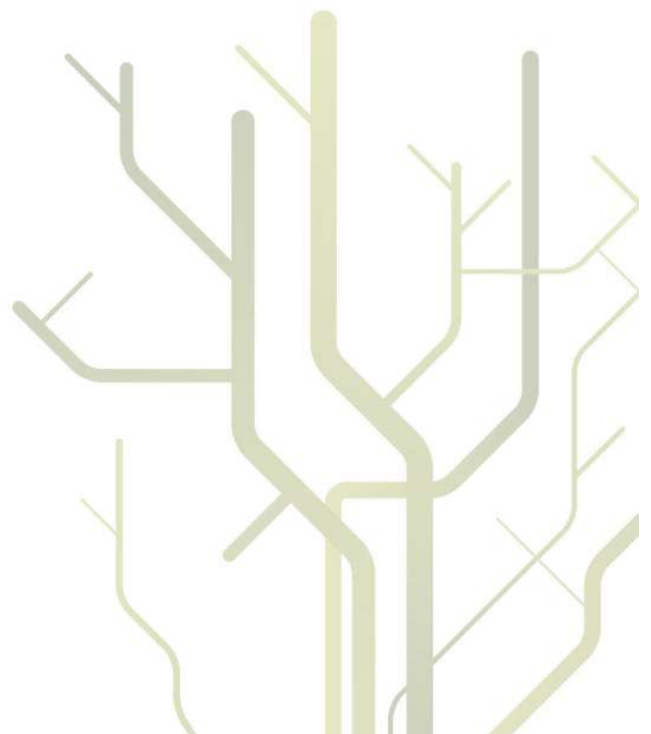


Using the Internet to Manage Atopic Eczema



Thomas G. Schopf

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Abbreviations

AE	Atopic eczema
CME	Continuing medical education
Fig	Figure
GP	General practitioner
MMS	Multimedia messaging service
NMA	Norwegian Medical Association
NNO	Norwegian Nurses Organisation
NST	Norwegian Centre for Integrated Care and Telemedicine
PKI	Public key infrastructure
REK-Nord	Regional Committee for Medical and Health Research Ethics in Northern Norway
RCT	Randomised controlled trial
SCORAD	Severity scoring of atopic dermatitis
SD	Standard deviation
SMS	Short message service
UV-light	Ultraviolet light

All clinical photographs appear by permission of the patient.

Papers

Paper 1

Bergmo TS, Wangberg SC, Schopf TR, Solvoll T.

Web-based consultations for parents of children with atopic dermatitis: results of a randomised controlled trial.

Acta paediatr 2009, 98(2):316-320.

Paper 2

Schopf TR, Bolle R, Solvoll T.

The workload of web-based consultations with atopic eczema patients at home.

BMC Res Notes 2010, 12;3:71.

Paper 3

Schopf TR, Flytkjær V.

Doctors and nurses benefit from interprofessional online education in dermatology.

BMC Med Educ 2011, 14;11:84.

Paper 4

Schopf TR, Flytkjær V.

Interactive web-based education of general practitioners may reduce referral rates in patients with atopic dermatitis: a randomised controlled trial.

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Chapter 1

Introduction

1.1 Atopic eczema

Atopic eczema (AE) is a chronic inflammatory skin disease which has had many different names throughout history - atopic dermatitis, neurodermatitis atopica and prurigo Besnier [1]. This variation mirrors the changing classifications and different theories of the pathogenesis of AE, which even today has not been fully resolved [2, 3]. The pathogenesis is complex, involving genetic, immunological and environmental mechanisms [4–6]. Defects in the epidermis, in which the protein filaggrin plays a key role, seem to cause a malfunction of the skin barrier [7–9]. There is also increased transepidermal water loss in the skin of AE patients. According to the “hygiene hypothesis”, the lack of certain antigenic stimuli in early childhood influences the maturation of the immune system, which in turn decreases the threshold for inflammatory reactions in the skin [10]. The importance of environmental factors is well known in the development of AE, and recent research in epigenetics suggests that environmental influences in utero or early life may affect gene function on a permanent basis [11, 12].

The disease frequently appears within the first year of life, but can also start in adulthood. It can disappear in many patients during childhood but may reappear in adolescence or in adulthood. In a certain proportion of children, however, full remission occurs. This variability of the clinical course has to be recognised, but unfortunately it is not possible to predict which patients will suffer from recurrence.

In some Western countries, AE is perhaps the most common skin disease. Prevalence varies with patient age and geography [13]. While rates in children may be as low as 2% in Asia, AE can be seen in up to 20-25% of children in northern Europe [14–16]. The disease is less common in adults and affects approximately 1-2% of the adult European population [17]. It is linked to other atopic diseases: allergic rhinitis ("hay fever") and asthma occur in 30-50% of AE patients [18].

AE also has considerable economical consequences [19,20]. In addition to costs related to consultations and medication, indirect expenses are incurred due to increased sick leave from school or workplace. In a report by Mancini et al. (2008) the total annual societal cost of AE in the US was estimated at \$ 364 million - 3.8 billion [19].

1.1.1 Atopic eczema and quality of life

AE has a profound impact on the quality of life of affected patients and their families [21–24]. The disease constantly shifts between symptomless periods and flare-ups, with itch as the main symptom. Itchy skin typically gets worse at night, resulting in poor sleep patterns in the affected children, their parents and even in siblings [25–27]. The treatment of itchy skin is challenging, and symptoms may last for weeks until they can be brought under control. The unpredictable course of AE and its tendency to recur is a cause of great frustration to patients and parents, even when treatment has been carried out according to best practice guidelines. Adolescents and adults often feel embarrassed about visible eczema, particularly on the face and hands, and associated mood disorders and stigmatisation have been reported [23,28–30]. The quality of life in affected children may be comparable to other chronic children's diseases such as diabetes or epilepsy [31].

1.1.2 Diagnosis of atopic eczema

AE is diagnosed clinically [1,32,33]. Its hallmark is pruritus, a major problem due not only to the discomfort it causes, but also because the itch leads to scratching and consequently further skin damage. In addition, patients frequently report dry and sensitive skin that is easily aggravated. Visual inspection reveals a symmetrical distribution of skin lesions, typically papules and erythema. Signs of scratching are common. In the acute phase there may be vesicles and oozing; later the eruptions dry up and become scaly (Fig. 1).

Although the eczema may affect all areas of the body, lesions are usually distributed in a typical manner: in children up to the age of two to three, they are typically located on the face as well as on the extensor sides of the hands, elbows and feet. In older children and adults classical flexural involvement occurs, e.g. in the antecubital fossa, wrists, popliteal fossa and ankles. Face and hands may be involved at all ages [33]. Lichenification, the characteristic thickening of eczematous skin, indicates chronic eczema.



Fig 1. Dry patches of atopic eczema on the forehead. Photo: Patient (Image used in a web-based consultation).

Certain variants of AE are more difficult to diagnose as they differ from classical eczema with flexural involvement [33]. Nummular eczema may be mistaken for psoriasis. Cases of AE where only the face or the hands are affected may also be misinterpreted. In adults, the prurigo type mainly affects the extensor sides of the extremities, so this may confuse doctors.

Asking the patient about family members is helpful as most patients have a family history of atopic diseases [32]. Several algorithms have been designed to help in the diagnosis, for instance the British working party's diagnostic criteria [34].

Differential diagnoses that should be considered include scabies, infantile seborrheic eczema and various forms of contact dermatitis. Unfortunately there are no diagnostic tests that can confirm AE, and routine skin biopsies are not helpful as the histopathological findings are unspecific.

1.1.3 Common complications

A common complication of AE is secondary bacterial infection [1, 32, 35]. *Staphylococcus aureus* is a frequently involved species, but various other streptococci may be found in bacterial swabs. Typical skin findings in secondary infection include oozing and impetigo-like lesions with crusts, but sometimes infections may show only subtle findings. Viruses may also be involved in secondary infections, e.g. herpes simplex virus in eczema herpeticum. Infected AE requires special treatment.

Allergies

Allergies also complicate AE. Patients are exposed to allergenic substances through inhalation, skin contact or ingestion; allergic reactions may be immediate or delayed [2]. Allergic contact dermatitis to a wide variety of substances has been reported, including therapeutic compounds used for the topical therapy of eczema [36]. The role of food allergy in AE has been intensely debated, but it seems clear that it plays a significant role in a certain proportion of pre-school children [37–39]. In contrast, food allergies do not appear to influence the course of AE significantly in adults.

The investigation of possible allergies in AE patients is challenging as the correct identification of an allergy requires a thorough case history [2]. Various allergy tests exist, but in a certain proportion of cases test results may be false [2]. Even true positive results are not necessarily clinically relevant. Doctors interpreting test results should be experienced in investigating allergies, as the diagnosis of an allergy may have significant therapeutic consequences.

1.1.4 Assessing the severity of AE

The individual assessment of the severity of AE in a particular patient is important [1, 32, 40]. Underestimating the severity of the eczema may lead to poor treatment decisions or failure to refer the patient to a specialist when necessary. In adults with severe AE, prolonged sick leave may be part of the treatment plan in order to avoid exposure to irritant substances in the workplace. Assessment may be a challenge to doctors and nurses unfamiliar with the disease. While heavily infected and oozing eczema can hardly be overlooked, the severity of chronic eczema showing only mild erythema may be

underestimated (Fig. 2). Because erythema is barely visible on black skin, assessing severity in dark-skinned patients may be difficult [41]. Special attention should also be paid to ordinary everyday activities where problems may arise, e.g. poor sleep at night or burning sensations during hand washing. The key to correct assessment is to supplement the clinical findings with relevant information from the patient or his/her parents [32,40].



Fig. 2. Mild erythema can easily be overlooked. Photo: J.F.Frantzen, NST.

A variety of scoring algorithms have been developed to help assess the severity of AE [40,42]. Some algorithms are based on clinical features, e.g. the EASI (“Eczema area and severity index”) algorithm. Quality of life questionnaires are aimed at assessing the patient’s own perceptions. The SCORAD (“Severity scoring of atopic dermatitis”) index combines both clinical findings and patient’s perceptions [42]. However, the use of these algorithms can be

time-consuming and requires a certain amount of training. To the author's knowledge, scoring algorithms have not been widely used in routine general practice.

