective studies (Engelhard & van den Hout, 2007; Engelhard, van den Hout, & Schouten, 2006).

In another review, the strongest risk factors were related to the immediate or early stress responses (Ozer, et al., 2003). The inclusion of the diagnosis, Acute Stress Disorder

(ASD) in DSM-IV was an effort to capture the early stress responses, but also a way to identify those who may develop PTSD (Cardeña et al., 1998; Harvey & Bryant, 2002). Mixed findings have been made about the predictive value of early responses for later PTSD. While a recent study found that the majority of those developing PTSD did not initially meet the criteria of ASD (Bryant, Creamer, O'Donnell, Silove, & McFarlane, 2008), a review of longitudinal studies concluded that the acute symptoms turned out as a risk factor (Peleg & Shalev, 2006). When it comes to the very long-term predictions from the early stress responses, combat experiences in a 50-year prospective study predicted the symptoms of PTSD (Lee, Vaillant, Torrey, & Elder, 1995). Moreover, links to later outcomes in terms of posttraumatic symptoms and general social functioning were found twenty years later among combat veterans from the Lebanon war (Solomon & Mikulincer, 2006; Solomon, et al., 2006).

Most studies on how early responses may predict later outcome have used a single measure point to cover the initial levels of stress. Norris and colleagues (2003) demonstrated how early recovery, or change over time, worked as a buffer. After at least one year, the group with stable, severe initial stress manifestations had more PTSD symptoms than the group with severe, but transient early reactions. Taking aspects of change or recovery into account, may add to the general understanding of the temporal relationship of early responses and later outcomes.

From end-points to trajectories of change

A shift from single endpoints as the main outcome to trajectories of change over time has recently been noted in the trauma field (Peleg & Shalev, 2006). Already in the late 1980s, eight different paths of posttraumatic morbidity were demonstrated by McFarlane (1988b) when studying firefighters in the long-term. In the early 1990s, Blank suggested to distinguish between the course of PTSD as being acute, delayed, chronic, intermittent and recurrent (1993).

By new developments in the methodology for studies of change, the longitudinal research has been enriched (Singer & Willett, 2003). Analyses of individual trajectories have been noted as particularly useful in trauma research (King, King, Salgado, & Shalev, 2003; Norris, 2006). In contrast to many other arenas within the mental health field, distress precipitated by a major trauma has a clear and traceable onset. The trajectory of distress after a disaster is usually obtainable. By the latent growth modeling (LGM), the individual's change over time is estimated. The approximations may be used for the prediction of the outcome.

Within this framework, O'Donnel et al., (2007) showed that those with and without PTSD after one year had different routes of recovery. By applying latent growth modeling, Murphy et al., (2003) showed that the decline in PTSD symptoms over five years after parents' loss of their children was predicted by the parents' gender and their perceived social support.

By also including the latent categorical classes into the growth modeling, the approach of Growth Mixture Modeling (GMM) is an alternative to LGM. Unlike traditional latent growth modeling which attempts to fit one growth curve to the entire sample, the goal of the growth mixture modeling is to identify various possible latent classes. The classes would then have different and specific growth curves or trajectories (B. Muthèn, 2001). The number of latent classes is determined by comparing the relative fit of the models with an increasing number of classes.

Over six years after the return of the veterans from the Gulf-war, Orcutt and colleagues (2004) identified a resilient and a chronic pathway in the posttraumatic symptoms by comparing individual trajectories of change. A similar distinction was found in a recent study in which heavy traumatized children were followed over three years (Nugent et al., 2009). By emphasizing that bouncing back seems to be the most common response to trauma,

Bonnano (2004) divided the prototypical patterns of disruption after a traumatic event into four patterns. He named them as chronic, delayed, recovery and resilience. The four trajectories were lately demonstrated by following a sample exposed to traumatic injuries over six months (deRoon-Cassini, Mancini, Rusch, & Bonanno, 2010).

A study targeting the trajectories after single disasters in two different samples, also demonstrated similar patterns (Norris, Tracy, & Galea, 2009). Both after the 11th September 2001 and after the Mexico floods in 1999 resistance, resilience, recovery and chronic dysfunction were found across the first 2 ½ and 2 years, respectively. Among terror victims, an additional delayed course was detected. Of recent, the interest in resilient trajectories has increased, as it turns out that most people exposed to traumatic events cope well (Bonanno, 2004; Bonanno, Galea, Bucciarelli, & Vlahov, 2006). Trajectories across several decades after a civilian disaster have so far not been demonstrated.

Resilience and trauma

In the 1970s and 1980s, resilience was discussed in developmental psychopathology in relation to protective factors seen in some children exposed to unfavourable life circumstances (Garmezy, 1971; Rutter, 1985). Later, the concept has gained attention also in traumatic stress studies (Bonanno, 2004; Bonanno, et al., 2006; Layne, Warren, Watson, & Shalev, 2007). A much used definition of adult resilience was given by Bonanno (2004, p. 20): "the ability of adults in otherwise normal circumstances who are exposed to an isolated and potentially highly disruptive event, such as the death of a close relation or a violent or life-threatening situation, to maintain relatively stable, healthy levels of psychological and physical functioning".

According to Bonnano, the drop of normal functioning displayed by the trajectories of resilience will be short (weeks), and it is considerably different from the recovery trajectories which showed poor functioning over months, or even years. Resilience is characterized by

just a transient absence of the normal functioning; the overall stability is maintained. Furthermore, resilience is to be distinguished from resistance, which refers to a trajectory absent of mental distress (Bonanno, 2004; Layne, et al., 2007). The recognition of resilience has implications both on the individual as well on the community level. In the aftermath of adverse events, it is important to emphasize resilience to the public rather than victimhood to foster recovery (Wessely, 2005).

Posttraumatic growth

While resilience refers to the capacity to bounce back to normal, other recent theoretical constructs have searched for thrive and positive changes after trauma. By introducing posttraumatic growth or PTG (Tedeschi & Calhoun, 1996) and parallel concepts such as stress-related growth (Park, Cohen, & Murch, 1996), and benefit-finding (Affleck & Tennen, 1996), the objective was to capture quantitatively positive outcomes. PTG has been defined as a "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (Tedeschi & Calhoun, 2004, p. 1). The notion of posttraumatic growth has roots in ancient literature, religion and philosophy, as well as in the early scholars of psychology (Calhoun & Tedeschi, 2006).

PTG has been widely debated and a body of research on PTG has been emerging (Helgeson, Reynolds, & Tomich, 2006; Tedeschi & Calhoun, 2006). Exploration of the concept is still in it's primary stages, and several questions about its nature remain unresolved (Hobfoll et al., 2007; Maercker & Zoellner, 2004; Park, 2004; Tedeschi & Calhoun, 2006; Wortman, 2004). One controversy deals with whether PTG relates to mental health problems (Park & Helgeson, 2006). Negative, positive, as well as no relationship between stress symptoms and PTG have been demonstrated (Helgeson, et al., 2006).

In the initial theory, the argument was that a minimum of stress had to be present in order to initiate the cognitive restructuring assumed to bring about posttraumatic growth

(Tedeschi, Park, & Calhoun, 1998). Accordingly, preliminary co-existence of stress symptoms and PTG would not come as a surprise (Janoff-Bulman, 2004). PTG is not identical to an increase in well-being, or a decrease in distress. Rather, the presence of PTG may imply fuller and richer lives in the survivors (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 2004). Others have opposed this view. Some have argued that PTG should affect the person's mental health in positive ways (Zoellner & Maercker, 2006). The two-component, or Janus-Face model of PTG, tries to reconcile the opposing views by suggesting a double aspect by including both a constructive as well as a dysfunctional side to explain self-perceived posttraumatic growth (Maercker & Zoellner, 2004). The constructive side is in line with the original PTG theory, signifying positive changes. A dysfunctional side is also included; PTG may represent distortions counterbalancing emotional distress. Others have pointed to the power of illusions helping traumatized persons to comfort themselves from the misery of their traumatized lives (Taylor & Brown, 1988; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). In this view, posttraumatic growth can be seen as a compensatory strategy (Levine, Laufer, Stein, Hamama-Raz, & Solomon, 2009; McFarland & Alvaro, 2000; Wortman, 2004; Znoj, 2006).

Varying time frames have been suggested to explain the diversity found. The relationship between PTG and well-being has more often been positive when two years or more have passed (Helgeson, et al., 2006). Some long-term expressions of growth and mental health have been demonstrated (Forstmeier, Kuwert, Spitzer, Freyberger, & Maercker, 2009; Lev-Wiesel & Amir, 2003; Maercker & Herrle, 2003; Solomon & Dekel, 2007). These studies have not included measures close to the event. The longitudinal project on the survivors from the North Sea oil rig disaster across almost three decades may add new insight to the long-term aspects of posttraumatic growth.

North Sea oil rig disaster – 27th March 1980

The present study is part of a larger long-term investigation of the survivors from the North Sea oil rig disaster of 27th March, 1980. The floating rig, named after the Norwegian author, Alexander L. Kielland (1849 -1906), was located on the Ekofisk field, halfway between Norway and the United Kingdom.

That afternoon in late March, the weather conditions were extremely bad. The winds were strong; 20 m/s which amount to a near gale. The waves were of 6-8 meters high. The water temperature was 4°C. The clear sight was limited to approximately 30 meters. Helicopters would normally not operate under such conditions due to the density of the fog. Around 6:30 P.M., a loud rumble was heard as one of the five legs broke off. The rig immediately tilted to an angle of 30°. The anchors on the opposite side kept the rig temporary stable. However, electricity onboard broke down and water poured in. The situation was chaotic. About forty minutes later, the angle had gradually reached 45° when the anchor wires broke. The rig capsized immediately; in less than a minute it was floating upside down with only the remaining four pontoons visible on the surface (Enghaug & Lønning, 1980; Holen, Sund, & Weisæth, 1983).

Rescue work was very difficult. Of the 212 men onboard, the minority of 89 survived. All had been directly exposed to a major trauma. They survived either by swimming over to the neighboring Edda rig, or by entering rafts or lifeboats, by being picked up from the sea by helicopters or supply vessels. Seventy-five of the survivors were registered with domicile in Norway. They have later been followed-up by this larger research project through four waves of data collections, in 1980, 1981, 1985 and 2007. The remaining 14 survivors were from UK, Spain, Portugal and Finland. They were excluded from the study to avoid problems related to cultural and language differences.

The first wave of data collection after the North Sea oil rig disaster was carried out in the months immediately after the disaster in 1980. Included were interviews and the completion of questionnaires. The second wave consisted of a mail survey after approximately 14 months. The third data collection was carried out about five years after the disaster; included were in-depth interviews, surveys in addition to the collection of social welfare data. Results from the three earliest data collections have been published elsewhere (Holen, 1991, 1993; Holen, et al., 1983).

The findings after the data collection in 1985 could be separated into three outcomes: one relating to the survivors' subjective appraisal of distress, one related to their occupational dysfunction, and one was related to the duration of their long-term sick-leaves after the event. The disaster experience itself, and also, the patterns of high alcohol consumption were significant predictors in all three outcomes. In addition, personality features conceptually related to neuroticism explained the outcome related to subjective reports on stress. Job stress, social support and background factors such as problems in childhood and a history of psychological suffering explained occupational dysfunction (Holen, 1990). The sick-leaves were far more common among the survivors on diagnoses subsumed under the three group labels "psychiatric", "psychosomatic" and "causalities" when contrasted with the comparison group (Holen, 1991). To summarize, major differences were found between the survivors and the matched comparison group after five years.

The last wave of data collection was organized in 2007 and consisted of semi-structured interviews, mostly over the phone, surveys and social welfare data. The papers of this thesis draws information from the self-reports made at all four points in time from 1980 to 2007, and also, from the demographic information, as well as the detections of later trauma.

General aim of thesis

The general aim of this thesis was to explore aspects of the long-term outcomes in mental health among survivors of the North Sea oil rig disaster of 1980.

Specific research questions addressed in this dissertation

In paper I:

- Will differences in stress levels disappear in the very long run between disaster survivors and those unexposed to disaster?
- Can the initial levels of stress responses and the early recovery within the first weeks post trauma predict the levels of distress in the very long-term?

In paper II:

- Will differences in general mental health disappear in the very long run between survivors and the comparison group?
- Can trajectories related to early recovery and long-term mental health be identified across decades?

In paper III:

- Will posttraumatic growth reported after almost three decades relate to the very early and later levels of posttraumatic stress, and also, to the general level of mental health?

Methods

Design, procedure and participants

Design and procedure

This disaster study has a naturalistic, longitudinal design of prospective long-term outcomes. The survivor population has been followed-up across almost three decades, in 1980, 1981, 1985 and 2007. The comparison group was included in the last two waves.

In 2005, all survivors (n = 61) and comparisons (n = 78) still alive and traceable were asked for written consent of continued use of the already collected data from the past. In addition, they were asked to take part in the next study. The fourth study, conducted in 2007[1] consisted of three parts: an extensive, in-depth telephone interview; a survey to be returned by mail; and the collection of health insurance data.

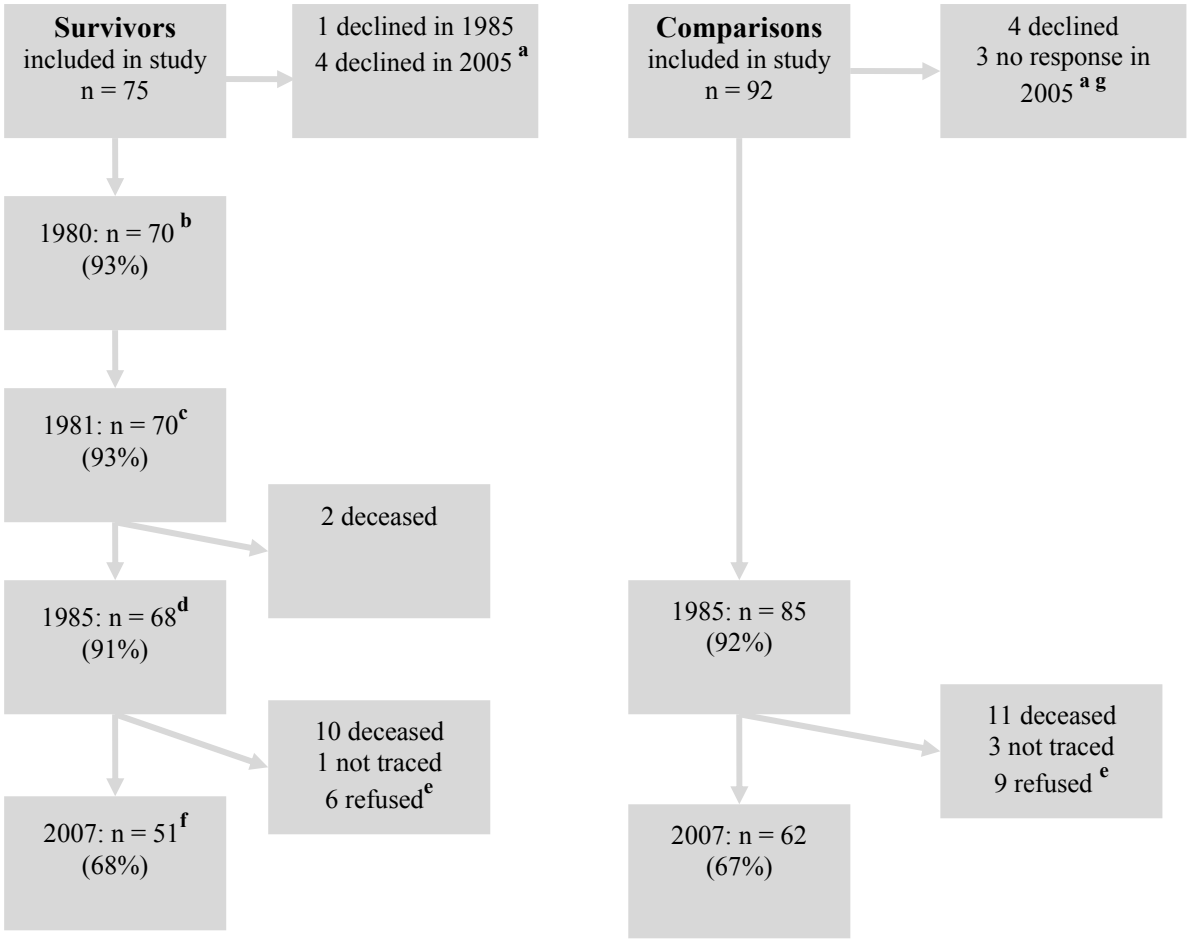
Participants

Of the 75 Norwegian survivors included in 1980, 51 (68.0%) participated in one or several parts of the study in 2007. Of the 92 men included in the comparison group in 1985, 62 (67.4 %) took part in the latest data collection. See figure 1 for a flowchart of participation across the four data collections.

Demographic information was collected from the survivors only, by personal interviews in 1980, and in 1985 it was done both for the survivors and the comparison groups. In 2007, it was done by telephone[2]. In table 2, an overview is given of the main psychosocial data from the survivors at the time of the disaster. Also, this information is covered at the five and 27-years follow-up studies for both the survivors and the comparison group.

[1] two men in the comparison group were not contacted until 2009 due to confusion with the names list
[2] Five men were again interviewed personal, in accordance with their wishes

Figure 1. Flowchart of all survivors from 1980 to 2007 and the comparison group from 1985



a: in 2005, when all participants still alive were approached for renewed consent, and also, asked to take part in next data collection
b: n = 3 had missing on some parts of self-report
c: n = 1: completed only a few questions in 1981, accepted to be contacted and participated in the 1985-interview
d: n = 3: did not complete the self-report, but other parts of study
e: refused participation in all parts of 2007- study
f: n = 45 completed all parts (i.e., SR=self report, I = interview, SW= social welfare data); n =1: I+ SW, n = 1 SW + partly I (due to illness), n = 1: SW + partly I+ partly SR (due to age), n = 1 SW, n = 1: SW + SR, n = 1: SW + I + partly SR (n = 46 completed all self-reports in 2007, n = 48 completed some self-reports in 2007)
g: data from the non-responders were deleted in accordance with the request from the ethical committee

Table 2. Age, marital and work status of survivors at the time of disaster in 1980, and of survivors and members of the comparison group at the follow-up in 1985 and 2007

		Time of accident	**Long-term follow-up**			
	Year	**1980**	**1985**		**2007**	
		Survivors N = 70*a)*	**Survivors N = 68**	**Comparisons N = 85**	**Survivors N = 51*c)***	**Comparisons N = 62**
Age		34.7 (9.3)	39.6 (9.0)	39.6 (8.5)	59.7 (7.4)	59.9 (6.8)
Marital status	Married/ Cohabitant	63 (90.0%) ***b)***	56 (82.4%)	76 (89.4%)	38 (74.5%)	48 (77.4%)
	Single	4 (5.7%)	5 (7.4%)	6 (7.1%)	2 (3.9%)	1 (1.6%)
	Divorced	1 (1.4%)	7 (10.3%)	3 (3.5%)	7 (13.7%)	9 (14.5%)
	Widower	1 (1.4%)	0	0	2 (3.9%)	4 (6.5%)
Work status	Employed	70 (100%)	55 (80.9%)	85 (100%)	25 (49.0%)	34 (54.8%)
	Unemployed	0	4 (5.9%)	0	0	0
	Retired	0	0	0	10 (19.6%)	16 (25.8%)
	Disablement/ Sickleave	0	9 (13.2%)	0	14 (27.4%)	12 (19.4%)

a): n= 69 for marital status; one person did not participate in the interview
b): of these, 4 were in stable relationships/engagements
c): n = 49 for marital and employment status; two persons did not participate in the interviews

Measures

Targeting mental health

Posttraumatic Stress Scale (PTSS-10)

The level of immediate stress responses was measured by the Post-Traumatic Stress Scale, a self-report inventory (Holen, et al., 1983). PTSS was used several times to detect the levels of stress at the subsequent data collections. The questionnaire was originally developed from a large pool of items endorsed by the survivors in 1980, and again in 1981. Single items were included which significantly distinguished between those with mental health problems

and those without. A 10-item and a 12-item (Holen, 1990) version exist. PTSS had originally a dichotomous scoring option, i.e., 1 - yes or 0 - no. Later, a Likert-scale from 1 to 7 was introduced (Weisæth & Mehlum, 1993). At times, the scale has been referred to as the Post-Traumatic Symptom Scale, but as the items rather deal with manifestations of stress than symptoms of a diagnostic entity, the designation Posttraumatic Stress Scale has been preferred. Psychometric evaluations of the PTSS with the Likert response option have been carried out in Norwegian samples (Eid, Thayer, & Johnsen, 1999).

