Teledermatology Reference List

Search performed at:
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi on September 18, 2006.
Using the following criteria 204 papers were retrieved: telederm*

1: Ned Tijdschr Geneeskd. 2006 Aug 26;150(34):1873-6.

[Initiatives to increase the efficiency of dermatological patient care]

[Article in Dutch]

van de Kerkhof PC.

Universitair Medisch Centrum St Radboud, afd Dermatologie, Nijmegen.

The number of tasks required of dermatologists has increased in the last decade. This article discusses potential ways to enhance the efficiency ofdermatological patient care and prevent problems of capacity. A study conducted in the UK found that, for the top 10 skin disorders, the accessibility of general practitioners with special expertise in dermatology was better than that of the dermatology clinic. Waiting times were considerably shorter with the general practitioners, but care was more expensive. Outcomes were similar for these skin disorders in terms of disease-specific quality of life. The study made no comment on the actual diagnostic ability of the specialised general practitioners. Teledermatology can reduce the number of referrals to a dermatologist by half. However, a considerable percentage of teledermatological consultations result in a different diagnosis than that obtained during a standard 'in vivo' consultation. Teledermatology can be a useful option for the follow-up of patients with ulcus cruris. The efficiency of dermatological care can be increased by working in teams. Dermatological nurses can be trained and conduct their own consultations under the supervision of a dermatologist. Dermatological care can also be organised in regional cooperative groups with general practitioners. Within these groups, teledermatology and specialised dermatology training for general practitioners can be useful innovations.

PMID: 16970008 [PubMed - in process]

2: J Dtsch Dermatol Ges. 2006 Jul;4(7):597-601.

[Rochus, patron saint of physicians and hospitals--a teledermatologic quiz]

[Article in German]

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The painting "St. Rochus with an angel" by Quinten Massys in the Alte Pinakothek in Munich was utilized for a teledermatological quiz. First, only a detail of the plague bubo on the thigh was sent electronically to all physicians in our department. The answers were correct descriptions, but the interpretations quite heterogeneous. In a second set, the full painting together with the hint-Pinakothek - was given. Now the number of descriptively correct diagnoses was high; one resident knew the name of the featured individual and his diagnosis. This example demonstrates one problem with teledermatology - when viewing a clinical picture, relevant additional information is frequently essential in order to make a correct diagnosis. In addition, this presentation of saint physicians and hospitals, the holy Rochus, better known to those who are under his protection.

Publication Types:
    Biography
    Historical Article

Personal Name as Subject:
    Rochus

PMID: 16883658 [PubMed - indexed for MEDLINE]

3: Arch Dermatol. 2006 May;142(5):648-9.

Patient perceptions about a novel form of patient-assisted teledermatology.

Eminovic N, Witkamp L, de Keizer NF, Wyatt JC.

Publication Types:
    Letter

PMID: 16702509 [PubMed - indexed for MEDLINE]

4: Br J Dermatol. 2006 Apr;154(4):801-2.

Personal digital assistants in teledermatology.

Massone C, Lozzi GP, Wurm E, Hofmann-Wellenhof R, Schoellnast R, Zalaudek I, Gabler G, Di Stefani A, Kerl H, Soyer HP.

Publication Types:
    Evaluation Studies
    Letter

PMID: 16536845 [PubMed - indexed for MEDLINE]

5: Int J Dermatol. 2006 Mar;45(3):220-9.

Teledermatology research review.

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Teledermatology consultations can be performed using either store-and-forward or real-time technology. The best-studied aspect of teledermatology is diagnostic reliability, also known as diagnostic agreement. A good level of diagnostic reliability is achieved by dermatologists using both store-and-forward and real-time modalities and is comparable to that found between clinic-based examiners. Less information is available regarding diagnostic accuracy. Current data suggest that teledermatologists reviewing store-and-forward consults achieve accuracy comparable to that of clinic-based dermatologists. When store-and-forward consult systems are used, approximately one in four in-person clinic appointments are averted. Real-time consult systems avoid the need to schedule approximately one in two clinic visits. Store-and-forward technology results in timelier interventions for patients when compared to a conventional referral process. To date, surveys of both store-and-forward and real-time teledermatology consult modalities suggest that patients, referring clinicians, and dermatologists are all highly satisfied with teledermatology consults. Very little has been published about the economic impact of store-and-forward teledermatology, whereas several studies have evaluated real-time modalities. Teledermatology has ranged from a cost-saving strategy to an intervention that incurs greater costs than conventional care, depending on the health care setting and economic perspective. Future research focusing on diagnostic accuracy, clinical outcomes using clinical course or disease status as outcome

measures, development of reliable and valid teledermatology-specific survey instruments, and economic analyses that assess cost-effectiveness will help guide future teledermatology program assessments and policy.

Publication Types:
    Review

PMID: 16533219 [PubMed - indexed for MEDLINE]

6: Clin Exp Dermatol. 2006 Jan;31(1):13-8.

Teledermatoscopy as a triage system for pigmented lesions: a pilot study.

Moreno-Ramirez D, Ferrandiz L, Galdeano R, Camacho FM.

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BACKGROUND: Skin-cancer screening should rely on simple, low-cost and high-sensitivity diagnostic procedures. AIMS: To compare diagnosis and management options after the evaluation of clinical and dermatoscopic teleconsultations with a store-and-forward teledermatology screening system for pigmented lesions. METHODS: Kappa values between telediagnoses and the gold standard (histological examination) were assessed. Referral rates, diagnostic confidence level (DCL), sensitivity and specificity were evaluated in both approaches. Picture quality and time and cost investments were also measured. In total, 61 teleconsultations were evaluated. RESULTS: Sensitivity of the clinical and dermatoscopic teleconsultations was 1 for both, whereas specificities were 0.65 and 0.78, respectively ($P < 0.05$). DCL was higher for the dermatoscopic teleconsultations (4.75 vs. 4.14, $P < 0.05$). Agreement between the clinical and dermatoscopic teleconsultation was kappa = 0.89 (95% CI 0.81-0.97). Agreement with the gold standard was 0.91 (95% CI 0.82-1.00) for the clinical teleconsultation and 0.94 (95% CI 0.88-1.00) for teledermatoscopy ($P > 0.05$). Teledermatoscopy increased the economic investment of a teledermatology facility by 2.4 times. The GP spent 1.5 times longer on dermatoscopic teleconsultations. CONCLUSIONS: Teledermatoscopy has improved the DCL, specificity and referral rates of a teledermatology-based screening system for pigmented lesions. A more detailed economic analysis remains to be performed before recommending teledermatoscopy as a routine screening procedure in pigmented-lesion clinics.

PMID: 16309470 [PubMed - indexed for MEDLINE]

7: J Telemed Telecare. 2006;12 Suppl 1:15-7.

Feasibility and acceptance of telemedicine for wound care in patients with chronic leg ulcers.

Hofmann-Wellenhof R, Salmhofer W, Binder B, Okcu A, Kerl H, Soyer HP.

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We examined the feasibility and acceptance of teledermatology for wound management of patients with chronic leg ulcers by home-care nurses. Forty-one chronic leg ulcers of different origin in 14 patients were included. After an initial in-person visit in which leg ulcers were assessed and classified, and underlying diseases noted, follow-up visits were done by home-care nurses. Once a week 1-4 digital images of the wound and surrounding skin and relevant clinical information were transmitted via a secure Website to an expert at the wound care centre. The experts provided an assessment of wound status and therapeutic recommendations. In 89% of the 492 teleconsultations, the quality of images was sufficient or excellent and the experts were confident giving therapeutic recommendations. Treatment modalities were changed or adapted in

one-third of the consultations. There was a significant decrease in visits to a general physician or the wound care centre. The acceptance of teledermatology was high in patients, home-care nurses and wound experts. Teledermatology offers great potential for chronic wound care and seems to be accepted both by patients and health-care persons.

PMID: 16884566 [PubMed - in process]

8: J Telemed Telecare. 2006;12(5):220-7.

How to do a telemedical consultation.

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In a telemedical consultation, medical information is sought at a distance. Two techniques may be used: asynchronous ('store and forward') and synchronous ('realtime'). Asynchronous consultations have the advantage that the two parties do not have to be available simultaneously; email, for example, has been used successfully for teledermatology. Synchronous consultations depend on communication media such as the telephone, radio or videoconferencing. Successful videoconferencing will involve consideration of four factors: the environment, session initiation, dialogue and session closure. The environment is very important for good-quality consultations and involves planning, equipment and training. Recognizing the advantages and limitations of the available media combined with appropriate planning and training will maximize the utilization of teleconsultations.

PMID: 16848933 [PubMed - in process]

9: J Telemed Telecare. 2006;12(3):151-8.

Diagnostic value of written referral and/or images for skin lesions.

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We examined whether it is possible for a dermatologist to diagnose benign and malignant skin lesions by telemedicine, given a comprehensive history and/or clinical images. A medical student recorded a standardized history and description of 109 skin lesions and took digital photographs of the presenting lesion(s) immediately prior to a normal outpatient dermatology consultation. About 52 dermatologists were invited to participate in online diagnosis. In all, 38 took part and they were provided with the text and/or the image(s) online on a secure Website. When the images and text were provided, 53% of teledermatology diagnoses were the same as the face-to-face diagnosis. When images alone were provided, 57% of diagnoses were the same. When text alone was provided, 41% of diagnoses were the same. The relatively low diagnostic concordance may have been due to the inexperience of many teledermatologists and poor quality image display systems. The teledermatologists were less confident in their diagnoses than face-to-face specialists, especially in the absence of images. The teledermatology management plan was more likely to include biopsy, excision or review than was the case at the face-to-face consultation. Teledermatology may result in an increase in follow-up appointments and surgical procedures.

PMID: 16638237 [PubMed - in process]

10: J Telemed Telecare. 2006;12(2):83-7.

Two years' experience with Web-based teleconsulting in dermatology.

Massone C, Soyer HP, Hofmann-Wellenhof R, Di Stefani A, Lozzi GP, Gabler G, Dong H, Argenziano G, Ozdemir F, Fink-Puches R, Salmhofer W, Zalaudek I, Nunzi E, Kerl H.

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A non-commercial teledermatology network based on store-and-forward operation was established in April 2002. The aim was to create an easy-to-use platform for teleconsultation services, where physicians could seek diagnostic advice in dermatology from a pool of expert consultants and where they could present and discuss challenging dermatology cases with special emphasis on diagnosis and therapy. An online moderated discussion forum was added in October 2003. During the first two years, 348 health-care professionals from 45 countries registered to use the Website. A total of 783 requests for consultations were answered; 285 requests concerned pigmented skin lesions, 440 requests were from the whole range of clinical dermatology and 58 requests were about non-melanoma skin cancer. Of a total of 133 requests analysed, 80 (60%) were answered within one day, 47 (35%) within one week, five (4%) within two weeks and one (1%) consultation was answered in more than two weeks. Our experience with a discretionary, non-commercial, multilingual Website for open-access teleconsulting in dermatology appears to be successful. The Website represents an example of user-generated content, together with active interaction between users, who can present and discuss cases with remote colleagues.

PMID: 16539755 [PubMed - in process]

11: J Telemed Telecare. 2006;12(2):79-82.

Evaluation of digital skin images submitted by patients who received practical training or an online tutorial.

Qureshi AA, Brandling-Bennett HA, Giberti S, McClure D, Halpern EF, Kvedar JC.

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We evaluated the ability of subjects to capture and submit teledermatology images with a digital camera. We also examined whether participants who received individual training sessions would capture better-quality images than participants who were provided only with self-training. Fifty participants were randomized between in-person training and self-training via an online tutorial. The majority of participants were young, well educated women. Two dermatologists reading the images for quality indicators had high agreement that digital images acquired were of high quality: images were well framed, appropriately bright, in focus and did not have a shadow. There was moderate agreement on diagnosis-related indicators, such as the presence or absence of pustules or papules and acne versus rosacea. There was no difference in the image-quality attributes between participants personally trained and those trained with the online tutorial. Subjects participating in this study were able to acquire images of good quality, irrespective of whether they received practical training or used an online tutorial.

PMID: 16539754 [PubMed - in process]

12: J Telemed Telecare. 2006;12(2):75-8.

Teledermatology reduces the number of patient referrals to a dermatologist.

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During a two-year study, 505 teledermatology consultations were carried out on 503 patients of 29 participating general practitioners (GPs) in the province of Friesland. One overview and two detail digital photographs of the skin problems were taken on a digital camera and attached to an email message containing standard clinical information. These email messages were sent to a dermatologist, who replied by email after evaluation. After a median follow-up time of 548 days, the GPs were interviewed about the dermatological referrals. The reduction in referrals was 51% (0.95 confidence interval = 47-58%) when the GP had the intention to refer. When the GPs had no intention to refer, there turned out to be a secondary traditional consultation in 17% of cases. The reduction of 51% of referrals after store-and-forward teledermatology consultation was similar to that seen in other studies of videoconferencing. Consultation using digital store-and-forward teledermatology by the GP can halve the number of referrals to a dermatologist for selected patients.

PMID: 16539753 [PubMed - in process]

13: Arch Dermatol. 2005 Oct;141(10):1319-20.

Comment on:
    Arch Dermatol. 2005 Feb;141(2):254-8.

Cellular phones in clinical teledermatology.

Massone C, Lozzi GP, Wurm E, Hofmann-Wellenhof R, Schoellnast R, Zalaudek I, Gabler G, Di Stefani A, Kerl H, Soyer HP.

Publication Types:
    Comment
    Letter

PMID: 16230577 [PubMed - indexed for MEDLINE]

14: Hautarzt. 2005 Oct;56(10):942-8.

[Teledermatology versus consultations--a comparative study of 120 consultations]

[Article in German]

Herrmann FE, Sonnichsen K, Blum A.

Hautklinik, Universitat, Tubingen.

Dermatology fulfills the prerequisites for telemedicine. An important application of telemedicine might be the field of dermatologic consultations. In this comparative study images of skin disease were taken of 120 patients hospitalized in the University Hospitals of Tuebingen to answer the following questions: (1) are the preconditions in daily routine given for teledermatology, (2) is there adequate agreement between the diagnoses reached in dermatologic consultations and with teledermatology, and (3) can the images be utilized for teaching purposes. Patient acceptance was very good and the images captured with a digital camera were easily obtained. The results of intraobserver analysis for the two teledermatologists without any knowledge of the patients' history were 70.2% and 46.4%, respectively, and with knowledge of the history 76.6% and 64.3%. The results of interobserver analysis without any knowledge of the patients' history were 46.4% and 57.2% and with knowledge of the history 64.3% and 66%, respectively. With the reduction of the image quality, reduced reliability of the diagnoses was observed. Seven of ten images could be used for teaching purposes. It was demonstrated that in dermatology telemedicine is applicable in many, but not in all patients who are referred for dermatologic consultations.

Publication Types:

Controlled Clinical Trial

PMID: 15759098 [PubMed - indexed for MEDLINE]

15: J Am Acad Dermatol. 2005 Oct;53(4):684-9.

The first images of atopic dermatitis: an attempt at retrospective diagnosis in dermatology.

Wallach D, Coste J, Tilles G, Taieb A.

BACKGROUND: Atopic dermatitis was defined in 1933. Earlier descriptions have yet not been thoroughly studied. OBJECTIVE: Our purpose was to identify the first images of atopic dermatitis among historical illustrations of skin diseases. METHODS: We posted 20 selected images on an Internet site and asked experts in pediatric dermatology to decide whether or not they represented atopic dermatitis. RESULTS: By means of the Delphi technique, a consensus could be reached for 19 of the 20 images. The experts' accuracy was good. LIMITATIONS: Thirty-one experts participated. No validated criteria were used for the selection of the images. CONCLUSION: The first representations of atopic dermatitis are engravings of skin diseases described under the names of strophulus confertus (Willan, 1796), lichen agrius (Willan, 1796), porrigo larvalis (Bateman, 1816), and eczema rubrum (Rayer, 1835). Teledermatology techniques can be reliably applied to retrospective diagnosis.

Publication Types:
Editorial
Historical Article

PMID: 16198792 [PubMed - indexed for MEDLINE]

16: Australas J Dermatol. 2005 Aug;46(3):144-9.

Operational teledermatology in Broken Hill, rural Australia.

See A, Lim AC, Le K, See JA, Shumack SP.

St George Dermatology and Skin Cancer Centre, Kogarah, New South Wales, Australia.

