PROJECT MANAGER
Project manager for the multicenter trial is Leiv Einar Gabrielsen, PhD. Gabrielsen works as a researcher at the Department of child and adolescent mental health at Sørlandet hospital, South-Eastern Norway Regional Health Authority. Gabrielsen is also project manager for the Agder studies, which is covered later in this protocol.

INTRODUCTION
The study presented here is a further development of an on-going clinical research project in the Agder region of Southern Norway\(^1\). Researchers and clinicians at the Department of child and adolescent mental health (ABUP) at Sørlandet hospital have developed a new clinical intervention, Friluftsterapi™ (FT), inspired by international adventure and wilderness therapy traditions. FT may be translated as *therapy in the open air* and is defined as a specialized approach to mental health treatment that combines individual and group-based therapeutic work with basic outdoor life, engaging participants through ecological, physiological and psychological processes.

Although many Norwegians view themselves as avid outdoor people, until recently, the use of outdoor life in general and adventure/wilderness therapy in particular has remained underexplored in the mental health services for at-risk adolescents in Scandinavia (Fernee, Gabrielsen, Andersen, & Mesel, 2015, in review). This is now changing, partly as a result of the project discussed here being the first of its kind in Scandinavia. In short, we developed a Norwegian version of wilderness therapy called *Friluftsterapi™* - which translates as “therapy in the open air” or “outdoor life therapy”. *Friluftsterapi™* draws on the diverse international practice and theory of WT, which has been adapted to the Norwegian socio-cultural context by integrating the outdoor life - *friluftsliv* - tradition (Gabrielsen & Fernee, 2014; Henderson & Vikander, 2007).

\(^1\) The research protocol, articles and more are available on the project web-site [www.friluftsterapi.com](http://www.friluftsterapi.com)
FT is a stand-alone outpatient group treatment offered adolescents that are referred to specialized hospital mental health care due to their mental health challenges. The ideology is based on the understanding that nature is a prime setting for facilitating, enveloping and strengthening therapeutic processes. The intervention consists of groups of 8 patients and 3 therapists. The entire treatment takes place during a 6-10 week period and consists of 8 single days and 2 wilderness trips of 2 and 5 nights, respectively. The intentions are that the patient after the completion of FT exhibits a clinically significant reduction of symptoms as well as improved self-efficacy, self-image and general perceived quality of life. Furthermore, the adolescents are empowered to identify future directions in life and develop his or her personal plan of how to reach these goals.

The project Friluftsterapi™ in Agder (hereafter referred to as the Agder studies) is accompanied by mixed methods research. These studies are geographically limited to Agder and include modest sample sizes. We now need to increase the statistical power, improve the overall generalizability of findings and ensure a deeper understanding of the complex phenomena studied. Thus a multicenter trial is warranted.

This protocol outlines the specifics of this multicenter trial.

BACKGROUND

Human interaction with nature is associated with increased psychological and social well-being (Howell, Dopko, Passmore, & Buro, 2011). For as long as we have written records we find accounts of man’s dependency of nature, not only as means of survival, but to replenish energy, meet spiritual needs, clear thoughts and as pure recreation alone. The Biophilia hypothesis (Wilson, 1984) suggests that there is an instinctive bond between human beings and other living systems and it is argued that our capacity to live in balance with nature is essential to human emotional and spiritual well-being (Roszak, Gomes, & Kanner, 1995).

The causal factors of nature’s effect on mental health and well-being are predominantly biological, suggesting that we are genetically adapted for a life in natural environments (Hessen, 2008). This understanding also underpins eco-philosophy (Næss, 1973) and eco-psychology (Roszak, 1995) theories, which promote the basic idea that today’s human mind is shaped by the modern social world, but is adapted to the natural world in which it evolved.

According to Kaplan and Kaplan (2009 p. 329) “it is hardly surprising that the environment plays a major role, not only in human well-being, but in understanding human behaviour as well”. Whilst the hectic urban life may lead to fragmentation and alienation, nature appears to restore energy and facilitate the emergence of undisturbed thoughts and reflections (Rapport T-1474 - Naturopplevelse, friluftsliv og vår psykiske helse). This seems particularly prudent within the Western adolescent culture of today, where most young are “connected” 24/7, and spend hours each day on social media, gaming and chatting. The rise in the school drop-out rate for this age group is of great concern and the above mentioned fragmentation and alienation is considered important in the understanding of this phenomena.