The 10-item version with the dichotomous scoring was used at all measure points of this study. Accordingly, the following ten stress manifestations were included: sleep difficulties, nightmares, depressed mood, startle reactions, tendency to withdraw, irritability, unstable mood, bad conscience, fear of reminders, and tensions in the body. In 1980, a retrospective post-trauma rating of the duration of each manifestation was made. For the scoring, six times frames were given: 1-3 days, 4-7 days, 2 weeks, 3 weeks, 4 weeks, 8 weeks or more. To allow growth modeling each item was coded in a dichotomous way for the six time points. If an item was endorsed to have lasted three weeks, the scoring on that time points was: 1-1-1-1-0-0. Accordingly, six total sum scores, each with a possible range from zero to ten were obtained from the initial positive endorsements from the six measure points. Cronbach's alphas for the total scores at the six time points were in 1980: $\alpha_{(n = 69)}$ =.61, .64, .71, .76, .76 and .77[3].

The PTSS does not presuppose exposure to a major stressor. Thus, comparisons with the unexposed oil-rig workers were possible. In 1985, the Cronbachs alphas were: $\alpha_{(n = 65)}$ =.86 for the survivors and $\alpha_{(n = 85)}$=.67 for the comparison group. In 2007, the values were respectively: $\alpha_{(n = 47)}$=.89 and $\alpha_{(n = 62)}$=.88.

[3] The participation rate in the three manuscripts this thesis is based on differ. Cronbachs alphas may therefore diverge slightly between the manuscripts. The exact numbers of participants used in each computation are given in brackets.

Impact of Event Scale (IES-15)

The Impact of Event Scale (IES-15; Horowitz, Wilner, & Alvarez, 1979) has been extensively used to detect posttraumatic stress (Sundin & Horowitz, 2003). Although, the IES does not directly diagnose PTSD, the scale has demonstrated to be a valid and a reliable self-report measure of psychological stress responses (Joseph, 2000; Sundin & Horowitz, 2002). The scale has 15 statements and includes seven Intrusion and eight Avoidance items. Contrary to the PTSS, and the later IES-22 (Weiss & Marmar, 1997), no items are targeting hyperarousal in the 15-item version.

The IES-22 was included in the latest data collection (2007), while IES-15 was consistently used at all four waves of the study, i.e., in 1980, 1981, 1985 and 2007. Therefore, the 15-item version was chosen for the longitudinal design. Participants were asked to indicate to which degree the North Sea oil rig disaster had impacted them during the last week prior to each data collection. On all four waves, responses were indicated on a Likert scale from 0 - "Not at all" to 5 - "To a very high degree".

The following Cronbach's alphas were obtained for the scales of Intrusion and Avoidance across the four waves: $1980_{(n = 45)}$; I: .93, A: .88; $1981_{(n = 45)}$; I: .92, A: .85; $1985_{(n = 44)}$; I: .95, A: .89; and $2007_{(n = 46)}$; I: .96, A: .91. The correlation coefficients between Intrusion and Avoidance scales were: 1980: .69; 1981: .69; 1985: .59; and 2007: .82. Due to the high inter correlations between the two subscales, the total IES was used in this study. The alphas for the four total scores were respectively: .94, .93, .95 and .95.

General Health Questionnaire (GHQ-20 and GHQ-28)

The General Health Questionnaire (Goldberg, 1972; Goldberg & Williams, 1988) was employed to capture the general mental health across the 27 years. Paper II applied the 20-item version used in 1980, 1981, 1985 and 2007.

The combination of PTSS and GHQ-20 in paper II was chosen in order to widen the knowledge derived from paper I. The overlap between the measures of specific stress (PTSS) and the general mental health by the GHQ-20 after 27 years was fairly high and as expected ($\rho_{(n=46)}$ = .69). On the content level, however, one may argue that the two measures target rather different aspects of distress.

The 0-0-1-1 scoring was used, giving a potential range of the total sum score from zero to 20. Cronbach's alphas for the survivors were: $1980_{(n=67)}$: .94, $1981_{(n=69)}$: .85, $1985_{(n=65)}$: .95, and $2007_{(n=46)}$: .95. For the comparison group, the alphas were: $1985_{(n=85)}$: .86 and in $2007_{(n=62)}$: .71.

In paper III, the 28-item version of GHQ included only in 2007 was applied (Goldberg & Hillier, 1979). Seven items targeted four scales each: Somatization, Anxiety related phenomena, Social dysfunction, and Depression. The Likert method (0-1-2-3) of scoring was chosen. This is recommended for symptom intensity, rather than psychiatric caseness scoring (0-0-1-1); a wider distribution is thereby obtained (Goldberg et al., 1997). For each subscale, the potential score went from 0 to 21. Cronbach's alphas of the four GHQ-28 subscales (n = 46) had the respective values: .87, .89, .91 and .86.

Miscellaneous measures

Posttraumatic Growth Inventory (PTGI)

The Post Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is one of the most widely used questionnaires to capture positive changes after trauma. The self-report scale has 21-items covering five subscales: Relating to others (7 items), New possibilities (5 items), Personal strength (4 items), Spiritual change (2 items), and Appreciation of life (3 items). The total sum is also used. In the original study, PTGI showed satisfactory internal consistencies for the total score of the 21 items (α = 0.90), as well as for each of the five

subscales; their alphas ranged from 0.67 - 0.85. Also, the original test-retest reliability over two months was fairly good ($r = 0.71$).

PTGI was administered to the participants 27 years after the disaster. Permission to develop a Norwegian translation was obtained from the authors. The questionnaire was translated, then back-translated by a native English speaker, which resulted in minor changes in the Norwegian edition. The participants were asked to indicate on a Likert scale to which degree they had experienced the stated positive changes after the North Sea oil rig disaster. The response options were 0 -"I did not experience this change as a result of my crisis" to 5 - "I experienced this change to a very great degree as a result of my crisis".
Cronbach's alpha of the Norwegian total PTGI score was .95 in 2007 (n= 46).

NEO-Five Factor Inventory (NEO-FFI)

In 2007, to capture aspects of the personality, the Five Factor Inventory (NEO-FFI) was applied. This short version of the NEO PI-R consists of 60 items, targeting the five dimensions of personality: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness (Costa & McCrae, 1992b). Items are rated on a Likert scale from 0 - "Very unlike me" to 4 - "Very like me". The questionnaire has been thoroughly validated, also for the Norwegian population (Martinsen, Nordvik, & Østbø, 2005). The alphas of the translated version range from 0.67 to 0.88. Cronbach's alphas in the present study ($n_{survivors} = 46$/ $n_{comparisons} = 62$) were: N: 0.91/0.91, E: 0.86/0.81, O: 0.70/0.70, A: 0.61/0.69, C: 0.81/0.86.

Statistical analyses

The analyses were carried out by using SPSS for Windows, version 16, for the papers I and III, and version 17, for paper II. Mplus (L. K. Muthèn & Muthèn, 1998-2007), version 5.21, was used for modeling the latent growth curves (paper I) and the growth mixture modeling (paper II).

Two-tailed p-values of .05 or lower were considered statistically significant. Due to the low number of participants, p-values up to .10 were reported. In paper II, ten pair-wise comparisons were done for each outcome measure, Bonferroni corrections were applied by dividing the p-values by the number of post hoc tests.

Descriptive statistics

Descriptive statistics were applied to find the mean values (M) and the standard deviations (SD). Possible differences between the groups with regard to demographic variables were analyzed by Chi-square.

Group analyses

In paper I, the first research question was addressed by a series of non-parametric group comparisons (Mann-Whitney U and Chi-square tests). Kolmogorov-Smirnov tests for normal distributions indicated that all total PTSS scores, except the first, were not normally distributed.

In paper II, deviations from normality were found for approximately one fourth of the variables when contrasting survivors according to their trajectories. Also, the sizes of the classes were unequal. The Kruskal-Wallis test were run to detect the overall differences between the groups, while pair-wise Mann-Whitney U with exact p-values were used for post-hoc tests.

In paper III, the non-parametric correlation coefficient, Spearman's rho (ρ), was chosen due to deviation from normality (Kolmogorov-Smirnov tests). Multiple regression analyses were chosen as the dependent variable (total PTGI) was normally distributed. The total IES scores from the various time points of data collections served as predictors. Subsequent traumas were controlled for in a second block.

The mediating effect of the IES on the relationship between the concurrent PTGI and the associated psychological distress was also explored. The analyses followed the four steps of Baron and Kenny (1986). Firstly, the independent variable has to be related to the dependent variable. Secondly, the independent variable has to have an effect on the mediator. Thirdly, when predicting the dependent variable by the mediator, controlling for the independent variable, this path has still an effect. Finally, the effect of the independent variable on the dependent variable is reduced when controlling for the mediator. The Sobel test was provided as an estimate on whether the mediation effect was statistically significant. Due to the sample size, an additional bootstrapping procedure was employed; n = 5000 bootstrap re-samples (Preacher & Hayes, 2004).

Latent Growth Modeling

The second research question of paper I was addressed by estimating a latent growth model (Duncan, Duncan, & Strycker, 2006) in relation to the six time points in the immediate aftermath of 1980. By this method, two latent parameters were estimated for each individual: an intercept covering the initial number of items positively endorsed; i.e., in the first three days after the disaster. In addition, a slope was computed, representing the individual recovery across those very early weeks.

To test whether the two latent parameters would predict the subsequent levels of the total PTSS at five and 27 years post disaster, the later scores were regressed on the two estimates. If significant, this would indicate that the initial stress levels, and also, the early recovery would influence the long-term outcome. Due to the limited sample size, a residual bootstrapping procedure was employed to establish the reliability of the estimate, and 500 bootstrap draws were chosen (Bollen & Stine, 1992).

Growth Mixture Modeling

In paper II, growth mixture modeling (GMM) was used to identify classes of trajectories. While traditional latent growth modeling attempts to fit one growth curve to the entire sample, the goal of the growth mixture modeling is to identify several possible latent classes of individuals within the sample. The various classes would then have different and specific growth curves (B. Muthèn, 2001).

By comparing the relative fit of the models with an increasing number of classes, the number of latent classes is determined. Bayesian Information Criteria (BIC) were compared between the models and used as fit statistics. Lower values indicate a better fit of the data.

Two independent growth processes were incorporated: the manifestations of stress during the first eight weeks by PTSS, and the repeated measures of general psychological distress from 1980 to 2007 by GHQ-20. Sixteen separate models were estimated.

Firstly, a two class-model, a three class-model, a four class-model, and a five class-model including only an intercept and a linear slope as growth parameters, were estimated for both PTSS and GHQ-20. Secondly, all four models were run with a quadratic slope for PTSS, thereby assuming non-linear growth in at least one class. Thirdly, the quadratic slope was removed for PTSS, but incorporated for GHQ-20. Finally, the quadratic slope was included for both variables.

Missing values

Full Information Maximum Likelihood (FIML) method was applied when estimating the LGM and GMM in Mplus, hence missing values were handled.

Regarding the PTSS scores from 1985 and 2007 in paper I, six responses to single items of the 257 (2.3%) were missing. In paper II, the proportion missing single items were 19 out of 11640 (0.2%). In paper III, 10 out of 4954 (0.3%) possible single items were

missing. Suitable to low occurrences, single mean imputation were performed to replace the few missing values (Fayers & Machin, 2007). To allow estimation of chi-square tables for single items in paper I, the mean imputation of the six missing values were rounded to 0 or 1.

Ethical aspects

The study was approved by the Regional Committee for Medical and Health Research Ethics, and by the Norwegian Social Science Data Services.

Summary of results

Paper I: Initial stress responses in relation to outcome after three decades

The study aimed at predicting posttraumatic stress five and 27 years after the North Sea oil rig disaster. The predictions were based on the initial levels of stress and the early recovery reported in 1980. The Posttraumatic Stress Scale (PTSS) was used at three measure points. The items address sleep difficulties, nightmares, depressed mood, startle reactions, tendency to withdraw, irritability, unstable mood, bad conscience, fear of reminders, and tensions in the body. From 1980, data from 69 of the 70 survivors from 1980 could be used in the latent growth modeling. Follow-up studies included 65 survivors and 85 matched, unexposed oil-rig workers in 1985; and respectively, 47 and 62 in 2007.

At the 5-year follow-up, the survivors reported higher total PTSS scores than those in the comparison group (survivors/comparisons: $M = 3.1$, $SD = 2.9$/ $M = 1.4$, $SD = 1.7$; $U = 1869.5$, $p < .001$). At the 27-year follow-up, the difference did not reach significance. Nevertheless, the survivors tended to report higher levels of stress than the comparison group (survivors/comparisons: $M = 2.6$, $SD = 3.0$/ $M = 1.8$, $SD = 2.6$; $U = 1214.5$, n.s.).
Except for two single items, i.e., sleep difficulties and bad conscience, the survivors in 1985 had significantly more frequent endorsements than the comparison group on every single PTSS item ($p < 0.05$). In 2007, only the items covering startle reactions ($U = 6.96$; $p < 0.05$) and the tendency to withdraw ($U = 5.02$, $p < 0.05$) remained significantly different.
The initial levels of stress and the early recovery rate predicted the very long-term outcome when using the total PTSS scores after five and 27 years. Thus, initial screenings by PTSS may be helpful in the early detection of victims of posttraumatic stress in the very long-term perspective.

Paper II: Disaster survivors in their third decade – trajectories of initial stress responses and long-term course of mental health

This study looks at the trajectories of initial stress and the long-term mental health among 70 survivors from the North Sea oil rig disaster (1980). To find latent classes, a growth mixture modeling of two processes was carried out. The first growth process explored the initial stress manifestations in the first eight weeks by using the Posttraumatic Stress Scale (PTSS-10). The second explored the general mental health in 1980, 1981, 1985 and 2007 by the General Health Questionnaire (GHQ-20). The survivors' scores on GHQ-20 from the last two data collections were contrasted with those of the matched group of oil workers (n = 85 in 1985) who were unexposed to trauma.

When combining early PTSS scores and the long-term GHQ-20 trajectories, four latent classes were identified for the 70 survivors. In the discussion, they were interpreted to be labeled resilient (n = 43; 61%), recovering (n = 10; 14%), chronic (n = 8; 11%), and relapsing (n = 9; 13%). Two thirds of the survivors were resilient and characterized by both a moderate PTSS starting value in addition to a rapid decline across the first eight weeks. The long-term scores on the GHQ-20 remained low. The trajectories of all those in the recovery, chronic and relapse groups had initially high and stable PTSS scores, while the long-term course on GHQ-20 differed. The chronic and the relapsing trajectories were related to a personality style with high scores on neuroticism. Early screening may identify those at risk of long-term mental health problems.

Paper III: Long-term perspectives on posttraumatic growth in disaster survivors

Findings on posttraumatic growth (PTG) and distress have not been consistent. This study examined the relationship in a very long-term perspective. The outcome measure was the Posttraumatic Growth Inventory which was completed by 46 survivors in 2007, i.e., 27 years post trauma. As the relationship between PTG and specific posttraumatic stress is widely debated, the repeated total scores of the Impact of Event Scale (IES-15) were chosen as the independent variables in the first analyses. The scores had been measured soon after the event, and again after one, five and 27 years. In the final follow-up, the general mental health (GHQ-28) was also assessed.

Strong positive associations were found between PTG and the concurrent level of posttraumatic stress. Weaker or no associations were found for their past levels of posttraumatic stress. In the regression analysis with the total PTGI as the dependent variable and the repeated IES scores from the four measure points as independent variables ($F(4,36) = 3.44$, $p < .05$), only the total IES from 2007 appeared as a predictor ($\beta = 0.49$, $p < 0.05$). Controlling for the subsequent traumatic experiences did not alter the findings ($F(5,35) = 3.13$; $p < .05$). IES from 2007 remained the significant predictor ($\beta = 0.45$, $p < 0.05$). The concurrent problems in their general mental health as measured by GHQ-28 clearly coexisted with PTG decades after a disaster, yet the association between PTG and GHQ were mediated by the concurrent posttraumatic stress (IES). The present findings suggest that self-reported posttraumatic growth decades after the trauma is related to the concurrent level of suffering.

Discussion

The main findings of this study will briefly be outlined below, and also, they will be compared with other studies. Thereafter, the strengths and limitations of the present research will be discussed before concluding.

Main findings

At the 5-year follow-up, the survivors reported higher total PTSS scores than those in the comparison group. Except for two single items, i.e., sleep difficulties and bad conscience, the survivors in 1985 had significantly more frequent endorsements than the comparison group on all single PTSS-items. At the 27-year follow-up, the difference in the total scores between the groups did not reach significance. Only the items covering the startle reactions, the tendency to withdraw and unstable mood remained significantly different. A comparable picture was seen for mental health problems. The total GHQ score differed clearly between the survivors and comparisons in 1985, but the difference had faded in 2007.

The initial levels of stress and the very early recovery rate predicted the long-term outcome when using the total PTSS scores after five and 27 years. When combining early PTSS and the long-term GHQ trajectories, four latent classes were identified; they may be called resilient, recovering, chronic, and relapsing. Two thirds of the survivors were resilient. Strong positive associations were found between posttraumatic growth (PTG) and the concurrent level of posttraumatic stress; weaker or no associations were found for the posttraumatic symptom levels of the past.

Fading symptom levels

A relatively well-established picture showing a decrease in symptoms across the first year has been drawn after disasters (Neria, et al., 2008; Norris, Friedman, & Watson, 2002). This is the first disaster study which has included a comparison group and has followed the survivors over 27 years. A continued fading in the symptom levels between survivors and the comparisons were seen over decades.

In 2007, some stress manifestations still distinguished the survivors from the comparison group: the startle reaction, the tendency to withdraw, and the unstable mood. Orr and colleagues (2003) in their twin-study demonstrated that the heart rate response to startling sounds was an acquired sign of PTSD. A recent study showed that both hypersensitivity and an exaggerated startle reaction turned out as essential markers of vulnerability in the development of PTSD (Pole et al., 2009). A sustained activation reflected by the startle reaction was reported in a two-year long-term study of survivors from an air crash accident (Michel, Lundin, & Otto, 2001). In a very long-term perspective, the startle reaction seems most persistent and calls for further explorations.

The fading stress manifestations are in line with prior studies following survivors across decades (Green, et al., 1990; Lundin & Jansson, 2007). After wars, long-lasting stress has been demonstrated in numerous retrospective studies (e.g., Amir & Lev-Wiesel, 2003; Askevold, 1976/77; Bramsen & van der Ploeg, 1999; Dirkzwager, et al., 2001; Eitinger & Strøm, 1973; Levy & Sidel, 2009) but also, after civil disasters (Favaro, et al., 2004; Holen, 1990; Hull, et al., 2002; Lazaratou, et al., 2008; Morgan, et al., 2003). With regard to the mental health problems of the oil rig survivors in 2007, the chronic and relapsing groups reported considerably higher symptom levels than the comparisons. Accordingly, persistent levels of general distress seemed to affect a minor part of the survivors.

To conclude; on the group-level, the symptom load diminishes over time. For some survivors, mental suffering persists in terms of specific posttraumatic stress, but also in the general mental health problems.

Initial stress and long-term predictions

The present findings demonstrate that the long-term links demonstrated between the early stress responses and the later outcome after exposure to war (Solomon, et al., 2006) may also apply to single civilian disasters. The findings are mixed when it comes to how well ASD may be predictive of later PTSD, but reviews have repeatedly reported the early suffering to be a potential risk factor (Norris, Friedman, & Watson, 2002; Peleg & Shalev, 2006).

Unlike prior studies which have been focusing on the long-term links between the initial responses and the outcome several decades later (Lee, et al., 1995; Solomon & Mikulincer, 2006), the present study looked at the rates of recovery as well as the levels of initial stress. The findings underscore that change over time in the very early phases may predict the later long-term outcome. This is in line with the study by Norris and colleagues (2003). They demonstrated that while early high stable symptoms were found to predict later negative outcomes, early high, but transient, symptoms did not.

The debate about the predictive value of the early symptoms is also linked to the questions of early interventions and screening. Most people recover spontaneously. Accordingly, early intervention for all has been considered as inappropriate (Litz & Maguen, 2007). By some, neither routine debriefing nor multiple sessions of early psychological intervention targeting everyone who has been exposed to traumatic events is recommended (Roberts, Kitchiner, Kenardy, & Bisson, 2009; Rose, Bisson, Churchill, & Wessely, 2002). On the other hand, interventions targeting those most at risk have been advocated (Bisson, Roberts, & Macho, 2003; Brewin et al., 2010). Useful screening tools may play an important

role. The present thesis indicates that the initial recovery from stress may serve as a screening tool in the post disaster care.

Mental health problems in the long run

Two thirds of the survivors from the North Sea oil rig disaster were classified as resilient; i.e., they reported some initial stress symptoms that quickly faded during the initial weeks. Thereafter, they stayed well across the decades. Additionally, 14% recovered more slowly; they needed some more time. One fourth reported persistent or increasing problems over the years.

One long-term retrospective study after an earthquake found about eighty percent to be affected by the event fifty years later (Lazaratou, et al., 2008). The affected proportions in the present study, however, concur with the proportion of those affected in the majority of the long-term studies; they range from 20 to 30% (Favaro, et al., 2004; Green, et al., 1990; Hull, et al., 2002; Lundin & Jansson, 2007; Morgan, et al., 2003). The findings are also in line with Bonnano (2004) who underscores that exposure to adverse events most often does not lead to lasting mental suffering.