From January 2001 to January 2002, Broken Hill, New South Wales, served as a trial site for teledermatology as one method of access to dermatologists. Fourteen participating general practitioners referred 46 patients making up 48 teledermatology cases. The mean diagnostic agreement between general practitioners and dermatologists was 35% and 50% for primary and differential diagnoses, respectively. Teledermatology patients formed 12% of the collectively referred dermatology patients (outpatients and teledermatology). In this project, high patient and general practitioner acceptability and positive medical outcomes confirm the value of rural teledermatology. However, this project also revealed unexpected barriers and pitfalls in the effective operation of rural teledermatology. Lack of education of participants, inertia among potential users and patient inconvenience are issues that may adversely affect the effective implementation of rural teledermatology.

PMID: 16008643 [PubMed - indexed for MEDLINE]

17: Isr Med Assoc J. 2005 Aug;7(8):487-90.

Comment in:
Isr Med Assoc J. 2005 Aug;7(8):525-6.

Teledermatology: quality assessment by user satisfaction and clinical efficiency.

Klaz I, Wohl Y, Nathansohn N, Yerushalmi N, Sharvit S, Kochba I, Brenner S.

Israel Defense Forces Medical Corps.

BACKGROUND: The Israel Defense Forces implemented a pilot teledermatology service in primary clinics. OBJECTIVES: To assess user satisfaction and clinical short-term effectiveness of a computerized store and forward teledermatology service in urban and rural units. METHODS: A multi-center prospective uncontrolled cohort pilot trial was conducted for a period of 6 months. Primary care physicians referred patients to a board-certified dermatologist using text email accompanied by digital photographs. Diagnosis, therapy and management were sent back to the referring PCP. Patients were asked to evaluate the level of the CSAFTD service, effect of the service on accessibility to dermatologists, respect for privacy, availability of drugs, health improvement and overall satisfaction. PCPs assessed the quality of the teledermatology consultations they received, the contribution to their knowledge, and their overall satisfaction. RESULTS: Tele-diagnosis alone was possible for 95% (n=413) of 435 CSAFTD referrals; 22% (n=95) of referrals also required face-to-face consultation, Satisfaction with CSAFTD was high among patients in both rural and urban clinics, with significantly higher scores in rural units. Rural patients rated the level of service, accessibility and overall satisfaction higher than did urban patients. PCPs were satisfied with the quality of the service and its contribution to their knowledge. Rural physicians rated level of service and overall satisfaction higher than did urban physicians. Tele-referrals were completed more efficiently than referral for face-to-face appointments. CONCLUSIONS: CSAFTD provided efficient, high quality medical service to rural and urban military clinics in the IDF.

Publication Types:
    Multicenter Study

PMID: 16106771 [PubMed - indexed for MEDLINE]

18: J Dtsch Dermatol Ges. 2005 Jul;3(7):566-8.

[Legal aspects of teledermatology]

[Article in German]

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Teledermatology places special demanding on participating physicians who are not only required to exercise the normal standard of care in diagnosis and treatment, but must also have additional obligations. The teledermatologist must have sufficient technical background to recognize if and how information transmitted by electronic media can serve as a basis for reliable diagnosis. He must work with an information transfer system which meets technical standards and legal requirments. Patient data security and data privacy requires special attention, as does the competence and legal status of the referring physician worker.

PMID: 15967018 [PubMed - indexed for MEDLINE]

19: Ann Intern Med. 2005 Jun 7;142(11):881-90.

Comment in:
    Ann Intern Med. 2005 Jun 7;142(11):938-9.

Summary for patients in:
    Ann Intern Med. 2005 Jun 7;142(11):I22.

Gulf War veterans' health: medical evaluation of a U.S. cohort.

Eisen SA, Kang HK, Murphy FM, Blanchard MS, Reda DJ, Henderson WG, Toomey R, Jackson LW, Alpern R, Parks BJ, Klimas N, Hall C, Pak HS, Hunter J, Karlinsky J, Battistone MJ, Lyons MJ; Gulf War Study Participating Investigators.

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BACKGROUND: United States military personnel reported various symptoms after deployment to the Persian Gulf during the 1991 Gulf War. However, the symptoms' long-term prevalence and association with deployment remain controversial. OBJECTIVE: To assess and compare the prevalence of selected medical conditions in a national cohort of deployed and nondeployed Gulf War veterans who were evaluated by direct medical and teledermatologic examinations. DESIGN: A cross-sectional prevalence study performed 10 years after the 1991 Gulf War. SETTING: Veterans were examined at 1 of 16 Veterans Affairs medical centers. PARTICIPANTS: Deployed (n = 1061) and nondeployed (n = 1128) veterans of the 1991 Gulf War. MEASUREMENTS: Primary outcome measures included fibromyalgia, the chronic fatigue syndrome, dermatologic conditions, dyspepsia, physical health-related quality of life (Short Form-36 [SF-36]), hypertension, obstructive lung disease, arthralgias, and peripheral neuropathy. RESULTS: Of 12 conditions, only 4 conditions were more prevalent among deployed than nondeployed veterans: fibromyalgia (deployed, 2.0%; nondeployed, 1.2%; odds ratio, 2.32 [95% CI, 1.02 to 5.27]); the chronic fatigue syndrome (deployed, 1.6%; nondeployed 0.1%; odds ratio, 40.6 [CI, 10.2 to 161]); dermatologic conditions (deployed, 34.6%; nondeployed, 26.8%; odds ratio, 1.38 [CI, 1.06 to 1.80]), and dyspepsia (deployed, 9.1%; nondeployed, 6.0%; odds ratio, 1.87 [CI, 1.16 to 2.99]). The mean physical component summary score of the SF-36 for deployed and nondeployed veterans was 49.3 and 50.8, respectively. LIMITATIONS: Relatively low participation rates introduce potential participation bias, and deployment-related illnesses that resolved before the research examination could not, by design, be detected. CONCLUSIONS: Ten years after the Gulf War, the physical health of deployed and nondeployed veterans is similar. However, Gulf War deployment is associated with an increased risk for fibromyalgia, the chronic fatigue syndrome, skin conditions, dyspepsia, and a clinically insignificant decrease in the SF-36 physical component score.

PMID: 15941694 [PubMed - indexed for MEDLINE]

20: Arch Dermatol. 2005 Jun;141(6):763-4.

Dysplastic pointillist nevus.

Moreno-Ramirez D, Ferrandiz L, Rios-Martin JJ, Camacho FM.

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BACKGROUND: Three cases of pointillist nevus, which is a distinctive clinical type of benign melanocytic nevus with variegated pigment, have been described in the literature to date. OBSERVATIONS: A 24-year-old man presented with an acquired melanocytic lesion composed of multiple tiny pigmented dots. Dermoscopy revealed multiple brown globules on a reddish skin-colored background, and histologic examination demonstrated architectural disorder with cytologic atypia.Conclusion To the best of our knowledge, we report a case of dysplastic pointillist nevus.

Publication Types:
    Case Reports

PMID: 15967924 [PubMed - indexed for MEDLINE]

21: Int J Dermatol. 2005 Jun;44(6):479-81.

Digital imaging: a diagnostic screening tool?

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BACKGROUND: Much interest has been shown in the possibility of using digital images to aid in the more rapid diagnosis of patients with dermatologic disease. A study was undertaken to test the efficacy of the "teledermatology" screening of referrals, and thereby to triage the patients to appropriate care. METHODS: A retrospective comparison of digital and "face-to-face" diagnoses by two consultant dermatologists was made. Eighty-four images from 75 patients seen in general dermatology clinics were studied. The clinical diagnosis and treatment plan of the patients seen in the clinic by one dermatologist were then compared with those suggested on digital image only, as seen by the other dermatologist. RESULTS: The diagnostic correlation between the two observers was fair, with full agreement in 47 of 84 cases (56%) and partial agreement in a further 10 (12%). There was no agreement in 14 cases (16.7%); in a further 13 cases, the images and history were not sufficient to allow a diagnosis to be made. The image quality was considered to be poor in 18 cases, but in six of these a diagnosis was still attempted. It was recommended that 66 patients (88%) should be seen in the hospital setting. Thirty patients (40%) received treatment at their visit. CONCLUSIONS: Teledermatology is not likely to have a great impact on reducing waiting lists. It is possible that it may help to prioritize referrals from remote areas.

PMID: 15941435 [PubMed - indexed for MEDLINE]

22: J Am Acad Dermatol. 2005 Jun;52(6):1098-9.

Teledermatology education for internal medicine residents.

Williams CM, Kedar I, Smith L, Brandling-Bennett HA, Lugn N, Kvedar JC.

Publication Types:
    Letter

PMID: 15928638 [PubMed - indexed for MEDLINE]

23: Actas Dermosifiliogr. 2005 May;96(4):222-30.

[Evaluation of a screening system for patients with pigmented lesions using store-and-forward teleconsultation]

[Article in Spanish]

Moreno D, Ferrandiz L, Perez-Bernal AM, Rios JJ, Carrasco R, Camacho F.

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INTRODUCTION: Pigmented lesion clinics (PLC's) were developed as a quick referral system for patients with pigmented lesions. However, the most appropriate method of selecting patients who need to be seen in these units is not clearly defined. Teledermatology is a tool whose usefulness as a patient selection system for PLC's needs to be evaluated. OBJECTIVE: To evaluate teleconsultation as a screening system for patients with pigmented lesions in terms of efficacy, accuracy and satisfaction. METHOD: Teleconsultations received at a PLC over a period of 12 weeks were evaluated. Teleconsultation patients

reported changes in a pigmented lesion, a lesion that had recently appeared, multiple lesions, symptomatic lesions or concern about a nevus. We calculated the time intervals in sending the teleconsultation report and in patients being seen at the "physical" PLC consultation, the intraobserver, interobserver and pathologist kappa coefficients, as well as the degree of satisfaction of patients and Primary Care (PC) physicians. RESULTS: 219 teleconsultations were evaluated, 49.3 % of which were referred to the "physical" consultation. The most frequent reason for the teleconsultation was concern about a nevus (37.0 %). The teleconsultations received responses in an average time of 43.9 hours, and patients were seen at the "physical" consultation within 2 weeks. The intraobserver agreement was kappa = 0.93 (95 % CI 0.87-0.98); interobserver agreement, kappa = 0.91 (95 % CI 0.87-0.96); and the agreement between the teledermatologist and the pathologist, kappa = 0.79 (95 % CI 0.70-0.89). 86 % of the patients and 91 % of the Primary Care physicians said that they were "very satisfied" with the implementation of this new system. CONCLUSIONS: Teleconsultation is an accurate screening system for patients with pigmented lesions. With this methodology, waiting times for patients with malignant lesions or those suspected of malignancy can be shortened at the same time as the PLC's excess workload is decreased. However, more experience is needed to establish the true usefulness of this filtering system in the early diagnosis of melanoma.

PMID: 16476372 [PubMed - indexed for MEDLINE]

24: Clin Exp Dermatol. 2005 May;30(3):209-14.

An evaluation of the role of a store-and-forward teledermatology system in skin cancer diagnosis and management.

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There is currently much interest in the potential role of telemedicine in improving the delivery of dermatological care in the UK. The two teledermatology systems available at present are divided into live video and store-and-forward technology. We investigated the value of a store-and-forward teledermatology system in the diagnosis and management of lesions suspicious of skin cancer. A total of 163 store-and-forward referrals of patients with one lesion each were assessed independently by a Consultant and a third-year trainee dermatologist. The accuracy of diagnosis and appropriateness of management from these assessments was compared to a subsequent face-to-face consultation with the Consultant. Analysis of the Consultants' diagnoses showed that 48% were identical for teledermatology and conventional face-to-face consultations. A further 17% of teledermatology diagnoses included the actual clinical diagnosis as a possibility but 20% were either incorrect or a diagnosis could not be made. In the remaining 15% of cases the digital image was of insufficient quality for assessment. Of the trainee's reports, 44% were identical to the clinical diagnoses and another 20% included the clinical diagnosis as a possibility. The management plan was appropriate in 55% of the total teledermatology referrals assessed by the Consultants and in 52% assessed by the trainee when compared with the conventional consultation. This study illustrates that the store-and forward type telemedicine system has limited diagnostic accuracy for skin lesions. However, our results suggest that store-and-forward teledermatology may be suitable and safe for screening out clearly benign lesions but the study casts doubt on its efficiency.

Publication Types:
    Evaluation Studies
    Multicenter Study

PMID: 15807671 [PubMed - indexed for MEDLINE]

25: J Am Acad Dermatol. 2005 May;52(5 Suppl 1):S65-8.

Cutaneous tuberculosis diagnosis in an inhospitable Amazonian region by means of telemedicine and molecular biology.

Angel DI, Alfonso R, Faizal M, Ricaurte O, Baez JA, Rojas A, Barato P, Patarroyo ME, Patarroyo MA.

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We report on a 13-year-old boy who displayed a chronic granulomatous inflammatory reaction of 5 years duration. The lesion was resistant to different antibiotic schemes; his routine laboratory tests and chest radiographs were normal. Teledermatologic consultation and histopathologic study of skin biopsy suggested scrofulodermal tuberculosis. Polymerase chain reaction amplification of DNA extracted from lymph node biopsy was taken as starting material for dot-blot hybridization using Mtp-40 and IS 6110 as probes for detecting either Mycobacterium tuberculosis or any mycobacteria belonging to the M tuberculosis complex, respectively. Positive results in both hybridizations were further confirmed by culturing in BACTEC MGIT 960 system. The lesion greatly diminished following isoniazid, rifampin, and ethambutol treatment. Telemedicine allowed a cutaneous tuberculosis diagnosis to be made of a patient living in a remote town located in the Amazon jungle by using molecular biology techniques.

Publication Types:
    Case Reports

PMID: 15858512 [PubMed - indexed for MEDLINE]

26: PLoS Med. 2005 Apr;2(4):e87. Epub 2005 Apr 26.

telederm.org: freely available online consultations in dermatology.

Soyer HP, Hofmann-Wellenhof R, Massone C, Gabler G, Dong H, Ozdemir F, Argenziano G.

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PMID: 15839749 [PubMed - indexed for MEDLINE]

27: Curr Opin Oncol. 2005 Mar;17(2):147-53.

Dermoscopy for skin cancer detection.

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PURPOSE OF REVIEW: The worldwide incidence of melanoma and nonmelanoma skin cancers is increasing alarmingly. The development of new techniques such as dermoscopy leads to a consequent progress in skin cancers screening. The purpose of this review is to highlight recent advances in dermoscopy, reviewing primary research articles published in the last year. RECENT FINDINGS: With the recent standardization of diagnostic procedures obtained by the Consensus Net Meeting on Dermoscopy and the definition of new melanoma-specific criteria, the efficacy in early melanoma diagnosis is improved. Dermoscopy is cost effective, leading to a decreased number of excised benign lesions, and the dermoscopic follow-up allows early detection of melanomas. However, the technique must be performed by experts in order not to miss melanomas. For this reason, instruction in dermoscopy is mandatory. Moreover, computer-aided diagnosis has been tested to

be a valid support for physicians. Teledermoscopy is a new tool that allows a second expert opinion to manage atypical lesions. SUMMARY: Dermoscopy opens up a new dimension on clinical morphology of skin lesions. Digital follow-up examinations, computer-aided diagnosis, and teledermoscopy are new facilities that will change the current management of skin cancers in general and melanoma in particular. Dermoscopy in the hands of experienced physicians has higher discriminatory power than naked-eye examination to detect skin cancers.

Publication Types:
    Review

PMID: 15725920 [PubMed - indexed for MEDLINE]

28: J Am Acad Dermatol. 2005 Feb;52(2):378-80.

Comment on:
    Plast Reconstr Surg. 2002 Aug;110(2):452-6.

The use of teledermatology to supervise dermatology residents.

Scheinfeld N.

Publication Types:
    Comment
    Letter

PMID: 15692501 [PubMed - indexed for MEDLINE]

29: Dermatology. 2005;210(3):211-7.

Wound teleconsultation in patients with chronic leg ulcers.

Salmhofer W, Hofmann-Wellenhof R, Gabler G, Rieger-Engelbogen K, Gunegger D, Binder B, Kern T, Kerl H, Soyer HP.