1.1.5 Treatment options

As there is no causal treatment of AE, avoidance of provocative factors is essential [2, 40]. A wide range of triggers may elicit or worsen a flare, typically including infections, frequent use of soaps and other detergents, cold weather and emotional stress [32, 40]. While many parents are convinced that their child's eczema is due to an allergy, this is the case only in a minority of patients [37, 38]. Since the stimuli that worsen the disease vary greatly between patients, health personnel need to be careful in assessing possible triggers and in determining the concrete offending agents that a particular patient should avoid [32, 40]. In the author's experience, it is also necessary to consider the timing of provocative stimuli. Some triggers may cause almost immediate reactions in the skin, whereas other effects may appear only after a few days [43]. In addition, there may be considerable cumulative effects that can be confusing for patients and doctors alike, as the trigger in question had been previously tolerated. Elucidating these issues may be time-consuming, and follow-up consultations are often necessary.

The medical treatment of AE comprises many modalities, but the cornerstone is the use of topically applied steroids which have anti-inflammatory and anti-pruritic effects [32, 40, 44]. Steroids are usually effective in relieving symptoms if there are no other complications such as infection. Preparations commonly used include creams and ointments and are divided into four classes according to potency (class I weak, class IV potent). They can be applied daily for several weeks and their use gradually decreased. The choice of steroid potency depends on where the eczema is and the age of the patient; the incorrect use of steroids may lead to side effects. Clinical signs of infection require attention because improvement may be delayed by infected eczema [45]. Steroids with antimicrobial substances, disinfective baths and wet dressings (e.g. using Burow's solution) are commonly applied. Systemic antibiotics may be necessary in recalcitrant cases.

Patients with AE appear to benefit from moisturisers [46, 47]. Emollients provide basic skin care and their use is also recommended on a permanent basis in symptom-free periods. However, patients may find the choice of the

right type of emollient confusing. The use of lotions and creams with high water content may be ineffective; in most cases rather greasy creams are recommended but the application can be messy. Greasy creams with low water content may also be used for skin protection when patients are outdoors for any length of time.

Topical immune modulators, for example tacrolimus and pimecrolimus, are a new kind of drug that may be used instead of, or intermittently with, topical steroids; they usually have few side effects [48]. These substances are particularly important when areas of thin skin are affected, e.g. on the face. Here they may be used more liberally compared to steroids.

Poor sleep patterns due to itch may be treated with oral antihistamines. In children, the use of first-generation, sedative antihistamines appears beneficial although the scientific evidence is at times conflicting [49–51].

In moderate to severe cases of AE, UV-light therapy may be used in addition to topical therapy [52]. This phototherapy is offered in outpatient clinics and private practices two to three times per week for four to eight weeks. In certain regions of the country (e.g. Northern Norway) UV-therapy is not readily available in rural areas, and patients may have to stay at a hotel near the clinic due to the long distances involved. Patients with severe AE may benefit from natural sun or “heliotherapy”, combined with sea-baths. Norwegian children with AE can be referred to a health centre in the Canary Islands (Spain), with almost full reimbursement for travel and accommodation costs [53].

Recalcitrant cases of AE may require further systemic treatment with immunosuppressant drugs. Systemic steroids, azathioprine, cyclosporine or methotrexate may be used, but basic skin care remains essential [52].

Because of the high prevalence of AE in Northern Europe and the concomitant lack of specialists, only a minor proportion of patients will see a dermatologist or paediatrician [54, 55]. As a consequence, most AE patients consult general practitioners (GPs) and/or community nurses when seeking help for their skin complaints.

1.1.6 Patient education

Studies have demonstrated that a substantial proportion of AE patients do not comply with the treatment recommendations given by their doctor [23, 56–58]. Some patients find the application of certain kinds of treatment difficult and time-consuming (e.g. potassium permanganate baths, emollients) [59]. Steroid

phobia, or fear of steroids, is also a common problem [57]. Inadequate and insufficient treatment with topical steroids may be the cause of many poor results in the treatment of skin diseases [60].

A growing body of evidence indicates that educating AE patients is beneficial [61–63]. Staab et al. (2006) demonstrated that AE in children improved following structured educational intervention with multidisciplinary teams [63]. While it is easy to explain to patients how to take oral medication, e.g. antihistamines, describing the correct use of topical skin preparations is more challenging, and most AE patients need detailed instructions on how to carry out the various treatment techniques [32, 59]. For instance, patients may need information about when to use a certain steroid ointment and how the dose may gradually be reduced [64]. If the patient begins tapering off a steroid ointment too early, the eczema may well recur, while on the other hand, prolonged use of potent steroids may result in side effects. Skin infections also need special attention [32, 40]. Patients need to understand when and how to start anti-infective treatment. The preparation of baths and dressings may look quite simple, but care is needed when preparing adequate concentrations of the disinfective substances, as there may be side effects if the concentration is too high. The chronic nature of AE must be repeatedly emphasised to patients [59].

In Norway, education for AE patients is currently being provided in three ways:

1. Patients may be instructed by a doctor or a nurse during the consultation.
2. Patients may attend courses, i.e. “eczema schools”.
3. Patients may engage in self-study using printed material (e.g. pamphlets, books) or the Internet [65].

While the first alternative implies individual counselling, a group of patients is instructed simultaneously in eczema schools. This allows for the possibility of patient-patient interaction. All university teaching hospitals in Norway, and certain private practices, currently offer courses for AE patients [66]. There are, in addition, special courses for parents of children with AE. Eczema schools typically last one or two days and are aimed at improving the treatment techniques applied by the patients or their parents. Many educational programmes also address the burden of coping and living with a

chronic skin disease, especially when children are affected. While eczema schools are mostly available in major clinics, patients living in remote areas of rural Norway may encounter difficulties in attending these courses. Long distances may require patients to stay overnight in a hotel, and even if costs are reimbursed, attending courses can cause practical childcare problems for parents with other children at home. Adult patients who wish to register on a course need a doctor's certificate if they have to stay away from work. Patient support organisations have arranged AE courses in some rural areas from time to time, but their capacity to regularly offer education throughout Norway appears limited [67]. Educational courses are typically organised through secondary and tertiary health care although it is the doctors and nurses in primary health care who are responsible for the treatment of the majority of AE patients. According to the Coordination Reform, health services should be provided through primary health care whenever possible [68]. There does seem to be a need for eczema schools in rural areas.

1.2 Continuing medical education

The aim of continuing medical education (CME) is to maintain and increase professional competence after graduation [69]. While the term "continuing professional development" is used for all types of activities that contribute to competence building, e.g. grand rounds or peer discussion, CME typically refers to traditional courses and lectures that are often organised and accredited by the various national medical associations. In some countries, CME is even required to maintain a medical license [70]. In Norway a certain number of CME credits are required to maintain certification in general medicine, and efforts have been made by policy-makers and educators in Europe to mutually recognise the CME credits earned in different countries [70].

There is an increasing awareness that CME can influence the quality of health care delivery [71]. When a variety of educational strategies were examined, the outcomes studied included knowledge, attitudes, skills, practice behaviour and health outcomes of patients [72–74]. The evidence shows that traditional lectures are less effective in teaching health professionals, but that interactive formats that allow learners to interact with other learners and/or teachers are more so [72]. Despite the growing body of evidence concerning the efficiency of

various educational methods, many CME activities still use instructional methods that have proved to be less successful.

While doctors and nurses in Norway have traditionally attended separate CME programmes specific to their profession, there has been increased interest in continuing interprofessional education elsewhere [75–78]. At the primary care level, AE patients may consult both doctors and nurses and will inevitably compare the advice given by nurses with that given by doctors. It is therefore important to provide consistent advice in order to avoid confusion [79]. A clear definition of each profession’s responsibility and role is essential. The Coordination Reform highlights the importance of improved cooperation between various health professions [68]. For this reason it appears necessary to strengthen interprofessional education both at graduate and postgraduate levels.

Health personnel who wish to attend a CME course face certain obstacles. A qualified stand-in is usually required to replace a doctor or nurse who is on a course. The course fee has to be paid. As many primary care doctors and nurses have to travel to attend further education, additional costs arise. GPs attending CME in Norway are regularly refunded their travel and hotel costs by the Norwegian Medical Association (NMA) whereas nurses are usually refunded by their employers [80]. However, access to CME for community nurses in Norway is limited: in one survey, 68% of community nurses said they knew about courses they needed, but they could not attend because of practical difficulties [81].

1.3 The Internet and web-based learning

1.3.1 The Internet

The Internet, an abbreviation of the word “internetworking”, is based on the concept of computer networks; research on connecting computers began in the 1950s and ‘60s [82]. Private use of the Internet as we know it today began in the 1990s. It has dramatically changed our access to information since personal computers and other electronic devices (e.g. notebooks, PDAs, cellular phones) have gradually become more affordable, and is now a major source of information for many people around the world. Internet usage has grown enormously, increasing from 495 million users in 2001 to an estimated 2.4 billion users in 2011 [83]. Through wireless Internet access, users can

access it outside their homes or workplaces. In Norway, 94% of the population have used PCs during the last three months and 92% of Norwegian households have access to the Internet [84]. The proportion of people who use the Internet daily or almost daily is reported at 82% in Norway. During the last three months, 52% of the population used the Internet to look for health-related information, while 42% used it for educational or course offers [84]. Patients and caregivers can read about health-related issues on traditional websites, interact with other patients on discussion forums or social networks, as well as communicate directly with health personnel via email or similar web-based services. Use of the Internet for health-related issues is on the increase [85].