Roughly one third is recovering from PTSD after major traumas; this was seen in the epidemological US study (Kessler, et al., 1995), as well in a study looking at resilience after the attacks of 11th September 2001 (Bonanno, et al., 2006). With regard to prior studies on trajectories, two studies found approximately 60% to be classified as recovering over time, while 40 % did not (Nugent, et al., 2009; Orcutt, et al., 2004). Others have demonstrated that four or five trajectories fit their data better. Still, resilience and recovering were common paths (deRoon-Cassini, et al., 2010; Norris, et al., 2009).

Changing the focus to the survivors who did not recover fully after the oil-rig disaster, the 24 % who remained in the chronic or relapsing groups are matching the numbers reported by Norris and colleagues (2009). In the sample after September 11th, they found 27% to be

either in the stable high, or in any of the two trajectories moving upward in symptom loads across the first 2 ½ years. In the sample from the Mexico flood, 22% of the survivors displayed persistent severe or moderate levels of posttraumatic stress.

The North sea oil rig project had a much longer time frame. Nevertheless, the proportion of those who follow the various trajectories in relation to more mental suffering seems to include from one third to one fourth of the participants. According to the findings of the present study, the risk of long-term mental health problems may be identified quite early in the post-traumatic phase.

Risk-factors

Those reporting mental health problems over the decades reported persistent high levels of stress during the first weeks. This adds to the findings discussed above. Most oil rig survivors reported some early manifestations of stress. A failure of recovery within the first weeks or months seems to indicate various subsequent trajectories representing some kind of long-term risk. One third of those reporting high and stable stress levels initially, or 14% of the total sample, were designated as recovering. Their mental health problems gradually decreased over the years. For two thirds of those reporting initially high and stable stress, or 24% of the total sample, the mental health problems were chronic or relapsing over time.

The elevated levels on neuroticism that was seen in the chronic and relapsing groups, point at an underlying vulnerability. The levels of neuroticism were not high in the recovering group. Enduring personality change after catastrophic experiences is a diagnostic entity in the ICD-10 (World Health Organization, 1992). It is possible to speculate that the higher levels of neuroticism may also result from the adverse event, and not be a pre-morbid vulnerability, at least in some cases.

The diagnosis of major personality change is emphasized to emerge after extensive and long-lasting, extremely adverse experiences such as torture, concentration camps and

combat experiences, rather than after single disasters (Beltran & Silove, 1999). Moreover, measures of personality have been found to be stable over time (Santor, Bagby, & Joffe, 1997). In addition, neuroticism as a risk factor has been documented in prospective studies (Engelhard & van den Hout, 2007; Engelhard, et al., 2006). The findings compare well with several other studies targeting the links between personality traits and the likelihood of developing of PTSD (Cox, et al., 2004; Fauerbach, et al., 2000; Holeva & Tarrier, 2001; McFarlane, 1988a). Neuroticism may serve as an additional vulnerability marker when screening persons of risk for long-term mental health problems. The inclusion of personality measures in trauma research and in the aftercare has already been called for (Cox, et al., 2004).

The findings underscore that early screening of the survivors, may help sifting out those who run the risk of long-term suffering. Persons who do not recover in the first months, and who in addition are high on neuroticism should preferably be given special attention in the wake of adverse events.

Posttraumatic growth in a long-term perspective

The positive associations between posttraumatic growth and posttraumatic stress that often is found, have been explained to result from cognitive restructuring needed to bring about PTG (Calhoun & Tedeschi, 2006; Tedeschi, et al., 1998). The findings in 2007 demonstrate strong positive associations between distress and growth even after almost three decades. The current levels of posttraumatic stress can hardly be seen as a part of a still ongoing cognitive restructuring. Rather, the reports of growth may be seen as a way to deal with the suffering present in the survivors (McFarland & Alvaro, 2000; Taylor & Brown, 1988; Wortman, 2004).

The findings of the present study could also be discussed in light of a recent concept, the Centrality of event scale (CES; Berntsen & Rubin, 2006). The scale has 20 items detecting

how central an adverse event has become in the person's life and identity. In this approach, the prevention of integrating the negative aspects of the trauma is highlighted. A strong focus on the adverse event may not serve the purpose of restoring health. Higher scores on CES in survivors who built their identities on the trauma exposure were associated with higher levels of PTSD symptoms (Berntsen & Rubin, 2007).

Accordingly, the strong positive associations between PTG and posttraumatic stress may possibly relate to the impact that the oil-rig disaster still has on the survivors' daily lives. That is, if their everyday lives and self-images are closely shaped by the disaster, this may result in high levels on scales such as the IES, PTSS and GHQ, targeting negative outcomes, as well as on the PTGI targeting positive outcomes. The unconditional acceptance of the adaptive function of PTG has been questioned (Zoellner & Maercker, 2006).

The present study did not look directly at possible links between resilience and posttraumatic growth. PTG was associated with continued mental suffering. Accordingly, posttraumatic growth and resilience do not seem to involve identical dimensions of the outcome. This challenge the reading of PTG as s kind of resilience (Lepore & Revenson, 2005). More likely, the findings concur with a recent trauma study which demonstrated an inverse relationship between the two constructs of posttraumatic growth and resilience (Levine, et al., 2009).

The present study did not include structured measures of general well-being. Although finding high associations between PTG and mental health problems and posttraumatic stress, the results may not imply less well-being for those reporting growth. Distinct biological correlates for well-being and ill-being have been demonstrated (Ryff et al., 2006). The call for a richer conceptual framework than the often used pathogenic scheme (Layne, et al., 2007) seems adequate. Further work is needed to explore the longitudinal aspects of PTG and posttraumatic distress.

Strengths and limitations

The main strength of this study is the repeated follow-up studies of a complete survivor population across almost three decades in combination with a matched comparison group. Such a long time span is so far, rare in disaster related research. An extended time frame is also associated with some limitations.

Several of the self-report questionnaires of today did not exist in the early phases of the data collections. Accordingly, they could only be included at later points. Hence, it is impossible exactly to infer what might have been the links between the reported level of posttraumatic growth and their mental health suffering from earlier points in time.

The use of repeated, identical measures over the four waves adds strength to the study; it allows analyses of change over time. The findings concur well with those of others.

The assessment of personality 27 years after the target event, calls for some caution in the interpretations. Conclusions about casual relationships may not be convincing, but may generate hypotheses for future studies. Endorsements of the initial manifestations of stress were retrospective. However, the mean of the time that had passed after the event was relatively short; it was approximately five months from the disaster and about three months from the last of the initial measure points.

A possible limitation might be the 22 years passing between the last two data collections from 1985 to 2007. Fluctuations may have taken place that this questionnaire approach did not detect.

The present study is based on the total population of Norwegian survivors after a civilian disaster. Having a total population is a strength in disaster research, especially when taking the high participation into account. On the other hand, the limited number of survivors puts restrictions on the statistical methods that may be applied. A low number of participants always calls for caution when generalizing the findings.

Another strength, but also a limitation, is related to gender; the population consisted only of men. They were screened before starting their offshore work. None had previously been hospitalized for psychiatric conditions. Thus, the findings would probably have demonstrated more psychopathology if it was drawn from a regular community sample of men. The findings may not readily be transferred to women. In a small sample, not having to account for the gender issues also adds to the strengths.

Conclusions

The long-term adaption of the oil rig workers compares well to the emerging picture after trauma found in other studies when looking at change over time. Most of the men were resilient; although many reported some initial distress, they quickly bounced back to their normal functioning. The importance in underscoring the human capacity to return back to balance has been called for (Wessely, 2005).

The present results show that posttraumatic growth reported after 27 years was associated with more mental problems. Further studies are needed to shed light on whether quantitative scales of posttraumatic growth and its likes, really measures what they intend to.

The horrifying experiences on that fatal early evening of 27th March 1980 seem to have caused continued or relapsing courses of mental suffering for about 1 out of 4 survivors. The present findings demonstrate that careful monitoring of the initial stress responses in addition to aspects of personality may be helpful in the prevention of long-term psychological problems.

References

Affleck, G., & Tennen, H. (1996). Construing benefits from adversity: Adaptational significance and dispositional underpinnings. *Journal of Personality, 64*(4), 899-922.

Amaya-Jackson, L., Davidson, J. R., Hughes, D. C., Swartz, M., Reynolds, V., George, L. K., & Blazer, D. G. (1999). Functional impairment and utilization of services associated with posttraumatic stress in the community. *Journal of Traumatic Stress, 12*(4), 709-724.

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, D.C.: Author.

Amir, M., & Lev-Wiesel, R. (2003). Time does not heal all wounds: quality of life and psychological distress of people who survived the holocaust as children 55 years later. *Journal of Traumatic Stress, 16*(3), 295-299.

Askevold, F. (1976/77). War Sailor syndrome. *Psychotherapy and Psychosomatics, 27*(3-6), 133-138.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Beltran, R. O., & Silove, D. (1999). Expert opinions about the ICD-10 category of enduring personality change after catastrophic experience. *Comprehensive Psychiatry, 40*(5), 396-403.

Bergh Johannesson, K., Lundin, T., Hultman, C. M., Lindam, A., Dyster-Aas, J., Arnberg, F., & Michel, P.-O. (2009). The effect of traumatic bereavement on tsunami-exposed survivors. *Journal of Traumatic Stress, 22*(6), 497-504.

Berntsen, D., & Rubin, D. C. (2006). The centrality of event scale: a measure of integrating a trauma into one's identity and its relation to post-traumatic stress disorder symptoms. *Behaviour Research and Therapy, 44*(2), 219-231.

Berntsen, D., & Rubin, D. C. (2007). When a trauma becomes a key to identiy: Enhanced integration of trauma memories predicts posttraumatic stress disorder symptoms. *Applied Cognitive Psychology, 21*(4), 417-431.

Bisson, J. I., Roberts, N., & Macho, G. S. (2003). Service innovations: The Cardiff traumatic stress initiative: an evidence-based approach to early psychological intervention following traumatic events. *Psychiatric Bulletin, 27*(4), 145-147.

Blank, A. S. (1993). The Longitudinal Course of Posttraumatic Stress Disorder. In J. R. T. Davidson & E. B. Foa (Eds.), *Posttraumatic Stress Disorder: DSM-IV and Beyond* (pp. 3 - 22). Washington, DC: American Psychiatric Press, Inc.

Bollen, K. A., & Stine, R. A. (1992). Bootstrapping Goodness-of-Fit Measures in Structural Equation Models. *Sociological Methods & Research, 21*(2), 205-229.

Bonanno, G. A. (2004). Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist, 59*(1), 20-28.

Bonanno, G. A., Galea, S., Bucciarelli, A., & Vlahov, D. (2006). Psychological resilience after disaster: New York City in the aftermath of the September 11th terrorist attack. *Psychological Science, 17*(3), 181-186.

Bramsen, I., & van der Ploeg, H. M. (1999). Fifty years later: the long-term psychological adjustment of ageing World War II survivors. *Acta Psychiatrica Scandinavica, 100*(5), 350-358.

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*(5), 748-766.

Brewin, C. R., Fuchkan, N., Huntley, Z., Robertson, M., Thompson, M., Scragg, P., d'Ardenne, P., & Ehlers, A. (2010). Outreach and screening following the 2005 London bombings: usage and outcomes. *Psychological Medicine, Epub ahead of print. Published online 09 Mar 2010*.

Bryant, R. A., Creamer, M., O'Donnell, M. L., Silove, D., & McFarlane, A. C. (2008). A multisite study of the capacity of acute stress disorder diagnosis to predict posttraumatic stress disorder. *Journal of Clinical Psychiatry, 69*(6), 923-929.

Calhoun, L. G., & Tedeschi, R. G. (2006). The Foundation of Posttraumatic Growth: An Expanded Framework. In L. G. Calhoun & R. G. Tedeschi (Eds.), *Handbook of Posttraumatic Growth - Research and Practice* (pp. 3-23). Mahwah, N.J.: Lawrence Erlbaum Associates.

Caplan, E. M. (1995). Trains, brains, and sprains: railway spine and the origins of psychoneuroses. *Bulletin of the History of Medicine, 69*(3), 387-419.

Cardeña, E., Holen, A., McFarlane, A., Solomon, Z., Wilkinson, C., & Spiegel, D. (1998). A multisite study of acute stress reactions to a disaster. In T. A. Widiger, A. J. Frances, H. A. Pincus, R. Ross, M. B. First, W. Davis & M. Kline (Eds.), *DSM-IV Sourcebook*. Washington, D.C.: American Psyciatric Association.

Costa, P. T., & McCrae, R. R. (1992a). Normal Personality Assessment in Clinical Practice: The NEO Personality Inventory. *Psychological Assessment, 4*(1), 5-13.

Costa, P. T., & McCrae, R. R. (1992b). *Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI): Professional manual*. Odessa, Fla.: Psychological Assessment Resources, Inc.

Cox, B. J., MacPherson, P. S., Enns, M. W., & McWilliams, L. A. (2004). Neuroticism and self-criticism associated with posttraumatic stress disorder in a nationally representative sample. *Behaviour Research and Therapy, 42*(1), 105-114.

Creamer, M., Burgess, P., & McFarlane, A. C. (2001). Post-traumatic stress disorder: findings from the Australian National Survey of Mental Health and Well-being. *Psychological Medicine, 31*(7), 1237-1247.

Davidson, J. R. (2001). Recognition and treatment of posttraumatic stress disorder. *JAMA, 286*(5), 584-588.

deRoon-Cassini, T. A., Mancini, A. D., Rusch, M. D., & Bonanno, G. A. (2010). Psychopathology and resilience following traumatic injury: a latent growth mixture model analysis. *Rehabilitation Psychology, 55*(1), 1-11.

Dirkzwager, A. J., Bramsen, I., & van der Ploeg, H. M. (2001). The longitudinal course of posttraumatic stress disorder symptoms among aging military veterans. *Journal of Nervous and Mental Disease, 189*(12), 846-853.

Duncan, T. E., Duncan, S. C., & Strycker, L. A. (2006). *An introduction to latent variable growth curve modeling: concepts, issues and applications*. Mahwah, N.J.: Lawrence Erlbaum.

Dyregrov, A., Frykholm, A. M., Lilled, L., Broberg, A. G., & Holmberg, I. (2003). The Goteborg discotheque fire, 1998. *Scandinavian Journal of Psychology, 44*(5), 449-457.

Dyregrov, A., & Gjestad, R. (2003). A maritime disaster: reactions and follow-up. *International Journal of Emergency Mental Health, 5*(1), 3-14.

Egede-Nissen, A. (1978). Krigsseilersyndromet. *Tidsskrift for den Norske Lægeforening, 98*, 469.

Eid, J., Johnsen, B. H., & Saus, E. R. (2005). Trauma narratives and emotional processing. *Scandinavian Journal of Psychology, 46*(6), 503-510.

Eid, J., Johnsen, B. H., & Thayer, J. F. (2001). Post-traumatic stress symptoms following shipwreck of a Norwegian Navy frigate - an early follow-up. *Personality and Individual Differences, 30*(8), 1283-1295.

Eid, J., Thayer, J. F., & Johnsen, B. H. (1999). Measuring post-traumatic stress: a psychometric evaluation of symptom - and coping questionnaires based on a Norwegian sample. *Scandinavian Journal of Psychology, 40*(2), 101-108.

Eitinger, L. (1964). *Concentration camp survivors in Norway and Israel*. Oslo: Universitetsforlaget.

Eitinger, L., & Strøm, A. (1973). *Mortality and morbidity after excessive stress: a follow-up investigation of Norwegian concentration campsurvivors*. Oslo: Universitetsforlaget.

Engelhard, I. M., & van den Hout, M. A. (2007). Preexisting neuroticism, subjective stressor severity, and posttraumatic stress in soldiers deployed to Iraq. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie, 52*(8), 505-509.

Engelhard, I. M., van den Hout, M. A., & Schouten, E. G. W. (2006). Neuroticism and low educational level predict the risk of posttraumatic stress disorder in women after miscarriage or stillbirth. *General Hospital Psychiatry, 28*(5), 414-417.

Enghaug, A., & Lønning, P. S. (1980). *"Alexander L. Kielland": katastrofe i Nordsjøen*. Oslo: Dreyer.

Erichsen, J. E. (1866). *On railway and other injuries of the nervous system*. London: Walton and Maberly.

Fauerbach, J. A., Lawrence, J. W., Schmidt, C. W., Jr., Munster, A. M., & Costa, P. T., Jr. (2000). Personality predictors of injury-related posttraumatic stress disorder. *Journal of Nervous and Mental Disease, 188*(8), 510-517.

Favaro, A., Zaetta, C., Colombo, G., & Santonastaso, P. (2004). Surviving the Vajont disaster: psychiatric consequences 36 years later. *Journal of Nervous and Mental Disease, 192*(3), 227-231.

Fayers, P. M., & Machin, D. (2007). *Quality of life. The Assessment, Analysis and Interpretation of Patient-reported Outcomes* (2nd ed.). Chichester: J. Wiley.

Forstmeier, S., Kuwert, P., Spitzer, C., Freyberger, H. J., & Maercker, A. (2009). Posttraumatic growth, social acknowledgment as survivors, and sense of coherence in former German child soldiers of World War II. *American Journal of Geriatric Psychiatry, 17*(12), 1030-1039.

Friedman, M. J., Resick, P. A., & Keane, T. M. (2007). PTSD: Twenty-five years of progress and challenges. In M. J. Friedman, P. A. Resick & T. M. Keane (Eds.), *Handbook of PTSD. Science and Practice*. New York: The Guilford Press.

Galea, S., Nandi, A., & Vlahov, D. (2005). The epidemiology of post-traumatic stress disorder after disasters. *Epidemiologic Reviews, 27*(1), 78-91.

Garmezy, N. (1971). Vulnerability research and the issue of primary prevention. *American Journal of Orthopsychiatry, 41*(1), 101-116.

Gersons, B. P., & Carlier, I. V. (1992). Post-traumatic stress disorder: the history of a recent concept. *British Journal of Psychiatry, 161*(6), 742-748.

Gleser, G. C., Green, B. L., & Winget, C. N. (1981). *Prolonged psychosocial effects of disaster: a study of Buffalo Creek*. New York: Academic Press.

Goldberg, D. P. (1972). *The detection of psychiatric illness by questionnaire: a technique for the identification and assessment of nonpsychotic psychiatric illness* (Vol. 21). Oxford: Oxford University Press.

Goldberg, D. P., Gater, R., Sartorius, N., Ustun, T. B., Piccinelli, M., Gureje, O., & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine, 27*(1), 191-197.

Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine, 9*(1), 139-145.

Goldberg, D. P., & Williams, P. (1988). *A user's guide to the general health questionnaire*. London: Nfer-Nelson.

Green, B. L., Lindy, J. D., Grace, M. C., Gleser, G. C., Leonard, A. C., Korol, M., & Winget, C. (1990). Buffalo Creek survivors in the second decade: stability of stress symptoms. *American Journal of Orthopsychiatry, 60*(1), 43-54.

Grubaugh, A. L., Magruder, K. M., Waldrop, A. E., Elhai, J. D., Knapp, R. G., & Frueh, B. C. (2005). Subthreshold PTSD in primary care: prevalence, psychiatric disorders, healthcare use, and functional status. *Journal of Nervous and Mental Disease, 193*(10), 658-664.

Hafstad, G. S., Gil-Rivas, V., Kilmer, R. P., & Raeder, S. (2010). Parental adjustment, family functioning, and posttraumatic growth among norwegian children and adolescents following a natural disaster. *American Journal of Orthopsychiatry, 80*(2), 248-257.

Hapke, U., Schumann, A., Rumpf, H. J., John, U., & Meyer, C. (2006). Post-traumatic stress disorder: the role of trauma, pre-existing psychiatric disorders, and gender. *European Archives of Psychiatry and Clinical Neuroscience, 256*(5), 299-306.

Harvey, A. G., & Bryant, R. A. (2002). Acute stress disorder: a synthesis and critique. *Psychological Bulletin, 128*(6), 886-902.

Healy, D. (1993). *Images of trauma: from hysteria to post-traumatic stress disorder*. London: Faber and Faber.

Heir, T., Piatigorsky, A., & Weisaeth, L. (2009). Longitudinal changes in recalled perceived life threat after a natural disaster. *British Journal of Psychiatry, 194*(6), 510-514.

Heir, T., Rosendal, S., Bergh Johannesson, K., Michel, P. O., Mortensen, E. L., Weisaeth, L., Andersen, H. S., & Hultman, C. M. (2010). Tsunami-affected Scandinavian tourists: Disaster exposure and post-traumatic stress symptoms. *Nordic Journal of Psychiatry, Epub ahead of print. Posted online April 29 2010*.

Helgeson, V. S., Reynolds, K. A., & Tomich, P. L. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology, 74*(5), 797-816.

Helweg-Larsen, P., Hoffmeyer, H., Kieler, J., Hess Thaysen, E., Hess Thaysen, J., Thygesen, P., & Hertel Wulff, M. (1952). Famine disease in German concentration camps; complications and sequels, with special reference to tuberculosis, mental disorders and social consequences. *Acta Psychiatrica et Neurologica Scandinavica Supplementum, 83*, 1-460.