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BACKGROUND: The treatment of chronic leg ulcers requires frequent assessments of local wound status and adjustment of therapy. The availability of reasonably priced photographic equipment and quick electronic transfer of high-quality digital images should make it possible that the assessment of wound status can be made by remote experts. OBJECTIVE: This study examines the feasibility of using teledermatology for wound assessment and therapeutic suggestions for patients with chronic leg ulcers. METHODS: One hundred ten chronic leg ulcers of different origins were examined in face-to-face consultations. The examining doctor assessed the wound, made therapeutic recommendations and took 1-4 photographs of the wound using a digital camera. The digital images and relevant clinical information were then transmitted via a web application to an expert in wound care, who provided an independent teledermatological assessment of wound status and therapeutic recommendations. RESULTS: In our study, a high accordance between direct consultations and electronic consultations was found in the assessment of chronic leg ulcers, especially for important features like slough (concordance: 84.6%), necrosis (concordance: 98.2%) and granulation tissue formation (concordance: 76.4%). Furthermore, the teledermatologist generally felt confident in recommending further treatment strategies and in planning further wound assessments via the internet. CONCLUSIONS: Our results suggest that teledermatology offers great potential for the future in chronic wound care. By reducing the need to travel long distances to the hospital or to consult a physician with expertise in wound care, wound teleconsultation might lower health care costs and improve the quality of life for patients with chronic wounds, while still maintaining a high quality of wound care.

PMID: 15785049 [PubMed - indexed for MEDLINE]

30: Dermatology. 2005;210(2):169-73.

Teledermatology: just cool or a real tool?

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Telemedicine is the practice of healthcare using interactive audio, visual and data communication. This includes healthcare delivery, diagnoses, consultation and treatment as well as education and transfer of medical data. The transmission of multimedia streams has remained a major challenge. Although the Internet remains basically insecure, technology allows today to define and implement complete security profiles for specific (medical) communities. Data security is a must as in all other areas of applied medicine. Teledermatology offers possibilities in consulting, continuous medical education or teleteaching. In the future, consulting and asking for a second opinion will be the gold standard of medical care. The quality of healthcare will be improved without saving direct costs. However, indirect costs such as time and effort for the patient and the citizen will be reduced.

Publication Types:
    Review

PMID: 15724100 [PubMed - indexed for MEDLINE]

31: J Ambul Care Manage. 2005 Jan-Mar;28(1):16-23.

Increasing access to care via tele-health: the Arizona experience.

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The Arizona Telemedicine Program (ATP) is a large, multidisciplinary, university-based program that provides telemedicine services, distance learning, informatics training, and telemedicine technology assessment capabilities to communities throughout Arizona. The types of teleconsultation services available include real-time and store-forward consultations, continuing medical education, and patient information sessions. Since the inception of the ATP, there have been 97,722 telemedicine events. The most frequently used telemedicine service is teleradiology, comprising 85,728 teleconsults. Next in frequency are teledermatology and telepsychiatry consultations. Results of patient satisfaction surveys indicate high levels of patient satisfaction with both real-time and store-forward consultations. Three studies of the efficacy of telemedicine services are discussed. One study of the efficacy and diagnostic accuracy of utilizing telecolposcopy, revealed a positive predictive value of the telecolposcopic impression of between 81% and 82%, while the positive predictive value of an in-person impression was 80%.

PMID: 15682957 [PubMed - indexed for MEDLINE]

32: J Telemed Telecare. 2005;11(7):354-60.

A comparison of teledermatology using store-and-forward methodology alone, and in combination with Web camera videoconferencing.

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We compared the diagnostic accuracy of conventional asynchronous teledermatology ('store-and-forward' [SAF]) with a combined technique, in which SAF methodology was used first, followed by a videoconference using low-cost Web cameras. The study involved 228 patients with 242 lesions. For each case, two independent teledermatologists (A and B) evaluated digital images and clinical information by the conventional SAF method and gave a single diagnosis. Then, each communicated with the patient via Web cameras and gave a single diagnosis (combined method). Finally, teledermatologist A performed a face-to-face examination of each patient and established the gold standard diagnosis. With the conventional SAF method, the diagnostic accuracy of teledermatologist A was 81%, while that for teledermatologist B was 75%. With the combined method, the corresponding values were 90% and 82% (P<0.001 for both). There was no significant difference in the interobserver agreement between the two methods. Use of Web camera videoconferencing improved patient satisfaction with teledermatology. This method of teledermatology may be a useful alternative to the SAF method alone.

PMID: 16238837 [PubMed - indexed for MEDLINE]

33: J Telemed Telecare. 2005;11(6):298-303.

Teledermatology as a filtering system in pigmented lesion clinics.

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Teledermatology was evaluated as a filtering system for a pigmented lesion clinic (PLC). A total of 219 teleconsultations were received at the PLC in a 12-week period. The outcome of the teleconsultation was that 49% of patients were referred to the face-to-face clinic. Teleconsultation reports were available to the general practitioner (GP) in a mean time of 44 h and patients attended the face-to-face clinic within the following two weeks. Agreement between different dermatologists was almost perfect, with k =0.91 (95% confidence interval [CI] 0.87-0.96) for diagnosis and kappa =0.92 (95% CI 0.86-0.98) for management options ("referral" or "non- referral"). Agreement within observers was excellent, with kappa =0.93 (95% CI 0.87-0.98). The accuracy of diagnosis, as judged by the histology, was less good, with kappa =0.79 (95% CI 0.70-0.89). In all, 86% of patients and 97% of GPs stated that they were "very satisfied" with the new system. Teledermatology performed well as a filtering system for the PLC. However, more experience is needed to detect the real effect, if any, of teleconsultation on the early diagnosis and prognosis of melanoma.

Publication Types:
    Evaluation Studies

PMID: 16168166 [PubMed - indexed for MEDLINE]

34: J Telemed Telecare. 2005;11(6):285-93.

Implementing a teledermatology programme.

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Although teledermatology has been beneficial and cost-effective in some settings, many programmes have failed, not because of the technology but because teledermatology was implemented in isolation. A thorough understanding of an organization's business process and business model is crucial before teledermatology is begun. Unless teledermatology is integrated into the current business process and model, the likelihood of success is greatly reduced. Important steps therefore include: (1) understanding how the organization delivers care; (2) analysing the alternatives, including cost-benefit analysis; (3) obtaining organizational support; (4) formulating an execution plan; (5) training staff and monitoring the process. If implemented correctly in the appropriate setting, teledermatology can significantly improve access and quality of care, while reducing or containing costs.

PMID: 16168164 [PubMed - indexed for MEDLINE]

35: J Telemed Telecare. 2005;11(6):276-84.

Prerecorded telemedicine.

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In prerecorded telemedicine (also known as asynchronous or store-and-forward), the person sending the information and the person receiving it do not need to do so simultaneously; thus, viewing the information can be done at some later time. Prerecorded telemedicine is therefore not appropriate for emergency consultations. In prerecorded telemedicine systems, the following steps can be distinguished: (1) the acquisition of diagnostic information at the remote site; (2) its storage, which can be at either site, or at both; (3) its delivery to the expert site through an appropriate connection; and (4) its display at the expert site. The types of information transferred include audio, data and text, still images and moving images (i.e. video). An increasingly common way of doing prerecorded telemedicine is by email sent via the Internet. Although there are some problems associated with the Internet, its wide availability and low cost have encouraged its use. Examples where email has been used successfully include teleradiology, telecardiology, teledermatology and telepathology. In some situations prerecorded telemedicine is the only way to provide remote medical services, or the most cost-effective method. Clearly, there are also situations when prerecorded telemedicine is not an appropriate way to deliver health services, for example whenever the sender of the information is not qualified to sample the information acquired or the specialist receiving the information must manipulate it, during acquisition, in some way.

Publication Types:
    Review

PMID: 16168163 [PubMed - indexed for MEDLINE]

36: J Telemed Telecare. 2005;11(2):77-84.

An incremental cost analysis of telehealth in Nova Scotia from a societal perspective.

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We examined the costs of telehealth in Nova Scotia from a societal perspective. The clinical outcomes of telepsychiatry and teledermatology services were

assumed to be similar to those for conventional face-to-face consultations. Cost information was obtained from the Nova Scotia Department of Health, the Canadian Institute for Health Information, and questionnaires to patients, physicians and telehealth coordinators. There were 215 questionnaires completed by patients, 135 by specialist physicians and eight by telehealth coordinators. Patient costs for a face-to-face consultation ranged from $240 to $1048 (all costs in Canadian dollars), whereas patient costs for telehealth were lower, from $17 to $70. However, from a societal perspective, the overall cost of providing face-to-face services was lower than for telehealth: the total costs for face-to-face services ranged from $325 to $1133, while the total costs for telehealth services ranged from $1736 to $28,084. A threshold analysis showed that, above a certain patient workload, telehealth services would be more cost-effective than face-to-face services from a societal perspective. This workload is attainable in Nova Scotia.

Publication Types:
    Multicenter Study

PMID: 15829051 [PubMed - indexed for MEDLINE]

37: Stud Health Technol Inform. 2005;114:11-7.

iPath - a Telemedicine Platform to Support Health Providers in Low Resource Settings.

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In many developing countries there is an acute shortage of medical specialists. The specialists and services that are available are usually concentrated in cities and health workers in rural health care, who serve most of the population, are isolated from specialist support [1]. Besides, the few remaining specialist are often isolated from colleagues. With the recent development in information and communication technologies, new option for telemedicine and generally for sharing knowledge at a distance are becoming increasingly accessible to health workers also in developing countries. Since 2001 the Department of Pathology in Basel, Switzerland is operating an Internet based telemedicine platform to assist health workers in developing countries. Over 1800 consultation have been performed since. This paper will give an introduction to iPath - the telemedicine platform developed for this project - and analyse two case studies: a teledermatology project from South Africa and a telepathology project from Solomon Islands.

PMID: 15923755 [PubMed - in process]

38: Stud Health Technol Inform. 2005;111:579-85.

Stiffness and texture perception for teledermatology.

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The goal of the teledermatology project currently being carried out at Stanford University is to deliver tactile images of the human skin to a dermatologist at a remote location, in real time. In order to make a diagnosis, dermatologists typically need to obtain data regarding the skin texture and the mechanical properties of any lesions on a patient's skin. For example, pre-cancerous or weather-damaged skin typically feels rougher than normal skin and the profile and stiffness of the underlying tissue may shed light on the nature of a skin disease.

PMID: 15718801 [PubMed - indexed for MEDLINE]

39: J Med Syst. 2004 Dec;28(6):575-9.

Assessment of patients' acceptance of and satisfaction with teledermatology.

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Teledermatology refers to the use of information and communication technologies (such as videoconferencing or transmission of digital images) to enable the practice of diagnostic dermatology between participants separated by geographic distance. The objective of this study was to critically review the quality of evidence about patient satisfaction with teledermatology applications. Sample size, reporting of validity and reliability, used instrument and its underlying constructs were determined for all studies where information was available. Fourteen studies were identified, five refer to store-and-forward applications, the remaining ones describe video-based systems. The systematic review demonstrated that methodological deficiencies in the published research impact the generalizability of findings. The two types of teledermatology (video-based and store-and-forward) require different satisfaction instruments as they are based on different contexts of care delivery, with video-mediated communication being key in the former and patients' absence from the diagnostic process in the latter mode of care delivery.

Publication Types:
    Review
    Validation Studies

PMID: 15615285 [PubMed - indexed for MEDLINE]

40: J Eur Acad Dermatol Venereol. 2004 Nov;18(6):665-9.

Value of the clinical history for different users of dermoscopy compared with results of digital image analysis.

Blum A, Hofmann-Wellenhof R, Luedtke H, Ellwanger U, Steins A, Roehm S, Garbe C, Soyer HP.

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BACKGROUND: The clinical history of a given pigmented lesion could influence the therapeutic decision. Teledermatology and automated image analysis also hold great potential for revolutionizing dermatology services. AIM: The aim of this retrospective study was to evaluate the diagnostic accuracy of users with different experiences in dermoscopy with and without information about patients and their history compared with classification by an automated analysing system. SETTING: One hundred and fifty-seven dermoscopic images of pigmented lesions, taken and proved by histopathology at the Pigmented Lesions Clinic of the Department of Dermatology of the University Tuebingen, Germany, were included. METHODS: All images were viewed by three investigators with different experience: excellent (A), average (B) and beginner (C). In the first dermoscopic classification, no information was available. After 3 months the same images were once more classified by the three investigators, now with the information about the patients and their history. The melanocytic lesions were tested by the Tuebinger Mole Analyser. RESULTS: For user A the sensitivity, specificity and diagnostic accuracy revealed no improvement on including the history (81.3% to 84.4%, 94.6% to 92.3% and 92.0% to 90.7%), whereas user B clearly improved his results (75.0% to 87.5%, 76.9% to 88.5% and 76.5% to 88.3%). No change in the sensitivity was seen by user C (84.4%), but there was a

clear improvement in the specificity (69.2% to 87.7%) and diagnostic accuracy (72.2% to 87.0%). Using the computer algorithm, a sensitivity of 100%, a specificity of 76.9% and a diagnostic accuracy of 81.9% were achieved. CONCLUSIONS: The study revealed results relevant to the use of dermoscopy: (1) continuing dermoscopic education influences the diagnostic accuracy; (2) the history is helpful for averaged users and beginners in dermoscopy; (3) digital image analysis has the highest sensitivity, but a lower specificity compared to the clinicians; and (4) digital dermoscopy could be used for store-and-forward systems in teledermoscopy.

PMID: 15482291 [PubMed - indexed for MEDLINE]

41: J Med Syst. 2004 Oct;28(5):455-67.

Design and implementation of a calibrated store and forward imaging system for teledermatology.

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The paper presents a computer-based imaging system aiming to support telemedicine examination sessions in dermatology. Many studies have proved the inadequacy of general practitioners to diagnose successfully common dermatological diseases; some of them may prove fatal if not diagnosed at their early stages (e.g., melanoma). Thus the need for telemedicine systems customized for dermatology becomes obvious for distant rural areas, where dermatological care is usually provided by general doctors. We treat technological issues such as image acquisition, camera calibration, illumination, data transmission, and data compression, and propose a store and forward architecture for image transmission. We also include a study of the effect that image compression quality factor has in the diagnostic value of the skin digital images, along with some initial results and conclusions from the pilot use of the system.

Publication Types:
    Review

PMID: 15527033 [PubMed - indexed for MEDLINE]

42: Telemed J E Health. 2004 Fall;10(3):294-303.

Is JPEG compression of videomicroscopic images compatible with telediagnosis? Comparison between diagnostic performance and pattern recognition on uncompressed TIFF images and JPEG compressed ones.

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Early melanoma diagnosis is an important goal for dermatologists. Polarized light systems are increasingly employed for dermatoscopic diagnosis of melanocytic lesions. For the purpose of teledermoscopy, whose importance is increasingly growing for consultation and teaching purposes, it is of utmost importance to establish whether, after compression, polarized light images maintain their informativeness. The aim of our study was to check the effects of compression on melanocytic lesion images acquired by means of a digital videomicroscope on the identification of morphological details of the image and on diagnostic accuracy. A total of 170 50-fold-magnified pigmented skin lesion images, acquired in Tagged Image File Format (TIFF) by a digital videomicroscope, were compressed using Joint Photographic Experts Group (JPEG) algorithms (compression factor 30). Two experts in videomicroscopy evaluated

both original and compressed images twice by describing single lesion features and expressing a diagnosis. Reproducibility in the assessment of dermoscopic parameters and observer performance were studied by kappa statistics and Receiver Operating Characteristic (ROC) analysis. Both intra- and interobserver reproducibility in the assessment of morphological details were higher when TIFF images were considered, indicating a better image quality. Nonetheless, there was no significant difference in the diagnostic accuracy between uncompressed images and compressed ones, although the intraobserver reproducibility in the diagnostic judgement was higher for uncompressed images. Despite loss in image details, factor 30 compressed videomicroscopic images enable a good diagnostic accuracy.

PMID: 15650524 [PubMed - indexed for MEDLINE]

43: Arch Dermatol. 2004 May;140(5):525-8.

Comparison of skin biopsy triage decisions in 49 patients with pigmented lesions and skin neoplasms: store-and-forward teledermatology vs face-to-face dermatology.

Shapiro M, James WD, Kessler R, Lazorik FC, Katz KA, Tam J, Nieves DS, Miller JJ.