1.3.2 Web-based learning - Distance education via the Internet

The expression "e-learning" can be defined as training or instruction delivered on computers or similar electronic devices [86]. Content may be presented by various media, e.g. text, graphics, photographs, animations, video or audio. Learners may engage in e-learning in a classroom or in a distance education setting. Learning may be self-paced or instructor-led. The term "web-based learning" (or "Online education") is applied when instruction involves the use of the Internet. Moore (2012) defines distance education as "teaching and planned learning in which teaching normally occurs in a different place from learning, requiring communication through technologies as well as special institutional organisation" [87]. The very first example of distance education was found at the end of the 19th century when correspondence courses enabled teachers and students to communicate with each other despite being physically separated [88]. Although the concept of distance education is not new, the wide-spread use of personal computers combined with increased access to the Internet has had a major impact on the design and organisation of distance education. Web-based courses may be accessed from almost any location, and online education has emerged as an alternative to ordinary classroom lessons which does not require participants and teachers to be physically present at a specific site and time [89]. Teachers and students can communicate through e-mail or other server-based Internet applications (Fig. 3) [90]. Consequently, the need for travelling can be reduced. Further advantages of web-based education include self-directed and self-paced learning, ease of updating content, search functionality and the possibility of linking to other web-based

resources. Many web-based curricula use multimedia, defined as the use of at least two media in the delivery of educational content, for example text and image or text and audio [91].



Fig. 3. Distance education via the Internet. Photo: NST.

Web-based teaching can be based on various learning theories. According to the constructivist learning theory, learners have to "construct" understanding, i.e. make sense of the learning material presented [92,93]. This involves a process of mental reorganisation during which new information is linked to previous knowledge in a meaningful way and contrasts, for instance, with the behaviouristic learning theory in which the focus is on strengthening or weakening desirable or undesirable behaviour [92]. The application of a particular learning theory in the design process of a learning programme may influence the instructional design of that programme [92].

Many studies have compared distance education including web-based learning with traditional classroom instruction [86]. In a meta-analysis by Bernard et al. (2004) the majority of reported effect sizes was around zero [94]. This

supports the view that it is pedagogy (or andragogy) rather than the delivery method that promotes effective learning. As most authors accept that web-based teaching and learning is as effective as traditional teaching, researchers are now focusing on identifying which learners benefit most from the various forms of web-based instructional techniques and in which settings [92,94]. Issues that need special consideration are instructional design, the needs of the target group (e.g. how much time do learners wish to spend on the course?) and technical constraints (e.g. are learners familiar with using the Internet?). One type of web-based curriculum may be highly effective in one setting, but not in another.

1.3.3 Web-based learning in the health professions

Web-based teaching and learning is used for graduate and post-graduate education of health personnel [95]. The use of the Internet by physicians seeking information and CME is constantly increasing [96]. Studies have demonstrated the beneficial effects of web-based education in the health sector, and it has been shown that web-based education has similar outcomes to those of traditional face-to-face education as regards knowledge, attitudes, skills, practice behaviour and health outcomes [97,98]. In many reports, however, outcome data relate to user satisfaction and knowledge acquisition, whereas the number of studies reporting on behavioural changes in doctors or in the health outcomes of patients appears limited [98–100].

Reports have indicated that web-based CME can be cost-effective, even though developing a web-based curriculum is expensive [101–103]. The cost per learner can be low provided there is a sufficiently large number of learners. Web-based CME has been used in dermatology [104,105]. To the author's knowledge no studies exist on web-based CME dealing with AE.

1.3.4 Web-based consultations - Teledermatology

Telemedicine enables remote diagnosis and management of medical conditions. The main benefit for patients is less travelling and better access to health care [106–108]. In Norway the telemedicine era started in the late 1980s (Fig.4) [109]. Videoconferencing was introduced between the dermatological clinic at the university teaching hospital in Tromsø and the local hospital in Kirkenes in 1989 [110].



Fig.4. Videoconference at the University Hospital of North-Norway in the late 1980s. Photo: NST.

In many countries web-based services now appear to be the most prevalent type of telemedicine applications within dermatology [111]. Various systems have been set up to enable remote consultations, but typically a primary care physician or nurse sends case history information and digital images showing the patient's skin to a dermatologist. The specialist responds to the request with a diagnosis, together with advice on the management. This type of telemedicine is commonly referred to as store-and-forward teledermatology. These systems work asynchronously: the physician who responds to a request may do so at a different time of the day from when the request was sent. In contrast, when telephones or video-conferences are used, both parties need to communicate simultaneously and consequently an appointment has to be made. Many studies have shown that store-and-forward technology can be used for remote diagnosis of skin diseases with a level of accuracy comparable with outpatient examinations [112–114]. There is evidence that the latest generation of mobile phones with inbuilt digital cameras may also be used to take images of skin lesions with sufficient quality for telemedical purposes [115, 116]. Clinical outcomes in teledermatology appear similar to ordinary consultations [117]. Studies have demonstrated that teledermatology may reduce by more than 50% the proportion of patients who need to travel to

a dermatologist; the percentages vary according to diagnoses and follow-up times in the trials [106, 107, 118]. Teledermatology can also be used to consult dermatology experts in other countries for second opinion [119].

So far, most teledermatology research has focused on communication between health personnel for remote diagnosis and/or triage, but the Internet may also be used for consultations between health personnel and patients at home. In the past this was often done through ordinary email, but now legislation in many countries requires secure server-based systems to be used when sensitive health-related information is transferred. Several reports have indicated the advantageous effects of home care telemedicine [120–122]. However, few studies exist that describe home monitoring of dermatological patients [123–125].

Many patients wish to communicate with their doctor through the Internet [126, 127]. This can be done by ordinary e-mail or by specially designed server-based systems ensuring privacy of transmitted data [128]. However, many physicians still hesitate to engage in electronic communication with patients as concerns have been raised about the possibility of resulting increased workload [129, 130]. There is some evidence in the literature that doctor-patient communication via the Internet is time-efficient [131–133].

Chapter 2

Aims of the study

1. To evaluate how web-based consultations for parents of children with AE affect health outcomes, self-management behaviour, health resource use and family costs.
2. To investigate the time needed by the doctor to process web-based consultation messages from parents of children with AE.
3. To develop a web-based curriculum for the education of primary care physicians and nurses in the management of AE, and to compare perceptions of the course between doctors and nurses.
4. To estimate the travel savings of physicians participating in a web-based curriculum on AE.
5. To assess whether a web-based curriculum combined with guidance via email or multimedia messaging service (MMS) may improve practice behaviour of primary care physicians managing patients with AE.

Chapter 3

Material and methods

3.1 Settings

Papers 1,2

This study was a randomised controlled trial (RCT) conducted at the University Hospital of North-Norway. Patients were consecutively recruited from the paediatric and dermatological outpatient units at the University Hospital of North-Norway in Tromsø and the Hammerfest County Hospital between August 2005 and September 2006. Children aged between six months to twelve years with moderate to severe AE, with at least one period of disease activity in the last 12 months, were eligible for inclusion. In the intervention group, parents were free to send requests via the Internet. The web-based consultation service was accessible briefly after randomisation. The parents could send requests via the Internet to a specialist ward for general advice at any time or when the eczema flared. They were also allowed to see their primary care physician at all times. Parents in the control group did not have access to web-based consultations but could contact their primary care physician at all times.

Paper 3

The study in Paper 3 reports on the perceptions of physicians and nurses after participating in the web-based course, "Help, it's itchy!" on AE. Physicians and nurses from all over Norway could register. The course was held twice in

2009 for two different mixed groups of learners. Each course offered unlimited access to the entire curriculum for eight weeks. After initially receiving an individual username and password, course participants were free to access the curriculum at any time during this period.

Paper 4

This study was a randomised controlled educational trial. Between May 2010 and June 2011, GPs from all over Norway were recruited (Appendix 1). All physicians currently employed in general practice were eligible for inclusion, but those employed as interns, board certified specialists in dermatology or paediatrics, and physicians who previously had participated in our web-based course were excluded. Physicians allocated to the intervention group were offered participation in the "Help, it's itchy!" course and in addition individual guidance via email or MMS on their cellular phone. They were registered for the online course and received information regarding access to the course including a username and password. In addition, they were free to send educational requests via email or MMS to a dermatologist (author TS) during the entire study period. Physicians in the control group neither had access to the web-based course, nor could they send educational requests via MMS or email. The study period was six months.

3.2 Web-based consultations for parents of children with AE

Paper 1

Data were collected through questionnaires at baseline and after twelve months (Appendix 2). During the initial consultation at the clinic, all parents took part in an individual educational session on treatment techniques. Baseline questionnaires and consent forms were handed to the parents. When these forms had been returned, the children were consecutively randomised into two groups using simple randomisation with shuffled envelopes. The waiting time from recruitment to randomisation was a maximum of two weeks for all participants. The parents then received information by letter about group allocation, and those in the intervention group received usernames, passwords and one-time codes for the secure web-based communication system.

The primary outcome was the change in severity of the eczema as measured by objective SCORAD [42]. Secondary outcomes were self-management behaviour, health resource use and family costs.

Eczema severity was measured using SCORAD (range 0-103). This is a tool for assessing the disease intensity based on extent, clinical signs and subjective symptoms such as itching and sleep disturbance. In the objective SCORAD (range 0-83) the patient-reported symptoms have been omitted.

Self-management behaviour was measured using a form where the parents noted which kind of treatment the children were given, e.g. emollients, baths, wet-wraps, antiseptics, topical steroids, and phototherapy, and how often (Appendix 2). Self-reported numbers of GP visits, outpatient consultations, emergency visits, hospital admissions, visits to complementary therapists and personal expenses (for treatment, special clothing, diets, etc.) were recorded. The participants were asked to estimate the number of health care visits one year prior to the study and during the 12 month follow-up. In addition the parents were asked about absence from work at baseline and one year follow-up. Use of web-based consultations during the trial period was recorded through computerised logging. The design of the trial was based on a significance level of 5% and a power of 80%. In order to demonstrate a change in eczema severity with an effect size $d=0.40$, 100 participants would be required in the trial. Allowing for a 20% drop-out rate, 125 participants had to be enrolled.

3.3 The workload of web-based consultations with atopic eczema patients

Paper 2

The use of the web-based consultation service by the parents was established through computerised logging of all messages. Technical problems were recorded through questionnaires. The doctor who answered the requests sent via the Internet recorded the amount of time needed for reading and answering 93 consecutive requests received between January 2007 and June 2008.

Messages containing only “thank you” or brief notes were not recorded. Time measurement was done by the use of an ordinary wristwatch with stop-clock functionality. Time was recorded in categories: less than five minutes, five to

ten minutes, and more than ten minutes. This approach was chosen in order to ease data recording and processing. All chronological data represent the work of one doctor.