Hobfoll, S. E., Hall, B. J., Canetti-Nisim, D., Galea, S., Johnson, R. J., & Palmieri, P. A. (2007). Refining our Understanding of Traumatic Growth in the Face of Terrorism: Moving from Meaning Cognitions to Doing what is Meaningful. *Applied Psychology: An International Review, 56*(3), 345-366.

Holen, A. (1990). *A long-term outcome study of survivors from a disaster: The Alexander L. Kielland disaster in perspective.* University of Oslo, Oslo.

Holen, A. (1991). A longitudinal study of the occurrence and persistence of post-traumatic health problems in disaster survivors. *Stress Medicine, 7*, 11 - 17.

Holen, A. (1993). The North Sea Oil Rig Disaster. In J. P. Wilson & B. Raphael (Eds.), *International Handbook of Traumatic Stress Syndromes* (pp. 471-478). New York: Plenum Press.

Holen, A., Sund, A., & Weisæth, L. (1983). *Alexander L. Kielland - katastrofen 27. mars 1980 [The Alexander L. Kielland disaster March 27, 1980]* Division for Disaster Psychiatry, University of Oslo, Norway.

Holeva, V., & Tarrier, N. (2001). Personality and peritraumatic dissociation in the prediction of PTSD in victims of road traffic accidents. *Journal of Psychosomatic Research, 51*(5), 687-692.

Horowitz, M. (1976). *Stress response syndromes*. New York: Jason Aronson.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine, 41*(3), 209-218.

Hull, A. M., Alexander, D. A., & Klein, S. (2002). Survivors of the Piper Alpha oil platform disaster: long-term follow-up study. *British Journal of Psychiatry, 181*(5), 433-438.

Hussain, A., Weisaeth, L., & Heir, T. (2010a). Changes in religious beliefs and the relation of religiosity to posttraumatic stress and life satisfaction after a natural disaster. *Social Psychiatry and Psychiatric Epidemiology, Epub ahead of print. Posted online 2010 Jul 31*.

Hussain, A., Weisaeth, L., & Heir, T. (2010b). Psychiatric disorders and functional impairment among disaster victims after exposure to a natural disaster: A population based study. *Journal of Affective Disorders, Epub ahead of print. Posted online 2010 Jul 8*.

Janoff-Bulman, R. (2004). Posttraumatic Growth: Three Explanatory Models. In Commentaries on "Posttraumatic Growth: Conceptual Foundations and Empirical Evidence". *Psychological Inquiry, 15*(1), 30-34.

Jensen, T. K., Dyb, G., & Nygaard, E. (2009). A longitudinal study of posttraumatic stress reactions in Norwegian children and adolescents exposed to the 2004 tsunami. *Archives of Pediatrics and Adolescent Medicine, 163*(9), 856-861.

Jeon, H. J., Suh, T., Lee, H. J., Hahm, B. J., Lee, J. Y., Cho, S. J., Lee, Y. R., Chang, S. M., & Cho, M. J. (2007). Partial versus full PTSD in the Korean community: prevalence, duration, correlates, comorbidity, and dysfunctions. *Depression and Anxiety, 24*(8), 577-585.

Johnsen, B. H., Eid, J., Lovstad, T., & Michelsen, L. T. (1997). Posttraumatic stress symptoms in nonexposed, victims, and spontaneous rescuers after an avalanche. *Journal of Traumatic Stress, 10*(1), 133-140.

Joseph, S. (2000). Psychometric evaluation of Horowitz's Impact of Event Scale: A review. *Journal of Traumatic Stress, 13*(1), 101-113.

Kardiner, A. (1941). *The traumatic neuroses of war*. Washington, DC: National Research Council.

Katz, C. L., Pellegrino, L., Pandya, A., Ng, A., & DeLisi, L. E. (2002). Research on psychiatric outcomes and interventions subsequent to disasters: a review of the literature. *Psychiatry Research, 110*(3), 201-217.

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*(12), 1048-1060.

Kessler, R. C., Zhao, S., Katz, S. J., Kouzis, A. C., Frank, R. G., Edlund, M., & Leaf, P. (1999). Past-year use of outpatient services for psychiatric problems in the National Comorbidity Survey. *American Journal of Psychiatry, 156*(1), 115-123.

King, L. A., King, D. W., Salgado, D. M., & Shalev, A. Y. (2003). Contemporary longitudinal methods for the study of trauma and posttraumatic stress disorder. *CNS spectrums, 8*(9), 686-692.

Kinzie, J. D., & Goetz, R. R. (1996). A century of controversy surrounding posttraumatic stress stress-spectrum syndromes: the impact on DSM-III and DSM-IV. *Journal of Traumatic Stress, 9*(2), 159-179.

Kristensen, P., Weisaeth, L., & Heir, T. (2009). Psychiatric disorders among disaster bereaved: an interview study of individuals directly or not directly exposed to the 2004 tsunami. *Depression and Anxiety, 26*(12), 1127-1133.

Layne, C. M., Warren, J. S., Watson, P., & Shalev, A. Y. (2007). Risk, vulnerability, resistance and resilience - Toward an integrative conceptualization of posttraumatic adaption. In M. J. Friedman, T. M. Keane & P. A. Resick (Eds.), *Handbook of PTSD - Science and practice* (pp. 497 -520). New York: The Guilford Press.

Lazaratou, H., Paparrigopoulos, T., Galanos, G., Psarros, C., Dikeos, D., & Soldatos, C. (2008). The psychological impact of a catastrophic earthquake: a retrospective study 50 years after the event. *Journal of Nervous and Mental Disease, 196*(4), 340-344.

Lee, K. A., Vaillant, G. E., Torrey, W. C., & Elder, G. H. (1995). A 50-year prospective study of the psychological sequelae of World War II combat. *American Journal of Psychiatry, 152*(4), 516-522.

Lepore, S. J., & Revenson, T. A. (2005). Resilience and posttraumatic growth: Recovery, resistance, and reconfiguration. In L. G. Calhoun & R. G. Tedeschi (Eds.), *Handbook of posttraumatic growth - Research and practice* (pp. 24 - 46). New York: Lawrence Erlbaum Associates.

Lev-Wiesel, R., & Amir, M. (2003). Posttraumatic Growth among Holocaust Child Survivors. *Journal of Loss & Trauma, 8*(4), 229-237.

Levine, S. Z., Laufer, A., Stein, E., Hamama-Raz, Y., & Solomon, Z. (2009). Examining the relationship between resilience and posttraumatic growth. *Journal of Traumatic Stress, 22*(4), 282-286.

Levy, B. S., & Sidel, V. W. (2009). Health effects of combat: a life-course perspective. *Annual Review of Public Health, 30*, 123-136.

Litz, B. T., & Maguen, S. (2007). Early intervention for trauma. In M. J. Friedman, T. M. Keane & P. A. Resick (Eds.), *Handbook of PTSD - Science and practice* (pp. 306 - 329). New York: The Guilford Press.

Lundin, T., & Jansson, L. (2007). Traumatic impact of a fire disaster on survivors--a 25-year follow-up of the 1978 hotel fire in Boras, Sweden. *Nordic Journal of Psychiatry, 61*(6), 479-485.

Maercker, A., & Herrle, J. (2003). Long-term effects of the Dresden bombing: Relationships to control beliefs, religious belief, and personal growth. *Journal of Traumatic Stress, 16*(6), 579-587.

Maercker, A., & Zoellner, T. (2004). The Janus Face of Self-Perceived Growth: Toward A Two-Component Model of Posttraumatic Growth. In Commentaries on "Posttraumatic Growth: Conceptual Foundations and Empirical Evidence". *Psychological Inquiry, 15*(1), 41-48.

Malt, U. F. (1987). *Biopsychosocial aspects of accidental injuries.* University of Oslo, Oslo.

Malt, U. F. (1988). The long-term psychiatric consequences of accidental injury. A longitudinal study of 107 adults. *British Journal of Psychiatry, 153*(6), 810-818.

Malt, U. F., Blikra, G., & Hoivik, B. (1989). The three-year biopsychosocial outcome of 551 hospitalized accidentally injured adults. *Acta Psychiatrica Scandinavica, 80*(Suppl 355), 84-93.

Malt, U. F., & Ugland, O. M. (1989). A long-term psychosocial follow-up study of burned adults. *Acta Psychiatrica Scandinavica, 80*(Suppl 355), 94-102.

Malt, U. F., & Weisaeth, L. (1989). Disaster psychiatry and traumatic stress studies in Norway. History, current status and future. *Acta Psychiatrica Scandinavica, 80*(Suppl 355), 7-12.

Martinsen, Ø. L., Nordvik, H., & Østbø, L. E. (2005). Norske versjoner av NEO PI-R og NEO-FFI [Norwegian versions of NEO PI-R and NEO-FFI]. *Tidsskrift for norsk psykologforening, 42*(5), 421-423.

McFarland, C., & Alvaro, C. (2000). The impact of motivation on temporal comparisons: coping with traumatic events by perceiving personal growth. *Journal of Personality and Social Psychology, 79*(3), 327-343.

McFarlane, A. C. (1988a). The aetiology of post-traumatic stress disorders following a natural disaster. *British Journal of Psychiatry, 152*(1), 116-121.

McFarlane, A. C. (1988b). The longitudinal course of posttraumatic morbidity. The range of outcomes and their predictors. *Journal of Nervous and Mental Disease, 176*(1), 30-39.

McFarlane, A. C., & Norris, F. H. (2006). Definition and Concepts in Disaster Research. In F. H. Norris, S. Galea, M. J. Friedman & P. J. Watson (Eds.), *Methods for Disaster Mental Health Research* (pp. 3 -19). New York: The Guilford Press.

McFarlane, A. C., & Van Hooff, M. (2009). Impact of childhood exposure to a natural disaster on adult mental health: 20-year longitudinal follow-up study. *British Journal of Psychiatry, 195*(2), 142-148.

Michel, P.-O., Lundin, T., & Otto, U. (2001). *Psykotraumatologi [Psychotraumatology]*. Lund, Sweden: Studentlitteratur.

Monson, C. M., Friedman, M. J., & LaBash, H. A. J. (2007). A psychological history of PTSD. In M. J. Friedman, T. M. Keane & P. A. Resick (Eds.), *Handbook of PTSD* (pp. 37-52). New York: Guilford.

Morgan, L., Scourfield, J., Williams, D., Jasper, A., & Lewis, G. (2003). The Aberfan disaster: 33-year follow-up of survivors. *British Journal of Psychiatry, 182*(6), 532-536.

Murphy, S. A., Johnson, L. C., Chung, I. J., & Beaton, R. D. (2003). The prevalence of PTSD following the violent death of a child and predictors of change 5 years later. *Journal of Traumatic Stress, 16*(1), 17-25.

Muthèn, B. (2001). Second -generation structural equation modeling with a combination of categorical and continuous latent variables: New opportunities for latent class/latent growth modeling. In L. M. Collins & A. Sayer (Eds.), *New Methods for the Analysis of Change* (pp. 291-322). Washington, D.C.: APA.

Muthèn, L. K., & Muthèn, B. O. (1998-2007). *Mplus User`s Guide* (5th ed.). Los Angeles: CA: Muthèn & Muthèn.

Myers, C. S. (1915). A contribution to the study of shell shock. *Lancet*, 316-320.

Mylle, J., & Maes, M. (2004). Partial posttraumatic stress disorder revisited. *Journal of Affective Disorders, 78*(1), 37-48.

Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological Medicine, 38*(4), 467-480.

Norris, F. H. (2006). Disaster research methods: past progress and future directions. *Journal of Traumatic Stress, 19*(2), 173-184.

Norris, F. H., & Elrod, C. L. (2006). Psychosocial Consequences of Disaster. In F. H. Norris, S. Galea, M. J. Friedman & P. J. Watson (Eds.), *Methods for Disaster Mental Health Research* (pp. 20 - 42). New York: The Guilford Press.

Norris, F. H., Friedman, M. J., & Watson, P. J. (2002). 60,000 disaster victims speak: Part II. Summary and implications of the disaster mental health research. *Psychiatry, 65*(3), 240-260.

Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981-2001. *Psychiatry, 65*(3), 207-239.

Norris, F. H., Galea, S., Friedman, M. J., & Watson, P. (2006). *Methods for disaster mental health research*. New York: The Guilford Press.

Norris, F. H., Murphy, A. D., Baker, C. K., & Perilla, J. L. (2003). Severity, timing, and duration of reactions to trauma in the population: an example from Mexico. *Biological Psychiatry, 53*(9), 769-778.

Norris, F. H., Tracy, M., & Galea, S. (2009). Looking for resilience: understanding the longitudinal trajectories of responses to stress. *Social Science and Medicine, 68*(12), 2190-2198.

Nugent, N. R., Saunders, B. E., Williams, L. M., Hanson, R., Smith, D. W., & Fitzgerald, M. M. (2009). Posttraumatic stress symptom trajectories in children living in families reported for family violence. *Journal of Traumatic Stress, 22*(5), 460-466.

O'Donnell, M. L., Elliott, P., Lau, W., & Creamer, M. (2007). PTSD symptom trajectories: from early to chronic response. *Behaviour Research and Therapy, 45*(3), 601-606.

Orcutt, H. K., Erickson, D. J., & Wolfe, J. (2004). The course of PTSD symptoms among Gulf War veterans: a growth mixture modeling approach. *Journal of Traumatic Stress, 17*(3), 195-202.

Orr, S. P., Metzger, L. J., Lasko, N. B., Macklin, M. L., Hu, F. B., Shalev, A. Y., & Pitman, R. K. (2003). Physiologic responses to sudden, loud tones in monozygotic twins

discordant for combat exposure: association with posttraumatic stress disorder. *Archives of General Psychiatry, 60*(3), 283-288.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychological Bulletin, 129*(1), 52-73.

Page, H. W. (1883). *Injuries of the spine and spinal cord: without apparent mechanical lesion, and nervous shock in their surgical and nedico-legal aspects*. London: Churchill.

Park, C. L. (2004). The Notion of Growth Following Stressful Life Experiences: Problems and Prospects. In Commentaries on "Posttraumatic Growth: Conceptual Foundations and Empirical Evidence". *Psychological Inquiry, 15*(1), 69-76.

Park, C. L., Cohen, L. H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality, 64*(1), 71-105.

Park, C. L., & Helgeson, V. S. (2006). Introduction to the special section: Growth following highly stressful life events - Current status and future directions. *Journal of Consulting and Clinical Psychology, 74*(5), 791-796.

Peleg, T., & Shalev, A. Y. (2006). Longitudinal studies of PTSD: overview of findings and methods. *CNS Spectrums, 11*(8), 589-602.

Plomin, R. (1994). *Genetics and experience: the interplay between nature and nurture*. Thousand Oaks, Calif.: Sage Publications.

Pole, N., Neylan, T. C., Otte, C., Henn-Hasse, C., Metzler, T. J., & Marmar, C. R. (2009). Prospective prediction of posttraumatic stress disorder symptoms using fear potentiated auditory startle responses. *Biological Psychiatry, 65*(3), 235-240.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*(4), 717-731.

Quarantelli, E. L. (1978). *Disasters: theory and research*. London: Sage.

Raphael, B. (1986). *When disaster strikes: a handbook for the caring professions*. London: Unwin Hyman.

Roberts, N. P., Kitchiner, N. J., Kenardy, J., & Bisson, J. (2009). Multiple session early psychological interventions for the prevention of post-traumatic stress disorder. *Cochrane Database of Systematic Reviews 2009*(3), Art. No.:CD006869. DOI:006810.001002/14651858.

Rose, S., Bisson, J., Churchill, R., & Wessely, S. (2002). Psychological debriefing for preventing post traumatic stress disorder (PTSD). *Cochrane Database of Systematic Reviews 2002*(2), Art. No.:CD000560. DOI:000510.001002/14651858.

Rutter, M. (1985). Resilience in the face of adversity. Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry, 147*(6), 598-611.

Ryff, C. D., Dienberg Love, G., Urry, H. L., Muller, D., Rosenkranz, M. A., Friedman, E. M., Davidson, R. J., & Singer, B. (2006). Psychological well-being and ill-being: do they have distinct or mirrored biological correlates? *Psychotherapy and Psychosomatics, 75*(2), 85-95.

Santor, D. A., Bagby, R. M., & Joffe, R. T. (1997). Evaluating stability and change in personality and depression. *Journal of Personality and Social Psychology, 73*(6), 1354-1362.

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: modeling change and event occurrence*. Oxford: Oxford University Press.

Solomon, Z., & Dekel, R. (2005). Posttraumatic stress disorder among Israeli ex-prisoners of war 18 and 30 years after release. *Journal of Clinical Psychiatry, 66*(8), 1031-1037.

Solomon, Z., & Dekel, R. (2007). Posttraumatic stress disorder and posttraumatic growth among Israeli ex-pows. *Journal of Traumatic Stress, 20*(3), 303-312.

Solomon, Z., & Mikulincer, M. (2006). Trajectories of PTSD: a 20-year longitudinal study. *American Journal of Psychiatry, 163*(4), 659-666.

Solomon, Z., Shklar, R., Singer, Y., & Mikulincer, M. (2006). Reactions to combat stress in Israeli veterans twenty years after the 1982 Lebanon war. *Journal of Nervous and Mental Disease, 194*(12), 935-939.

Stein, D. J., Cloitre, M., Nemeroff, C. B., Nutt, D. J., Seedat, S., Shalev, A. Y., Wittchen, H. U., & Zohar, J. (2009). Cape Town consensus on posttraumatic stress disorder. *CNS Spectrums, 14*(1 Suppl 1), 52-58.

Stein, M. B., Walker, J. R., Hazen, A. L., & Forde, D. R. (1997). Full and partial posttraumatic stress disorder: findings from a community survey. *American Journal of Psychiatry, 154*(8), 1114-1119.

Sund, A. (2008). *Historien om katastrofepsykiatrien som nytt fagområde i Norge [History of disaster psychiatry as a new research field in Norway]*. [Sessvollmoen]: Forsvarets sanitet.

Sundin, E. C., & Horowitz, M. J. (2002). Impact of Event Scale: psychometric properties. *British Journal of Psychiatry, 180*(3), 205-209.

Sundin, E. C., & Horowitz, M. J. (2003). Horowitz's Impact of Event Scale evaluation of 20 years of use. *Psychosomatic Medicine, 65*(5), 870-876.

Talbert, F. S., Braswell, L. C., Albrecht, J. W., Hyer, L. A., & Boudewyns, P. A. (1993). NEO-PI profiles in PTSD as a function of trauma level. *Journal of Clinical Psychology, 49*(5), 663-669.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103*(2), 193-210.

Taylor, S. E., Kemeny, M. E., Reed, G. M., Bower, J. E., & Gruenewald, T. L. (2000). Psychological resources, positive illusions, and health. *American Psychologist, 55*(1), 99-109.

Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*(3), 455-471.

Tedeschi, R. G., & Calhoun, L. G. (2004). Target Article: "Posttraumatic Growth: Conceptual Foundations and Empirical Evidence". *Psychological Inquiry, 15*(1), 1 - 18.

Tedeschi, R. G., & Calhoun, L. G. (2006). *Handbook of posttraumatic growth research and practice*. Mahwah, N.J.: Lawrence Erlbaum.

Tedeschi, R. G., Park, C. L., & Calhoun, L. G. (1998). *Posttraumatic growth: positive change in the aftermath of crisis*. Mahwah, N.J.: Lawrence Erlbaum Associates.

Terr, L. C. (1981). Psychic trauma in children: observations following the Chowchilla school-bus kidnapping. *American Journal of Psychiatry, 138*(1), 14-19.

Terr, L. C. (1983). Chowchilla revisited: the effects of psychic trauma four years after a school-bus kidnapping. *American Journal of Psychiatry, 140*(12), 1543-1550.

Thoresen, S., Tonnessen, A., Lindgaard, C. V., Andreassen, A. L., & Weisaeth, L. (2009). Stressful but rewarding: Norwegian personnel mobilised for the 2004 tsunami disaster. *Disasters, 33*(3), 353-368.

Ursano, R. J. (2007). *Textbook of disaster psychiatry*. Cambridge: Cambridge University Press.

van der Kolk, B. A. (2007). The History of trauma in Psychiatry In M. J. Friedman, T. M. Keane & P. A. Resick (Eds.), *Handbook of PTSD* (pp. 19 - 36). New York: The Guilford Press.

van der Kolk, B. A., & van der Hart, O. (1989). Pierre Janet and the breakdown of adaptation in psychological trauma. *American Journal of Psychiatry, 146*(12), 1530-1540.

van der Kolk, B. A., Weisaeth, L., & van der Hart, O. (1997). History of trauma in Psychiatry. In B. A. Van der Kolk, A. C. McFarlane & L. Weisaeth (Eds.), *Traumatic Stress* (pp. 47-74). New York: Guilford Press.

van Zelst, W. H., de Beurs, E., Beekman, A. T., van Dyck, R., & Deeg, D. D. (2006). Well-being, physical functioning, and use of health services in the elderly with PTSD and subthreshold PTSD. *International Journal of Geriatric Psychiatry, 21*(2), 180-188.