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OBJECTIVE: To determine the relative efficacy of store-and-forward teledermatology vs face-to-face dermatology consultations in triage decisions about the need for a biopsy of neoplastic skin changes. DESIGN: Prospective study of consecutive patients judged by an internist to require dermatologic consultation for a skin growth. SETTING: Private primary care and dermatology practices and an academic dermatology practice. PATIENTS: Patients requiring dermatology consultation for evaluation of skin growths. Patients were seen by a single primary care physician between July 10, 1998, and August 4, 2000. INTERVENTION: Digital photographs of skin growths were obtained by the primary care physician and evaluated by a teledermatologist. The patient was then seen face-to-face by a dermatologist. A biopsy was performed if either dermatologist favored biopsy. MAIN OUTCOME MEASURES: Decisions to perform a biopsy. Agreement between the dermatologists was assessed. RESULTS: Of the 49 patients with evaluable photographs, the face-to-face dermatologist and teledermatologist recommended a biopsy for the same 26 patients, yielding a sensitivity of the teledermatologist of 1.00 (95% confidence interval [CI], 0.87-1.00) and a specificity of 1.00 (95% CI, 0.85-1.00). The agreement between the dermatologists (kappa) was 1.00 (95% CI, 0.72-1.00). CONCLUSION: Store-and-forward teledermatology may provide an accurate and cost-effective method of determining whether skin growths in patients presenting to primary care physicians should undergo biopsy.

Publication Types:
    Evaluation Studies

PMID: 15148095 [PubMed - indexed for MEDLINE]

44: Nurs Times. 2004 Apr 6-12;100(14):38-41.

Development of a district-wide teledermatology service.

Lawton S, English J, McWilliam J, Wildgust L, Patel R.

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Demand for dermatology services is increasing, resulting in changes in service provision and the role of nurses. Technological advances have led to the

development of telemedicine. This article describes how four primary care trusts and the dermatology department at Queen's Medical Centre developed a district-wide teledermatology service. The service was led by nurses and a GP with a special interest in dermatology.

PMID: 15119133 [PubMed - indexed for MEDLINE]

45: Arch Dermatol. 2004 Apr;140(4):477-8.

Comment on:
    Arch Dermatol. 2004 Apr;140(4):473-6.

Digital photography, confidentiality, and teledermatology.

Goldberg DJ.

Publication Types:
    Comment
    Editorial

PMID: 15096378 [PubMed - indexed for MEDLINE]

46: Ned Tijdschr Geneeskd. 2004 Feb 14;148(7):314-8.

[Teledermatological consultation]

[Article in Dutch]

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Teledermatological consultation can be effected in two ways. One is 'store-and-forward' which involves storing photographic digital images and sending them to a consultant dermatologist who then replies by e-mail, and the other is by videoconferencing using a real time interactive audiovisual link. In daily general practice the first method is the easiest to implement. In 76-90% of cases, a diagnosis or differential diagnosis made in this way corresponds with the diagnosis made at the more usual face-to-face examination. The advantage of teledermatological consultation is that diagnosis and therapy take place faster than after regular referral and it is better than no referral at all. The referring physician should deliver data on the patient's history and physical examination in a standardized format. The same is true for the encoded personal data, the working diagnosis, and referral request. One overview and 2 detailed photos from two angles are normally taken. The overview shows the extent and localization of the skin abnormality. The patient has to consent to a teledermatological consultation. The responsibility for the treatment lies with the doctor who sees the patient face-to-face. The data that is transmitted must be encrypted or coded in such a way that it cannot be traced back to one particular person.

Publication Types:
    Case Reports
    Review

PMID: 15015248 [PubMed - indexed for MEDLINE]

47: Australas J Dermatol. 2004 Feb;45(1):23-28.

Retrospective review of teledermatology in the Waikato, 1997-2002.

Oakley AM, Rennie MH.

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We reviewed scheduled interactive teledermatology consultations from 1997 to 2002 between the Department of Dermatology of Health Waikato in Hamilton and remote sites at Taumarunui Hospital, Taupo Health Centre and the Ranolf Medical Centre, Rotorua, in New Zealand. Eighty-five per cent of 384 appointments were attended and most non-attendances were unexplained. The reason for consulting a dermatologist was inflammatory skin disease in 74% of cases, cutaneous infection in 10%, a skin lesion in 12% and no diagnosis was made in 4%. Follow ups were arranged for 41%, mainly by telemedicine (74%). Despite the apparent success of 75% of consultations and positive feedback from patients attending them, the service has not proved sustainable long-term. This is because of other priorities for the delivery of health care, lack of support by clinicians and administrators, and ongoing financial costs.

PMID: 14961904 [PubMed - as supplied by publisher]

48: Br J Dermatol. 2004 Feb;150(2):312-6.

Dermatoses associated with travel to Burkina Faso and diagnosed by means of teledermatology.

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BACKGROUND: The pattern of dermatoses occurring in travellers to tropical areas is poorly documented. OBJECTIVES: To diagnose skin diseases in travellers to Burkina Faso by means of teledermatology; to assess the educational value of teledermatology for the local general practitioner (GP). METHODS: Patients (Westerners and Burkinabese nationals) were included in the study if they presented with a cutaneous disease to the GP based in Ouagadougou, Burkina Faso. Images of the skin lesions were acquired with a point-and-shoot digital camera and sent via the Internet, together with the clinical history. Diagnostic concordance between dermatologists in France and the GP in Ouagadougou was analysed as a simple proportion of agreement and 95% confidence interval. RESULTS: One hundred and twenty-four patients (M/F ratio 1.17; 80.6% Westerners) were included in the study. One hundred and thirty dermatoses were identified: 73 (56%) were of infectious origin, and 19 (15%) were related to eczematous dermatitis. The skin infections were mainly due to bacteria (18%), fungi (14%) or arthropods (13%). Parasitic dermatoses were observed only in Burkinabese nationals. Among Westerners, fungal dermatoses were observed only in long-term residents. The diagnostic agreement between the local GP and the remote dermatologists was 49% overall (95% confidence interval 41-58). Agreement between the GP and the dermatologists on the dermatological category improved significantly over time ($P<0.05$). CONCLUSIONS: Telemedecine can improve the management of cutaneous diseases among Western travellers. Most dermatoses observed in Western travellers to Burkina Faso are of infectious origin. Teledermatology has educational value for local GPs.

PMID: 14996103 [PubMed - indexed for MEDLINE]

49: Gac Med Mex. 2004 Jan-Feb;140(1):23-6.

[First study of teledermatology in Mexico. A new public health tool]

[Article in Spanish]

Lepe V, Moncada B, Castanedo-Cazares JP, Martinez-Rodriguez A, Mercado-Ceja SM, Gordillo-Moscoso A.

Hospital Central Dr. Ignacio Morones Prieto, Facultad de Medicina, Universidad Autonoma de San Luis Potosi, S.L.P. Mexico.

BACKGROUND: Telemedicine has been used for more than 50 years. Dermatology has been one of the specialties where it has reached great development (Teledermatology). When the observation is made simultaneously by the outreach specialist and by the non-specialist at the workplace, it is called synchronous teledermatology, and asynchronous when information is filmed, stored, and presented to the specialist at a later time. OBJECTIVE: To evaluate efficacy and reliability of asynchronous teledermatology for adequate diagnosis of skin diseases. METHODS: Fifty patients with dermatologic disorders were seen in a poor tropical rural zone, first by non-dermatologists in conventional consultation and then by dermatologists to obtain a diagnosis (gold standard); the latter step consisted of evaluation of filmed lesions by another group of dermatologist later on. RESULTS: There was a high concordance of diagnosis between the two groups of dermatologists when kappa analysis was performed. CONCLUSION: It appears important to use these technological advances in developing-countries to improve delivery of health care.

PMID: 15022884 [PubMed - indexed for MEDLINE]

50: J Telemed Telecare. 2004;10(6):346-50.

Diagnosis and categorization of acral melanocytic lesions using teledermoscopy.

Piccolo D, Soyer HP, Chimenti S, Argenziano G, Bartenjev I, Hofmann-Wellenhof R, Marchetti R, Oguchi S, Pagnanelli G, Pizzichetta MA, Saida T, Salvemini I, Tanaka M, Wolf IH, Zgavec B, Peris K.

Department of Dermatology, University of L'Aquila, L'Aquila, Italy.

We performed a multicentre study to test the validity of teledermoscopy for diagnosing acral melanoma and to evaluate inter-observer agreement on the classification of acral melanocytic lesions. Dermoscopic images of 77 acral melanocytic lesions (71 common melanocytic naevi and 6 melanomas) were sent by email to 11 dermatologists with different degrees of experience in dermoscopy. The observers analysed the images on a computer monitor to diagnose acral melanoma or atypical lesions and to categorize all lesions. All 11 observers, regardless of their degree of experience, obtained high values for sensitivity (mean 0.91, SD 0.09) and specificity (mean 0.95, SD 0.04) with regard to the diagnosis of melanoma. The inter-observer agreement was good to excellent (kappa 0.49-0.88) for the categorization of acral melanocytic lesions. All six melanomas were correctly classified as 'atypical pattern' and all observers recommended surgical excision. Teledermoscopy represents a useful tool for the diagnosis of acral melanoma and for the categorization of patterns that suggest benign or potentially malignant acral melanocytic lesions.

Publication Types:
    Evaluation Studies
    Multicenter Study

PMID: 15603633 [PubMed - indexed for MEDLINE]

51: J Telemed Telecare. 2004;10 Suppl 1:44-7.

Trial of low-cost teledermatology in primary care.

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We examined the feasibility of a low-cost, store-and-forward teledermatology

service for general practitioners (GPs) in regional Queensland. Digital pictures and a brief case history were transmitted by email. A service coordinator carried out quality control checks and then forwarded these email messages to a consultant dermatologist. On receiving a clinical response from the dermatologist, the service coordinator returned the message to the referring GP. The aim was to provide advice to rural GPs within one working day. Over six months, 63 referrals were processed by the teledermatology service, covering a wide range of dermatological conditions. In the majority of cases the referring doctors were able to treat the condition after receipt of email advice from the dermatologist; however, in 10 cases (16%) additional images or biopsy results were requested because image quality was inadequate. The average time between a referral being received and clinical advice being provided to the referring GPs was 46 hours. The number of referrals in the present study, 1.05 per month per site, was similar to that reported in other primary care studies. While the use of low-cost digital cameras and public email is feasible, there may be other issues, for example remuneration, which will militate against the widespread introduction of primary care teledermatology in Australia.

Publication Types:
    Evaluation Studies
    Multicenter Study

PMID: 15603607 [PubMed - indexed for MEDLINE]

52: J Telemed Telecare. 2004;10(2):94-8.

General practitioners' perceptions of asynchronous telemedicine in a randomized controlled trial of teledermatology.

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We studied the perceptions of general practitioners (GPs) towards teledermatology, before and after its introduction into eight general practices for the purposes of a randomized controlled trial. A postal questionnaire was distributed before the trial and again one year later. Thirty-six of the 42 GPs responded on each occasion (a response rate of 86%). In the second survey, only 21% of respondents indicated that they were satisfied with teledermatology in their practice, while 47% said that they were dissatisfied. Thirty-one per cent said that they felt confident about diagnosis and management of care through teledermatology, and 28% reported that they were unconfident. Only 23% of respondents said that they would consider using a telemedicine system in the future, while 34% said they would not (43% were unsure). There were no significant findings to suggest that the GPs' perceptions changed over time. Less favourable responses to telemedicine were found than has been observed in previous studies, which suggests that the model of telemedicine described in this study would not be widely acceptable to GPs.

Publication Types:
    Clinical Trial
    Multicenter Study
    Randomized Controlled Trial

PMID: 15068645 [PubMed - indexed for MEDLINE]

53: J Telemed Telecare. 2004;10(1):34-8.

A pilot study of a combined dermoscopic-pathological approach to the telediagnosis of melanocytic skin neoplasms.

Ferrara G, Argenziano G, Cerroni L, Cusano F, Di Blasi A, Urso C, Soyer HP.

Pathological Anatomy, Gaetano Rummo City Hospital, Benevento, Italy.

We examined a combined (dermoscopic-pathological) approach to the telediagnosis of melanocytic skin lesions. A store-and-forward teleconsultation was simulated. Dermoscopic and histopathology images from 12 melanocytic lesions were stored in a telepathology workstation. A dermoscopy consultant, a histopathology consultant and an expert in dermoscopic-pathological correlation gave their diagnoses and comments on the images. The consensus diagnosis between two teleconsultants on the original histological slides was regarded as the gold standard. The diagnostic accuracy was 83% (including one false negative diagnosis of malignancy) for teledermoscopy and 100% for teledermatopathology. The combined approach detected one case that showed a much greater atypia on dermoscopy than on histopathology. In this case step-sections of the sample were deemed to be required for definite diagnosis. The combined approach was helpful in detecting macroscopic and microscope sampling errors of melanocytic lesions during teleconsultation.

PMID: 15006214 [PubMed - indexed for MEDLINE]

54: J Telemed Telecare. 2004;10(1):29-33.

Patient satisfaction with teledermatology: quantitative and qualitative results from a randomized controlled trial.

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As part of a randomized controlled trial involving 208 dermatology patients, a quantitative and qualitative study was undertaken to explore patients' satisfaction with a specialist dermatological opinion and further management obtained through either a traditional outpatient consultation (control group) or an asynchronous teleconsultation (telemedicine group). There was a response rate of 71% to the quantitative patient satisfaction survey (148 replies from 208 distributed questionnaires). The responders comprised 80 of the 111 telemedicine patients (72%) and 68 of the 97 control patients (70%). Overall levels of patient satisfaction were high in both groups, and there was no significant difference between them. Ninety per cent of patients in the control group were satisfied with their overall care, compared with 81% in the telemedicine group, and 87% of patients in the control group were satisfied with their overall management, compared with 84% in the telemedicine group. Follow-up qualitative interviews with 30 of the participants also suggested that patients were generally positive about their care and management, regardless of group, age or gender. Receiving a diagnosis, treatment and cure, receiving adequate information and explanations, the need to be taken seriously, the need for individualized personal care, and the importance of a short waiting time for an appointment and treatment were all aspects of care and management most likely to result in patient satisfaction, regardless of modality.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 15006213 [PubMed - indexed for MEDLINE]

55: J Telemed Telecare. 2004;10(1):25-8.

Reliability of Web-based teledermatology consultations.

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We studied the reliability of teledermatology diagnoses made using a Web-based system. Clinical photographs and information relating to 125 patients were placed on a Web server. Three dermatologists made the most likely diagnosis via a Web interface. The reference diagnosis was made in a face-to-face consultation with a fourth dermatologist; where appropriate it was confirmed histologically. The teledermatologists were correct in 57% of cases when viewing the images alone. Their diagnostic accuracy improved to 70% when additional clinical information was available. The rate of agreement between the teledermatologists ranged from 44% to 70% (kappa= 0.22-0.32). Seventy-seven per cent of the patients were correctly diagnosed by at least two dermatologists when clinical information was provided. A Web-based system appears to be reliable for teledermatology. A single well trained teledermatologist may give better results than a group of less well trained clinicians.

PMID: 15006212 [PubMed - indexed for MEDLINE]

56: J Telemed Telecare. 2004;10(1):21-4.

The challenges of following patients and assessing outcomes in teledermatology.

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We retrospectively reviewed the follow-up and outcomes of 50 store-and-forward teledermatology patients, and compared the findings with those from a control group of 50 patients who had been seen in person. Patient records were examined for a six-month period following the initial referral to a dermatologist. Variables examined included medical records from the referral, evidence of actions taken (e.g. biopsy), evidence of follow-up visits, and what (if any) clinical outcomes were noted. There were few differences between the teledermatology and in-person groups. The main difference was whether there was any report in the record that the referring clinician took some action based on the consultation with the specialist: there were more reports of action being taken in the teledermatology group than in the in-person group. Reports of outcomes were found in only 6% and 8% of the records of the teledermatology and in-person groups, respectively. The challenges of assessing outcomes in teledermatology for rural patients include patient loss to follow-up, lack of information in the patient records and low rates of patient return to the referring clinician for follow-up.

PMID: 15006211 [PubMed - indexed for MEDLINE]

57: Telemed J E Health. 2004 Winter;10(4):422-31.

Patient and clinician satisfaction with a store-and-forward teledermatology consult system.

Whited JD, Hall RP, Foy ME, Marbrey LE, Grambow SC, Dudley TK, Datta SK, Simel DL, Oddone EZ.