Often geared towards adolescents, adventure and wilderness therapy broadly refers to planned interventions focusing on the use of nature as an essential aspect of treating mental health problems and/or behavioural problems (Becker, 2010; Gass, Gillis, & Russell, 2012). With characteristics like goal setting, trust building, problem solving, challenge and stress, adventure and wilderness therapy aims to increase participants’ confidence, locus of control and self-esteem (Hill, 2007). The enhancement of self-efficacy is crucial, and is one of the most subscribed to hypothesis to explain benefits (Eikenæs, Gude, & Hoffart, 2006).
Subject limitations: Despite promising results from eco- and environmental psychology studies in general, and wilderness therapy studies in particular, utilizing nature as means to improve mental health in adolescents is not established practice in Norway. This may be surprising when taking into account our close historical and cultural ties to nature and activities herein (Gabrielsen & Fernee, 2014). There have been some sporadic efforts, mostly within the public health domain, but none of these include formal treatment and have yet to be subjected to systematic research.

Applications and implications: International research is indicative of positive relations between various adventure and wilderness therapy programs and a range of outcomes associated with improved psychological functioning (Bowen & Neill, 2013; Norton et al., 2014). However, some limitations hamper much of the empirical documentation in this field. Suggestions for future research encourages study designs with adequate sample size, randomized controlled trials, longitudinal follow-up designs, specific diagnostic groups, identification of effect variables, controlling for confounding variables, offer precise descriptions of interventions and therapeutic processes, supplements with qualitative data and addressing ethical issues (Becker, 2010; Eikenaes et al., 2006; Gillen & Balkin, 2006; Harper, Russell, Cooley, & Cupples, 2007; Hill, 2007; Norton et al., 2014; Rapport T-1474; Wilson & Lipsey, 2000).

By using a wide array of research designs, held together through a systematic mixed methods approach, the Agder studies as well as the forthcoming multicenter trial aim to meet many of the above recommendations for future research

Achievements of the Agder studies: In addition to support from Sørlandet Hospital, these studies are enabled by grants from the Regional Research Fund Agder (NOK 200.000,-) and the Competency Development Fund of Southern Norway (NOK 2.000.000,-). The project group is multi-disciplinary and includes several PhD level researchers and specialized clinicians and one project financed PhD candidate. In addition, three self-financed Master degree candidates are doing their research as part of the Agder studies. Several articles are in preparation as data is being analyzed in addition to four papers that already have resulted from the Agder studies.

We have conducted considerable networking, attended international conferences and visited research groups in the US and Australia. At the 7th International Adventure Therapy Conference in Denver, USA, we conducted a workshop titled “Wilderness therapy within the mental health care in Norway - creating opportunities and navigating challenges”. This presentation resulted in considerable attention as we are among the first to implement a stand-alone adventure/wilderness therapy program within a specialized mental health care facility. Gabrielsen and Fernee from the project group have become Norway’s representatives to the Adventure Therapy International Committee (ATIC). We are presently working to formalize cooperation with research environments in Australia and Canada.

Preliminary findings in the Agder studies: Data is being collected from five FT interventions and initial analysis of the quantitative data will not take place before late autumn.

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2 Gabrielsen & Fernee (2014)  
Gabrielsen, Fernee, Aasen, & Eskedal (in press)  
Fernee, Gabrielsen, Andersen, & Mesel (in press)  
Fernee, Andersen, Gabrielsen, & Mesel (in preparation)
2015. What we do know, however, is that several patients who have received mental health treatment for years at ABUP, now have been discharged following FT. Also, two out of three FT patients are discharged after completing the 10 week intervention – a very short time compared to the ABUP average of 328 days (2010-2014, age 15-17, N=2412). We are also analysing qualitative data that appears to support previous anecdotal feedback from the adolescents.

RESEARCH GOALS
Our research goals are the following:

1. What are the outcomes of Friluftsterapi™ on at risk adolescents?
2. What factors contribute to these outcomes of Friluftsterapi™?
3. What therapeutic mechanisms occur within Friluftsterapi™?
4. What is the cost-effectiveness of Friluftsterapi™ compared to other mental health approaches?

METHOD
Research Goal 1: What are the outcomes of Friluftsterapi™ on at risk adolescents?

This design uses, base-line-, pre-, post- and follow up tests\(^3\) as well as continuous clinical measures.