3.4 The web-based consultation service

Papers 1,2

The web-based consultation service is based on patient-initiated contact, and the doctor usually replied within one working day. In addition to writing their own comments, parents could use a special form to specify the skin area affected and the intensity of the eczema. Photographs of affected skin areas could be attached, but this was not mandatory. There were no limitations concerning the length or frequency of requests provided they were dealing with AE. One experienced resident in dermatology (author TS) at the University Hospital of North-Norway answered the requests, while two specially trained nurses answered messages when the doctor was on leave. Medical guidance was always available for the nurses, and when advice on medication was requested (local or systemic), a doctor was always consulted. When an answer was sent, the patient was automatically informed through SMS. There was no system for notifying the health personnel about incoming requests; they generally logged in twice daily in order to access requests. The software used is based on open source components that were further developed by Well Diagnostics (DIPS ASA, Bodø, Norway) for use in this project. The functionality provided includes a secure messaging system which ensures the patients' privacy while sending photographs and text to their provider via an ordinary web-browser. The images were uploaded directly from the camera, leaving no sensitive data on the computer used. The security requirements for sending sensitive information over the Internet were handled by a two-phased authentication process with username and password over an encrypted connection using a public key infrastructure (PKI), followed by a one-time password valid for ten minutes that was sent to the patient's mobile phone. This procedure had to be repeated each time the patient sent messages or read responses.

3.5 Perceptions of physicians and nurses participating in the web-based course, "Help, it's itchy!"

Paper 3

Participating physicians and nurses were asked to rate their agreement to 15 statements using a Likert scale, in addition to six open-ended qualitative questions. The questionnaire was adapted from similar questionnaires used previously for the evaluation of various online health courses designed at the Norwegian Centre for Integrated Care and Telemedicine (NST). Responses to the open-ended questions were analysed by identifying common themes, and grouped accordingly. Use of the curriculum was established through computerised logging. The number of participants' postings in the discussion forum was counted manually. Postings in the discussion forum were classified as educational or social. A random selection of 60 answers to the homework assignments (30 answers each from doctors and nurses respectively) submitted by course participants were rated in a blind manner by two independent board-certified dermatologists not involved in the project. The quality of the answers was rated from 1-5 (1=very poor; 2=poor; 3 medium; 4=good; 5=very good). The nine questions answered by a particular participant were identical for doctors and nurses. (A tenth question was not analysed in the study because it was intended for doctors only). Assuming equal groups and a drop-out rate of 40%, 80 participants would be required to show a difference between doctors and nurses in the total questionnaire score of five points with a power of 80% and significance level of 5% (SD=6).

3.6 Travel savings of physicians participating in the web-based course, "Help, it's itchy!"

Paper 3

The assumption was that participation in the online course would replace a traditional face-to-face course. Based on data from the NMA on real refund applications, the hypothetical saved travel and hotel accommodation expenses were calculated [80]. Refund data for 2007 were analysed. The costs for

developing the course were estimated through logging the working hours of involved staff, excluding research work.

3.7 Practice behaviour of physicians participating in the web-based course, "Help, it's itchy!", including additional guidance via email or MMS

Paper 4

Randomisation was arranged consecutively from September 2010-June 2011 via the central telephone randomisation service at the Clinical Research Department of the University Hospital of North-Norway. Randomisation lists were computer generated using block randomisation with random block sizes 4, 6 and 8. Participants were informed by email to which group they had been allocated and began the trial immediately. Physicians in the intervention group had unlimited access to the web-based curriculum for the entire study period, starting one to three days after randomisation. The primary outcome was the duration of topical steroid treatment prescribed by the participating GPs. Secondary outcomes were the number of treatment modalities prescribed and the number of referrals to specialist health care. Physicians who wished to receive CME credits had to pass the online examination within the first six weeks after initial login. In addition to communication via email or MMS, physicians could also interact with the dermatologist and other learners through a discussion forum on the course website, but without the option to send photographs. Physicians in both groups were requested to fill in a short online survey reporting their treatment prescriptions each time they were consulted by an AE patient during the six month study period (Appendix 3). For the purpose of this study, a patient with AE was defined as a person of any age with a clinical diagnosis of AE, or a person probably having AE as judged by the participating physicians. In addition, physicians were asked to fill in online questionnaires about working experience, attitudes and habits regarding the management of AE at start-up and at the end of the study period. In the intervention group there were also questions concerning satisfaction of sending educational requests via email or MMS. Doctors were asked to rate their

agreement on four statements concerning satisfaction using a Likert scale. The start-up questionnaire and one treatment survey had to be submitted before randomisation. Physicians were not required to report treatments immediately after they had seen the patient, but were advised to do this at the end of the working day. A reminder message was regularly sent by email every three weeks to all participants. The online form to collect data on the treatments used multiple choice questions (Appendix 3). Physicians were asked to report the number of days they had instructed the patient to use steroid creams or ointments, including tapering-off. Numerous treatment modalities were listed on the form and doctors had to tick which they had prescribed. Those included were emollients, baths, dressings, topical steroids (specifying potency class I-IV: I mild, IV very potent), topical calcineurin inhibitors, wet wrap dressings, oral antihistamines, systemic antibiotics, systemic steroids and dietary eliminations. Finally, there were questions about referral to specialist health care. The physicians were asked to indicate whether they intended to refer the patient and if so, to specify the reasons for referral and to which speciality. Reasons for referral included uncertainty about the diagnosis, flare of the disease, poor response to treatment, need for allergological investigation and "other" reasons. We made no attempt to collect data on the severity of AE because we considered it unrealistic to train participants in using a validated scoring algorithm for AE. After collecting the data according to the study protocol, a content analysis of the educational requests sent via email or MMS was also carried out. Common themes were identified and grouped accordingly. The content analysis was done independently by the authors TS and VF. Disagreement was resolved by consensus. The design of the trial was based on a significance level of 5% and a power of 80% against a difference of three days ($SD=4$) in the duration of topical steroid treatment between the groups. This difference appeared meaningful based on clinical experience. In calculating the sample size we had to consider the number of treatment reports that each participating physician was going to submit. Assuming an average of 4 measurements per physician, 20 participants would be required in order to show a statistically significant difference in the primary outcome. In the case of only one treatment report per physician, 59 participants would be required. Since the number of measurements per participant was difficult to estimate prior to the trial, we aimed at reaching a sample size of 20-59 participants. Allowing for a 20% drop-out rate, 25-74 participants had to be enrolled.

3.8 The web-based course, "Help, it's itchy!"

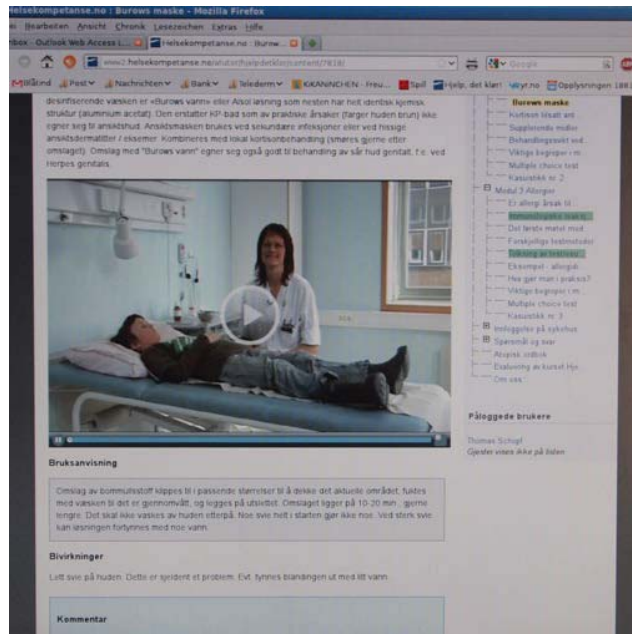


Fig. 5. Instruction video from the course, "Help, it's itchy!". Photo: Thomas Schopf, NST.

Papers 3,4

In 2008, "Help, it's itchy!" was developed, a web-based course aimed specifically at doctors and nurses. The idea was to educate primary care doctors and nurses in the management of AE, including basic skin care techniques. Two board-certified dermatologists and a board-certified paediatrician wrote the content of the curriculum. An experienced GP, three consultant dermatologists and a nurse reviewed the course. The educational boards of family medicine of the NMA as well as the Norwegian Nurses Organisation (NNO) reviewed and approved the course for CME credits for doctors and nurses. The "Help, it's itchy!" course was developed on the basis of constructivist learning theory [92,93]. Content was presented as narrative text and in audiovisual format in three modules:

1. Steroids and calcineurin inhibitors

2. Infections

3. Allergies

While some subsections were marked “especially recommended for doctors or nurses”, all learners were encouraged to study these sections. Clinical examples were presented with photographs showing various stages of AE. Video sequences (Fig. 5) and photo series were used to demonstrate various therapeutic techniques: applying emollients, preparation of facial dressings, preparation of wet-wraps and preparation of potassium permanganate baths. Various information sheets were demonstrated to exemplify actual instructions to patients. Links to other online resources for patients as well as health personnel were presented [65]. In a threaded discussion forum, learners could post comments and questions that were answered by the dermatologist (author TS) or commented on by other learners. At start-up, the dermatologist encouraged learners to introduce themselves in a social thread. All communication was asynchronous. In every module there was an optional test set with eight to nine multiple choice questions for self-assessment. After submission of all answers in a particular test set, learners automatically received feedback. To complete the course, every learner had to submit a homework assignment involving three hypothetical patient cases illustrated with photographs (Appendix 4). A total of nine questions about treatment recommendations had to be answered. The homework patient cases, including all questions, were accessible at any time during the course. The dermatologist provided learners with feedback including a copy of the submitted answers three to five days after submission.

3.9 Guidance via email or MMS

Paper 4

Physicians were encouraged to send their questions about all AE topics via email or MMS (Fig. 6). They were specifically offered the option of discussing real cases from their practice and could attach close-up photographs showing the patient’s skin lesions provided the patient had given informed consent. The dermatologist responded to requests within one or two working days by sending an answer via email or MMS. The requests were for educational purposes only. Physicians were instructed to ensure that no data or images

were transferred that could possibly lead to the identification of the patient. They were informed prior to the study that sending requests for the referral of patients to specialist health care was not possible.