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The aim of this study was to assess satisfaction with and acceptance of a store and forward teledermatology consult system among patients, referring primary-care clinicians, and consultant dermatologists. As part of a randomized clinical trial that compared the clinical and economic outcomes of store and forward teledermatology to a conventional referral process, we conducted satisfaction assessments among participating patients, referring primary-care

clinicians, and consultant dermatologists. Survey questions included issues related to the timeliness of each consult process, the confidence participants displayed in each consult modality, and assessments of overall satisfaction and preferences. A majority of referring clinicians (92%) and dermatologist consultants (75%) reported overall satisfaction with the teledermatology consult process. Ninety-five percent of referring clinicians reported that teledermatology resulted in more timely referrals for their patients. This finding was validated by the observation that teledermatology patients reached a point of initial intervention significantly sooner than did patients in usual care (41 days versus 127 days, p = 0.0001). Teledermatology patients reported satisfaction with the outcome of their teledermatology consultation 82% of the time. However, patients did not express a clear preference for a consult method. A total of 41.5% of patients preferred teledermatology, 36.5% preferred usual care, and 22% were neutral. Our study showed a high level of satisfaction among all users of a store-and-forward teledermatology consult system, and, in some cases, our survey results could be validated with observed clinical outcomes.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 15689645 [PubMed - indexed for MEDLINE]

58: Telemed J E Health. 2003 Fall;9(3):259-64.

Patient knowledge and attitude toward information technology and teledermatology: some tentative findings.

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A large proportion of Internet users tend to ask health-related questions. There is evidence of growing interest in the use of information technology in health care delivery. Moreover, patient-driven health care is becoming a reality. We hypothesized that dermatology outpatients would be knowledgeable and capable of participating in teledermatology services. Hence, this study was conducted to evaluate knowledge among teledermatology patients. The survey instrument was composed of 16 close-ended questions. The validity and reliability of the questions were tested in a pilot study. Institutional Review Board approval was obtained. Consecutive patients seen at two dermatology clinics at tertiary care hospitals were recruited for a regular survey. A total of 430 questionnaires were completed. About two-thirds of the patients reported having a computer at home, with Internet access, and also using e-mail regularly. Slightly more than one-half of them used the Internet to search for health-related information. One in 5 patients had digital cameras. More than one-half would consider getting an opinion from their physician or send their skin images to their physician via a secure Internet connection. Based on this cross-sectional survey, dermatology outpatients seem to be accepting of and technologically capable of participating in teledermatology.

PMID: 14611693 [PubMed - indexed for MEDLINE]

59: Clin Exp Dermatol. 2003 Jul;28(4):356-9.

Teledermatology in practice.

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Teledermatology has been the focus of much interest in recent years. Potential uses include a simple supporting role for primary care, more accurate triage of dermatology patients or an 'advice only' service reducing the need for dermatology patients to attend outpatient clinics. With the current under-provision of dermatology services in the UK and the waiting list targets set by government, teledermatology systems have been proposed as a possible solution. 'Store and forward' teledermatology systems are easy to set up and it has been shown that accurate diagnoses can be made using digital images attached to an E-mailed history. In an area of geographical isolation a store and forward teledermatology system has been used successfully to reduce patient waiting times. In Peterborough we have been using a store and forward teledermatology system for over 4 years. Our experience has demonstrated that for only a small number of selected patients was it possible to provide an advice-only service, but the majority of patients still need to be seen in the outpatient clinic. Despite the technical simplicity of these systems today there is still little evidence that teledermatology will have a significant impact on patient workload in the average dermatology clinic. It must be recognized that teledermatology is potentially a useful communication tool for selected patients in primary care but is unlikely to solve waiting list problems or replace the need for local dermatology services.

PMID: 12823290 [PubMed - indexed for MEDLINE]

60: Telemed J E Health. 2003 Summer;9(2):167-77.

Teledermatology: the case of adoption and diffusion of telemedicine health Waikato in New Zealand.

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Telemedicine emerged as a possible solution to New Zealand health providers in reaching out to rural patients, by offering medical services and conducting administrative meetings and training. However, despite the rapid growth and high visibility of these projects in countries like the United States, relatively few patients are now being seen through telemedicine. Accordingly, this research attempts to investigate telemedicine's effectiveness in New Zealand by using a theoretical framework. Thus, the purpose of this paper is to explain factors influencing the adoption and diffusion of telemedicine utilising the video conferencing technology (TMVC) for dermatology within Health Waikato Ltd. (HW). Findings indicate weak presence of critical assessment into technological innovation prior to adoption. Factors like complexity, compatibility, and trialability were not assessed extensively by HW, and would have hindered its adoption. Teledermatology was mainly assessed according to its relative advantage and cost effectiveness. While essential this should be alongside other factors pertaining to as addressed within this research. On the other hand, the wide diffusion of teledermatology relied on its economical benefit to HW and on its effectiveness as a diagnostic tool. This research highlights the importance of the product champion for the successful adoption and diffusion of teledermatology.

Publication Types:
    Review

PMID: 12855039 [PubMed - indexed for MEDLINE]

61: Cutis. 2003 Jun;71(6):476-80.

Teledermatology: an intraobserver diagnostic correlation study, Part II.

Pak HS, Harden D, Cruess D, Welch ML, Poropatich R; National Capital Area Teledermatology Consortium.

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This is part II of an intraobserver diagnostic correlation study comparing teledermatology with traditional face-to-face evaluation. Part I discussed the methodology and diagnostic correlation results between teledermatology and in-person consultation (Cutis. 2003;71:399-403). This second part reports the diagnostic certainty level between the 2 groups, which are shown to be significantly different (teledermatology, 7/10; in-person, 9/10). This difference held true in every category of skin condition evaluated (P < or = .0065). Unlike other studies, we found that teledermatologists recommended biopsies 10% more frequently than clinic-based evaluators. We discuss the reasons for the lower diagnostic certainty level of teledermatologists, as well as the limitations of this study. Despite the limitations, we conclude that teledermatology appears to be an effective method of delivering dermatologic care in the appropriate setting.

PMID: 12839260 [PubMed - indexed for MEDLINE]

62: Cutis. 2003 May;71(5):399-403.

Teledermatology: an intraobserver diagnostic correlation study, part I.

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Many studies have been published recently on the effectiveness of teledermatology as a diagnostic tool; however, much of the data comes from live 2-way video teleconferencing consultations and very little comes from more readily available "store and forward" consultations. Moreover, most published studies compare the diagnoses of 2 different dermatologists (interobserver comparison). Given the lack of data on baseline interdermatologist diagnostic variability, the interpretation of currently available diagnostic correlation data is somewhat difficult. The objective of this study is to measure the degree of diagnostic concordance between a dermatologist seeing a patient via a teledermatology consult system and the same dermatologist seeing the same patient face-to-face in a dermatology clinic at a tertiary medical center. A random sample of 404 patients was selected from patients who had routine appointments at our dermatology clinic.

Publication Types:
    Evaluation Studies

PMID: 12769408 [PubMed - indexed for MEDLINE]

63: Eur J Dermatol. 2003 May-Jun;13(3):288-93.

Difference between real and perceived power of dermoscopical methods for detection of malignant melanoma.

Schiffner R, Wilde O, Schiffner-Rohe J, Stolz W.

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Clear proceedings in detection of malignant melanoma and monitoring of melanocytic nevi (MN) have been achieved by dermoscopy in recent years: sensitivity to 95% is possible for experts. Does patients' confidence in methods for detection of malignant melanoma most important for adherence in follow-up

reflect this diagnostic power? A self-administered survey was performed in 210 consecutive patients at 13 private dermatological practices and the department of Dermatology of the University of Regensburg. Confidence was assessed by a 5-step ordinal scale ranging from 1 to 5 (higher values indicate higher confidence) and willingness-to-pay (wtp) as health-economic instrument for naked-eye inspection (NEI), handheld dermoscopy (HHD), digital dermoscopy (DD), and teledermoscopy (TD); additional, wtp for a hypothetical method promising 100% accuracy. Data of 143 patients (response rate 69.5%; mean age 37 years, 58% female) could be analysed. Mean confidence was 1.9 0.9 for NEI, 2.8 0.9 for HHD, 4.5 0.7 for DD, and 4.7 0.5 for TD. Mean wtp per examination was 0.64% 1.1 of monthly income for NEI, 1.1% 1.9 for HHD, 2.8% 3.3 for DD, 3.1% 4.6 for TD, and 5.0% 7.8 for hypothetical method. Differences between methods were statistically significant. Compared to the hypothetical method, NEI achieved only 14.9%, HHD 24.8%, DD 58.4%, and TD 60% of maximum confidence. This study was performed without any influence on routine information for patients. Results therefore represent patients' actual knowledge of dermoscopical methods in daily dermatological practices. Patients' confidence was highest for TD, HHD was clearly underestimated. Willingness-to-pay in HHD, DD, and TD was at least 40% below a hypothetical method promising 100% accuracy. Better information about diagnostic accuracy of methods available is necessary to increase patients' knowledge and confidence.

Publication Types:
Multicenter Study

PMID: 12804992 [PubMed - indexed for MEDLINE]

64: Skinmed. 2003 May-Jun;2(3):159-62.

Evaluating patient acceptance of a teledermatology link of an urban urgent-care dermatology clinic run by residents with board certified dermatologists.

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BACKGROUND: A teledermatology system was established in a dermatology urgent-care clinic staffed by dermatology residents in the emergency department. These residents had previously lacked attending dermatology supervision. METHODS AND PATIENTS: Resident physicians took digital pictures of patients' lesions and downloaded the images onto a network personal computer (PC). The images were stored on the hospital's server and then viewed within 5 minutes by an attending dermatologist, in a different location, using a network PC with monitor. Resident and attending physicians discussed the cases over the telephone. Patient acceptance was assessed via separate written surveys. Fifty-one patients, approximately 10 resident physicians, and two attending dermatologists participated in the study. RESULTS: Patient acceptance of the teledermatology system was high (93%). Teledermatology may prove a viable means of evaluating dermatologic complaints in the emergency department.

Publication Types:
Evaluation Studies

PMID: 14673291 [PubMed - indexed for MEDLINE]

65: J Ayub Med Coll Abbottabad. 2003 Apr-Jun;15(2):34-6.

Comparison of store and forward method of teledermatology with face-to-face consultation.

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BACKGROUND: To compare the accuracy of store and forward method of teledermatology with the traditional face-to-face consultation. METHODS: The comparison was done between Institute of Dermatology King Edward Medical College Lahore that served as teledermatology center and Dermatology Department of Pakistan Institute of Medical Sciences Islamabad from where patients were selected. Telmedpak provided the technical support. Thirty three patients were selected from outpatient department of PIMS and images were taken using a digital camera. Images were stored in computer and were sent to Institute of Dermatology via e-mail for Teleconsultation along with a short history and examination findings. Diagnosis of consultant after face-to-face consultation was then compared with the image based diagnosis that is after teleconsultation. RESULTS: In 81% of the cases the diagnosis on face-to-face consultation was same ($p < 0.05$) while in 18% of the cases the two diagnoses differed. In 9% ($n = 3$) of the cases, image resolution was not good but out of these three, diagnosis was same in two and differed in one case. CONCLUSION: This study concludes that store and forward method of teledermatology is reliable and can provide a means of increasing access to dermatological care in rural and under-served areas.

PMID: 14552246 [PubMed - indexed for MEDLINE]

66: Dermatol Online J. 2003 Feb;9(1):18.

Comment on:
Dermatol Online J. 2001 Feb;7(1):21.

Easy photodermoscopy for teledermatology.

Castanedo-Cazares JP, Lepe V, Torres-Alvarez B, Moncada B.

Publication Types:
Comment
Letter

PMID: 12639475 [PubMed - indexed for MEDLINE]

67: AMIA Annu Symp Proc. 2003;:913.

Role-based and Adaptive user interface designs in a Teledermatology consult system: a way to secure and a way to enhance.

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User interface design is one of the most important parts of developing applications. Nowadays, a quality user interface must not only accommodate interaction between machines and users, but also needs to recognize the differences and provide functionalities for users from role-to-role or even individual-to-individual. With the web-based application of our Teledermatology consult system, the development environment provides us highly useful opportunities to create dynamic user interfaces, which lets us to gain greater access control and has the potential to increase efficiency of the system. We will describe the two models of user interfaces in our system: Role-based and Adaptive.

PMID: 14728419 [PubMed - indexed for MEDLINE]

68: Curr Probl Dermatol. 2003;32:257-60.

Teledermatology in Switzerland.

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PMID: 12472021 [PubMed - indexed for MEDLINE]

69: Curr Probl Dermatol. 2003;32:233-46.

Teledermatology in sub-Saharan Africa.

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PMID: 12472018 [PubMed - indexed for MEDLINE]

70: Curr Probl Dermatol. 2003;32:222-5.

Teledermatology in North America.

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PMID: 12472016 [PubMed - indexed for MEDLINE]

71: Curr Probl Dermatol. 2003;32:207-12.

Teledermatoscopy in daily routine--results of the first 100 cases.

Coras B, Glaessl A, Kinateder J, Klovekorn W, Braun R, Lepski U, Landthaler M, Stolz W.

Department of Dermatology, University of Regensburg, Germany.

Publication Types:
    Evaluation Studies

PMID: 12472014 [PubMed - indexed for MEDLINE]

72: Curr Probl Dermatol. 2003;32:201-6.

Teledermoscopy.

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PMID: 12472013 [PubMed - indexed for MEDLINE]

73: Curr Probl Dermatol. 2003;32:172-5.

A survey among dermatologists in practice about teledermatology.

Glaessl A, Coras B, Popal H, Landthaler M, Stolz W.

Department of Dermatology, University of Regensburg, Germany.

PMID: 12472008 [PubMed - indexed for MEDLINE]

74: Curr Probl Dermatol. 2003;32:167-71.

Teledermatology in the nursing home.

Zelickson BD.

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Publication Types:
    Evaluation Studies

PMID: 12472007 [PubMed - indexed for MEDLINE]

75: Curr Probl Dermatol. 2003;32:154-7.

Dermanet--a tailor-made tool for teledermatology....

Kuhnis L, Milesi L.

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PMID: 12472005 [PubMed - indexed for MEDLINE]

76: Curr Probl Dermatol. 2003;32:24-31.

Teledermatology delivery modalities: real time versus store and forward.

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Department of Telecommunication, Michigan State University, East Lansing, Mich., USA. pwhitten@msu.edu

PMID: 12471986 [PubMed - indexed for MEDLINE]

77: Igaku Butsuri. 2003;23(1):40-3.

[Inter-hospital teledermatology conference using a videophone network]

[Article in Japanese]

Yamazaki Y, Saida T, Takizawa M, Murase S.

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We organized an inter-hospital teledermatology conference with images through a digital telephone line (ISDN, 128kbps). Our conference system consists of two videophones. A videophone "Phoenix PICSEND-R" (NTT) in the multi-point connection mode is used for discussion among doctors from five hospitals. In addition, using another videophone "Phoenix mini type-S" (NTT), clinical and dermoscopic findings obtained with a digital video camera and a videomicroscope "VMS-1900" (Scalar, Tokyo) respectively were transmitted to Shinshu University Hospital from four rural sites. We have found that the quality of the images obtained is entirely sufficient to make an accurate diagnosis. To calibrate the color and size of skin lesions, a matching sticker "CASMATCH" (Bearmedic, Tokyo) has proved useful. Forty-one times of conference were held from September 1999 to August 2002. In total, the concordance rate between the telediagnosis and the finally confirmed diagnosis was 69% (77 of 112 cases). In cases limited to pigmented skin lesions, the rate was higher (84%) and it was concluded that such conditions are suited for the telediagnosis. The ease with which the data can be manipulated enables us to discuss difficult cases in detail. This style of

teleconference system may have benefits for dermatologists especially at rural hospitals in consultation with senior doctors.

PMID: 12832863 [PubMed - indexed for MEDLINE]

78: J Telemed Telecare. 2003;9(6):321-7.

Potential effect of patient-assisted teledermatology on outpatient referral rates.

Eminovic N, Witkamp L, Ravelli AC, Bos JD, van den Akker TW, Bousema MT, Henquet CJ, Koopman RJ, Zeegelaar JE, Wyatt JC.

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We carried out a pilot study on the feasibility and accuracy of store-and-forward teledermatology based on patient-provided images and history as a triage tool for outpatient consultation. Patients referred by their general practitioner provided a history and images via the Internet. The information was reviewed by one of 12 teledermatologists and the patient then visited a different dermatologist in person within two days. Three independent dermatologists compared the remote and in-person diagnoses in random order to determine diagnostic agreement. Broader agreement was also measured, by comparing the main disease groups into which the two diagnoses fell. The teledermatologists indicated whether an in-person consultation or further investigations were necessary. There were 105 eligible patients, aged four months to 72 years, who were willing to participate. For the 96 cases included in the analysis, complete diagnostic agreement was found in 41% (n=39), partial diagnostic agreement in 10% (n=10) and no agreement in 49% (n=47). There was disease group agreement in 66% of cases (n=63). Nearly a quarter (23%) of participating patients could have safely been managed without an in-person visit to a dermatologist.