Participants: Adolescents that are referred to three different Departments for child and adolescent mental health care, preferably within the South-Eastern Norway Health Authority region. Each department will conduct 2-6 interventions with 7-10 participants over a period of 18 months.

The adolescents (N≈120, age 16-18) may be recruited directly from admission or be transferred to FT from an ongoing hospital treatment. FT is always voluntary. Inclusion criteria are depression, apathy, anxiety, self-harming behaviour, low self-esteem/efficacy, and/or relational problems. Exclusion criteria are psychosis, substance abuse problems and strong social anxiety.

Procedures and methods: The FT interventions\(^4\) will be conducted during the autumn of 2016 and throughout 2017.

The FT program aims to increase motivation and knowledge of how to engage in wildlife settings. Through individual and group activities, increasingly demanding and complex tasks are presented. Besides increasing the participants’ general outdoor knowledge, group cohesion is an independently important goal. We will cover practical issues such as dressing effectively, nutrition, navigation, safety, camp routines etc. Where applicable, the participants will learn techniques for climbing, fishing, canoeing etc.

\(^3\) It is very challenging to perform randomized controlled trials (RCT) within this field, and there are at present no high quality RCT studies available. The reasons are complex, and in our previous efforts to incorporate this design we encountered considerable ethical, practical, methodological and outcome obstacles which forced us to abandon this approach all together. These experiences are presented and discussed in Gabrielsen, Fernee, Aasen, & Eskedal (in press). This manuscript is available at www.friluftsterapi.com

\(^4\) For details of the intervention itself see Manual for Friluftsterapi™ which can be requested from Gabrielsen.
There will be on-going individual- and group therapy sessions to help process and harness the experiences participants have during the program. Small and large events and incidents will be highlighted and used therapeutically. We will work within the concept of “closed group therapy” and the goals here are;

1. Participants are given the opportunity to recognise and accept their problems and processes of growth as they become affectively connected to other participants that show similar problems and growth processes.
2. Participants’ reflection upon their own and others behaviours will be anchored in the group, and predictably this process will lead to higher levels of self-efficacy among the group members. It is crucial that learning from the FT has transference value to other aspects of life.

**Measures:** The main test battery will be administered four times:

1. Baseline at admission point (waitlist control)
2. Pre FT
3. Post FT
4. 12 month post FT follow up

The physiological variables and measure of executive functions will be collected three times:

1. Pre FT
2. Post FT
3. 12 month post FT follow up

The daily clinical measure will be administered throughout FT

**Psychological variables included the main test battery**: 1) Sense of Coherence Scale (SOC-13; Antonovsky, 1993), 2) Adolescent Life Goal Profile Scale (ALGPS; Gabrielsen, Ulleberg, & Watten, 2012), 3) Big Five Inventory (BFI-20; Engvik & Clausen, 2011), 4) General Perceived Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995), 5) Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), 6) Self-rated Health (SRH; Breidablik, Meland & Lydersen, 2008), 7) Hospital Anxiety and Depression Scale (HAD; Zigmond & Snaith, 1983), 8) Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Kriemeyer, & Toney, 2006) 9) Life Effectiveness Questionnaire (L.E.Q.-H; Neill, Marsh, & Richards, 2003), 10) Youth Outcome Questionnaire (Y-OQ-SR 2.0; Wells, Burlingame & Lambert, 1999) and 11) a customized questionnaire (school attendance, family relations, leisure activities, internet and media use, future plans etc.).

**Daily clinical measure:** The state section (20 items) of the State-Trait Anxiety Inventory (STAI-S; Spielberger et al., 1983).

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5 The baseline test battery consists of 244 items. The pre-, post- and follow up test battery consist of 222 items (the BFI-20 is only administered once). Presently a new measure, the Adventure Therapy Experience Scale (ATES) is undergoing final validation in the US. Pending satisfactory psychometric properties we will translate/validate the scale for use in Norway and include it in our test battery.
Physiological variables: 1) Heart Rate Variability (HRV), 2) Height/weight and 3) Measures of executive functions from the Wechsler Adult Intelligence Scale (WAIS IV).

The psychological variables provide insight into the participants psychosocial functioning on many levels. The choice of inventories and scales reflect in part a psychological paradigm where measures of symptoms and illnesses partly are supported by strength-focused questionnaires. Many of the above variables are strong indicators of mental health, quality of life and resilience (Gabrielsen, 2012).