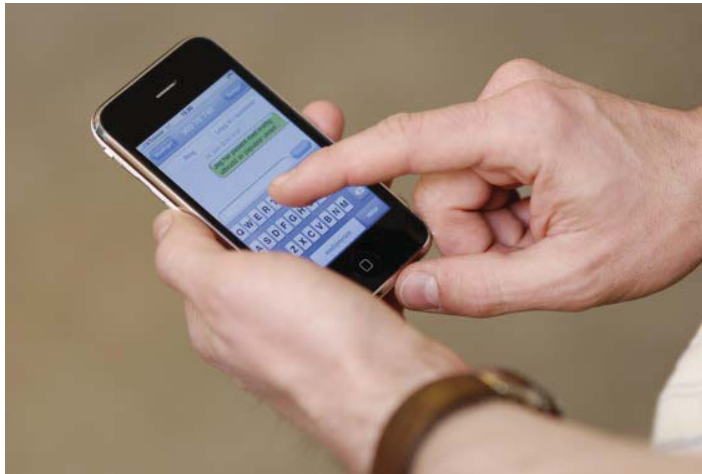


Fig. 6. Guidance via the mobile phone. Photo: J.F.Frantzen, NST.

3.10 Ethical considerations

The research reported in this thesis was conducted in accordance with the Declaration of Helsinki [134]. All parents of the patients in Papers 1 and 2 gave informed consent prior to enrolment. The Regional Committee for Medical and Health Research Ethics in Northern Norway (REK-Nord) and the Data Inspectorate of Norway approved the study protocol. As patient recruitment had started before July 1st 2005, the trial reported in Papers 1 and 2 was not registered in a clinical trials registry. All participating doctors and/or nurses in Papers 3 and 4 gave informed consent before enrolment. The study in Paper 3 did not report experimental biomedical research, and therefore approval by the ethics committee was not required. The study protocol in Paper 4 was reviewed by the REK-Nord which concluded that the study did not need formal approval as this was a non-clinical trial that did not investigate health outcomes. For the same reasons, the study was not included in a clinical trials registry.

3.11 Statistics

Data were analysed on an intention-to-treat basis in Paper 1.

Repeated-measures analysis of covariance was used to compare baseline and post-measurements between the groups. Baseline differences were entered into the analyses as covariates. Because the data in Paper 2 did not contain a normal distribution, Chi-Squared statistic for analysis of the doctor's time data was used. In Paper 3, the student's t-test was used to compare the mean total questionnaire scores and the mean homework scores between doctors and nurses. Questionnaire scores from single questions were compared using the Mann-Whitney U-test. The percentages of submitted homework assignments and discussion postings were compared by Chi-Squared statistic. Interrater agreement between the scoring dermatologists was determined by intraclass correlation. In Paper 4, data were analysed on an intention-to-treat basis. A generalised estimating equations model was used in all outcome analyses to account for random effects introduced by doctors reporting more than one treatment during the study period. An exchangeable covariance structure handled treatment data as within-subject repeated measurements. SPSS for Windows was used for the statistical analysis in all papers. All given P values are 2-tailed, $P < 0.05$ indicates statistical significance.

Chapter 4

Summary of main results

4.1 Main results, Paper 1

Bergmo TS, Wangberg SC, Schopf TR, Solvoll T.

Web-based consultations for parents of children with atopic dermatitis: results of a randomised controlled trial.

Acta paediatr 2009, 98(2):316-320.

- Nineteen out of 50 participants (38%) in the intervention group used web-based consultations, sending a total of 158 messages.
- Mean objective SCORAD improved from pre- to post- intervention (21.6 to 19.9) but the difference was not significant. There was no interaction between the groups.
- In both groups the mean number of skin care treatments per week performed by the parents decreased significantly from baseline to one-year follow-up (3.1 to 2.2, $P < 0.001$). There was no interaction between the groups.
- Except for hospital admissions, both groups had significantly fewer overall health-care visits after the one-year intervention compared to baseline measurements (7.1 versus 2.9, $P < 0.001$). Family costs and absence from work were not reduced during the study period. The intervention group tended to have fewer visits to complementary therapists than the control group, but this was not significant.

- Fifteen out of 19 users (79%) would recommend the consultation service to other parents of children with AE.

4.2 Main results, Paper 2

Schopf TR, Bolle R, Solvoll T.

The workload of web-based consultations with atopic eczema patients at home.

BMC Res Notes 2010, 12;3:71.

- Twelve patients sent a total of 93 requests during the study period.
- The time needed by the physician to read and answer a request was less than 5 minutes in 60% of the cases.
- The doctor spent significantly more time answering requests that had photographs attached compared to requests without photographs (P=0.005).
- The time needed to answer requests received during the winter season (October-March) was significantly longer than the rest of the year (P=0.023).
- There was no correlation between the answering time and the age of the patient.

4.3 Main results, Paper 3

Schopf TR, Flytkjær V.

Doctors and nurses benefit from interprofessional online education in dermatology.

BMC Med Educ 2011, 14;11:84.

- Fifty-nine learners (67%) completed the joint web-based course for doctors and nurses.
- The mean total questionnaire score on perceptions of the course was 64.5 (doctors: 64.7; nurses: 64.5). We found no significant difference in the total questionnaire scores between doctors and nurses.

- Fifteen out of 55 learners (27%; 6 doctors, 9 nurses) commented that a mix of professions in the course was positive. Six out of 55 learners (11%; 4 doctors, 2 nurses) commented neutrally. No negative comments were identified on this question.
- Twenty-seven learners (31%; 16 doctors, 11 nurses) made a total of 53 postings in the discussion forum. Forty-seven percent of postings were of social character (doctors 50%; nurses 44%), the remainder were educational.
- There were no significant differences in the quality of submitted homework assignments, which were given an average score of 3.6 for doctors and 3.5 for nurses by rater 1. Rater 2 scored 3.9 and 3.6 for doctors and nurses respectively.
- The cost of developing the course was Kr 716 841 and the first 86 learners saved Kr 455 198 in travel expenses. The break-even point between travel/hotel expenses and course development costs was identified at 135 saved travel refund applications.

4.4 Main results, Paper 4

Schopf TR, Flytkjær V.

Interactive web-based education of general practitioners may reduce referral rates in patients with atopic dermatitis: a randomised controlled trial.

Submitted June 2012

- The doctors reported a total of 190 patient treatments including baseline treatment data (intervention group: 97 treatments, control group: 93 treatments). Overall 35.4% of the reported treatments were related to adult patients (intervention group: 35.1%, control group: 35.9%).
- Seventeen out of 24 doctors (70.8%) had either logged into the course website or sent an educational request via email or MMS.
- There was a significant increase in the duration of topical steroid treatment compared to baseline for both groups ($P=0.018$). There was no significant difference between the groups.

- There was no significant difference between the groups in the number of treatment modalities prescribed.
- Eight out of 73 treatment reports (11.0%) in the intervention group indicated referral to specialist health care, whereas 21 out of 71 treatment reports (29.6%) in the control group did so. This difference in the number of referrals was significant ($P=0.030$).

Chapter 5

Discussion

The focus of this thesis is on using the Internet to manage AE. Papers 1 and 2 report a web-based consultation service for parents of children with AE. In Paper 3 perceptions of doctors and nurses are compared after participating in a web-based CME course on AE. Paper 4 investigates the impact of web-based CME on the practice behaviour of primary care physicians.

5.1 Discussion of methodology

There is an ongoing debate among telemedicine researchers concerning methodology [135]. While quantitative methods have been the most common approach in clinical medicine, it is argued that qualitative methods may be beneficial in telemedicine [135]. Use of the latter method may reveal additional information that would not be available in a quantitative study. Qualitative and quantitative methods have also been combined in a mixed methods design. The trials in this thesis represent mainly quantitative research methods. The study in Paper 3 applied a mixed design of qualitative and quantitative methods. Some of the patients participating in the trial in Paper 1 were also interviewed and the data analysed in a qualitative study [136]. However these data are not part of this thesis and are therefore not considered further. The trials reported in Papers 1 and 4 had an experimental design with random allocation of subjects to an intervention or a control group. Randomised controlled trials are the preferred method of assessing the effects of innovative treatments in medicine. By randomly allocating subjects, the

groups will be similar, and consequently confounding variables will have similar effects on all subjects. Ideally, any differences in the outcome variables can then be explained by the effect of the intervention. In order to show a statistical significance of the outcome variables in one group compared to the other, the sample size has to be sufficient. According to the CONSORT statement, the sample size should be determined before a trial starts as an insufficient sample size may lead to wrong conclusions [137]. Interpretation of data obtained from studies with small sample size is a well known issue, also in telemedicine research. In order to obtain a power of 80%, the sample size in the trial reported in Paper 1 was estimated at 100 patients. Because of difficulties in recruiting patients and a high drop-out rate, this number could not be reached. This limitation has to be taken into account when the results are discussed. We may have failed to reject the null hypothesis when it was in fact false, i.e. committing a type II error.

While the trial described in Paper 1 aimed at assessing health outcomes in patients, Paper 4 reports on a non-clinical educational trial: the subjects studied were physicians and the outcomes were the treatment which these physicians had prescribed to their patients. Health outcomes were not recorded. The aim of the study in Paper 4 was to assess whether web-based intervention may improve the practice behaviour of primary care physicians. It has been argued that trials investigating web-based education should compare different variants of web-based interventions rather than comparing web-based education with no intervention [97]. The main reason for this argument is that the majority of educational trials indicate that web-based education works. But since the focus in many previous trials on web-based CME has been on learner satisfaction and knowledge gain rather than practice behaviour, the trial in Paper 4 was designed to investigate the potential effects on practice behaviour in a busy Norwegian primary care setting. To the author's knowledge, this has not been done before. Thus a two group parallel design with a control group was decided on. Alternatively, in order to compare different variants of web-based education with a control group, a three arm design could have been chosen. However, it appeared difficult to recruit enough participants for such a trial.