Publication Types:
    Evaluation Studies

PMID: 14680515 [PubMed - indexed for MEDLINE]

79: J Telemed Telecare. 2003;9(5):249-52.

The reliability of diagnosis using store-and-forward teledermatology.

Du Moulin MF, Bullens-Goessens YI, Henquet CJ, Brunenberg DE, de Bruyn-Geraerds DP, Winkens RA, Dirksen CD, Vierhout WP, Neumann HA.

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We compared diagnoses made by a teledermatologist from digital photographs and patient histories sent from general practitioners using a store-and-forward technique and those made by another dermatologist in a face-to-face consultation with the same patients. A total of 117 patients (mean age 47 years) were referred by 18 general practitioners for diagnosis of a skin condition. Between one and seven digital images were transmitted per case. In 31% of the cases, three images were transmitted. There was full concordance between store-and-forward and face-to-face diagnoses in 57 of 106 cases (54%); in 10 cases (9%) there was overlap between the differential diagnoses provided by the teledermatologist and the face-to-face consultant. Diagnostic categories with relatively high concordances were eczema and follicular eruptions. General practitioners need to be trained in the making of digital images and in giving a good patient history.

PMID: 14599326 [PubMed - indexed for MEDLINE]

80: J Telemed Telecare. 2003;9 Suppl 1:S48-50.

Guidelines for teleradiology practice: results of the Tyrolean teleradiology pilot project.

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The Tyrolean telemedicine pilot project linked the University Clinic of Innsbruck and the district hospital in Reutte. Five medical specialties were investigated: teleradiology, telepathology, teledermatology, tele-ophthalmology and tele-oncology. A Tyrolean 'four-column model of quality management in telemedicine' was introduced to ensure a global view of the project and to avoid mistakes. In teleradiology, a 12-step workflow was developed, which described the medical responsibilities at each stage. We found that the defined teleradiology workflow and the technical equipment for data security and data exchange worked without problems in over 79% of a total of 424 cases. To ensure continuous quality assurance, the whole teleradiology workflow was ISO 9001:2000 certified.

PMID: 12952721 [PubMed - indexed for MEDLINE]

81: J Telemed Telecare. 2003;9 Suppl 1:S17-8.

Implementing telemedicine services in northern Norway: barriers and facilitators.

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Telemedicine is not simply a technology - it also involves processes. The use of telemedicine is influenced by many factors. Our intention was to examine what conditions promote the use of telemedicine between general practitioners (GPs) and hospitals. Qualitative interviews were undertaken with 16 GPs in northern Norway. The extent to which GPs were using the services was limited, although some used them fairly frequently. The most widely used service was teledermatology. The GPs saw advantages of the services in general and saw clear benefits for their patients. The services were considered to be time-consuming, and the lack of adequate government remuneration for the time involved in teleconsultations was seen as a barrier to their use. The GPs focused on their own ability to handle new technology and expressed a need to practise more.

PMID: 12952708 [PubMed - indexed for MEDLINE]

82: J Telemed Telecare. 2003;9 Suppl 1:S9-12.

Evaluation of an Internet-based teledermatology system.

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We established a Website which allowed clinical dermatology cases to be submitted, with digital images, through a simple online form. The case could then be managed within the public health service. A database containing 6000 drug interactions was also available on the Website to help clinical management.

The Website was tested by 10 junior doctors, who examined dermatology patients, filled in the electronic form with their clinical observations and descriptions, and forwarded digital images. Five dermatologists then evaluated the 71 cases stored on the Website. The agreement between the virtual evaluation and the definitive diagnosis (on face-to-face examination) was 95%. The Website could be used in national health strategies, as a tool for promoting voluntary medical attendance, and for multicentre epidemiological surveillance.

Publication Types:
    Evaluation Studies

PMID: 12952705 [PubMed - indexed for MEDLINE]

83: J Telemed Telecare. 2003;9(3):135-9.

A teledermatological approach to enhance diagnostic accuracy in dermatohistopathology.

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We determined whether digital photographs of skin lesions could enhance diagnostic accuracy in dermatohistological evaluations. Two dermatohistopathologists examined 375 unsorted consecutive cases. On a standardized questionnaire they recorded whether the final diagnostic interpretation would be improved by the availability of digital images of the skin lesions. In 101 cases (27%) they said that digital photographs would be helpful. Subsequently, 30 histological analyses were performed with and without digital photographs of the skin lesions. Presentation of digital photographs reduced the number of differential diagnoses significantly, from a median of 3 to 2. Ratings of ability to make a single definitive diagnosis increased significantly with the presentation of digital photographs. Enhancement of information given by the digital images was scored a median of 6 (on a scale of 0-10, with higher scores reflecting greater enhancement). Digital photographs of skin lesions are likely to refine diagnostic accuracy in histopathology.

PMID: 12877774 [PubMed - indexed for MEDLINE]

84: J Telemed Telecare. 2003;9(1):42-5.

Patient satisfaction with teledermatology services.

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We collected data on patient satisfaction with the use of teledermatology services. During a 27-month study, a single dermatologist saw a total of 321 patients via telemedicine. The patients completed 483 surveys, although not all questions were answered on all surveys. There was a high level of satisfaction among patients using teledermatology: 88% of 258 respondents said that they were satisfied with their telemedicine session. In terms of the eight questions on the questionnaire, 84% of the responses were in the top two positive categories on a seven-point Likert scale. In addition, access to dermatology appeared to increase with the availability of the telemedicine service.

Publication Types:
    Multicenter Study

PMID: 12641892 [PubMed - indexed for MEDLINE]

85: Stud Health Technol Inform. 2003;95:107-12.

An open Internet platform to distributed image processing applied to dermoscopy.

Guillod J, Schmid-Saugeon P, Decaillet F, Panizzon R, Kunt M, Thiran JP.

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Proprietary systems for dermoscopy images analysis are available to improve the diagnosis and follow-up of the pigmented skin lesions. Their performance seems comparable with that of a human expert. Progress in computer-aided classification of melanocytic lesions depends notably on judicious choices of the algorithms dedicated to the extraction of signs from the dermoscopy images and of the method which combines these signs to classify the lesions. To allow the researcher's community to benefit from their large set of elementary algorithms already available for dermoscopy, we set up a system accessible through the Internet which: allows the engineers to register their algorithms while preserving their secrecy: their programs run on their own server; lets a user to define its own sequence of image analysis and to apply it to its images: the system automatically calls the appropriate remote programs; makes possible and stimulates the synergy of worldwide researchers in order to validate algorithms of images analysis best suited to achieve the correct diagnosis and to track the malignant melanoma; makes these techniques available to the greatest number of users through the Web and thus to support a mass screening; reduces the maintenance of the system to the minimum: it requires users only an Internet browser and engineers to follow a simple widespread standardised interface for distributed programs. Various problems should be addressed: the lack of standardisation of images acquisition: algorithms based on relative colours are best suited to this system; the copyrights on images and algorithms; charging the use of remote computer resources. This system allows for an international collaborative work in the fight against the malignant melanoma by offering a conceptual and technical platform of teledermoscopy. It is intended to support synergy between the engineers and the users implied in the diagnosis and teaching of dermoscopy.

PMID: 14663971 [PubMed - indexed for MEDLINE]

86: Telemed J E Health. 2003 Winter;9(4):351-60.

An economic analysis of a store and forward teledermatology consult system.

Whited JD, Datta S, Hall RP, Foy ME, Marbrey LE, Grambow SC, Dudley TK, Simel DL, Oddone EZ.

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Our objective was to assess the economic impact of store-and-forward teledermatology in a United States Department of Veterans Affairs (VA) health care setting. Patients being referred to the Dermatology Consult Service from the Primary Care Clinics at the Durham, North Carolina VA Medical Center were randomized either to usual care or to a teledermatology consultation. Fixed and variable costs for both consult modalities were identified using a microcosting approach. The observed clinical outcomes from the randomized trial generated probability and effectiveness measures that were inserted into a decision model. A cost analysis and a cost-effectiveness analysis that compared the two consult modalities was performed. Teledermatology was not cost saving when compared to usual care using observed costs and outcomes. Sensitivity analyses indicated that teledermatology has the potential to be cost saving if clinic visit costs, travel costs, or averted clinic visits were higher than observed in the study. Teledermatology was cost-effective for decreasing the time required for patients

to reach a point of initial definitive care. Cost-effectiveness ratios ranged from $0.12-0.17 (U.S.) per patient per day of time to initial intervention.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 14980092 [PubMed - indexed for MEDLINE]

87: Exp Dermatol. 2002 Dec;11(6):599-614.

Abstracts of the 3rd European Symposium on Teledermatology. Graz, Austria, November 8-9, 2002.

[No authors listed]

Publication Types:
    Congresses
    Overall

PMID: 12473068 [PubMed - indexed for MEDLINE]

88: Lakartidningen. 2002 Oct 10;99(41):4044-6.

[Teledermatology saves both time and money. Better utilization of physicians, shorter waiting lists]

[Article in Swedish]

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PMID: 12451941 [PubMed - indexed for MEDLINE]

89: Telemed J E Health. 2002 Fall;8(3):323-32.

Web site for training nonmedical health-care workers to identify potentially malignant skin lesions and for teledermatology.

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The development of a Web site to enable nonmedical health professionals to screen skin potentially malignant skin lesions is described. A nurse assistant and a dermatologist tested the Web site. An electronic clinical form was developed to allow a nurse assistant to send case reports and photographs for remote diagnosis by a dermatologist. The nurse assistant photographed the lesions of 92 patients who presented some kind of dermatological condition. The images were then sent for evaluation by the dermatologist followed by in person examination by the same physician. The diagnoses, which resulted from the examination in person and, in some cases, the biopsy results, were compared with the diagnostic impressions of the nurse assistant and with the diagnostic hypothesis of the dermatologist at a distance. The lesions were classified as either malignant or nonmalignant. Kappa statistics showed a high association between the suspected malignity and nonmalignity of the lesions between the dermatologist ($p = 6.01 \times 10(-9)$) and the nurse assistant and between the diagnosis at distance and in person ($p < 1.0 \times 10(-14)$). The Web site allowed a nurse assistant to screen for potentially malignant skin lesions and, thus, proved to be appropriate for a large-scale test.

PMID: 12419026 [PubMed - indexed for MEDLINE]

90: Telemed J E Health. 2002 Fall;8(3):313-21.

Teledermatology's impact on time to intervention among referrals to a dermatology consult service.

Whited JD, Hall RP, Foy ME, Marbrey LE, Grambow SC, Dudley TK, Datta S, Simel DL, Oddone EZ.

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The aim of this study was to determine if a teledermatology consult system, using store-and-forward digital imaging technology, results in patients achieving a shorter time from referral date to date of initial definitive intervention when compared to a traditional referral process. Patients being referred to the dermatology consult service from the primary care clinics at the Durham VA Medical Center were randomized to either a teledermatology consultation or usual care. A usual care consultation consisted of a text-based electronic consult request. A teledermatology consultation included digital images and a standardized history, in addition to the text-based electronic consult. Time to initial definitive intervention was defined as the time between referral date and the date the patient was scheduled for a clinic visit for those patients that the consultant requested a clinic-based evaluation, or the time between referral date and the date the consult was answered by the consultant if a clinic visit was not required. Patients in the teledermatology arm of the study reached a time to initial definitive intervention significantly sooner than did those patients randomized to usual care (median 41 days versus 127 days, $p = 0.0001$, log-rank test). Additionally, 18.5% of patients in the teledermatology arm avoided the need for a dermatology clinic-based visit compared to zero patients avoiding a dermatology clinic visit in the usual care arm of the study ($p < 0.001$, z-test). Teledermatology consult systems can result in significantly shorter times to initial definitive intervention for patients compared to traditional consult modalities, and, in some cases, the need for a clinic-based visit can be avoided.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 12419025 [PubMed - indexed for MEDLINE]

91: Semin Cutan Med Surg. 2002 Sep;21(3):179-89.

Teledermatology and teledermatopathology.

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Teledermatology is in essence an application of clinical telemedicine that deals with the practice of dermatology via the latest communication and information technology. As with other telemedicine applications, the goal is to provide the highest quality of dermatologic care more efficiently by moving patient information rather than the patient. Teledermatopathology, on the other hand, is a nonclinical telemedicine application specifically relating to diagnosis of cutaneous histologic specimens. There are numerous articles evaluating diagnostic concordance of teledermatology. However, because of a lack of a "true" gold standard, most published studies have compared diagnostic capabilities of teledermatology to our traditional face-to-face evaluations. Although the diagnostic correlation varies from study to study, most experts agree that Store and Forward and real-time video teleconferencing

teledermatology is as clinically effective as a face-to-face consultation, which is less than 100% accurate. Teledermatopathology is showing similar potential, but because of the limitations on sampling error and the high cost of the alternative, robotic remote telepathology units, its acceptance into our daily practice has been delayed. This article focuses mainly on Store and Forward Teledermatology given its significant advantage and reviews the literature on teledermatology and teledermatopathology's diagnostic concordance and acceptance.

Publication Types:
    Review

PMID: 12322991 [PubMed - indexed for MEDLINE]

92: Skinmed. 2002 Sep-Oct;1(1):20-4.

Comment in:
    Skinmed. 2002 Sep-Oct;1(1):18-9.

Jumping into the future using teledermoscopy.

Piccolo D, Peris K, Chimenti S, Argenziano G, Soyer HP.

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BACKGROUND: Teledermoscopy uses telecommunication technologies to transfer images of pigmented skin lesions via the Internet for teleconsultation. DESIGN: Clinical and dermoscopic images of 66 and 43 pigmented skin lesions achieved in two consecutive studies were sent by e-mail to dermatologists with different degrees of experience in dermoscopy for a telediagnosis. All lesions included in these studies were surgically excised and diagnosed histopathologically. RESULTS: The diagnostic concordance between the face-to-face diagnosis and the telediagnosis was 91% in the first study, whereas, in the second study, it varied from 76.7%-95.3%. The accuracy of the diagnoses in both studies was not related to the quality of the images, but did highly depend on the level of diagnostic difficulty of a given pigmented skin tumor and on the level of experience of each observer. CONCLUSIONS: Teleconsultation of dermoscopic images of pigmented skin lesions via e-mail provides a similar degree of diagnostic accuracy as face-to-face diagnosis when the diagnosis is made by a dermatologist confident with dermoscopy.

Publication Types:
    Evaluation Studies

PMID: 14673232 [PubMed - indexed for MEDLINE]

93: Skinmed. 2002 Sep-Oct;1(1):18-9.

Comment on:
    Skinmed. 2002 Sep-Oct;1(1):20-4.

Teledermoscopy: a specific application of teledermotology.

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Publication Types:
    Comment

PMID: 14673231 [PubMed - indexed for MEDLINE]

94: Australas J Dermatol. 2002 Aug;43(3):171-4.

Teledermatology: influence of zoning and education on a clinician's ability to observe peripheral lesions.

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Teledermatology can benefit rural and remote communities, where specialist dermatological services may not be readily available. Regarding store-and-forward teledermatology, we hypothesized that the site of a lesion in an image (zoning) may influence a clinician's ability to observe target lesions, and that education on image viewing may improve use of this technology. We examined this by conducting both pre- and post-education studies. The education on image viewing consisted of a presentation on the outcome of the first study-survey on image viewing. The first study demonstrated that zoning influences a clinician's visual attention and that significant, concurrent lesions in the periphery may be missed. The second study demonstrated that brief education could produce a measurable change in observing peripheral lesions. These findings have medico-legal implications and suggest that further education in the use of such technology is necessary in order to optimize patient care and prevent potential errors.

PMID: 12121392 [PubMed - indexed for MEDLINE]

95: Acad Med. 2002 Jul;77(7):742-3.

A picture is worth more than a thousand words: enhancement of a pre-exam telephone consultation in dermatology with digital images.