We have previously translated and validated from English to Norwegian the Life Effectiveness Questionnaire and the Youth Outcome Questionnaire that are frequently used in WT research in Australia and the US respectively. Including the Youth Outcome Questionnaire in our program will allow us access to comparative data from the US based National Association of Therapeutic Schools and Programs research database (NATSAP).

There is interplay between physiological and psychological phenomena, and in this study we will investigate if changes in heart rate variability (HRV) can serve as an effect proxy measurement of psychological improvements. HRV, beat to beat changes in the cardiac cycle, reflects the balance between the cardiac sympathetic and vagal efferent activity (Crawford et al., 1999). This balance is dependent of several mechanisms working in concert to maintain sufficient cardiovascular activity. When these systems are not functioning at an adequate level, an individual’s stress response may be more severe or extended. The consequence is a more deleterious effect of stress response that may lead to several medical and psychological diseases, characterised by low HRV (Wheat & Larkin, 2010). Resting HRV is an indicator of self-regulatory capacity, and distinctions in HRV patterns have been found when children with proactive and reactive aggression have been compared (Scarpa, Haden, & Tanaka, 2010). Hansen and colleges (2004) have shown a relationship between physical fitness, HRV and cognitive function. The physiological variables will monitor somatic growth during intervention and follow up and will serve as indicator of pubertal stage

**Research Goal 2:** What factors contribute to these outcomes of Friluftsterapi™?

**Participants:** Same as research goal 1

**Procedures and methods:** The project’s design facilitates identifying contributing factors to outcome (Shadish, Cook, & Campbell, 2002). Furthermore, the longitudinal design where participants are monitored for one year after the FT will provide indications of the robustness of possible outcomes. Also, the clinically relevant Stait-Trait Anxiety Inventory is collected every day throughout the intervention, 17 times for each participant. This data will be subjected to multi-level modeling, which according to Gelman (2006) can be helpful for causal inferences.

**Research Goal 3:** What therapeutic mechanisms occur within Friluftsterapi™?

**Participants:** Participants will be made up of four randomly selected patients from each site in the first round of FT (N ≈ 12). During the subsequent rounds of FT, all of the participants will be included in focus group interviews taking place at each site.
Procedures and methods: A two-stage qualitative multi-method approach will be applied in order to investigate how the wilderness therapy process is experienced by the individual participant, as well as identifying the perceived effects of the intervention in a longitudinal perspective.

First stage: a multisite case study will be conducted where four patients at each site are randomly selected to participate in the study. The main sources of qualitative data in this first stage will be: a) participant observation, and b) individual semi-structured interviews. The researcher will visit the various wilderness therapy sites and take part as a participant-as-observer at various stages of the process spending up to seven days in the field observing the selected client cases. The purpose of the observation is to gain a broader understanding of wilderness therapy as a treatment modality operating in various contexts, and more specifically explore the complex therapeutic mechanisms occurring within these different wilderness therapy sites exemplified through the selected cases. The approach may allow the researcher to establish a rapport with the participants (Russell & Phillips-Miller, 2002) and is also intended to add nuances to the subsequent analysis of the data (Hinds, 2011). Each of the selected adolescent participants will be interviewed shortly following the closing seminar.

Second stage: during the next rounds of FT the researcher will conduct focus group interviews at each site around the time of the conclusion of the treatment.

Both the individual- and focus group interview guides consist of open-ended questions that attempt to explore the participants’ subjective experiences and reflections attached to the wilderness therapy treatment. The focus group interview guide will be informed by the results from the multisite case study, where the purpose is to further expand on these topics. The overall goal is to gain a broader understanding of the key therapeutic mechanisms and to identify the perceived outcomes of the group treatment.

In order to explore how these potential effects might be transferred and maintained beyond the intervention, longitudinal data will be obtained through a second round of interviews around the time of the 12 months follow-up session. In the multisite case study the follow-up interviews will be conducted individually in person, whereas the follow-up of the focus group participants will take the form of short individual interviews over the telephone.

The interviews will be recorded and transcribed. Interview transcripts and relevant written accounts (field notes, reflexive notebook) will be explored through systematic and rigorous content analysis in order to identify preliminary coding categories and emerging themes, which make up the basis for the final conceptual analysis.

Research Goal 4: What is the cost-effectiveness of Friluftsterapi™ compared to other mental health approaches?