5.2 Discussion of main results

In Northern and Western Europe most patients with AE are treated in primary health care [54,55]. This is in line with the intention of policy makers who wish to move chronic care away from hospitals and into the communities [68]. Patients with severe AE, uncertain diagnosis, treatment failure or complications may require referral to a specialist [40,55]. While adult patients are treated by dermatologists, child patients and adolescents are managed by dermatologists or paediatricians.

5.2.1 Web-based consultations for parents of children with AE



Fig. 7. Secondary skin infections may interfere with treatment. Photo: Patient (Image used in a web-based consultation).

There was no significant effect of the web-based consultation service on the severity of the eczema as measured by objective SCORAD (Paper 1). In both groups there was a significant reduction in the number of skin care treatments and health care visits after one year, compared to baseline measurements, but there was no difference across the groups.

Use of the Internet for health-related information is very common [84]. Reports have indicated that many patients also wish to engage in web-based communication with their doctor [126, 127]. On the other hand, attrition is a well-known phenomenon in web-based telemedicine interventions [138, 139]. This was also a finding in our study where more than half the parents in the intervention group never used the counselling service (Paper 1). It has to be emphasised that the web-based consultation service was intended as a supplement to face-to-face consultations, not as a replacement.

Preservation of privacy and confidentiality when exchanging medical information and images over the Internet is an important legal issue, and this online service fulfilled the security requirements by using a two-phased authentication (Paper 1). In addition to a username and password, a one-time password valid for ten minutes was sent to the patient's cellular phone during the login process. This may have caused login trouble for certain users and may partly explain the low use of the service. Approximately one out of three users reported some kind of technical difficulty. Unfortunately we do not have conclusive, comprehensive data on how user-friendliness was perceived by the parents using the consultation service. Since the data in this trial were analysed on an intention-to-treat basis, low adherence may have underestimated the benefits of the intervention. A subgroup analysis was not performed as this method contains potential flaws. Another explanation for the results may be that the individual educational face-to-face session provided to both groups at start-up was effective in strengthening the parents' skills in handling their child's eczema. This positive effect of parental education corresponds with other studies in the literature [63]. Several review articles about home care telemedicine have indicated advantageous effects of home telehealth [120, 122]. A recently published study on the follow-up of cancer patients clearly demonstrated benefits [140]. Despite teledermatology representing one of the best investigated areas within telemedicine, so far only a few reports can be found in the literature describing home telehealth applications designed for dermatology patients [123–125].

While there is some evidence that patient-physician communication through email and web messaging is time efficient for the doctor, few studies have tried to assess the actual time required to process web messages [131–133]. The study in Paper 2 showed that the time needed by the physician to read and answer a consultation was less than five minutes in more than half the cases. The amount of time needed for the doctor to respond to a request from the

patient is small compared to an ordinary consultation at the hospital, not to mention compared to the time needed by the patient to travel. These findings are consistent with other reports in the literature [131,133]. The concerns raised by some physicians about increased workload due to web-based patient communication seem to have little scientific support. The web-based consultation service allowed patients to consult a specialist without the need of prior referral from a primary care physician. This bypassing of the primary care physician in the trial has been questioned. Critics specifically asked why a specialist provided the service rather than the patient's own family doctor, who knows the patient best. The basic idea of the Internet consultation service was to educate patients. In Norway and elsewhere the concept of "eczema schools" almost exclusively involves secondary health care institutions. Typically, an interprofessional team consisting of dermatologists and/or paediatricians, specialised nurses and other health professions teach eczema patients face-to-face in a class. Therefore, in the study on web-based counselling it appeared reasonable to involve a specialist experienced in the teaching of patients in eczema classes. In addition, it was rather difficult from a practical point of view to involve a substantial number of primary care physicians in the study. Concerns may be raised whether primary care physicians are competent to provide a counselling service for AE on their own [141–143]. GPs may find the management of patients with AE challenging, as guidelines commonly present a wide range of therapeutic modalities [32,40]. For instance doctors are recommended to identify relevant trigger factors based on a thorough case history before setting up a specific treatment plan. Secondary skin infections are common in AE and warrant special attention (Fig.7). Compared to other doctors, dermatologists use more complex treatment regimens including the liberal use of topical steroids [141,142]. In contrast, GPs appear to be more conservative in the use of steroids in terms of potency and treatment duration. Nevertheless, it seems a good idea to involve primary care doctors in the delivery of home care telemedicine services, possibly supported by the secondary health care level. There do not appear to be any technical barriers, as asynchronous web-based communication systems can handle multiple users. When advice is given from a specialist, the primary care physician can get a copy of the message and vice versa. The role of primary care nurses also needs to be considered; the key role of specialised nurses in the management of AE patients has already been demonstrated [62].

5.2.2 The web-based course, "Help, it's itchy!"

This was the first web-based CME course in dermatology designed for both doctors and nurses to be implemented in Norway. The idea of a joint course was based on the concept of interprofessional education: the Coordination Reform underlines the need for more cooperation between health professions [68]. There has been increased focus on the potential benefits of educating doctors, nurses and other health professionals together [75]. This may be done both in graduate and post-graduate education.

Based on the findings in Paper 3, doctors and nurses seemed to be equally satisfied with the curriculum, and no significant difference in the total questionnaire score was found. The percentage of learners completing the course was higher among doctors, who also performed slightly better in the management of the patient cases in the homework assignments, but these differences were not significant. A possible explanation for the higher completion rate could be motivation. In Norway GPs are obliged to obtain a certain number of CME credits in order to be re-certified every five years [144]. In contrast, nurses are not obliged to complete CME courses in the same way. In general, time and costs for the creation of distance learning are rarely compensated [145]. The NMA funds the administration of most web-based CME courses in Norway. Refund of travel and accommodation costs for doctors attending traditional courses is an additional burden for the NMA [80]. Savings due to reduced travel costs could instead be used to cover some of the high costs involved in the creation of distance learning.

Theoretically the potential travel savings associated with the two online courses described in Paper 3 equal more than half of the developing costs. While the ability of online education to reduce travel expenses obviously has been acknowledged by private companies, there seem to be few reports in the medical literature investigating this issue [146]. In a review (2002), Brown et al. reported that economic evaluations of CME are rare [103]. In a study by Walsh (2010) e-learning appeared more cost-effective compared to traditional learning methods for GPs [102]. The results in Paper 3 suggest that savings due to reduced travel expenses should be taken into account when online CME programmes are planned.

Less than one third of learners made a posting in the discussion forum, which is less than was hoped for. However, both doctors and nurses appreciated reading threads in the discussion forum even if they did not post messages

themselves. "Lack of time" was a typical explanation given for the limited use. Time constraints as a barrier to interaction in online education have been reported before [147].

In the study reported in Paper 4, the web-based course on the management of AE was combined with the possibility of discussing cases from the GPs' own practices with a dermatologist via email or MMS. Although a dermatologist was also involved in forum discussions in the course reported in Paper 3, the next course, reported in Paper 4, was modified to increase the discussion activity by introducing the possibility of interacting via email or MMS. This approach appeared more user-friendly as compared to using the course forum where a login procedure was required. In addition, participating physicians could easily send digital images to the dermatologist by email or MMS. As hoped, the percentage of physicians engaged in discussion was higher in the study in Paper 4 compared to Paper 3. Doctors seemed to prefer email rather than MMS for educational discussions. The main findings in Paper 4 were that physicians in the intervention group referred fewer patients to secondary health care and that there were no differences between the groups as regards the duration of topical steroid treatment and the number of treatment modalities prescribed. The reasons for referral appeared to be similar in both groups. "Treatment failure" and "flare" were the reported reasons for referral in more than half the cases. According to Emerson et al. (1998), the majority of referred AE patients have a mild to moderate case of the disease [54]. Because AE is so common, even a small reduction in referral rates could have a considerable impact on the workload of dermatologists and paediatricians dealing with AE patients. Reducing referrals would also have economic consequences. In 2010 there were 5406 hospital-based outpatient consultations with AE registered children in Norway [148]. Every consultation was reimbursed with at least Kr 273 [148]. In contrast, the reimbursement in primary health care for a similar consultation was Kr 136 [149]. Based on a 20% reduction in referrals and a potential saving of Kr 137 per referral avoided, there would be a potential national annual saving of Kr 148 124 for hospital reimbursements.

Concerning the duration of topical steroid treatment, there was no significant difference between the groups. However, there was a significant increase in the duration of topical steroid treatment as compared to baseline for both groups. This might be due to the Hawthorne effect, i.e. the study itself may have influenced the participants' behaviour [150]. Another possible explanation

might be the online form used for the collection of data, on which various treatment options were listed. When repeatedly using this form, physicians in both groups may have realised shortcomings in their knowledge of the management of AE. This might have stimulated them to reflection and learning which in turn influenced treatment in both groups.

There would seem to be a potential for CME to reduce unnecessary referrals [104]. In his 2008 review, Akbari et al. reported that educational activities led by secondary care providers improved referral behaviour [151]. In contrast, the passive dissemination of guidelines appeared ineffective. The study in Paper 4 suggests that a web-based educational intervention aimed at primary care physicians may help to reduce referrals.

Chapter 6

Conclusions

The main conclusions may be summed up as follows. A web-based course for primary care physicians, in which they can discuss cases with a dermatologist, can reduce the number of referrals of AE patients to specialist health care (Paper 4).

Doctors and nurses seem equally satisfied with a joint web-based course. Time constraints are perceived as a barrier to interaction, and there may be limited use of an online discussion forum. A similar set of homework assignments may be used for both doctors and nurses. There is already a potential for saving travel expenses in the short term, and a joint eczema course seems sustainable over time (Paper 3).

Individual web-based consultations may be used in the follow-up of AE patients at home. There is no effect on the severity of AE as measured by objective SCORAD, or on self-management behaviour, resource use and family costs when traditional treatment for childhood AE is supplemented by web-based consultations. The amount of time needed for the doctor to respond to a web-based request from the patient appears to be small. The time for reading a request and writing an answer depends on seasonal variations of disease activity and on whether photographs are supplied. Although the majority of users of a web-based consultation service recommend the service to other patients, there is a large proportion of non-users (Papers 1 and 2).