Weisaeth, L. (1989a). The stressors and the post-traumatic stress syndrome after an industrial disaster. *Acta Psychiatrica Scandinavica Supplementum, 80*(Suppl 355), 25-37.

Weisaeth, L. (1989b). A study of behavioural responses to an industrial disaster. *Acta Psychiatrica Scandinavica, 80*(Suppl 355), 13-24.

Weisaeth, L. (2001). Acute posttraumatic stress: nonacceptance of early intervention. *Journal of Clinical Psychiatry, 62*(Suppl 17), 35-40.

Weisaeth, L. (2002). The European history of psychotraumatology. *Journal of Traumatic Stress, 15*(6), 443-452.

Weiss, D. S., & Marmar, C. R. (1997). The Impact of Event Scale - Revised. In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 399 - 411). New York: Guilford Press.

Weisæth, L. (1984). *Stress reactions to an industrial disaster: an investigation of disaster behaviour and acute post-traumatic stress reactions, and a prospective, controlled, clinical and interventive study of sub-acute and long-term post-traumatic stress reactions.* University of Oslo, Oslo.

Weisæth, L., & Mehlum, L. (Eds.). (1993). *Mennesker, traumer og kriser [People, Trauma and Crisis]*. Oslo: Universitetsforlaget.

Wessely, S. (2005). The London attacks--aftermath: Victimhood and resilience. *New England Journal of Medicine, 353*(6), 548-550.

Winje, D. (1996). Long-term outcome of trauma in adults: the psychological impact of a fatal bus accident. *Journal of Consulting and Clinical Psychology, 64*(5), 1037-1043.

Winje, D., & Ulvik, A. (1998). Long-term outcome of trauma in children: the psychological consequences of a bus accident. *Journal of Child Psychology and Psychiatry, 39*(5), 635-642.

World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization.

Wortman, C. B. (2004). Posttraumatic Growth: Progress and Problems. In Commentaries on "Posttraumatic Growth: Conceptual Foundations and Empirical Evidence". *Psychological Inquiry, 15*(1), 81-90.

Yehuda, R., & McFarlane, A. C. (1995). Conflict between current knowledge about posttraumatic stress disorder and its original conceptual basis. *American Journal of Psychiatry, 152*(12), 1705-1713.

Znoj, H. (2006). Bereavement and Posttraumatic Growth. In L. G. Calhoun & R. G. Tedeschi (Eds.), *Handbook of Posttraumatic Growth - Research and Practice* (pp. 176 - 196). Mahwah, N.J.: Lawrence Erlbaum Associates.

Zoellner, T., & Maercker, A. (2006). Posttraumatic growth in clinical psychology - A critical review and introduction of a two component model. *Clinical Psychology Review, 26*(5), 626-653.

Paper I

Is not included due to copyright

Paper II

Is not included due to copyright

Paper III

Is not included due to copyright

Dissertations at the Faculty of Medicine, NTNU

1977

1. Knut Joachim Berg: EFFECT OF ACETYLSALICYLIC ACID ON RENAL FUNCTION
2. Karl Erik Viken and Arne Ødegaard: STUDIES ON HUMAN MONOCYTES CULTURED *IN VITRO*

1978

3. Karel Bjørn Cyvin: CONGENITAL DISLOCATION OF THE HIP JOINT.
4. Alf O. Brubakk: METHODS FOR STUDYING FLOW DYNAMICS IN THE LEFT VENTRICLE AND THE AORTA IN MAN.

1979

5. Geirmund Unsgaard: CYTOSTATIC AND IMMUNOREGULATORY ABILITIES OF HUMAN BLOOD MONOCYTES CULTURED IN VITRO

1980

6. Størker Jørstad: URAEMIC TOXINS
7. Arne Olav Jenssen: SOME RHEOLOGICAL, CHEMICAL AND STRUCTURAL PROPERTIES OF MUCOID SPUTUM FROM PATIENTS WITH CHRONIC OBSTRUCTIVE BRONCHITIS

1981

8. Jens Hammerstrøm: CYTOSTATIC AND CYTOLYTIC ACTIVITY OF HUMAN MONOCYTES AND EFFUSION MACROPHAGES AGAINST TUMOR CELLS *IN VITRO*

1983

9. Tore Syversen: EFFECTS OF METHYLMERCURY ON RAT BRAIN PROTEIN.
10. Torbjørn Iversen: SQUAMOUS CELL CARCINOMA OF THE VULVA.

1984

11. Tor-Erik Widerøe: ASPECTS OF CONTINUOUS AMBULATORY PERITONEAL DIALYSIS.
12. Anton Hole: ALTERATIONS OF MONOCYTE AND LYMPHOCYTE FUNCTIONS IN REALTION TO SURGERY UNDER EPIDURAL OR GENERAL ANAESTHESIA.
13. Terje Terjesen: FRACTURE HEALING AND STRESS-PROTECTION AFTER METAL PLATE FIXATION AND EXTERNAL FIXATION.
14. Carsten Saunte: CLUSTER HEADACHE SYNDROME.
15. Inggard Lereim: TRAFFIC ACCIDENTS AND THEIR CONSEQUENCES.
16. Bjørn Magne Eggen: STUDIES IN CYTOTOXICITY IN HUMAN ADHERENT MONONUCLEAR BLOOD CELLS.
17. Trond Haug: FACTORS REGULATING BEHAVIORAL EFFECTS OG DRUGS.

1985

18. Sven Erik Gisvold: RESUSCITATION AFTER COMPLETE GLOBAL BRAIN ISCHEMIA.
19. Terje Espevik: THE CYTOSKELETON OF HUMAN MONOCYTES.
20. Lars Bevanger: STUDIES OF THE Ibc (c) PROTEIN ANTIGENS OF GROUP B STREPTOCOCCI.
21. Ole-Jan Iversen: RETROVIRUS-LIKE PARTICLES IN THE PATHOGENESIS OF PSORIASIS.
22. Lasse Eriksen: EVALUATION AND TREATMENT OF ALCOHOL DEPENDENT BEHAVIOUR.
23. Per I. Lundmo: ANDROGEN METABOLISM IN THE PROSTATE.

1986

24. Dagfinn Berntzen: ANALYSIS AND MANAGEMENT OF EXPERIMENTAL AND CLINICAL PAIN.
25. Odd Arnold Kildahl-Andersen: PRODUCTION AND CHARACTERIZATION OF MONOCYTE-DERIVED CYTOTOXIN AND ITS ROLE IN MONOCYTE-MEDIATED CYTOTOXICITY.
26. Ola Dale: VOLATILE ANAESTHETICS.

1987

27. Per Martin Kleveland: STUDIES ON GASTRIN.
28. Audun N. Øksendal: THE CALCIUM PARADOX AND THE HEART.
29. Vilhjalmur R. Finsen: HIP FRACTURES

1988

30. Rigmor Austgulen: TUMOR NECROSIS FACTOR: A MONOCYTE-DERIVED REGULATOR OF CELLULAR GROWTH.
31. Tom-Harald Edna: HEAD INJURIES ADMITTED TO HOSPITAL.
32. Joseph D. Borsi: NEW ASPECTS OF THE CLINICAL PHARMACOKINETICS OF METHOTREXATE.
33. Olav F. M. Sellevold: GLUCOCORTICOIDS IN MYOCARDIAL PROTECTION.
34. Terje Skjærpe: NONINVASIVE QUANTITATION OF GLOBAL PARAMETERS ON LEFT VENTRICULAR FUNCTION: THE SYSTOLIC PULMONARY ARTERY PRESSURE AND CARDIAC OUTPUT.
35. Eyvind Rødahl: STUDIES OF IMMUNE COMPLEXES AND RETROVIRUS-LIKE ANTIGENS IN PATIENTS WITH ANKYLOSING SPONDYLITIS.
36. Ketil Thorstensen: STUDIES ON THE MECHANISMS OF CELLULAR UPTAKE OF IRON FROM TRANSFERRIN.
37. Anna Midelfart: STUDIES OF THE MECHANISMS OF ION AND FLUID TRANSPORT IN THE BOVINE CORNEA.
38. Eirik Helseth: GROWTH AND PLASMINOGEN ACTIVATOR ACTIVITY OF HUMAN GLIOMAS AND BRAIN METASTASES - WITH SPECIAL REFERENCE TO TRANSFORMING GROWTH FACTOR BETA AND THE EPIDERMAL GROWTH FACTOR RECEPTOR.
39. Petter C. Borchgrevink: MAGNESIUM AND THE ISCHEMIC HEART.
40. Kjell-Arne Rein: THE EFFECT OF EXTRACORPOREAL CIRCULATION ON SUBCUTANEOUS TRANSCAPILLARY FLUID BALANCE.
41. Arne Kristian Sandvik: RAT GASTRIC HISTAMINE.
42. Carl Bredo Dahl: ANIMAL MODELS IN PSYCHIATRY.

1989

43. Torbjørn A. Fredriksen: CERVICOGENIC HEADACHE.
44. Rolf A. Walstad: CEFTAZIDIME.
45. Rolf Salvesen: THE PUPIL IN CLUSTER HEADACHE.
46. Nils Petter Jørgensen: DRUG EXPOSURE IN EARLY PREGNANCY.
47. Johan C. Ræder: PREMEDICATION AND GENERAL ANAESTHESIA IN OUTPATIENT GYNECOLOGICAL SURGERY.
48. M. R. Shalaby: IMMUNOREGULATORY PROPERTIES OF TNF-α AND THE RELATED CYTOKINES.
49. Anders Waage: THE COMPLEX PATTERN OF CYTOKINES IN SEPTIC SHOCK.
50. Bjarne Christian Eriksen: ELECTROSTIMULATION OF THE PELVIC FLOOR IN FEMALE URINARY INCONTINENCE.
51. Tore B. Halvorsen: PROGNOSTIC FACTORS IN COLORECTAL CANCER.

1990

52. Asbjørn Nordby: CELLULAR TOXICITY OF ROENTGEN CONTRAST MEDIA.
53. Kåre E. Tvedt: X-RAY MICROANALYSIS OF BIOLOGICAL MATERIAL.
54. Tore C. Stiles: COGNITIVE VULNERABILITY FACTORS IN THE DEVELOPMENT AND MAINTENANCE OF DEPRESSION.
55. Eva Hofsli: TUMOR NECROSIS FACTOR AND MULTIDRUG RESISTANCE.
56. Helge S. Haarstad: TROPHIC EFFECTS OF CHOLECYSTOKININ AND SECRETIN ON THE RAT PANCREAS.
57. Lars Engebretsen: TREATMENT OF ACUTE ANTERIOR CRUCIATE LIGAMENT INJURIES.
58. Tarjei Rygnestad: DELIBERATE SELF-POISONING IN TRONDHEIM.
59. Arne Z. Henriksen: STUDIES ON CONSERVED ANTIGENIC DOMAINS ON MAJOR OUTER MEMBRANE PROTEINS FROM ENTEROBACTERIA.
60. Steinar Westin: UNEMPLOYMENT AND HEALTH: Medical and social consequences of a factory closure in a ten-year controlled follow-up study.
61. Ylva Sahlin: INJURY REGISTRATION, a tool for accident preventive work.
62. Helge Bjørnstad Pettersen: BIOSYNTHESIS OF COMPLEMENT BY HUMAN ALVEOLAR MACROPHAGES WITH SPECIAL REFERENCE TO SARCOIDOSIS.
63. Berit Schei: TRAPPED IN PAINFUL LOVE.
64. Lars J. Vatten: PROSPECTIVE STUDIES OF THE RISK OF BREAST CANCER IN A COHORT OF NORWEGIAN WOMAN.

1991

65. Kåre Bergh: APPLICATIONS OF ANTI-C5a SPECIFIC MONOCLONAL ANTIBODIES FOR THE ASSESSMENT OF COMPLEMENT ACTIVATION.
66. Svein Svenningsen: THE CLINICAL SIGNIFICANCE OF INCREASED FEMORAL ANTEVERSION.
67. Olbjørn Klepp: NONSEMINOMATOUS GERM CELL TESTIS CANCER: THERAPEUTIC OUTCOME AND PROGNOSTIC FACTORS.
68. Trond Sand: THE EFFECTS OF CLICK POLARITY ON BRAINSTEM AUDITORY EVOKED POTENTIALS AMPLITUDE, DISPERSION, AND LATENCY VARIABLES.
69. Kjetil B. Åsbakk: STUDIES OF A PROTEIN FROM PSORIATIC SCALE, PSO P27, WITH RESPECT TO ITS POTENTIAL ROLE IN IMMUNE REACTIONS IN PSORIASIS.
70. Arnulf Hestnes: STUDIES ON DOWN´S SYNDROME.
71. Randi Nygaard: LONG-TERM SURVIVAL IN CHILDHOOD LEUKEMIA.
72. Bjørn Hagen: THIO-TEPA.
73. Svein Anda: EVALUATION OF THE HIP JOINT BY COMPUTED TOMOGRAMPHY AND ULTRASONOGRAPHY.

1992

74. Martin Svartberg: AN INVESTIGATION OF PROCESS AND OUTCOME OF SHORT-TERM PSYCHODYNAMIC PSYCHOTHERAPY.
75. Stig Arild Slørdahl: AORTIC REGURGITATION.
76. Harold C Sexton: STUDIES RELATING TO THE TREATMENT OF SYMPTOMATIC NON-PSYCHOTIC PATIENTS.
77. Maurice B. Vincent: VASOACTIVE PEPTIDES IN THE OCULAR/FOREHEAD AREA.
78. Terje Johannessen: CONTROLLED TRIALS IN SINGLE SUBJECTS.
79. Turid Nilsen: PYROPHOSPHATE IN HEPATOCYTE IRON METABOLISM.
80. Olav Haraldseth: NMR SPECTROSCOPY OF CEREBRAL ISCHEMIA AND REPERFUSION IN RAT.
81. Eiliv Brenna: REGULATION OF FUNCTION AND GROWTH OF THE OXYNTIC MUCOSA.

1993

82. Gunnar Bovim: CERVICOGENIC HEADACHE.
83. Jarl Arne Kahn: ASSISTED PROCREATION.
84. Bjørn Naume: IMMUNOREGULATORY EFFECTS OF CYTOKINES ON NK CELLS.
85. Rune Wiseth: AORTIC VALVE REPLACEMENT.
86. Jie Ming Shen: BLOOD FLOW VELOCITY AND RESPIRATORY STUDIES.
87. Piotr Kruszewski: SUNCT SYNDROME WITH SPECIAL REFERENCE TO THE AUTONOMIC NERVOUS SYSTEM.
88. Mette Haase Moen: ENDOMETRIOSIS.
89. Anne Vik: VASCULAR GAS EMBOLISM DURING AIR INFUSION AND AFTER DECOMPRESSION IN PIGS.
90. Lars Jacob Stovner: THE CHIARI TYPE I MALFORMATION.
91. Kjell Å. Salvesen: ROUTINE ULTRASONOGRAPHY IN UTERO AND DEVELOPMENT IN CHILDHOOD.

1994

92. Nina-Beate Liabakk: DEVELOPMENT OF IMMUNOASSAYS FOR TNF AND ITS SOLUBLE RECEPTORS.
93. Sverre Helge Torp: *erb*B ONCOGENES IN HUMAN GLIOMAS AND MENINGIOMAS.
94. Olav M. Linaker: MENTAL RETARDATION AND PSYCHIATRY. Past and present.
95. Per Oscar Feet: INCREASED ANTIDEPRESSANT AND ANTIPANIC EFFECT IN COMBINED TREATMENT WITH DIXYRAZINE AND TRICYCLIC ANTIDEPRESSANTS.
96. Stein Olav Samstad: CROSS SECTIONAL FLOW VELOCITY PROFILES FROM TWO-DIMENSIONAL DOPPLER ULTRASOUND: Studies on early mitral blood flow.
97. Bjørn Backe: STUDIES IN ANTENATAL CARE.
98. Gerd Inger Ringdal: QUALITY OF LIFE IN CANCER PATIENTS.
99. Torvid Kiserud: THE DUCTUS VENOSUS IN THE HUMAN FETUS.
100. Hans E. Fjøsne: HORMONAL REGULATION OF PROSTATIC METABOLISM.
101. Eylert Brodtkorb: CLINICAL ASPECTS OF EPILEPSY IN THE MENTALLY RETARDED.
102. Roar Juul: PEPTIDERGIC MECHANISMS IN HUMAN SUBARACHNOID HEMORRHAGE.
103. Unni Syversen: CHROMOGRANIN A. Phsysiological and Clinical Role.

1995

104. Odd Gunnar Brakstad: THERMOSTABLE NUCLEASE AND THE *nuc* GENE IN THE DIAGNOSIS OF *Staphylococcus aureus* INFECTIONS.
105. Terje Engan: NUCLEAR MAGNETIC RESONANCE (NMR) SPECTROSCOPY OF PLASMA IN MALIGNANT DISEASE.
106. Kirsten Rasmussen: VIOLENCE IN THE MENTALLY DISORDERED.
107. Finn Egil Skjeldestad: INDUCED ABORTION: Timetrends and Determinants.
108. Roar Stenseth: THORACIC EPIDURAL ANALGESIA IN AORTOCORONARY BYPASS SURGERY.
109. Arild Faxvaag: STUDIES OF IMMUNE CELL FUNCTION *in mice infected with* MURINE RETROVIRUS.

1996

110. Svend Aakhus: NONINVASIVE COMPUTERIZED ASSESSMENT OF LEFT VENTRICULAR FUNCTION AND SYSTEMIC ARTERIAL PROPERTIES. Methodology and some clinical applications.
111. Klaus-Dieter Bolz: INTRAVASCULAR ULTRASONOGRAPHY.
112. Petter Aadahl: CARDIOVASCULAR EFFECTS OF THORACIC AORTIC CROSS-CLAMPING.
113. Sigurd Steinshamn: CYTOKINE MEDIATORS DURING GRANULOCYTOPENIC INFECTIONS.
114. Hans Stifoss-Hanssen: SEEKING MEANING OR HAPPINESS?
115. Anne Kvikstad: LIFE CHANGE EVENTS AND MARITAL STATUS IN RELATION TO RISK AND PROGNOSIS OF CANCER.
116. Torbjørn Grøntvedt: TREATMENT OF ACUTE AND CHRONIC ANTERIOR CRUCIATE LIGAMENT INJURIES. A clinical and biomechanical study.
117. Sigrid Hørven Wigers: CLINICAL STUDIES OF FIBROMYALGIA WITH FOCUS ON ETIOLOGY, TREATMENT AND OUTCOME.
118. Jan Schjøtt: MYOCARDIAL PROTECTION: Functional and Metabolic Characteristics of Two Endogenous Protective Principles.
119. Marit Martinussen: STUDIES OF INTESTINAL BLOOD FLOW AND ITS RELATION TO TRANSITIONAL CIRCULATORY ADAPATION IN NEWBORN INFANTS.
120. Tomm B. Müller: MAGNETIC RESONANCE IMAGING IN FOCAL CEREBRAL ISCHEMIA.
121. Rune Haaverstad: OEDEMA FORMATION OF THE LOWER EXTREMITIES.
122. Magne Børset: THE ROLE OF CYTOKINES IN MULTIPLE MYELOMA, WITH SPECIAL REFERENCE TO HEPATOCYTE GROWTH FACTOR.
123. Geir Smedslund: A THEORETICAL AND EMPIRICAL INVESTIGATION OF SMOKING, STRESS AND DISEASE: RESULTS FROM A POPULATION SURVEY.

1997

124. Torstein Vik: GROWTH, MORBIDITY, AND PSYCHOMOTOR DEVELOPMENT IN INFANTS WHO WERE GROWTH RETARDED *IN UTERO*.
125. Siri Forsmo: ASPECTS AND CONSEQUENCES OF OPPORTUNISTIC SCREENING FOR CERVICAL CANCER. Results based on data from three Norwegian counties.
126. Jon S. Skranes: CEREBRAL MRI AND NEURODEVELOPMENTAL OUTCOME IN VERY LOW BIRTH WEIGHT (VLBW) CHILDREN. A follow-up study of a geographically based year cohort of VLBW children at ages one and six years.
127. Knut Bjørnstad: COMPUTERIZED ECHOCARDIOGRAPHY FOR EVALUTION OF CORONARY ARTERY DISEASE.
128. Grethe Elisabeth Borchgrevink: DIAGNOSIS AND TREATMENT OF WHIPLASH/NECK SPRAIN INJURIES CAUSED BY CAR ACCIDENTS.
129. Tor Elsås: NEUROPEPTIDES AND NITRIC OXIDE SYNTHASE IN OCULAR AUTONOMIC AND SENSORY NERVES.
130. Rolf W. Gråwe: EPIDEMIOLOGICAL AND NEUROPSYCHOLOGICAL PERSPECTIVES ON SCHIZOPHRENIA.
131. Tonje Strømholm: CEREBRAL HAEMODYNAMICS DURING THORACIC AORTIC CROSSCLAMPING. An experimental study in pigs.