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OBJECTIVE: In addition to the assessment and the management of patients with skin diseases, a considerable portion of dermatology residency involves examining clinical images and generating differential diagnoses from these images. This training, though helpful for recognizing manifestations of rare disorders, goes unused by most practicing dermatologists after certification. In contrast, dermatology residents learn and master verbal descriptions of skin diseases and continue to use this skill throughout their careers. However, problems arise when a dermatologist is not available and a non-dermatologist attempts to verbally describe a skin condition. An accurate description of a cutaneous disorder can facilitate effective triage management of a patient when a dermatologist is not available. Unfortunately, an inaccurate description by the referring provider can lead to diagnostic bias and ineffective, or even harmful, initial treatment. In recent years, digital photography has facilitated the electronic transfer of clinical images over distances. However, despite the promise that this technique shows in providing teledermatologic services to specialty-underserved areas and the availability of low-cost digital cameras, telephone consultation is still the standard of care when a dermatologist is not available. The purpose of this study is to compare the reliability of dermatologic consultations that use the telephone with that of dermatologic consultations that use both the telephone and digital images. DESCRIPTION: After patient approval, an acute care provider randomly assigned patients with skin disorders of unclear etiology to two groups, with and without digital images. The acute care provider then performed an exam and took the patient's history. Telephone data, with or without digital images, were then presented to the consulting dermatologist, who formulated a pre-physical exam differential diagnosis and treatment plan. The consulting dermatologist immediately examined the patient in person and refined the diagnosis and management. The confidence

in diagnosis, both before and after the in-person exam, was compared in the patient group with digital images and in the patient group without digital images using a five-point scale (1 = no confidence, 5 = most confident). DISCUSSION: The consulting dermatologist evaluated 12 patients (six with digital images and six without digital images). In the patient group with digital images, the consulting dermatologist's confidence in diagnosis varied very little from before to after the in-person exam (from no change in five cases to a one-point increase in the sixth case). In the patient group without digital images, the consulting dermatologist's confidence level increased significantly from before to after the in-person exam. This led to therapy changes for three of the six patients in the patient group without digital images, versus two of the six patients in the patient group with digital images. This study indicates that an acute care provider's verbal description of a skin condition may be less reliable compared with a provider's verbal description combined with digital images. Telephone-only descriptions may also lead to management discrepancies more frequently than telephone descriptions with digital images. This has at least two implications for medical education: (1) need for support of formal teaching of the language of dermatology to non-dermatologists and (2) justification of the time spent in two-dimensional clinical image interpretation by dermatology residents in light of digital image technology.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 12114161 [PubMed - indexed for MEDLINE]

96: Dermatol Surg. 2002 Jul;28(7):643-5.

Interobserver agreement on dermoscopic features of pigmented basal cell carcinoma.

Peris K, Altobelli E, Ferrari A, Fargnoli MC, Piccolo D, Esposito M, Chimenti S.

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BACKGROUND: A dermoscopic method based on the absence of a pigment network and the presence of at least one of six positive features has been described for diagnosis of pigmented basal cell carcinoma (BCC). OBJECTIVE: To evaluate the observers' global agreement and interobserver agreement on each dermoscopic parameter of the method recently proposed. METHODS: Dermoscopic images of 56 pigmented BCCs were examined by five observers with different degrees of experience in dermoscopy. RESULTS: An overall full agreement was reached for the absence of pigment network (k = 1). Very good agreement was detected for the presence of spoke wheel areas (k = 0.85) and arborizing vessels (k = 0.72), and good agreement was shown for ulceration (k = 0.49) and multiple blue-gray globules (k = 0.41). No agreement was identified on large blue-gray ovoid nests (k = 0.28) and leaflike areas (k = 0.26). CONCLUSION: We confirm the reproducibility of the method and show that ulceration, spoke wheel areas, and arborizing tel- angiectases represent the most robust positive parameters.

PMID: 12135528 [PubMed - indexed for MEDLINE]

97: J Am Acad Dermatol. 2002 Jul;47(1):68-72.

Patient and referring provider satisfaction with teledermatology.

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BACKGROUND: Teledermatology has become more widely used, but its impact has not been clearly elucidated. We developed a teledermatology program in response to clinical need, based on the store-and-forward approach. OBJECTIVE AND METHODS: Our purpose was to evaluate the satisfaction of patient and referring physician by using telephone interview. RESULTS: Both patients and providers considered this a useful program and would recommend it to a friend or colleague. The patients were split in their overall rating of the program and its ability to treat their skin conditions. Their greatest concern was their lack of direct contact with their dermatologist. Other common concerns were waiting time and follow-up. Privacy concerns were not commonly mentioned. Providers expressed greater satisfaction than their patients. Their greatest concerns involved the inability of the program to handle the demand. CONCLUSION: The program provided a service that was valued by both patients and providers. The most common concern was the impact on the physician-patient relationship.

Publication Types:
    Evaluation Studies

PMID: 12077584 [PubMed - indexed for MEDLINE]

98: Telemed J E Health. 2002 Summer;8(2):143-7.

Telemedicine versus in-person dermatology referrals: an analysis of case complexity.

Krupinski E, Barker G, Rodriguez G, Engstrom M, Levine N, Lopez AM, Weinstein RS.

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The goal of this study was to determine whether teledermatology referrals differ significantly from in-person referrals with respect to case complexity and diagnosis of cases referred. Teledermatology cases were compared to in-person cases seen by the same university dermatologist who also reviews the teledermatology cases. These were also compared with in-person cases evaluated by a different dermatologist at local clinics using traditional referral patterns. Study parameters included Current Procedural Terminology (CPT) codes as a measure of case complexity, International Classification of Disease (ICD) codes as a measure of case types, and time from referral to actual consultation. The most common CPT codes used for teledermatology were 99241 and 99242 with no significant differences in the frequency of assigned CPT codes for teledermatology versus in-person consultation. An analysis of the diagnostic codes revealed no significant differences between the types of cases referred to telemedicine and those referred for in-person consultation. Time between referral and actual encounter with the dermatologist was significantly shorter via telemedicine than either local or university clinic in-person visits.

PMID: 12079603 [PubMed - indexed for MEDLINE]

99: Comput Biol Med. 2002 May;32(3):209-20.

'CHEATS': a generic information communication technology (ICT) evaluation framework.

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This paper describes a generic framework for the evaluation of information communication technologies. This framework, CHEATS, utilises both qualitative

and quantitative research methods and has proved appropriate in multiple clinical settings including telepsychiatry, teledermatology and teleeducation. The paper demonstrates how a multidisciplinary approach is essential when evaluating new and emerging technologies, particularly when such systems are implemented in real service as opposed to a research setting.

PMID: 11922936 [PubMed - indexed for MEDLINE]

100: Ann Dermatol Venereol. 2002 Jan;129(1 Pt 1):102-7.

[Multicentre randomised control trial comparing real time teledermatology with conventional outpatient dermatological care: societal cost-benefit analysis]

[Article in French]

Machet L.

Nantes, France.

Publication Types:
    Clinical Trial
    Multicenter Study
    Randomized Controlled Trial

PMID: 12035736 [PubMed - indexed for MEDLINE]

101: Arch Dermatol. 2002 Jan;138(1):53-8.

Comment in:
    Arch Dermatol. 2002 Oct;138(10):1380.

Concordance between telepathologic diagnosis and conventional histopathologic diagnosis: a multiobserver store-and-forward study on 20 skin specimens.

Piccolo D, Soyer HP, Burgdorf W, Talamini R, Peris K, Bugatti L, Canzonieri V, Cerroni L, Chimenti S, De Rosa G, Filosa G, Hoffmann R, Julis I, Kutzner H, Manente L, Misciali C, Schaeppi H, Tanaka M, Tyler W, Zelger B, Kerl H.

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OBJECTIVE: To study the validity and feasibility of transferring images of cutaneous biopsy specimens via e-mail to remote physicians active in dermatopathology for teleconsultation. DESIGN: Twenty skin specimens previously diagnosed at the Department of Dermatology, University of Graz, Austria, were subsequently sent for teleconsultation using the store-and-forward method. For each case, 3 or 4 images at different magnifications were sent by e-mail to 16 colleagues (11 dermatopathologists and 5 pathologists) in 15 centers in 6 different countries. Six weeks later each observer received the hematoxylin-eosin-stained specimens to render a conventional diagnosis. SETTING: Dermatopathology and pathology units within institutional and private settings. MATERIAL: Twenty small skin biopsy specimens of cutaneous diseases were selected randomly from a study set of 80. MAIN OUTCOME MEASURE: Concordance between telepathologic diagnoses and conventional histopathologic diagnoses of 20 skin specimens. RESULTS: On average, 78% of the telediagnoses were correct (range, 60%-95%), whereas 85% of the conventional diagnoses were correct (range, 60%-95%). A perfect diagnostic concordance was obtained in 7 (35%) of 20 cases, and a significant difference was identified in only 1 case. CONCLUSIONS: Results suggest that telepathology performed by physicians active in dermatopathology may serve as a reliable technique for the diagnosis of cutaneous diseases when experts in dermatopathology are not available locally. Furthermore, teledermatopathology is attractive because it provides an opportunity to obtain timely consultation on difficult cases.

PMID: 11790167 [PubMed - indexed for MEDLINE]

102: Hautarzt. 2002 Jan;53(1):11-7.

[Dermatology in telemedicine. Possibilities and limits]

[Article in German]

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Telemedicine including teledermatology is the application of telecommunication technology for the purpose of diagnostics, planning and guiding of therapy and education. With the possibility to gain fast access to specialty knowledge, telemedicine makes it possible to deliver health care to patients at distant sites. By participating in telemedical consultations, patients receive accurate diagnosis in a rapid manner and save travel costs and time. Due to recent advances in computing and telecommunications technology, telemedicine will assume a more and more important role in future health care delivery. Telemedicine is utilized by almost all medical specialties but to varying degrees. Dermatology as a visually based specialty is predestined to use the various capabilities of telemedicine. The main applications so far include teledermatohistology and clinical teledermatology. The objective of this paper is to present the current status of teledermatology as part of telemedicine with a look toward future applications.

PMID: 11963216 [PubMed - indexed for MEDLINE]

103: J Telemed Telecare. 2002;8 Suppl 2:1-2.

Telemedicine and changes in the distribution of tasks between levels of care.

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The present investigation, which was part of a larger study, was designed to answer the question 'Has telemedicine produced changes in the distribution of tasks between the general practitioner and specialist, or between the local hospital and university/central hospital?' Qualitative interviews were carried out with 30 persons involved in four telemedicine services in Norway: teledermatology, tele-otolaryngology, telepsychiatry, and a telepathology frozen-section service. The results indicated that telemedicine does not produce large changes in the distribution of tasks. The reported effects were largest and most complex for telepsychiatry, followed by teledermatology. Local variations in how telemedicine is practised may explain the variation in the findings between telemedicine applications.

PMID: 12217112 [PubMed - indexed for MEDLINE]

104: J Telemed Telecare. 2002;8 Suppl 1:1-30.

Systematic review of evidence for the benefits of telemedicine.

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A systematic review of telemedicine assessments based on searches of electronic databases between 1966 and December 2000 identified 66 scientifically credible

studies that included comparison with a non-telemedicine alternative and that reported administrative changes, patient outcomes, or results of economic assessment. Thirty-seven of the studies (56%) suggested that telemedicine had advantages over the alternative approach, 24 (36%) also drew attention to some negative aspects or were unclear whether telemedicine had advantages and five (8%) found that the alternative approach had advantages over telemedicine. The most convincing evidence on the efficacy and effectiveness of telemedicine was given by some of the studies on teleradiology (especially neurosurgical applications), telemental health, transmission of echocardiographic images, teledermatology, home telecare and on some medical consultations. However, even in these applications, most of the available literature referred only to pilot projects and to short-term outcomes. Few papers considered the long-term or routine use of telemedicine. For several applications, including teleradiology, savings and sometimes clinical benefit were obtained through avoidance of travel and associated delays. Studies of home care and monitoring applications showed convincing evidence of benefit, while those on teledermatology indicated that there were cost disadvantages to health-care providers, although not to patients. Forty-four of the studies (67%) appeared to have potential to influence future decisions on the telemedicine application under consideration. However, a number of these had methodological limitations. Although useful clinical and economic outcomes data have been obtained for some telemedicine applications, good-quality studies are still scarce and the generalizability of most assessment findings is rather limited.

Publication Types:
    Review

PMID: 12020415 [PubMed - indexed for MEDLINE]

105: J Telemed Telecare. 2002;8(2):107-11.

Learning in organizations working with telemedicine.

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To investigate learning in telemedicine, qualitative interviews were conducted with 30 people working with telepsychiatry, teledermatology, a telepathology frozen-section service and tele-otolaryngology. More than 80% of the respondents said that they had learnt something new by using telemedicine. Most frequently the participants improved their knowledge of the specialty in which they were involved, but this was not the only way in which they learnt. The learning did not necessarily change behaviour, as two-thirds of the respondents felt that the learning had not permitted them to perform tasks for which they had previously needed assistance (although this varied somewhat with the type of telemedical work that respondents were engaged in). Two-thirds of respondents thought that something more could be done in telemedical work to promote their own learning, which shows the clear potential for learning by telemedicine. Learning could be promoted further by extending the use of the technology to other applications. To start working with telemedicine, initial instruction seems to be sufficient--a more extensive training programme appears unnecessary. In future, as many applications of telemedicine are implemented, health-care organizations may become important arenas for learning and leaders will have to focus on learning. The results of the present study clearly showed that working with telemedicine produces learning.

PMID: 11972946 [PubMed - indexed for MEDLINE]

106: J Telemed Telecare. 2002;8(2):63-71.

A review of guidelines and standards for telemedicine.

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We conducted a review to establish the range and scope of current telemedicine guidelines and standards. Published guidelines were identified by searching the Medline and Telemedicine Information Exchange (TIE) databases, and by performing a Google search using the term 'telemedicine guidelines'. Three types of guidelines were identified, namely clinical, operational and technical. Clinical guidelines included those for teleradiology, telepsychiatry, home telenursing, minor injuries telemedicine, surgical telemedicine, teledermatology and telepathology. Operational guidelines included those for email communication, Internet access and videoconferencing. Technical guidelines included those from the American Telemedicine Association and the US Office for the Advancement of Telehealth. The main standards relevant to telemedicine include those of the International Telecommunication Union and the DICOM standard. The scarcity of guidelines and standards suggests that telemedicine is not yet near to routine use. If an international telemedicine organization were to take responsibility for defining guidelines, under the direction of clinicians with appropriate telemedicine experience, this might speed up their development.

Publication Types:
    Review

PMID: 11972941 [PubMed - indexed for MEDLINE]

107: J Telemed Telecare. 2002;8(1):41-7.

Changes in the job situation due to telemedicine.

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Little is known either about how telemedicine changes the job situation or about how the working environment might be improved for those involved in telemedicine. To investigate these issues, qualitative interviews were carried out with 30 people in Norway working with telepsychiatry (12 respondents), teledermatology (six respondents), a telepathology frozen-section service (10 respondents) and tele-otolaryngology (two respondents). The median annual number of remote consultations in telepsychiatry was nine, in teledermatology 81 and in the telepathology frozen-section service nine. The positive aspects of working with telemedicine included less travelling, which gave more time for other work, less need to travel in poor weather, new contacts, an increased sense of professional security (because support was readily available) and the satisfaction of seeing partners in communication. At its present volume, telemedicine generally fits into daily work patterns quite well. Problems do occur, but they can be solved by appropriate organizational measures. Long-term scheduling of telemedical sessions may be important. Many telemedicine workers want to have the equipment in their own office. Working with telemedicine can be tiring and those interviewed wanted to limit the number of hours per week. A solution may be to use large clinics, such as university clinics, where the telemedical work could be distributed between several specialists. Large telemedicine clinics with a full-time dedicated staff would need careful consideration of working practices.

PMID: 11809084 [PubMed - indexed for MEDLINE]

108: Recent Results Cancer Res. 2002;160:125-32.

Why is epiluminescence microscopy important?

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The new morphological information provided by epiluminescence microscopy (ELM) requires a fresh approach to the analysis of pigmented lesions. It necessitates a learning process that pertains to the recognition of hitherto unknown morphological features and is based on the discrimination of these features and their combination into two different patterns. ELM has been shown to improve the sensitivity and specificity of the diagnosis of melanoma and other pigmented lesions by 25-30%. Digitized ELM (DELM) provides an unlimited capacity for data storage and retrieval. It is a computerized imaging method, objective and noninvasive; it provides objective evidence of lesional changes on follow-up; documents growth and any changes in the structure and shape of lesions; and thus helps in decisions on whether to excise them or not. It provides for quality control by means of the aforementioned documentation, which may also serve as back-up in the case of medico-legal problems. In addition, the spectrum is widened by the dimension of teledermatology and cybernet computer-assisted diagnosis, which holds great promise for the future. ELM and DELM are thus the most important single development of the past three decades in the early diagnosis of melanoma.

PMID: 12079206 [PubMed - indexed for MEDLINE]

109: Br J Dermatol. 2001 Dec;145(6):911-7.