Chapter 7

Future aspects



Fig. 8. Learning in a virtual world. Photo: NST.

The study in Paper I was carried out between 2005 and 2007, more than five years ago. Since then, there have been remarkable technical developments in mobile phone technology. While the parents of the AE patients in our trial had to transfer the eczema images from the digital camera to the computer, mobile phones now have built-in cameras allowing digital images to be sent directly from the phone via MMS or email. Use of this functionality has become increasingly popular. Compared to the procedure described in our study, the use of such mobile phones seems much more user-friendly. Digital images taken by mobile phones appear to be of sufficient quality for monitoring

inflammatory skin disease [115]. It is also possible to attach dermoscopes to mobile phones to obtain dermoscopic images of pigmented skin lesions. The feasibility of teledermoscopy by using mobile phone cameras has been proven [116]. There can be little doubt that in a few years most mobile phones on the market will be capable of taking images suitable for teledermatology. The question whether web-based counselling of patients can improve health outcomes deserves further attention. Home-based telemedicine systems that are being developed now should include the possibility to communicate directly from the mobile phone. Within the last few years, as social networks (e.g. Facebook) have become popular, they are increasingly used for health-related issues [152]. The use of social networks may influence the development of home care telehealth, something which also needs to be addressed in future research. Teledermatology is one of the best studied fields within telemedicine. It has been shown in many previous studies that teledermatology may be used as a triage tool to reduce the number of patients who need to attend a face-to-face consultation with a dermatologist. In contrast, relative little research has been done concerning the effects of continuing professional development and web-based CME in dermatology. It seems clear that traditional, lecture-based CME has poor outcomes and should be abandoned in its present form. Courses that allow and encourage learners to interact with each other or with teachers have proved more effective. However, the success of web-based education is dependent on tailoring the right solution in a given setting. One size does not fit all. New concepts in web-based CME may involve a combination of clinical teledermatology services and tailored educational activities. The introduction of virtual worlds in education has opened up new horizons (Fig. 8) [153]. This may help to reach the goal of improved care in the communities and reduced workload at secondary care levels.

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Paper 1

Paper 2

Paper 3

Paper 4

Appendix 1

Advertisement used to recruit doctors (in Norwegian)



Eksem og allergiveiledning for allmennpraktikere

Savner du veiledning fra spesialisthelsetjenesten? Usikker på om kortisonkrem kan brukes på infisert eksem eller om du skal teste pasienten for allergi?

Nå kan du prøve ut et nytt veiledningskonsept for allmennpraktikere, der målet er økt kompetanse innen atopisk eksem og allergier.

Vi søker etter primærleger som vil være med i en randomisert kontrollert studie som skal undersøke effekten av individuell veiledning via MMS eller epost, samt gjennom nettkurset "Hjelp, det klør!".

Kurset er godkjent med 10 timer for spesialiteten allmenntillegning. Det kreves minimalt med ekstra tid for å registrere data til studien (online spørreskjema).

Forutsetning for å delta er at du er autorisert lege og for tiden jobber i allmennpraksis. Veiledningen varer i 6 måneder og man velger selv tidspunkt for oppstart (senest 31.03.2011).

Prosjektleder:

Barnelege og allergolog Roald Bolle,
Universitetssykehuset Nord-Norge

Kontaktperson:

Hudlege Thomas Schopf
Telefon: 915 27 503

thomas.roger.schopf@telemed.no

Appendix 2

Questionnaire for parents of children with AE (in Norwegian)

SPØRRESKJEMA FOR FORELDRE/FORESATTE TIL BARN MED ATOPISK EKSEM SOM DELTAR I PROSJEKTET:

”EKSEMVEILEDNING VIA INTERNETT”

Vi håper deltakerne fyller ut disse spørreskjemaene og returnerer dem i vedlagte svarkonvolutt så snart som mulig og innen 1 uke etter de er mottatt.

Noen av spørsmålene i dette skjemaet kan ligne på hverandre, eller synes mindre relevante for akkurat deg. Dette er av forskningsmessige hensyn. Vi ber deg derfor vennligst ta stilling til hvert enkelt av spørsmålene uavhengig av om du har svart på noe lignende tidligere og passe på at du svarer på samtlige spørsmål.

For deltakere som har barn mellom 6 og 12 år ber vi om at barnet besvarer det skjemaet som er merket med: ”Spørreskjema til barn mellom 6 og 12 år”.

Deltakerne må ikke skrive navnet på dette skjemaet. Deltakerne kan trekke seg fra deltagelse når som helst, uten å oppgi noen grunn. Skjemaene returneres til prosjektleder ved NST i vedlagte svarkonvolutt.

Dersom du har noen spørsmål eller vil vite mer om prosjektet, kan du kontakte:

Terje Solvoll
Prosjektleder
Nasjonalt senter for telemedisin
Pb. 35, 9038 Tromsø
Tlf: 90 93 21 83
e-post:
terje.solvoll@telemed.no



1. Barnets alder _____ år 2. Barnets kjønn Jente Gutt

3. Er du
 Mor Far Annet _____

4. Din alder _____ 5. Bostedskommune _____

6. Sivilstand
 Ugift Gift/Samboer Annet _____

7. Hvor mange barn under 16 år er det i din husholdning? _____ barn

8. Hvor stor samlet bruttoinntekt (før fradrag og skatt er trukket fra) hadde din husholdning i 2004?
_____ kroner

9. Hvor mange år av samlet skole/utdanning har du?

- mindre enn, eller 9 år
 10-11 år
 12 år
 13-16 år
 mer enn 17 år

10. Hvor mange år har dette barnet ditt hatt eksemplager? _____ år

11. I løpet av de to siste ukene, hvordan vil du gradere barnets eksem og omfang?

- 0: fin og myk hud Mindre spredte områder
 1: tørr hud
 2: tørr hud med mye kløe Mer sammenhengende områder
f. ex hele ansiktet, mange leddområder
 3: røde eksemflekker med kløe Mesteparten av kroppen
 4: hissig(irritert) oppbluss med røde flekker,
små kløknuter og mye kløe, ev væske
 5: hissig(irritert) eksem med kloremarker,
pustler og småsår, ev væske
 6: Væskende, åpne eksemsår og skorper(rur). Infisert og smertefullt

12. Hvilken eksembehandling får barnet? Kryss av i skjemaet:

	Daglig	2-4 ganger i uken	Ukentlig	>2 ganger pr mnd	1-2 ganger pr mnd	Sjeldnere	Aldri
Fuktighetskrem							
Kortisonkrem/salve (Hydrokortison/grad 1) ¹							
Kortisonkrem/salve (sterkere/grad ≥ 2) ¹							
Protopic/Elidel krem							
KP-bad ²							
Wet-wrap							
Lysbehandling							
Klibad							
Infeksjonsbehandling							
Alsolbehandling/Burows maske							
Oljebad							
Annet..							

¹ 1 gang = 1 behandlingsperiode

² Kaliumpermanganat-bad



13. Har noen i familien (foreldre, søsken) hatt astma, allergi eller eksem?

ja nei

Hvis ja, kryss av i skjemaet:

	Aktuelle barn	Mor	Far	Brødre	Søstre
Astma					
Allergi					
Eksem					

Dersom andre barn i familien har eksem:

14. Hvor mange? _____

15. Hvor gamle er de? _____

16. Hvor lenge har de hatt eksem? _____

17. Hvis du ser over tid, hvilken gradering ligger de på det meste av tiden? (se gradering spm 11) ____

18. I forhold til barnets eksem; Hva opplever du som de største utfordringene i hverdagen?

19. Hvordan er eksembehandlingen fordelt mellom dere som har den daglige omsorgen for barnet? Angi i prosent, f.eks. Mor: 50% far: 30% bestemor: 20%

20. Hvor ofte har du spørsmål angående eksem?

Daglig Annenhver dag Ukentlig Månedlig Sjelden/aldri

21.

I hvor stor grad er helsevesenet tilgjengelig når du har spørsmål om eksem?

Sett kryss der det passer best:

0- ikke tilgjengelig

5- lett tilgjengelig

	0	1	2	3	4	5	Ikke aktuelt
Helsesøster							
Fastlegen							
Legevakt							
Poliklinikken							
Sengeposten							
Eksemveiledning via Internett (dette prosjektet)							
Alternativ behandler							
Andre Internett tjenester							

22.

I hvor stor grad får du fram dine spørsmål under en konsultasjon med helsepersonell?

Sett kryss der det passer best:

0- ikke i det hele tatt

5- får sagt alt det jeg vil

	0	1	2	3	4	5	Ikke aktuelt
Helsesøster							
Fastlegen							
Legevakt							
Poliklinikken							
Sengeposten							
Eksemveiledning via Internett (dette prosjektet)							
Alternativ behandler							
Andre Internett tjenester							



23.

I hvor stor grad får du fram din historie under en konsultasjon med helsepersonell?

Sett kryss der det passer best:

- 0- ikke i det hele tatt
5- får sagt alt det jeg vil

	0	1	2	3	4	5	Ikke aktuelt
Helsesøster							
Fastlegen							
Legevakt							
Poliklinikken							
Sengeposten							
Eksemveiledning via Internett (dette prosjektet)							
Alternativ behandler							
Andre Internett tjenester							

24. I hvor stor grad føler du/dere at behandlingen av eksemet mestres på en tilfredsstillende måte akkurat nå?

- Veldig godt
 Ganske godt
 Liten
 Ikke i det hele tatt

25. Hvor stort er behovet ditt/deres for mer veiledning og tettere oppfølging?

- Veldig stort
 Ganske stort
 Lite
 Fraværende

26. Hvor ofte føler du/dere at omgivelsene reagerer på barnets eksem?

- Veldig ofte
 Ganske ofte
 Av og til
 Ikke i det hele tatt

27. I hvor stor grad føler du/dere at dette eventuelt er et problem?

- Veldig mye
 Ganske mye
 Liten
 Ikke i det hele tatt

28. I hvor stor grad føler du/dere at det er en ekstra belastning for familien at ett eller flere barn er rammet av atopisk eksem?