1998

132. Martinus Bråten: STUDIES ON SOME PROBLEMS REALTED TO INTRAMEDULLARY NAILING OF FEMORAL FRACTURES.
133. Ståle Nordgård: PROLIFERATIVE ACTIVITY AND DNA CONTENT AS PROGNOSTIC INDICATORS IN ADENOID CYSTIC CARCINOMA OF THE HEAD AND NECK.
134. Egil Lien: SOLUBLE RECEPTORS FOR **TNF** AND **LPS**: RELEASE PATTERN AND POSSIBLE SIGNIFICANCE IN DISEASE.
135. Marit Bjørgaas: HYPOGLYCAEMIA IN CHILDREN WITH DIABETES MELLITUS
136. Frank Skorpen: GENETIC AND FUNCTIONAL ANALYSES OF DNA REPAIR IN HUMAN CELLS.
137. Juan A. Pareja: SUNCT SYNDROME. ON THE CLINICAL PICTURE. ITS DISTINCTION FROM OTHER, SIMILAR HEADACHES.
138. Anders Angelsen: NEUROENDOCRINE CELLS IN HUMAN PROSTATIC CARCINOMAS AND THE PROSTATIC COMPLEX OF RAT, GUINEA PIG, CAT AND DOG.
139. Fabio Antonaci: CHRONIC PAROXYSMAL HEMICRANIA AND HEMICRANIA CONTINUA: TWO DIFFERENT ENTITIES?
140. Sven M. Carlsen: ENDOCRINE AND METABOLIC EFFECTS OF METFORMIN WITH SPECIAL EMPHASIS ON CARDIOVASCULAR RISK FACTORES.

1999

141. Terje A. Murberg: DEPRESSIVE SYMPTOMS AND COPING AMONG PATIENTS WITH CONGESTIVE HEART FAILURE.
142. Harm-Gerd Karl Blaas: THE EMBRYONIC EXAMINATION. Ultrasound studies on the development of the human embryo.
143. Noèmi Becser Andersen:THE CEPHALIC SENSORY NERVES IN UNILATERAL HEADACHES. Anatomical background and neurophysiological evaluation.
144. Eli-Janne Fiskerstrand: LASER TREATMENT OF PORT WINE STAINS. A study of the efficacy and limitations of the pulsed dye laser. Clinical and morfological analyses aimed at improving the therapeutic outcome.
145. Bård Kulseng: A STUDY OF ALGINATE CAPSULE PROPERTIES AND CYTOKINES IN RELATION TO INSULIN DEPENDENT DIABETES MELLITUS.
146. Terje Haug: STRUCTURE AND REGULATION OF THE HUMAN UNG GENE ENCODING URACIL-DNA GLYCOSYLASE.
147. Heidi Brurok: MANGANESE AND THE HEART. A Magic Metal with Diagnostic and Therapeutic Possibilites.
148. Agnes Kathrine Lie: DIAGNOSIS AND PREVALENCE OF HUMAN PAPILLOMAVIRUS INFECTION IN CERVICAL INTRAEPITELIAL NEOPLASIA. Relationship to Cell Cycle Regulatory Proteins and HLA DQBI Genes.
149. Ronald Mårvik: PHARMACOLOGICAL, PHYSIOLOGICAL AND PATHOPHYSIOLOGICAL STUDIES ON ISOLATED STOMACS.
150. Ketil Jarl Holen: THE ROLE OF ULTRASONOGRAPHY IN THE DIAGNOSIS AND TREATMENT OF HIP DYSPLASIA IN NEWBORNS.
151. Irene Hetlevik: THE ROLE OF CLINICAL GUIDELINES IN CARDIOVASCULAR RISK INTERVENTION IN GENERAL PRACTICE.
152. Katarina Tunòn: ULTRASOUND AND PREDICTION OF GESTATIONAL AGE.
153. Johannes Soma: INTERACTION BETWEEN THE LEFT VENTRICLE AND THE SYSTEMIC ARTERIES.
154. Arild Aamodt: DEVELOPMENT AND PRE-CLINICAL EVALUATION OF A CUSTOM-MADE FEMORAL STEM.
155. Agnar Tegnander: DIAGNOSIS AND FOLLOW-UP OF CHILDREN WITH SUSPECTED OR KNOWN HIP DYSPLASIA.
156. Bent Indredavik: STROKE UNIT TREATMENT: SHORT AND LONG-TERM EFFECTS
157. Jolanta Vanagaite Vingen: PHOTOPHOBIA AND PHONOPHOBIA IN PRIMARY HEADACHES

2000

158. Ola Dalsegg Sæther: PATHOPHYSIOLOGY DURING PROXIMAL AORTIC CROSS-CLAMPING CLINICAL AND EXPERIMENTAL STUDIES
159. xxxxxxxxx (blind number)
160. Christina Vogt Isaksen: PRENATAL ULTRASOUND AND POSTMORTEM FINDINGS – A TEN YEAR CORRELATIVE STUDY OF FETUSES AND INFANTS WITH DEVELOPMENTAL ANOMALIES.

161. Holger Seidel: HIGH-DOSE METHOTREXATE THERAPY IN CHILDREN WITH ACUTE LYMPHOCYTIC LEUKEMIA: DOSE, CONCENTRATION, AND EFFECT CONSIDERATIONS.
162. Stein Hallan: IMPLEMENTATION OF MODERN MEDICAL DECISION ANALYSIS INTO CLINICAL DIAGNOSIS AND TREATMENT.
163. Malcolm Sue-Chu: INVASIVE AND NON-INVASIVE STUDIES IN CROSS-COUNTRY SKIERS WITH ASTHMA-LIKE SYMPTOMS.
164. Ole-Lars Brekke: EFFECTS OF ANTIOXIDANTS AND FATTY ACIDS ON TUMOR NECROSIS FACTOR-INDUCED CYTOTOXICITY.
165. Jan Lundbom: AORTOCORONARY BYPASS SURGERY: CLINICAL ASPECTS, COST CONSIDERATIONS AND WORKING ABILITY.
166. John-Anker Zwart: LUMBAR NERVE ROOT COMPRESSION, BIOCHEMICAL AND NEUROPHYSIOLOGICAL ASPECTS.
167. Geir Falck: HYPEROSMOLALITY AND THE HEART.
168. Eirik Skogvoll: CARDIAC ARREST Incidence, Intervention and Outcome.
169. Dalius Bansevicius: SHOULDER-NECK REGION IN CERTAIN HEADACHES AND CHRONIC PAIN SYNDROMES.
170. Bettina Kinge: REFRACTIVE ERRORS AND BIOMETRIC CHANGES AMONG UNIVERSITY STUDENTS IN NORWAY.
171. Gunnar Qvigstad: CONSEQUENCES OF HYPERGASTRINEMIA IN MAN
172. Hanne Ellekjær: EPIDEMIOLOGICAL STUDIES OF STROKE IN A NORWEGIAN POPULATION. INCIDENCE, RISK FACTORS AND PROGNOSIS
173. Hilde Grimstad: VIOLENCE AGAINST WOMEN AND PREGNANCY OUTCOME.
174. Astrid Hjelde: SURFACE TENSION AND COMPLEMENT ACTIVATION: Factors influencing bubble formation and bubble effects after decompression.
175. Kjell A. Kvistad: MR IN BREAST CANCER – A CLINICAL STUDY.
176. Ivar Rossvoll: ELECTIVE ORTHOPAEDIC SURGERY IN A DEFINED POPULATION. Studies on demand, waiting time for treatment and incapacity for work.
177. Carina Seidel: PROGNOSTIC VALUE AND BIOLOGICAL EFFECTS OF HEPATOCYTE GROWTH FACTOR AND SYNDECAN-1 IN MULTIPLE MYELOMA.

2001

178. Alexander Wahba: THE INFLUENCE OF CARDIOPULMONARY BYPASS ON PLATELET FUNCTION AND BLOOD COAGULATION – DETERMINANTS AND CLINICAL CONSEQUENSES
179. Marcus Schmitt-Egenolf: THE RELEVANCE OF THE MAJOR hISTOCOMPATIBILITY COMPLEX FOR THE GENETICS OF PSORIASIS
180. Odrun Arna Gederaas: BIOLOGICAL MECHANISMS INVOLVED IN 5-AMINOLEVULINIC ACID BASED PHOTODYNAMIC THERAPY
181. Pål Richard Romundstad: CANCER INCIDENCE AMONG NORWEGIAN ALUMINIUM WORKERS
182. Henrik Hjorth-Hansen: NOVEL CYTOKINES IN GROWTH CONTROL AND BONE DISEASE OF MULTIPLE MYELOMA
183. Gunnar Morken: SEASONAL VARIATION OF HUMAN MOOD AND BEHAVIOUR
184. Bjørn Olav Haugen: MEASUREMENT OF CARDIAC OUTPUT AND STUDIES OF VELOCITY PROFILES IN AORTIC AND MITRAL FLOW USING TWO- AND THREE-DIMENSIONAL COLOUR FLOW IMAGING
185. Geir Bråthen: THE CLASSIFICATION AND CLINICAL DIAGNOSIS OF ALCOHOL-RELATED SEIZURES
186. Knut Ivar Aasarød: RENAL INVOLVEMENT IN INFLAMMATORY RHEUMATIC DISEASE. A Study of Renal Disease in Wegener's Granulomatosis and in Primary Sjögren's Syndrome
187. Trude Helen Flo: RESEPTORS INVOLVED IN CELL ACTIVATION BY DEFINED URONIC ACID POLYMERS AND BACTERIAL COMPONENTS
188. Bodil Kavli: HUMAN URACIL-DNA GLYCOSYLASES FROM THE UNG GENE: STRUCTRUAL BASIS FOR SUBSTRATE SPECIFICITY AND REPAIR
189. Liv Thommesen: MOLECULAR MECHANISMS INVOLVED IN TNF- AND GASTRIN-MEDIATED GENE REGULATION
190. Turid Lingaas Holmen: SMOKING AND HEALTH IN ADOLESCENCE; THE NORD-TRØNDELAG HEALTH STUDY, 1995-97

191. Øyvind Hjertner: MULTIPLE MYELOMA: INTERACTIONS BETWEEN MALIGNANT PLASMA CELLS AND THE BONE MICROENVIRONMENT
192. Asbjørn Støylen: STRAIN RATE IMAGING OF THE LEFT VENTRICLE BY ULTRASOUND. FEASIBILITY, CLINICAL VALIDATION AND PHYSIOLOGICAL ASPECTS
193. Kristian Midthjell: DIABETES IN ADULTS IN NORD-TRØNDELAG. PUBLIC HEALTH ASPECTS OF DIABETES MELLITUS IN A LARGE, NON-SELECTED NORWEGIAN POPULATION.
194. Guanglin Cui: FUNCTIONAL ASPECTS OF THE ECL CELL IN RODENTS
195. Ulrik Wisløff: CARDIAC EFFECTS OF AEROBIC ENDURANCE TRAINING: HYPERTROPHY, CONTRACTILITY AND CALCUIM HANDLING IN NORMAL AND FAILING HEART
196. Øyvind Halaas: MECHANISMS OF IMMUNOMODULATION AND CELL-MEDIATED CYTOTOXICITY INDUCED BY BACTERIAL PRODUCTS
197. Tore Amundsen: PERFUSION MR IMAGING IN THE DIAGNOSIS OF PULMONARY EMBOLISM
198. Nanna Kurtze: THE SIGNIFICANCE OF ANXIETY AND DEPRESSION IN FATIQUE AND PATTERNS OF PAIN AMONG INDIVIDUALS DIAGNOSED WITH FIBROMYALGIA: RELATIONS WITH QUALITY OF LIFE, FUNCTIONAL DISABILITY, LIFESTYLE, EMPLOYMENT STATUS, CO-MORBIDITY AND GENDER
199. Tom Ivar Lund Nilsen: PROSPECTIVE STUDIES OF CANCER RISK IN NORD-TRØNDELAG: THE HUNT STUDY. Associations with anthropometric, socioeconomic, and lifestyle risk factors
200. Asta Kristine Håberg: A NEW APPROACH TO THE STUDY OF MIDDLE CEREBRAL ARTERY OCCLUSION IN THE RAT USING MAGNETIC RESONANCE TECHNIQUES

2002

201. Knut Jørgen Arntzen: PREGNANCY AND CYTOKINES
202. Henrik Døllner: INFLAMMATORY MEDIATORS IN PERINATAL INFECTIONS
203. Asta Bye: LOW FAT, LOW LACTOSE DIET USED AS PROPHYLACTIC TREATMENT OF ACUTE INTESTINAL REACTIONS DURING PELVIC RADIOTHERAPY. A PROSPECTIVE RANDOMISED STUDY.
204. Sylvester Moyo: STUDIES ON STREPTOCOCCUS AGALACTIAE (GROUP B STREPTOCOCCUS) SURFACE-ANCHORED MARKERS WITH EMPHASIS ON STRAINS AND HUMAN SERA FROM ZIMBABWE.
205. Knut Hagen: HEAD-HUNT: THE EPIDEMIOLOGY OF HEADACHE IN NORD-TRØNDELAG
206. Li Lixin: ON THE REGULATION AND ROLE OF UNCOUPLING PROTEIN-2 IN INSULIN PRODUCING ß-CELLS
207. Anne Hildur Henriksen: SYMPTOMS OF ALLERGY AND ASTHMA VERSUS MARKERS OF LOWER AIRWAY INFLAMMATION AMONG ADOLESCENTS
208. Egil Andreas Fors: NON-MALIGNANT PAIN IN RELATION TO PSYCHOLOGICAL AND ENVIRONTENTAL FACTORS. EXPERIENTAL AND CLINICAL STUDES OF PAIN WITH FOCUS ON FIBROMYALGIA
209. Pål Klepstad: MORPHINE FOR CANCER PAIN
210. Ingunn Bakke: MECHANISMS AND CONSEQUENCES OF PEROXISOME PROLIFERATOR-INDUCED HYPERFUNCTION OF THE RAT GASTRIN PRODUCING CELL
211. Ingrid Susann Gribbestad: MAGNETIC RESONANCE IMAGING AND SPECTROSCOPY OF BREAST CANCER
212. Rønnaug Astri Ødegård: PREECLAMPSIA – MATERNAL RISK FACTORS AND FETAL GROWTH
213. Johan Haux: STUDIES ON CYTOTOXICITY INDUCED BY HUMAN NATURAL KILLER CELLS AND DIGITOXIN
214. Turid Suzanne Berg-Nielsen: PARENTING PRACTICES AND MENTALLY DISORDERED ADOLESCENTS
215. Astrid Rydning: BLOOD FLOW AS A PROTECTIVE FACTOR FOR THE STOMACH MUCOSA. AN EXPERIMENTAL STUDY ON THE ROLE OF MAST CELLS AND SENSORY AFFERENT NEURONS

2003

216. Jan Pål Loennechen: HEART FAILURE AFTER MYOCARDIAL INFARCTION. Regional Differences, Myocyte Function, Gene Expression, and Response to Cariporide, Losartan, and Exercise Training.
217. Elisabeth Qvigstad: EFFECTS OF FATTY ACIDS AND OVER-STIMULATION ON INSULIN SECRETION IN MAN
218. Arne Åsberg: EPIDEMIOLOGICAL STUDIES IN HEREDITARY HEMOCHROMATOSIS: PREVALENCE, MORBIDITY AND BENEFIT OF SCREENING.
219. Johan Fredrik Skomsvoll: REPRODUCTIVE OUTCOME IN WOMEN WITH RHEUMATIC DISEASE. A population registry based study of the effects of inflammatory rheumatic disease and connective tissue disease on reproductive outcome in Norwegian women in 1967-1995.
220. Siv Mørkved: URINARY INCONTINENCE DURING PREGNANCY AND AFTER DELIVERY: EFFECT OF PELVIC FLOOR MUSCLE TRAINING IN PREVENTION AND TREATMENT
221. Marit S. Jordhøy: THE IMPACT OF COMPREHENSIVE PALLIATIVE CARE
222. Tom Christian Martinsen: HYPERGASTRINEMIA AND HYPOACIDITY IN RODENTS – CAUSES AND CONSEQUENCES
223. Solveig Tingulstad: CENTRALIZATION OF PRIMARY SURGERY FOR OVARAIN CANCER. FEASIBILITY AND IMPACT ON SURVIVAL
224. Haytham Eloqayli: METABOLIC CHANGES IN THE BRAIN CAUSED BY EPILEPTIC SEIZURES
225. Torunn Bruland: STUDIES OF EARLY RETROVIRUS-HOST INTERACTIONS – VIRAL DETERMINANTS FOR PATHOGENESIS AND THE INFLUENCE OF SEX ON THE SUSCEPTIBILITY TO FRIEND MURINE LEUKAEMIA VIRUS INFECTION
226. Torstein Hole: DOPPLER ECHOCARDIOGRAPHIC EVALUATION OF LEFT VENTRICULAR FUNCTION IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION
227. Vibeke Nossum: THE EFFECT OF VASCULAR BUBBLES ON ENDOTHELIAL FUNCTION
228. Sigurd Fasting: ROUTINE BASED RECORDING OF ADVERSE EVENTS DURING ANAESTHESIA – APPLICATION IN QUALITY IMPROVEMENT AND SAFETY
229. Solfrid Romundstad: EPIDEMIOLOGICAL STUDIES OF MICROALBUMINURIA. THE NORD-TRØNDELAG HEALTH STUDY 1995-97 (HUNT 2)
230. Geir Torheim: PROCESSING OF DYNAMIC DATA SETS IN MAGNETIC RESONANCE IMAGING
231. Catrine Ahlén: SKIN INFECTIONS IN OCCUPATIONAL SATURATION DIVERS IN THE NORTH SEA AND THE IMPACT OF THE ENVIRONMENT
232. Arnulf Langhammer: RESPIRATORY SYMPTOMS, LUNG FUNCTION AND BONE MINERAL DENSITY IN A COMPREHENSIVE POPULATION SURVEY. THE NORD-TRØNDELAG HEALTH STUDY 1995-97. THE BRONCHIAL OBSTRUCTION IN NORD-TRØNDELAG STUDY
233. Einar Kjelsås: EATING DISORDERS AND PHYSICAL ACTIVITY IN NON-CLINICAL SAMPLES
234. Arne Wibe: RECTAL CANCER TREATMENT IN NORWAY – STANDARDISATION OF SURGERY AND QUALITY ASSURANCE

2004

235. Eivind Witsø: BONE GRAFT AS AN ANTIBIOTIC CARRIER
236. Anne Mari Sund: DEVELOPMENT OF DEPRESSIVE SYMPTOMS IN EARLY ADOLESCENCE
237. Hallvard Lærum: EVALUATION OF ELECTRONIC MEDICAL RECORDS – A CLINICAL TASK PERSPECTIVE
238. Gustav Mikkelsen: ACCESSIBILITY OF INFORMATION IN ELECTRONIC PATIENT RECORDS; AN EVALUATION OF THE ROLE OF DATA QUALITY
239. Steinar Krokstad: SOCIOECONOMIC INEQUALITIES IN HEALTH AND DISABILITY. SOCIAL EPIDEMIOLOGY IN THE NORD-TRØNDELAG HEALTH STUDY (HUNT), NORWAY
240. Arne Kristian Myhre: NORMAL VARIATION IN ANOGENITAL ANATOMY AND MICROBIOLOGY IN NON-ABUSED PRESCHOOL CHILDREN
241. Ingunn Dybedal: NEGATIVE REGULATORS OF HEMATOPOIETEC STEM AND PROGENITOR CELLS
242. Beate Sitter: TISSUE CHARACTERIZATION BY HIGH RESOLUTION MAGIC ANGLE SPINNING MR SPECTROSCOPY

243. Per Arne Aas: MACROMOLECULAR MAINTENANCE IN HUMAN CELLS – REPAIR OF URACIL IN DNA AND METHYLATIONS IN DNA AND RNA
244. Anna Bofin: FINE NEEDLE ASPIRATION CYTOLOGY IN THE PRIMARY INVESTIGATION OF BREAST TUMOURS AND IN THE DETERMINATION OF TREATMENT STRATEGIES
245. Jim Aage Nøttestad: DEINSTITUTIONALIZATION AND MENTAL HEALTH CHANGES AMONG PEOPLE WITH MENTAL RETARDATION
246. Reidar Fossmark: GASTRIC CANCER IN JAPANESE COTTON RATS
247. Wibeke Nordhøy: MANGANESE AND THE HEART, INTRACELLULAR MR RELAXATION AND WATER EXCHANGE ACROSS THE CARDIAC CELL MEMBRANE