We acknowledge that documenting “economic” effectiveness arguably may be equally beneficial to the wilderness therapy field as compared to the more common focus on causality.

Procedures and methods: Initial cost-effectiveness analysis will be conducted according to guidelines suggested by Muenning (2008). Costs will be evaluated in the societal perspective with all detectable costs included and in a before-after design including costs 12 month prior to intervention and 12 month after. The cost-effectiveness analysis will be performed with the
most powerful clinical changes detected in the main psychological test battery (Research goal 1). The Center for Health Economic Evaluation (HEHØ) will be consulted to ensure the quality of this part of the project.

**User involvement:** The friluftsterapi intervention has been developed in close cooperation with adolescent patients, and we ran an entire program with the main intention of getting feedback from the participants, before starting the Agder studies. PhD candidate Fernee and two Master candidates focus exclusively on qualitative research, collecting data from participants and their guardians. This helps us understand ongoing processes as well as being enabled to improve the intervention itself. When presenting the project to others we include former and new participants when possible. Participant experiences will also be included in the forthcoming ethical accounts of Friluftsterapi. This is part of the Agder studies, but the knowledge derived here will be vital when proceeding with the multicenter trials.

**Research ethics:** We will apply to the Regional Ethics Committee for the South Eastern Health Region for approval of these studies. The Agder study specifically addressed ethical challenges within FT and knowledge of what areas should be awarded particular awareness will emphasized throughout the preparation and conduction of these multicenter trials.

**THE PROJECT GROUP**
The project manager is Leiv Einar Gabrielsen and the deputy project manager is Carina Ribe Fernee, both with the Department for Child and Adolescent Mental Health (ABUP). Gabrielsen and Fernee will be overseeing all stages of the project with specific focus on the quantitative and qualitative aspects of the research respectively. Gabrielsen will report to a steering committee. There will also be a workgroup consisting of representatives of the affiliated centres/departments. The project group consists of:

- **ABUP, Sørlandet hospital:** PhD in psychology Leiv E. Gabrielsen
  - PhD/MD Leif T. Eskedal
  - PhD candidate in Health Sciences Carina R. Fernee and
  - Clinical child psychologist Gunnar O. Aasen

- **University of Agder:** PhD in medical ethics Terje Mesel
  - PhD/Psychologist Ingrid Dundas
  - PhD/Psychologist Anita Lill Hansen

- **University of Bergen:** Sentrum and Lund Health Unit.
  - Intention of professional cooperation has been established with:
    - Dr. James Neill, University of Canberra, Australia
    - Dr. Anita Pryor, Adventure Works, Australia
    - Dr. Nevin Harper, University of Victoria, Canada
    - Dr. Kaye Richards, Liverpool John Moore University, UK
    - MSW Will Dobud, True North Experiences, Australia

Contributions to the study are subject-specific according to individual expertise – remuneration is co-authorships on the relevant papers planned in the study as well as exchange of data etc.

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6 For an example of user involvement in project presentation please see [http://www.abup.no/helsestudio1-nesten-helg-friluftsterapi-med-naturen-som-behandler/](http://www.abup.no/helsestudio1-nesten-helg-friluftsterapi-med-naturen-som-behandler/)
Further applications within mental health care: These studies will foremost provide knowledge about how Friluftsterapi™ affects health, as well as insight into clients’ on-going processes within the Friluftsterapi™ framework.

The current studies will provide data stemming from the most rigorous design practically possible without seriously compromising the ecological validity. We aim to provide the National health authorities with more knowledge about all aspects of Friluftsterapi™, and thus enable qualified decisions about its future as a possible new treatment modality.

Communications of results: Publication of findings will be in relevant scientific journals

Time line:
- 2. quarter 2015 and onwards: Prepare research protocol and apply for funding
- 1. quarter 2015 – 4. quarter 2015: Establish national and international partnerships
- 1. quarter 2016: Send formal application to REK
- 1. quarter 2016 – 4. quarter 2017: Conduct FT interventions & research
- 1. quarter 2017 – 4. quarter 2018: Prepare and submit articles

Status as of August 2015: Progress is according to the timeline above and research partnerships have been, and are being established. The Agder studies are proceeding as planned providing valuable experience and data. The project web-site www.friluftsterapi.com was launched in January 2015. The project steering committee was in place and active from March 2015. The project leader will during the autumn of 2015 inform and invite other centres to partake in the study.

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REFERENCES