- Veldig mye
 Ganske mye
 Liten
 Ikke i det hele tatt

29. Hvor stor påvirkning har barnets/barnas eksem hatt på familielivet/hverdagslivet den siste uken?

- Veldig stor
 Ganske stor
 Liten
 Ikke i det hele tatt

30. Hvor ofte føler du/dere at nattesøvnen til de andre familiemedlemmene påvirkes av barnets eksem?

- Veldig ofte
 Ganske ofte
 Av og til
 Ikke i det hele tatt



31. Hvor ofte føler du/dere at barnets eksem er en belastning for forholdet mellom deg og din partner?

- Veldig ofte
- Ganske ofte
- Av og til
- Ikke i det hele tatt

32. På en skala fra 1 til 10 der 1 er det verst tenkelige og 10 det beste – hvordan vil du si at den samlede livskvaliteten for deg/dere som foreldre er på det nåværende tidspunkt?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	10

33. På en skala fra 1 til 10 der 1 er det verst tenkelige og 10 det beste – hvordan vil du si at den samlede livskvaliteten for barnet er på det nåværende tidspunkt?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	10

Vennligst sett kryss ved de svarene som passer best for deg (ett kryss for hvert spørsmål)

	Helt galt	Nokså galt	Nokså riktig	Helt riktig
34) Jeg klarer alltid å løse vanskelige problemer hvis jeg prøver hardt nok.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35) Hvis noen motarbeider meg, så kan jeg finne måter og veier for å få det som jeg vil.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36) Det er lett for meg å holde fast på planene mine og nå målene mine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37) Jeg føler meg trygg på at jeg ville kunne takle uventede hendelser på en effektiv måte.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38) Takket være ressursene mine så vet jeg hvordan jeg skal takle uventede situasjoner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39) Jeg kan løse de fleste problemer hvis jeg går tilstrekkelig inn for det.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40) Jeg beholder roen når jeg møter vanskeligheter fordi jeg stoler på mestringsvevnen min.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41) Når jeg møter et problem, så finner jeg vanligvis flere løsninger på det.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42) Hvis jeg er i knipe, så finner jeg vanligvis en vei ut.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43) Samme hva som hender så er jeg vanligvis i stand til å takle det.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



- | | | | |
|---|----------------------|---|--------------------|
| 44) I hvilken grad forstyrrer ditt barns eksem dine daglige aktiviteter? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 45) I hvilken grad synes du det er viktig å følge med ditt barns eksem? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 46) I hvilken grad synes du det er viktig å følge ditt barns eksembehandling? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 47) I hvilken grad oppfatter du ditt barns eksem som et alvorlig helseproblem? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 48) I hvilken grad bekymrer du deg for langtidskomplikasjoner som følge av ditt barns eksem? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 49) I hvilken grad bekymrer du deg over ditt barns eksem? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 50) I hvilken grad støtter din eventuelle partner deg i forhold til ditt barns eksem? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 51) I hvilken grad støtter eller hjelper din lege eller ditt behandlingsteam deg med ditt barns eksem? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 52) I hvilken grad støtter din familie og venner deg i forhold til ditt barns eksem? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 53) I hvilken grad har du noen å dele eventuelle bekymringer i forhold til ditt barns eksem med? | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 54) Jeg føler meg trygg på min evne til å håndtere mitt barns eksem. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 55) Jeg føler meg i stand til å møte utfordringen med å følge opp mitt barns eksem. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 56) Jeg er i stand til å håndtere mitt barns eksem nå. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 57) Jeg er i stand til å følge opp mitt barns rutinemessige eksembehandling nå. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 58) Jeg har tenkt å følge opp mitt barns eksem jevnlig. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 59) Jeg har planlagt tidspunkter for når jeg skal sjekke mitt barns eksem. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 60) Jeg kommer til å følge opp mitt barns eksembehandling. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 61) Jeg kommer til å sjekke mitt barns eksem minst to ganger i uka. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 62) Å følge opp mitt barns eksem kommer ofte i konflikt med andre aspekter av livet som er viktige for meg. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 63) Ytre problemer som tidspress eller økonomi gjør det ofte vanskelig å følge opp mitt barns eksem. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |
| 64) Å følge opp mitt barns eksem går ofte på bekostning av å følge opp andre viktige personer i livet mitt. | Ikke i det hele tatt | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | I veldig stor grad |



65. Hvor mange ganger har du/dere vært i kontakt med helsevesenet pga dette barnets eksem de siste 12 måneder?

Time hos fastlege: _____ gang(er)
Telefon til fastlege: _____ gang(er)
Legevakt: _____ gang(er)
Poliklinikk sykehuset: _____ gang(er)
Innleggelse sykehuset: _____ gang(er)
Alternativ behandler: _____ gang(er)
Helsesøster _____ gang(er)

66. Hvor store utgifter hadde du/dere til salver, kremer medisiner og lignende til dette barnet i forbindelse med eksemet de siste 12 måneder? (Se bort fra det dere får på blå resept). _____ kroner

67. Mottar familien engangsstønad eller annen offentlig støtte i forbindelse med dette barnets eksem?

Ja Nei

68. Hvis ja, hvor mye? _____ kroner per år

69. Hvor mange ganger var du eller din partner hjemme med sykt barn pga dette barnets eksemplager de siste 12 måneder?

Antall dager fravær i sum for dere begge _____

Barneavdeling på UNN skal i et forskningsprosjekt teste ut et tilbud om veiledning til foreldre med barn med atopisk eksem direkte fra sykehuset til hjemmet via Internett. Det blir benyttet trygg og forsvarlig teknologi som er tilnærmet lik den som nettbankene bruker. Med denne løsningen kan du/dere ved behov, ta digitale bilder av barnets eksem hjemme, sende det direkte til barneavdelingen på UNN og få svar med råd og veiledning om behandling uten å måtte reise til fastlegen, legevakta eller sykehuset.

Anta at dette blir en integrert del av behandlingsopplegget for barn med atopisk eksem om ett år og at familien din vil få tilbud om veiledning via Internett.

70. Dersom det ble bestemt at brukerne selv måtte betale for et slikt tilbud, hvor mye kunne du maksimalt være villig til å betale per veiledning? Sett ring rundt det beløpet som er nærmest din maksimale betalingsvilje.

0
100 400
200 500
300 600

71. Dersom du ikke kunne tenke deg å betale noe, dvs. du har satt ring rundt 0 ovenfor, er dette fordi?

(sett ett kryss):

Et slikt tilbud har ingen nytte for oss, så vi ville ikke benyttet oss av det selv om det var gratis
 Andre grunner

72. Til den prisen du satte ring rundt, hvor mange ganger i måneden tror du at du ville benytte deg av tilbudet om veiledning fra UNN? _____ ganger

Kommentar: _____



Appendix 3

Questionnaire for doctors reporting treatment of
AE patients (in Norwegian)

Spørsmål 1

/

Er pasienten et barn (dvs under 18 år) eller voksen?

- Barn
 - Voksen
-

Spørsmål 2

/

Hvilken behandling har du gitt pasienten? (Flere mulig)

- Fuktighetskrem
 - Kalibad
 - Omslag inkludert Alsol/Burows ansiktsmaske
 - Kortisonkrem / salve
 - Protopic / Elidel
 - Våtbandasje / annen okklusjon
 - Antihistamin
 - Systemisk antibiotika
 - Systemisk kortison
 - Eliminasjon av matvarer
-

Spørsmål 3

/

Dersom du krysset av på kortisonkrem / salve i spørsmål 2, hvilken type kortison var det du ga? (Flere mulig)

- Gruppe 1
 - Gruppe 2
 - Gruppe 3
 - Gruppe 4
 - Vet ikke
-

Spørsmål 4

/

Dersom du krysset av på kortisonkrem / salve i spørsmål 2: Hvor lenge skal pasienten bruke kortisonkrem / salve? Angi antall dager med kortisonbehandling inkludert tiden for evt. nedtrapping.

Spørsmål 5

/

Skal du henvise pasienten til spesialist?

- Nei.
 - Ja, til barnelege.
 - Ja, til hudlege.
-

Spørsmål 6

/

Dersom du skal henvise pasienten til spesialist, hva er årsakene? (Flere mulig)

- Usikkerhet omkring diagnosen
 - Tilstanden har blusset opp
 - Behandlingen fungerer dårlig
 - Ønsker allergiutredning / testing
 - Annet
-

Spørsmål 7

/

Evt. kommentarer til behandlingen.

Appendix 4

Homework assignments used in the web-based course, "Help, it's itchy!" (English translation)

Appendix - Homework assignment questions (clinical images in case 1 and 2, not shown)

Case 1

The patient is a 7 year old boy whose eczema flared in the last 10 days. He has been treated with over-the-counter topical steroids for 5 days without any improvement.

Which type of steroid do you intend to use on the trunc and upper extremities?

Describe a treatment regimen including a tapering plan.

There is also eczema on the genitals and in the groins. Which kind of steroid would you use for this?

When is it appropriate to see the patient for a clinical follow-up? If the treatment has failed then, what do you do next?

Is tacrolimus an alternative treatment? Consider both the first consultation and the follow-up appointment.

Case 2

The patient is a 4 year old girl who was diagnosed with atopic eczema during her first year of life. She has suffered during the last 6 months with itch and skin eruptions.

Since two weeks there has been a flare affecting the entire body including the face.

Her mother has treated her with topical steroids. On the trunc and extremities she used betamethasone valerate, but does not recall the name of the drug used on the facial skin. The condition has improved on the trunc, but on the face and the upper extremities it is virtually unchanged.

Describe the skin findings on the facial skin and hands. Consider if there are signs of infection.

Which additional information would you ask the patient?

Set up a treatment regimen for the face and the upper extremities.

Case 3

Anne, 5 years old, is seen by the doctor together with her parents. She was diagnosed with atopic eczema and asthma 2 years old. The eczema has always been worse after the ingestion of eggs. The last 6 months her mother has noticed a possible rash after ingesting fish and citrus fruits. She is uncertain whether Anne has a food allergy.

Describe the typical scenario of a fish allergy.

How would you investigate Anne? Consider if testing is indicated and if so, which tests should be done?

The following question is for doctors only: Specific IgE for fish shows 40 kU/l. How do you interpret this? What advice do you give to the mother?



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