2005

248. Sturla Molden: QUANTITATIVE ANALYSES OF SINGLE UNITS RECORDED FROM THE HIPPOCAMPUS AND ENTORHINAL CORTEX OF BEHAVING RATS
249. Wenche Brenne Drøyvold: EPIDEMIOLOGICAL STUDIES ON WEIGHT CHANGE AND HEALTH IN A LARGE POPULATION. THE NORD-TRØNDELAG HEALTH STUDY (HUNT)
250. Ragnhild Støen: ENDOTHELIUM-DEPENDENT VASODILATION IN THE FEMORAL ARTERY OF DEVELOPING PIGLETS
251. Aslak Steinsbekk: HOMEOPATHY IN THE PREVENTION OF UPPER RESPIRATORY TRACT INFECTIONS IN CHILDREN
252. Hill-Aina Steffenach: MEMORY IN HIPPOCAMPAL AND CORTICO-HIPPOCAMPAL CIRCUITS
253. Eystein Stordal: ASPECTS OF THE EPIDEMIOLOGY OF DEPRESSIONS BASED ON SELF-RATING IN A LARGE GENERAL HEALTH STUDY (THE HUNT-2 STUDY)
254. Viggo Pettersen: FROM MUSCLES TO SINGING: THE ACTIVITY OF ACCESSORY BREATHING MUSCLES AND THORAX MOVEMENT IN CLASSICAL SINGING
255. Marianne Fyhn: SPATIAL MAPS IN THE HIPPOCAMPUS AND ENTORHINAL CORTEX
256. Robert Valderhaug: OBSESSIVE-COMPULSIVE DISORDER AMONG CHILDREN AND ADOLESCENTS: CHARACTERISTICS AND PSYCHOLOGICAL MANAGEMENT OF PATIENTS IN OUTPATIENT PSYCHIATRIC CLINICS
257. Erik Skaaheim Haug: INFRARENAL ABDOMINAL AORTIC ANEURYSMS – COMORBIDITY AND RESULTS FOLLOWING OPEN SURGERY
258. Daniel Kondziella: GLIAL-NEURONAL INTERACTIONS IN EXPERIMENTAL BRAIN DISORDERS
259. Vegard Heimly Brun: ROUTES TO SPATIAL MEMORY IN HIPPOCAMPAL PLACE CELLS
260. Kenneth McMillan: PHYSIOLOGICAL ASSESSMENT AND TRAINING OF ENDURANCE AND STRENGTH IN PROFESSIONAL YOUTH SOCCER PLAYERS
261. Marit Sæbø Indredavik: MENTAL HEALTH AND CEREBRAL MAGNETIC RESONANCE IMAGING IN ADOLESCENTS WITH LOW BIRTH WEIGHT
262. Ole Johan Kemi: ON THE CELLULAR BASIS OF AEROBIC FITNESS, INTENSITY-DEPENDENCE AND TIME-COURSE OF CARDIOMYOCYTE AND ENDOTHELIAL ADAPTATIONS TO EXERCISE TRAINING
263. Eszter Vanky: POLYCYSTIC OVARY SYNDROME – METFORMIN TREATMENT IN PREGNANCY
264. Hild Fjærtoft: EXTENDED STROKE UNIT SERVICE AND EARLY SUPPORTED DISCHARGE. SHORT AND LONG-TERM EFFECTS
265. Grete Dyb: POSTTRAUMATIC STRESS REACTIONS IN CHILDREN AND ADOLESCENTS
266. Vidar Fykse: SOMATOSTATIN AND THE STOMACH
267. Kirsti Berg: OXIDATIVE STRESS AND THE ISCHEMIC HEART: A STUDY IN PATIENTS UNDERGOING CORONARY REVASCULARIZATION
268. Björn Inge Gustafsson: THE SEROTONIN PRODUCING ENTEROCHROMAFFIN CELL, AND EFFECTS OF HYPERSEROTONINEMIA ON HEART AND BONE

2006

269. Torstein Baade Rø: EFFECTS OF BONE MORPHOGENETIC PROTEINS, HEPATOCYTE GROWTH FACTOR AND INTERLEUKIN-21 IN MULTIPLE MYELOMA
270. May-Britt Tessem: METABOLIC EFFECTS OF ULTRAVIOLET RADIATION ON THE ANTERIOR PART OF THE EYE

271. Anne-Sofie Helvik: COPING AND EVERYDAY LIFE IN A POPULATION OF ADULTS WITH HEARING IMPAIRMENT
272. Therese Standal: MULTIPLE MYELOMA: THE INTERPLAY BETWEEN MALIGNANT PLASMA CELLS AND THE BONE MARROW MICROENVIRONMENT
273. Ingvild Saltvedt: TREATMENT OF ACUTELY SICK, FRAIL ELDERLY PATIENTS IN A GERIATRIC EVALUATION AND MANAGEMENT UNIT – RESULTS FROM A PROSPECTIVE RANDOMISED TRIAL
274. Birger Henning Endreseth: STRATEGIES IN RECTAL CANCER TREATMENT – FOCUS ON EARLY RECTAL CANCER AND THE INFLUENCE OF AGE ON PROGNOSIS
275. Anne Mari Aukan Rokstad: ALGINATE CAPSULES AS BIOREACTORS FOR CELL THERAPY
276. Mansour Akbari: HUMAN BASE EXCISION REPAIR FOR PRESERVATION OF GENOMIC STABILITY
277. Stein Sundstrøm: IMPROVING TREATMENT IN PATIENTS WITH LUNG CANCER – RESULTS FROM TWO MULITCENTRE RANDOMISED STUDIES
278. Hilde Pleym: BLEEDING AFTER CORONARY ARTERY BYPASS SURGERY - STUDIES ON HEMOSTATIC MECHANISMS, PROPHYLACTIC DRUG TREATMENT AND EFFECTS OF AUTOTRANSFUSION
279. Line Merethe Oldervoll: PHYSICAL ACTIVITY AND EXERCISE INTERVENTIONS IN CANCER PATIENTS
280. Boye Welde: THE SIGNIFICANCE OF ENDURANCE TRAINING, RESISTANCE TRAINING AND MOTIVATIONAL STYLES IN ATHLETIC PERFORMANCE AMONG ELITE JUNIOR CROSS-COUNTRY SKIERS
281. Per Olav Vandvik: IRRITABLE BOWEL SYNDROME IN NORWAY, STUDIES OF PREVALENCE, DIAGNOSIS AND CHARACTERISTICS IN GENERAL PRACTICE AND IN THE POPULATION
282. Idar Kirkeby-Garstad: CLINICAL PHYSIOLOGY OF EARLY MOBILIZATION AFTER CARDIAC SURGERY
283. Linn Getz: SUSTAINABLE AND RESPONSIBLE PREVENTIVE MEDICINE. CONCEPTUALISING ETHICAL DILEMMAS ARISING FROM CLINICAL IMPLEMENTATION OF ADVANCING MEDICAL TECHNOLOGY
284. Eva Tegnander: DETECTION OF CONGENITAL HEART DEFECTS IN A NON-SELECTED POPULATION OF 42,381 FETUSES
285. Kristin Gabestad Nørsett: GENE EXPRESSION STUDIES IN GASTROINTESTINAL PATHOPHYSIOLOGY AND NEOPLASIA
286. Per Magnus Haram: GENETIC VS. AQUIRED FITNESS: METABOLIC, VASCULAR AND CARDIOMYOCYTE ADAPTATIONS
287. Agneta Johansson: GENERAL RISK FACTORS FOR GAMBLING PROBLEMS AND THE PREVALENCE OF PATHOLOGICAL GAMBLING IN NORWAY
288. Svein Artur Jensen: THE PREVALENCE OF SYMPTOMATIC ARTERIAL DISEASE OF THE LOWER LIMB
289. Charlotte Björk Ingul: QUANITIFICATION OF REGIONAL MYOCARDIAL FUNCTION BY STRAIN RATE AND STRAIN FOR EVALUATION OF CORONARY ARTERY DISEASE. AUTOMATED VERSUS MANUAL ANALYSIS DURING ACUTE MYOCARDIAL INFARCTION AND DOBUTAMINE STRESS ECHOCARDIOGRAPHY
290. Jakob Nakling: RESULTS AND CONSEQUENCES OF ROUTINE ULTRASOUND SCREENING IN PREGNANCY – A GEOGRAPHIC BASED POPULATION STUDY
291. Anne Engum: DEPRESSION AND ANXIETY – THEIR RELATIONS TO THYROID DYSFUNCTION AND DIABETES IN A LARGE EPIDEMIOLOGICAL STUDY
292. Ottar Bjerkeset: ANXIETY AND DEPRESSION IN THE GENERAL POPULATION: RISK FACTORS, INTERVENTION AND OUTCOME – THE NORD-TRØNDELAG HEALTH STUDY (HUNT)
293. Jon Olav Drogset: RESULTS AFTER SURGICAL TREATMENT OF ANTERIOR CRUCIATE LIGAMENT INJURIES – A CLINICAL STUDY
294. Lars Fosse: MECHANICAL BEHAVIOUR OF COMPACTED MORSELLISED BONE – AN EXPERIMENTAL IN VITRO STUDY
295. Gunilla Klensmeden Fosse: MENTAL HEALTH OF PSYCHIATRIC OUTPATIENTS BULLIED IN CHILDHOOD
296. Paul Jarle Mork: MUSCLE ACTIVITY IN WORK AND LEISURE AND ITS ASSOCIATION TO MUSCULOSKELETAL PAIN

297. Björn Stenström: LESSONS FROM RODENTS: I: MECHANISMS OF OBESITY SURGERY – ROLE OF STOMACH. II: CARCINOGENIC EFFECTS OF *HELICOBACTER PYLORI* AND SNUS IN THE STOMACH

2007

298. Haakon R. Skogseth: INVASIVE PROPERTIES OF CANCER – A TREATMENT TARGET ? IN VITRO STUDIES IN HUMAN PROSTATE CANCER CELL LINES
299. Janniche Hammer: GLUTAMATE METABOLISM AND CYCLING IN MESIAL TEMPORAL LOBE EPILEPSY
300. May Britt Drugli: YOUNG CHILDREN TREATED BECAUSE OF ODD/CD: CONDUCT PROBLEMS AND SOCIAL COMPETENCIES IN DAY-CARE AND SCHOOL SETTINGS
301. Arne Skjold: MAGNETIC RESONANCE KINETICS OF MANGANESE DIPYRIDOXYL DIPHOSPHATE (MnDPDP) IN HUMAN MYOCARDIUM. STUDIES IN HEALTHY VOLUNTEERS AND IN PATIENTS WITH RECENT MYOCARDIAL INFARCTION
302. Siri Malm: LEFT VENTRICULAR SYSTOLIC FUNCTION AND MYOCARDIAL PERFUSION ASSESSED BY CONTRAST ECHOCARDIOGRAPHY
303. Valentina Maria do Rosario Cabral Iversen: MENTAL HEALTH AND PSYCHOLOGICAL ADAPTATION OF CLINICAL AND NON-CLINICAL MIGRANT GROUPS
304. Lasse Løvstakken: SIGNAL PROCESSING IN DIAGNOSTIC ULTRASOUND: ALGORITHMS FOR REAL-TIME ESTIMATION AND VISUALIZATION OF BLOOD FLOW VELOCITY
305. Elisabeth Olstad: GLUTAMATE AND GABA: MAJOR PLAYERS IN NEURONAL METABOLISM
306. Lilian Leistad: THE ROLE OF CYTOKINES AND PHOSPHOLIPASE A_2S IN ARTICULAR CARTILAGE CHONDROCYTES IN RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS
307. Arne Vaaler: EFFECTS OF PSYCHIATRIC INTENSIVE CARE UNIT IN AN ACUTE PSYCIATHRIC WARD
308. Mathias Toft: GENETIC STUDIES OF LRRK2 AND PINK1 IN PARKINSON'S DISEASE
309. Ingrid Løvold Mostad: IMPACT OF DIETARY FAT QUANTITY AND QUALITY IN TYPE 2 DIABETES WITH EMPHASIS ON MARINE N-3 FATTY ACIDS
310. Torill Eidhammer Sjøbakk: MR DETERMINED BRAIN METABOLIC PATTERN IN PATIENTS WITH BRAIN METASTASES AND ADOLESCENTS WITH LOW BIRTH WEIGHT
311. Vidar Beisvåg: PHYSIOLOGICAL GENOMICS OF HEART FAILURE: FROM TECHNOLOGY TO PHYSIOLOGY
312. Olav Magnus Søndenå Fredheim: HEALTH RELATED QUALITY OF LIFE ASSESSMENT AND ASPECTS OF THE CLINICAL PHARMACOLOGY OF METHADONE IN PATIENTS WITH CHRONIC NON-MALIGNANT PAIN
313. Anne Brantberg: FETAL AND PERINATAL IMPLICATIONS OF ANOMALIES IN THE GASTROINTESTINAL TRACT AND THE ABDOMINAL WALL
314. Erik Solligård: GUT LUMINAL MICRODIALYSIS
315. Elin Tollefsen: RESPIRATORY SYMPTOMS IN A COMPREHENSIVE POPULATION BASED STUDY AMONG ADOLESCENTS 13-19 YEARS. YOUNG-HUNT 1995-97 AND 2000-01; THE NORD-TRØNDELAG HEALTH STUDIES (HUNT)
316. Anne-Tove Brenne: GROWTH REGULATION OF MYELOMA CELLS
317. Heidi Knobel: FATIGUE IN CANCER TREATMENT – ASSESSMENT, COURSE AND ETIOLOGY
318. Torbjørn Dahl: CAROTID ARTERY STENOSIS. DIAGNOSTIC AND THERAPEUTIC ASPECTS
319. Inge-Andre Rasmussen jr.: FUNCTIONAL AND DIFFUSION TENSOR MAGNETIC RESONANCE IMAGING IN NEUROSURGICAL PATIENTS
320. Grete Helen Bratberg: PUBERTAL TIMING – ANTECEDENT TO RISK OR RESILIENCE ? EPIDEMIOLOGICAL STUDIES ON GROWTH, MATURATION AND HEALTH RISK BEHAVIOURS; THE YOUNG HUNT STUDY, NORD-TRØNDELAG, NORWAY
321. Sveinung Sørhaug: THE PULMONARY NEUROENDOCRINE SYSTEM. PHYSIOLOGICAL, PATHOLOGICAL AND TUMOURIGENIC ASPECTS
322. Olav Sande Eftedal: ULTRASONIC DETECTION OF DECOMPRESSION INDUCED VASCULAR MICROBUBBLES
323. Rune Bang Leistad: PAIN, AUTONOMIC ACTIVATION AND MUSCULAR ACTIVITY RELATED TO EXPERIMENTALLY-INDUCED COGNITIVE STRESS IN HEADACHE PATIENTS

324. Svein Brekke: TECHNIQUES FOR ENHANCEMENT OF TEMPORAL RESOLUTION IN THREE-DIMENSIONAL ECHOCARDIOGRAPHY
325. Kristian Bernhard Nilsen: AUTONOMIC ACTIVATION AND MUSCLE ACTIVITY IN RELATION TO MUSCULOSKELETAL PAIN
326. Anne Irene Hagen: HEREDITARY BREAST CANCER IN NORWAY. DETECTION AND PROGNOSIS OF BREAST CANCER IN FAMILIES WITH *BRCA1*GENE MUTATION
327. Ingebjørg S. Juel : INTESTINAL INJURY AND RECOVERY AFTER ISCHEMIA. AN EXPERIMENTAL STUDY ON RESTITUTION OF THE SURFACE EPITHELIUM, INTESTINAL PERMEABILITY, AND RELEASE OF BIOMARKERS FROM THE MUCOSA
328. Runa Heimstad: POST-TERM PREGNANCY
329. Jan Egil Afset: ROLE OF ENTEROPATHOGENIC *ESCHERICHIA COLI* IN CHILDHOOD DIARRHOEA IN NORWAY
330. Bent Håvard Hellum: *IN VITRO* INTERACTIONS BETWEEN MEDICINAL DRUGS AND HERBS ON CYTOCHROME P-450 METABOLISM AND P-GLYCOPROTEIN TRANSPORT
331. Morten André Høydal: CARDIAC DYSFUNCTION AND MAXIMAL OXYGEN UPTAKE MYOCARDIAL ADAPTATION TO ENDURANCE TRAINING

2008

332. Andreas Møllerløkken: REDUCTION OF VASCULAR BUBBLES: METHODS TO PREVENT THE ADVERSE EFFECTS OF DECOMPRESSION
333. Anne Hege Aamodt: COMORBIDITY OF HEADACHE AND MIGRAINE IN THE NORD-TRØNDELAG HEALTH STUDY 1995-97
334. Brage Høyem Amundsen: MYOCARDIAL FUNCTION QUANTIFIED BY SPECKLE TRACKING AND TISSUE DOPPLER ECHOCARDIOGRAPHY – VALIDATION AND APPLICATION IN EXERCISE TESTING AND TRAINING
335. Inger Anne Næss: INCIDENCE, MORTALITY AND RISK FACTORS OF FIRST VENOUS THROMBOSIS IN A GENERAL POPULATION. RESULTS FROM THE SECOND NORD-TRØNDELAG HEALTH STUDY (HUNT2)
336. Vegard Bugten: EFFECTS OF POSTOPERATIVE MEASURES AFTER FUNCTIONAL ENDOSCOPIC SINUS SURGERY
337. Morten Bruvold: MANGANESE AND WATER IN CARDIAC MAGNETIC RESONANCE IMAGING
338. Miroslav Fris: THE EFFECT OF SINGLE AND REPEATED ULTRAVIOLET RADIATION ON THE ANTERIOR SEGMENT OF THE RABBIT EYE
339. Svein Arne Aase: METHODS FOR IMPROVING QUALITY AND EFFICIENCY IN QUANTITATIVE ECHOCARDIOGRAPHY – ASPECTS OF USING HIGH FRAME RATE
340. Roger Almvik: ASSESSING THE RISK OF VIOLENCE: DEVELOPMENT AND VALIDATION OF THE BRØSET VIOLENCE CHECKLIST
341. Ottar Sundheim: STRUCTURE-FUNCTION ANALYSIS OF HUMAN ENZYMES INITIATING NUCLEOBASE REPAIR IN DNA AND RNA
342. Anne Mari Undheim: SHORT AND LONG-TERM OUTCOME OF EMOTIONAL AND BEHAVIOURAL PROBLEMS IN YOUNG ADOLESCENTS WITH AND WITHOUT READING DIFFICULTIES
343. Helge Garåsen: THE TRONDHEIM MODEL. IMPROVING THE PROFESSIONAL COMMUNICATION BETWEEN THE VARIOUS LEVELS OF HEALTH CARE SERVICES AND IMPLEMENTATION OF INTERMEDIATE CARE AT A COMMUNITY HOSPITAL COULD PROVIDE BETTER CARE FOR OLDER PATIENTS. SHORT AND LONG TERM EFFECTS
344. Olav A. Foss: "THE ROTATION RATIOS METHOD". A METHOD TO DESCRIBE ALTERED SPATIAL ORIENTATION IN SEQUENTIAL RADIOGRAPHS FROM ONE PELVIS
345. Bjørn Olav Åsvold: THYROID FUNCTION AND CARDIOVASCULAR HEALTH
346. Torun Margareta Melø: NEURONAL GLIAL INTERACTIONS IN EPILEPSY
347. Irina Poliakova Eide: FETAL GROWTH RESTRICTION AND PRE-ECLAMPSIA: SOME CHARACTERISTICS OF FETO-MATERNAL INTERACTIONS IN DECIDUA BASALIS
348. Torunn Askim: RECOVERY AFTER STROKE. ASSESSMENT AND TREATMENT; WITH FOCUS ON MOTOR FUNCTION
349. Ann Elisabeth Åsberg: NEUTROPHIL ACTIVATION IN A ROLLER PUMP MODEL OF CARDIOPULMONARY BYPASS. INFLUENCE ON BIOMATERIAL, PLATELETS AND COMPLEMENT

350. Lars Hagen: REGULATION OF DNA BASE EXCISION REPAIR BY PROTEIN INTERACTIONS AND POST TRANSLATIONAL MODIFICATIONS
351. Sigrun Beate Kjøtrød: POLYCYSTIC OVARY SYNDROME – METFORMIN TREATMENT IN ASSISTED REPRODUCTION
352. Steven Keita Nishiyama: PERSPECTIVES ON LIMB-VASCULAR HETEROGENEITY: IMPLICATIONS FOR HUMAN AGING, SEX, AND EXERCISE
353. Sven Peter Näsholm: ULTRASOUND BEAMS FOR ENHANCED IMAGE QUALITY
354. Jon Ståle Ritland: PRIMARY OPEN-ANGLE GLAUCOMA & EXFOLIATIVE GLAUCOMA. SURVIVAL, COMORBIDITY AND GENETICS
355. Sigrid Botne Sando: ALZHEIMER'S DISEASE IN CENTRAL NORWAY. GENETIC AND EDUCATIONAL ASPECTS
356. Parvinder Kaur: CELLULAR AND MOLECULAR MECHANISMS BEHIND METHYLMERCURY-INDUCED NEUROTOXICITY
357. Ismail Cüneyt Güzey: DOPAMINE AND SEROTONIN RECEPTOR AND TRANSPORTER GENE POLYMORPHISMS AND EXTRAPYRAMIDAL SYMPTOMS. STUDIES IN PARKINSON'S DISEASE AND IN PATIENTS TREATED WITH ANTIPSYCHOTIC OR ANTIDEPRESSANT DRUGS
358. Brit Dybdahl: EXTRA-CELLULAR INDUCIBLE HEAT-SHOCK PROTEIN 70 (Hsp70) – A ROLE IN THE INFLAMMATORY RESPONSE ?
359. Kristoffer Haugarvoll: IDENTIFYING GENETIC CAUSES OF PARKINSON'S DISEASE IN NORWAY
360. Nadra Nilsen: TOLL-LIKE RECEPTOR 2 –EXPRESSION, REGULATION AND SIGNALING
361. Johan Håkon Bjørngaard: PATIENT SATISFACTION WITH OUTPATIENT MENTAL HEALTH SERVICES – THE INFLUENCE OF ORGANIZATIONAL FACTORS.
362. Kjetil Høydal : EFFECTS OF HIGH INTENSITY AEROBIC TRAINING IN HEALTHY SUBJECTS AND CORONARY ARTERY DISEASE PATIENTS; THE IMPORTANCE OF INTENSITY,, DURATION AND FREQUENCY OF TRAINING.
363. Trine Karlsen: TRAINING IS MEDICINE: ENDURANCE AND STRENGTH TRAINING IN CORONARY ARTERY DISEASE AND HEALTH.
364. Marte Thuen: MANGANASE-ENHANCED AND DIFFUSION TENSOR MR IMAGING OF THE NORMAL, INJURED AND REGENERATING RAT VISUAL PATHWAY
365. Cathrine Broberg Vågbø: DIRECT REPAIR OF ALKYLATION DAMAGE IN DNA AND RNA BY 2-OXOGLUTARATE- AND IRON-DEPENDENT DIOXYGENASES
366. Arnt Erik Tjønna: AEROBIC EXERCISE AND CARDIOVASCULAR RISK FACTORS IN OVERWEIGHT AND OBESE ADOLESCENTS AND ADULTS
367. Marianne W. Furnes: FEEDING BEHAVIOR AND BODY WEIGHT DEVELOPMENT: LESSONS FROM RATS
368. Lene N. Johannessen: FUNGAL PRODUCTS AND INFLAMMATORY RESPONSES IN HUMAN MONOCYTES AND EPITHELIAL CELLS
369. Anja Bye: GENE EXPRESSION PROFILING OF *INHERITED* AND *ACQUIRED* MAXIMAL OXYGEN UPTAKE – RELATIONS TO THE METABOLIC SYNDROME.
370. Oluf Dimitri Røe: MALIGNANT MESOTHELIOMA: VIRUS, BIOMARKERS AND GENES. A TRANSLATIONAL APPROACH
371. Ane Cecilie Dale: DIABETES MELLITUS AND FATAL ISCHEMIC HEART DISEASE. ANALYSES FROM THE HUNT1 AND 2 STUDIES
372. Jacob Christian Hølen: PAIN ASSESSMENT IN PALLIATIVE CARE: VALIDATION OF METHODS FOR SELF-REPORT AND BEHAVIOURAL ASSESSMENT
373. Erming Tian: THE GENETIC IMPACTS IN THE ONCOGENESIS OF MULTIPLE MYELOMA
374. Ole Bosnes: KLINISK UTPRØVING AV NORSKE VERSJONER AV NOEN SENTRALE TESTER PÅ KOGNITIV FUNKSJON
375. Ola M. Rygh: 3D ULTRASOUND BASED NEURONAVIGATION IN NEUROSURGERY. A CLINICAL EVALUATION
376. Astrid Kamilla Stunes: ADIPOKINES, PEROXISOME PROFILERATOR ACTIVATED RECEPTOR (PPAR) AGONISTS AND SEROTONIN. COMMON REGULATORS OF BONE AND FAT METABOLISM
377. Silje Engdal: HERBAL REMEDIES USED BY NORWEGIAN CANCER PATIENTS AND THEIR ROLE IN HERB-DRUG INTERACTIONS
378. Kristin Offerdal: IMPROVED ULTRASOUND IMAGING OF THE FETUS AND ITS CONSEQUENCES FOR SEVERE AND LESS SEVERE ANOMALIES

379. Øivind Rognmo: HIGH-INTENSITY AEROBIC EXERCISE AND CARDIOVASCULAR HEALTH
380. Jo-Åsmund Lund: RADIOTHERAPY IN ANAL CARCINOMA AND PROSTATE CANCER

2009

381. Tore Grüner Bjåstad: HIGH FRAME RATE ULTRASOUND IMAGING USING PARALLEL BEAMFORMING
382. Erik Søndenaa: INTELLECTUAL DISABILITIES IN THE CRIMINAL JUSTICE SYSTEM
383. Berit Rostad: SOCIAL INEQUALITIES IN WOMEN'S HEALTH, HUNT 1984-86 AND 1995-97, THE NORD-TRØNDELAG HEALTH STUDY (HUNT)
384. Jonas Crosby: ULTRASOUND-BASED QUANTIFICATION OF MYOCARDIAL DEFORMATION AND ROTATION
385. Erling Tronvik: MIGRAINE, BLOOD PRESSURE AND THE RENIN-ANGIOTENSIN SYSTEM
386. Tom Christensen: BRINGING THE GP TO THE FOREFRONT OF EPR DEVELOPMENT
387. Håkon Bergseng: ASPECTS OF GROUP B STREPTOCOCCUS (GBS) DISEASE IN THE NEWBORN. EPIDEMIOLOGY, CHARACTERISATION OF INVASIVE STRAINS AND EVALUATION OF INTRAPARTUM SCREENING
388. Ronny Myhre: GENETIC STUDIES OF CANDIDATE TENE3S IN PARKINSON'S DISEASE
389. Torbjørn Moe Eggebø: ULTRASOUND AND LABOUR
390. Eivind Wang: TRAINING IS MEDICINE FOR PATIENTS WITH PERIPHERAL ARTERIAL DISEASE
391. Thea Kristin Våtsveen: GENETIC ABERRATIONS IN MYELOMA CELLS
392. Thomas Jozefiak: QUALITY OF LIFE AND MENTAL HEALTH IN CHILDREN AND ADOLESCENTS: CHILD AND PARENT PERSPECTIVES
393. Jens Erik Slagsvold: N-3 POLYUNSATURATED FATTY ACIDS IN HEALTH AND DISEASE – CLINICAL AND MOLECULAR ASPECTS
394. Kristine Misund: A STUDY OF THE TRANSCRIPTIONAL REPRESSOR ICER. REGULATORY NETWORKS IN GASTRIN-INDUCED GENE EXPRESSION
395. Franco M. Impellizzeri: HIGH-INTENSITY TRAINING IN FOOTBALL PLAYERS. EFFECTS ON PHYSICAL AND TECHNICAL PERFORMANCE
396. Kari Hanne Gjeilo: HEALTH-RELATED QUALITY OF LIFE AND CHRONIC PAIN IN PATIENTS UNDERGOING CARDIAC SURGERY
397. Øyvind Hauso: NEUROENDOCRINE ASPECTS OF PHYSIOLOGY AND DISEASE
398. Ingvild Bjellmo Johnsen: INTRACELLULAR SIGNALING MECHANISMS IN THE INNATE IMMUNE RESPONSE TO VIRAL INFECTIONS
399. Linda Tømmerdal Roten: GENETIC PREDISPOSITION FOR DEVELOPMENT OF PREEMCLAMPSIA – CANDIDATE GENE STUDIES IN THE HUNT (NORD-TRØNDELAG HEALTH STUDY) POPULATION
400. Trude Teoline Nausthaug Rakvåg: PHARMACOGENETICS OF MORPHINE IN CANCER PAIN
401. Hanne Lehn: MEMORY FUNCTIONS OF THE HUMAN MEDIAL TEMPORAL LOBE STUDIED WITH fMRI
402. Randi Utne Holt: ADHESION AND MIGRATION OF MYELOMA CELLS – IN VITRO STUDIES –
403. Trygve Solstad: NEURAL REPRESENTATIONS OF EUCLIDEAN SPACE
404. Unn-Merete Fagerli: MULTIPLE MYELOMA CELLS AND CYTOKINES FROM THE BONE MARROW ENVIRONMENT; ASPECTS OF GROWTH REGULATION AND MIGRATION
405. Sigrid Bjørnelv: EATING– AND WEIGHT PROBLEMS IN ADOLESCENTS, THE YOUNG HUNT-STUDY
406. Mari Hoff: CORTICAL HAND BONE LOSS IN RHEUMATOID ARTHRITIS. EVALUATING DIGITAL X-RAY RADIOGRAMMETRY AS OUTCOME MEASURE OF DISEASE ACTIVITY, RESPONSE VARIABLE TO TREATMENT AND PREDICTOR OF BONE DAMAGE
407. Siri Bjørgen: AEROBIC HIGH INTENSITY INTERVAL TRAINING IS AN EFFECTIVE TREATMENT FOR PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE
408. Susanne Lindqvist: VISION AND BRAIN IN ADOLESCENTS WITH LOW BIRTH WEIGHT
409. Torbjørn Hergum: 3D ULTRASOUND FOR QUANTITATIVE ECHOCARDIOGRAPHY

410. Jørgen Urnes: PATIENT EDUCATION IN GASTRO-OESOPHAGEAL REFLUX DISEASE. VALIDATION OF A DIGESTIVE SYMPTOMS AND IMPACT QUESTIONNAIRE AND A RANDOMISED CONTROLLED TRIAL OF PATIENT EDUCATION
411. Elvar Eyjolfsson: 13C NMRS OF ANIMAL MODELS OF SCHIZOPHRENIA
412. Marius Steiro Fimland: CHRONIC AND ACUTE NEURAL ADAPTATIONS TO STRENGTH TRAINING
413. Øyvind Støren: RUNNING AND CYCLING ECONOMY IN ATHLETES; DETERMINING FACTORS, TRAINING INTERVENTIONS AND TESTING
414. Håkon Hov: HEPATOCYTE GROWTH FACTOR AND ITS RECEPTOR C-MET. AUTOCRINE GROWTH AND SIGNALING IN MULTIPLE MYELOMA CELLS
415. Maria Radtke: ROLE OF AUTOIMMUNITY AND OVERSTIMULATION FOR BETA-CELL DEFICIENCY. EPIDEMIOLOGICAL AND THERAPEUTIC PERSPECTIVES
416. Liv Bente Romundstad: ASSISTED FERTILIZATION IN NORWAY: SAFETY OF THE REPRODUCTIVE TECHNOLOGY
417. Erik Magnus Berntsen: PREOPERATIV PLANNING AND FUNCTIONAL NEURONAVIGATION – WITH FUNCTIONAL MRI AND DIFFUSION TENSOR TRACTOGRAPHY IN PATIENTS WITH BRAIN LESIONS
418. Tonje Strømmen Steigedal: MOLECULAR MECHANISMS OF THE PROLIFERATIVE RESPONSE TO THE HORMONE GASTRIN
419. Vidar Rao: EXTRACORPOREAL PHOTOCHEMOTHERAPY IN PATIENTS WITH CUTANEOUS T CELL LYMPHOMA OR GRAFT-vs-HOST DISEASE
420. Torkild Visnes: DNA EXCISION REPAIR OF URACIL AND 5-FLUOROURACIL IN HUMAN CANCER CELL LINES

2010

421. John Munkhaugen: BLOOD PRESSURE, BODY WEIGHT, AND KIDNEY FUNCTION IN THE NEAR-NORMAL RANGE: NORMALITY, RISK FACTOR OR MORBIDITY ?
422. Ingrid Castberg: PHARMACOKINETICS, DRUG INTERACTIONS AND ADHERENCE TO TREATMENT WITH ANTIPSYCHOTICS: STUDIES IN A NATURALISTIC SETTING
423. Jian Xu: BLOOD-OXYGEN-LEVEL-DEPENDENT-FUNCTIONAL MAGNETIC RESONANCE IMAGING AND DIFFUSION TENSOR IMAGING IN TRAUMATIC BRAIN INJURY RESEARCH
424. Sigmund Simonsen: ACCEPTABLE RISK AND THE REQUIREMENT OF PROPORTIONALITY IN EUROPEAN BIOMEDICAL RESEARCH LAW. WHAT DOES THE REQUIREMENT THAT BIOMEDICAL RESEARCH SHALL NOT INVOLVE RISKS AND BURDENS DISPROPORTIONATE TO ITS POTENTIAL BENEFITS MEAN?
425. Astrid Woodhouse: MOTOR CONTROL IN WHIPLASH AND CHRONIC NON-TRAUMATIC NECK PAIN
426. Line Rørstad Jensen: EVALUATION OF TREATMENT EFFECTS IN CANCER BY MR IMAGING AND SPECTROSCOPY
427. Trine Moholdt: AEROBIC EXERCISE IN CORONARY HEART DISEASE
428. Øystein Olsen: ANALYSIS OF MANGANESE ENHANCED MRI OF THE NORMAL AND INJURED RAT CENTRAL NERVOUS SYSTEM
429. Bjørn H. Grønberg: PEMETREXED IN THE TREATMENT OF ADVANCED LUNG CANCER
430. Vigdis Schnell Husby: REHABILITATION OF PATIENTS UNDERGOING TOTAL HIP ARTHROPLASTY WITH FOCUS ON MUSCLE STRENGTH, WALKING AND AEROBIC ENDURANCE PERFORMANCE
431. Torbjørn Øien: CHALLENGES IN PRIMARY PREVENTION OF ALLERGY. THE PREVENTION OF ALLERGY AMONG CHILDREN IN TRONDHEIM (PACT) STUDY.
432. Kari Anne Indredavik Evensen: BORN TOO SOON OR TOO SMALL: MOTOR PROBLEMS IN ADOLESCENCE
433. Lars Adde: PREDICTION OF CEREBRAL PALSY IN YOUNG INFANTS. COMPUTER BASED ASSESSMENT OF GENERAL MOVEMENTS
434. Magnus Fasting: PRE- AND POSTNATAL RISK FACTORS FOR CHILDHOOD ADIPOSITY
435. Vivi Talstad Monsen: MECHANISMS OF ALKYLATION DAMAGE REPAIR BY HUMAN AlkB HOMOLOGUES

436. Toril Skandsen: MODERATE AND SEVERE TRAUMATIC BRAIN INJURY. MAGNETIC RESONANCE IMAGING FINDINGS, COGNITION AND RISK FACTORS FOR DISABILITY
437. Ingeborg Smidesang: ALLERGY RELATED DISORDERS AMONG 2-YEAR OLDS AND ADOLESCENTS IN MID-NORWAY – PREVALENCE, SEVERITY AND IMPACT. THE PACT STUDY 2005, THE YOUNG HUNT STUDY 1995-97
438. Vidar Halsteinli: MEASURING EFFICIENCY IN MENTAL HEALTH SERVICE DELIVERY: A STUDY OF OUTPATIENT UNITS IN NORWAY
439. Karen Lehrmann Ægidius: THE PREVALENCE OF HEADACHE AND MIGRAINE IN RELATION TO SEX HORMONE STATUS IN WOMEN. THE HUNT 2 STUDY
440. Madelene Ericsson: EXERCISE TRAINING IN GENETIC MODELS OF HEART FAILURE
441. Marianne Klokk: THE ASSOCIATION BETWEEN SELF-REPORTED ECZEMA AND COMMON MENTAL DISORDERS IN THE GENERAL POPULATION. THE HORDALAND HEALTH STUDY (HUSK)
442. Tomas Ottemo Stølen: IMPAIRED CALCIUM HANDLING IN ANIMAL AND HUMAN CARDIOMYOCYTES REDUCE CONTRACTILITY AND INCREASE ARRHYTHMIA POTENTIAL – EFFECTS OF AEROBIC EXERCISE TRAINING
443. Bjarne Hansen: ENHANCING TREATMENT OUTCOME IN COGNITIVE BEHAVIOURAL THERAPY FOR OBSESSIVE COMPULSIVE DISORDER: THE IMPORTANCE OF COGNITIVE FACTORS
444. Mona Løvlien: WHEN EVERY MINUTE COUNTS. FROM SYMPTOMS TO ADMISSION FOR ACUTE MYOCARDIAL INFARCTION WITH SPECIAL EMPHASIS ON GENDER DIFFERECES
445. Karin Margaretha Gilljam: DNA REPAIR PROTEIN COMPLEXES, FUNCTIONALITY AND SIGNIFICANCE FOR REPAIR EFFICIENCY AND CELL SURVIVAL
446. Anne Byriel Walls: NEURONAL GLIAL INTERACTIONS IN CEREBRAL ENERGY – AND AMINO ACID HOMEOSTASIS – IMPLICATIONS OF GLUTAMATE AND GABA
447. Cathrine Fallang Knetter: MECHANISMS OF TOLL-LIKE RECEPTOR 9 ACTIVATION
448. Marit Følsvik Svindseth: A STUDY OF HUMILIATION, NARCISSISM AND TREATMENT OUTCOME IN PATIENTS ADMITTED TO PSYCHIATRIC EMERGENCY UNITS
449. Karin Elvenes Bakkelund: GASTRIC NEUROENDOCRINE CELLS – ROLE IN GASTRIC NEOPLASIA IN MAN AND RODENTS
450. Kirsten Brun Kjelstrup: DORSOVENTRAL DIFFERENCES IN THE SPATIAL REPRESENTATION AREAS OF THE RAT BRAIN
451. Roar Johansen: MR EVALUATION OF BREAST CANCER PATIENTS WITH POOR PROGNOSIS
452. Rigmor Myran: POST TRAUMATIC NECK PAIN. EPIDEMIOLOGICAL, NEURORADIOLOGICAL AND CLINICAL ASPECTS
453. Krisztina Kunszt Johansen: GENEALOGICAL, CLINICAL AND BIOCHEMICAL STUDIES IN *LRRK2* – ASSOCIATED PARKINSON'S DISEASE
454. Pål Gjerden: THE USE OF ANTICHOLINERGIC ANTIPARKINSON AGENTS IN NORWAY. EPIDEMIOLOGY, TOXICOLOGY AND CLINICAL IMPLICATIONS
455. Else Marie Huuse: ASSESSMENT OF TUMOR MICROENVIRONMENT AND TREATMENT EFFECTS IN HUMAN BREAST CANCER XENOGRAFTS USING MR IMAGING AND SPECTROSCOPY
456. Khalid S. Ibrahim: INTRAOPERATIVE ULTRASOUND ASSESSMENT IN CORONARY ARTERY BYPASS SURGERY – WITH SPECIAL REFERENCE TO CORONARY ANASTOMOSES AND THE ASCENDING AORTA
457. Bjørn Øglænd: ANTHROPOMETRY, BLOOD PRESSURE AND REPRODUCTIVE DEVELOPMENT IN ADOLESCENCE OF OFFSPRING OF MOTHERS WHO HAD PREECLAMPSIA IN PREGNANCY
458. John Olav Roaldset: RISK ASSESSMENT OF VIOLENT, SUICIDAL AND SELF-INJURIOUS BEHAVIOUR IN ACUTE PSYCHIATRY – A BIO-PSYCHO-SOCIAL APPROACH
459. Håvard Dalen: ECHOCARDIOGRAPHIC INDICES OF CARDIAC FUNCTION – NORMAL VALUES AND ASSOCIATIONS WITH CARDIAC RISK FACTORS IN A POPULATION FREE FROM CARDIOVASCULAR DISEASE, HYPERTENSION AND DIABETES: THE HUNT 3 STUDY
460. Beate André: CHANGE CAN BE CHALLENGING. INTRODUCTION TO CHANGES AND IMPLEMENTATION OF COMPUTERIZED TECHNOLOGY IN HEALTH CARE

461. Latha Nrugham: ASSOCIATES AND PREDICTORS OF ATTEMPTED SUICIDE AMONG DEPRESSED ADOLESCENTS – A 6-YEAR PROSPECTIVE STUDY
462. Håvard Bersås Nordgaard: TRANSIT-TIME FLOWMETRY AND WALL SHEAR STRESS ANALYSIS OF CORONARY ARTERY BYPASS GRAFTS – A CLINICAL AND EXPERIMENTAL STUDY

2011

463. Marte Helene Bjørk: DO BRAIN RHYTHMS CHANGE BEFORE THE MIGRAINE ATTACK? A LONGITUDINAL CONTROLLED EEG STUDY
464. Carl-Jørgen Arum: A STUDY OF UROTHELIAL CARCINOMA: GENE EXPRESSION PROFILING, TUMORIGENESIS AND THERAPIES IN ORTHOTOPIC ANIMAL MODELS
465. Ingunn Harstad: TUBERCULOSIS INFECTION AND DISEASE AMONG ASYLUM SEEKERS IN NORWAY. SCREENING AND FOLLOW-UP IN PUBLIC HEALTH CARE
466. Leif Åge Strand: EPIDEMIOLOGICAL STUDIES AMONG ROYAL NORWEGIAN NAVY SERVICEMEN. COHORT ESTABLISHMENT, CANCER INCIDENCE AND CAUSE-SPECIFIC MORTALITY
467. Katrine Høyer Holgersen: SURVIVORS IN THEIR THIRD DECADE AFTER THE NORTH SEA OIL RIG DISASTER OF 1980. LONG-TERM PERSPECTIVES ON MENTAL HEALTH