Patient satisfaction with teledermatology is related to perceived quality of life.

Williams TL, Esmail A, May CR, Griffiths CE, Shaw NT, Fitzgerald D, Stewart E, Mould M, Morgan M, Pickup L, Kelly S.

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BACKGROUND: There is a lack of good data about patient satisfaction with teledermatology and about its potential interaction with quality-of-life factors. OBJECTIVES: To assess the association between perceived skin-related quality of life and patient satisfaction with a nurse-led teledermatology service. METHODS: In a mobile nurse-led teledermatology clinic located in four inner city general practices in Manchester, the teledermatology service used digital cameras to capture and store images of skin conditions for remote diagnosis by dermatologists. One hundred and twenty-three adult patients, non-urgent dermatology referrals from primary care, completed the Dermatology Life Quality Index (DLQI) and a 15-item patient satisfaction questionnaire. RESULTS: In common with other studies of patient satisfaction, subjects reported highly favourable views of 'hotel' aspects of the service (93%) and found it 'convenient' (86%). However, 40% of patients would have preferred to have had a conventional face-to-face consultation with a dermatologist, and 17% felt unable to speak freely about their condition. Patient satisfaction with the service was related to quality of life. Patients reporting lower quality of life as measured by the DLQI were more likely to prefer a face-to-face encounter with a dermatologist ($r = 0.216$, $P < 0.05$), and to evince anxiety about being photographed ($r = 0.223$, $P < 0.05$). CONCLUSIONS: Patient acceptance and satisfaction with telemedicine services is complicated by patients' subjective health status. Telehealthcare providers need to recognize that patients with poor quality of life may want and benefit from face-to-face interaction with expert clinicians.

Publication Types:
Evaluation Studies

PMID: 11899144 [PubMed - indexed for MEDLINE]

110: Australas J Dermatol. 2001 Nov;42(4):247-51.

Accuracy and reliability of store-and-forward teledermatology: preliminary results from the St George Teledermatology Project.

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Teledermatology is the practice of dermatology across distances (and time) and involves the transfer of electronic information. To be effective and safe, the teledermatology process needs to demonstrate an acceptable level of accuracy and reliability. Accuracy is reflected by the degree of concordance (agreement) between the teledermatology and face-to-face diagnoses. Reliability is dependent on how consistently a set of results can be reproduced across different operators. Mean concordance (primary diagnoses) achieved by four dermatologists studying 53 store-and-forward diagnostic cases, originating from 49 referred patients, was 79% (range 73-85%). When the differential diagnoses were taken into account, the variation across individual dermatologists narrowed further, with a mean of 86% (range 83-89%). In contrast, the mean general practitioner (GP; n=11) concordance (GP face-to-face vs reference dermatologist store-and-forward diagnoses) was 49%. An interim review of all 49 teledermatology patients showed no adverse outcome at the end of 3 months. The ability to request face-to-face visits by dermatologists, combined with GPs maintaining primary care of the referred patient, serve as additional safeguards for patients using a telemedicine system. Our results indicate that teledermatology management of referred skin complaints is both accurate and reliable.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 11903155 [PubMed - indexed for MEDLINE]

111: Br J Dermatol. 2001 Apr;144(4):696-707.

Teledermatology: a review.

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Teledermatology holds great potential for revolutionizing the delivery of dermatology services, providing equitable service to remote areas and allowing primary care physicians to refer patients to dermatology centres of excellence at a distance. However, before its routine application as a service tool, its reliability, accuracy and cost-effectiveness need to be verified by rigorous evaluation. Teledermatology can be applied in one of two ways: it may be conducted in real-time, utilizing videoconferencing equipment, or by store-and-forward methods, when transmitted digital images or photographs are submitted with a clinical history. While there is a considerable range of reported accuracy and reliability, evidence suggests that teledermatology will become increasingly utilized and incorporated into more conventional dermatology service delivery systems. Studies to date have generally found that real-time dermatology is likely to allow greater clinical information to be obtained from the patient. This may result in fewer patients requiring conventional consultations, but it is generally more time-consuming and costly to the health service provider. It is often favoured by the patient because of the instantaneous nature of the diagnosis and management regimen for the condition, and it has educational value to the primary care physician. Store-and-forward

systems of teledermatology often give high levels of diagnostic accuracy, and are cheaper and more convenient for the health care provider, but lack the immediacy of patient contact with the dermatologist, and involve a delay in obtaining the diagnosis and advice on management. It is increasingly likely that teledermatology will prove to be a significant tool in the provision of dermatology services in the future. These services will probably be provided by store-and-forward digital image systems, with real-time videoconferencing being used for case conferences and education. However, much more research is needed into the outcomes and limitations of such a service and its effect on waiting lists, as well as possible cost benefits for patients, primary health care professionals and dermatology departments.

Publication Types:
    Review

PMID: 11298526 [PubMed - indexed for MEDLINE]

112: J Cutan Med Surg. 2001 Mar-Apr;5(2):111-6. Epub 2001 Mar 2.

Teledermatology in New Zealand.

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BACKGROUND: Teledermatology is the delivery of specialist dermatological services at a distance. It has become possible because of technological advances in digital imaging and telecommunications. Consultations may be "interactive" using video-conferencing equipment or "store-and-forward" using prerecorded text and images. The best method to deliver teledermatology services is unknown. OBJECTIVE: Studies were designed to determine (a) if it was possible to diagnose and manage skin diseases using video-conferencing equipment, (b) if teledermatology was acceptable to patients and medical practitioners, and (c) whether it offered any economic advantages. We have also compared interactive and store-and-forward techniques. METHOD: The trials were conducted in collaboration with the Institute of Telemedicine & Telecare, Queen's University, Belfast, as part of the UK Teledermatology Trials. RESULTS: The trials have involved more than 300 teledermatology consultations. Having established that a diagnosis can be made in more than two-thirds of the cases, the majority of video consultations have resulted in satisfactory management, with only small numbers of patients requiring face-to-face review. Teledermatology is generally popular with patients and can save them considerable time and money. Routine clinics continue in three centers. We have found that effective store-and-forward teledermatology requires very good images and comprehensive historical referral data.

Publication Types:
    Review

PMID: 11443482 [PubMed - indexed for MEDLINE]

113: Br J Dermatol. 2001 Feb;144(2):328-33.

Evaluating a telemedicine system to assist in the management of dermatology referrals.

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BACKGROUND: Teledermatology systems fall into two categories: live video or store-and-forward. In the former, video-conferencing equipment is used to connect a patient with a remote consultant. This method has been evaluated as an aid to dermatology, but it is expensive both in terms of capital and running costs. Video consultations are generally longer than conventional ones and harder to schedule. Some authors have considered store-and-forward as an alternative to live video: instead of a consultation, specialists could make a rapid inspection of a transmitted still image. OBJECTIVES: A study was conducted to evaluate the role of telemedicine in the dermatology outpatients department of a district general hospital (Whittington Hospital NHS Trust, London, U.K.). METHODS: One hundred and ninety-four patients were seen by one of two consultant dermatologists. A nurse used a video camera to store digital images of each patient's problem and compiled a history from the GP's referral letter. The images were reviewed 13 months later by both dermatologists; they recorded a provisional diagnosis and an assessment of how urgent an appointment would have been made given the information provided by the system. A third consultant graded the level of agreement between the telemedicine diagnoses and the face-to-face consultations. RESULTS: High levels of agreement were found between the diagnoses of the dermatologists using the system to inspect images and those of the dermatologist who saw the patients (77%). Consultants using the system recommended fewer urgent appointments (32% compared with 64%) and felt that in 31% of cases the patient did not need to be seen. In 15% of these cases (5% of the total), however, their diagnosis differed significantly from that of the consultant who saw the patient. Had the system been in use, 14% of patients conventionally assigned a non-urgent appointment would have been seen urgently. CONCLUSIONS: The images allowed a reasonably accurate diagnosis. The software was not reliable (six cases could not be viewed), or easy to use (it took approximately an hour to view 20 cases) but an improved version could be used in triaging outpatient appointments.

Publication Types:
    Evaluation Studies

PMID: 11251567 [PubMed - indexed for MEDLINE]

114: Adv Dermatol. 2001;17:325-38.

Teledermatopathology.

Black-Schaffer S, Flotte TJ.

Harvard Medical School, Massachusetts General Hospital, Boston, USA.

PMID: 11758122 [PubMed - indexed for MEDLINE]

115: Am J Clin Dermatol. 2001;2(2):59-64.

Teledermatology. Current status and future directions.

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Teledermatology is becoming an increasingly common means of delivering dermatologic healthcare worldwide and will almost certainly play a greater role in the future. The type of technology used distinguishes the 2 modes of teledermatology consultation. The store and forward technique uses still digital images generated by a digital camera. Consultations of this type are considered asynchronous since the images are obtained, sent, and reviewed at different times. In contrast, real-time interactive consultations are synchronous. Patients and clinicians interact in real-time through an audio-video communication link. Each modality has its advantages and disadvantages, and

studies appear in the literature that assess both technologies. Although diagnostic reliability (precision) assessments for teledermatology are subject to limitations, existing information indicates that both store and forward and real-time interactive technology result in reliable diagnostic outcomes when compared with clinic-based evaluations. Less information regarding diagnostic accuracy is available; however, one evaluation that used store and forward technology found comparable diagnostic accuracy between teledermatology consultations and clinic-based examinations. Currently, little information is available regarding cost effectiveness and patient outcomes. Existing evidence, while inconclusive, suggests that teledermatology may be more costly than traditional clinic-based care, especially when using real-time interactive technology. Teledermatology has been shown to have utility as a triage mechanism for determining the urgency or need for a clinic-based consultation. Overall, patients appear to accept teledermatology and are satisfied with it as a means of obtaining healthcare. Clinicians have also generally reported positive experiences with teledermatology. Future studies that focus on cost effectiveness, patient outcomes, and patient and clinician satisfaction will help further define the potential of teledermatology as a means of dermatologic healthcare delivery.

Publication Types:
    Review

PMID: 11705304 [PubMed - indexed for MEDLINE]

116: Hautarzt. 2001 Jan;52(1):26-30.

[Evaluation of a telemedicine pilot project]

[Article in German]

Schiener R, Bredlich RO, Pillekamp H, Peter RU.

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BACKGROUND AND OBJECTIVE: Rapid progress in computer and information technologies has led to an increased interest in the use of telemedicine during the past few years.Thus it should be clarified, whether teledermatology can achieve comparable results to conventional specialist examination and advice. PATIENTS/METHODS: We initiated a pilot study, comparing teledermatology with conventional examination in a dermatology outpatient setting. 60 patients were included. RESULTS: Out of 60 teledermatological examinations, remote clinicians were in agreement with face-to-face clinicians in 90%. Teledermatology was unable to make a useful diagnosis in 6 patients, however further diagnostic procedures were ordered, enabling teledermatologists to achieve correct diagnoses. Regarding need for further diagnostic tests, there was no difference between teledermatology and conventional examination. CONCLUSIONS: Teledermatology appears suitable to transfer a dermatologist's expertise over large distances.

Publication Types:
    Evaluation Studies

PMID: 11220234 [PubMed - indexed for MEDLINE]

117: J Telemed Telecare. 2001;7 Suppl 2:59-61.

Teledermatology in the Waikato region of New Zealand.

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Teledermatology consultations over a video-link began at Health Waikato in 1995. Clinical trials involving about 500 patients have demonstrated the diagnostic accuracy and economic gains of these teleconsultations, and patient satisfaction with them. Yet, six years on, out-of-date equipment remains under-used. There has been no expansion of the network and no additional clinical teleconsultation services. Possible reasons include the excessive capital cost of videoconferencing equipment, clinician overwork, inconvenience, lack of reimbursement, administrative and governmental inertia, and little demand from patients and their doctors. To widen our referral base without the inconvenience of videoconferencing, we decided to offer a secure browser-based dermatology tele-advice service to referring general practitioners who owned digital cameras. With the increase in online health information and electronic communication, we assumed it would be popular. But, despite up to six-month waits for patients to be seen in the dermatology outpatient clinic, few patients have been referred to the service. Explanations have included time constraints, unavailability of a camera, no Internet access at the time of consultation and lack of reimbursement. Can we look forward to a future in which all doctors have high-speed access to the Internet at their desktop through their practice management systems? Who will pay? Will they continue to prefer conventional referral?

Publication Types:
    Evaluation Studies

PMID: 11747661 [PubMed - indexed for MEDLINE]

118: J Telemed Telecare. 2001;7 Suppl 2:55-9.

Progress in Australian teledermatology.

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Because of their remoteness, the majority of rural towns in Australia are disadvantaged in terms of access to dermatological services. Telemedicine offers one solution. Since the mid-1990s, Australian dermatologists have experimented with telemedicine as an adjunct to clinical practice. The technical viability of teledermatology was first demonstrated in 1997. In 1999, the accuracy and reliability of teledermatology were demonstrated in a real-life urban setting. In 2001, Broken Hill (in western New South Wales), a location remote from dermatology services, served as a trial site for the institution of teledermatology as the primary method of accessing dermatological services. High patient and general practitioner acceptability and positive medical outcomes were demonstrated, but the study also revealed unexpected barriers and pitfalls in the effective operation of rural teledermatology.

Publication Types:
    Evaluation Studies

PMID: 11747660 [PubMed - indexed for MEDLINE]

119: J Telemed Telecare. 2001;7 Suppl 1:45-6.

Patient satisfaction with store-and-forward teledermatology.

Williams T, May C, Esmail A, Ellis N, Griffiths C, Stewart E, Fitzgerald D, Morgan M, Mould M, Pickup L, Kelly S.

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We assessed patient satisfaction with a nurse-led store-and-forward teledermatology service in Manchester. A teledermatology nurse obtained the patient's history, took digital photographs of the patient's skin lesion and then sent the information to a hospital dermatologist, who responded with management advice the following week. Of 141 patients who attended their teledermatology appointment, 123 (50 male, 73 female) completed the study questionnaire (87%). The average age of respondents was 42 years (SD 17, range 18-90 years). Ninety-three per cent reported that they were happy with the teleconsultation while 86% reported that it was more convenient than going to the outpatient clinic. Forty per cent agreed that they would feel more comfortable seeing the dermatologist in person while only 58% were comfortable with not speaking to the dermatologist about their skin condition. The absence of interaction with the dermatologist and the delay in receiving management advice may have contributed to the somewhat low satisfaction rates.

PMID: 11576488 [PubMed - indexed for MEDLINE]

120: J Telemed Telecare. 2001;7 Suppl 1:23-5.

A simulation model for analysing patient activity in dermatology.

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We developed a general model to assess patient activity within the primary and secondary health-care sectors following a dermatology outpatient consultation. Based on observed variables from the UK teledermatology trial, the model showed that up to 11 doctor-patient interactions occurred before a patient was ultimately discharged from care. In a cohort of 1000 patients, the average number of health-care visits was 2.4 (range 1-11). Simulation analysis suggested that the most important parameter affecting the total number of doctor-patient interactions is patient discharge from care following the initial consultation. This implies that resources should be concentrated in this area. The introduction of teledermatology (either realtime or store and forward) changes the values of the model parameters. The model provides a quantitative tool for planning the future provision of dermatology health-care.

PMID: 11576479 [PubMed - indexed for MEDLINE]

121: J Telemed Telecare. 2001;7(5):257-65.

A comparative study of teleconsultations versus face-to-face consultations.

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We compared the diagnoses made by one dermatologist via telemedicine with those of another dermatologist made in a face-to-face consultation. The patients first underwent a teledermatology consultation and then a face-to-face consultation. A general practitioner was present with the patient in the videoconference studio. Videoconferencing equipment connected at 384 kbit/s was used. The doctor-patient relationship and the satisfaction of the patients and dermatologists in the two settings were assessed, as well as technical conditions during the videoconferences. There were 121 patients, with a mean age of 40 years (range 17-82 years). There was a high degree of concordance between the two sets of diagnoses, with 72% complete agreement and 14% partial agreement between the two dermatologists. A total of 116 patients (96% of those included) completed a questionnaire. Both the patients and the dermatologists were in general satisfied with the videoconferences. Videoconferencing with a participating

general practitioner may be useful in dermatology, but the technique should be used only for selected patients.

PMID: 11571079 [PubMed - indexed for MEDLINE]

122: J Telemed Telecare. 2001;7(4):233-8.

A cost-minimization analysis of the societal costs of realtime teledermatology compared with conventional care: results from a randomized controlled trial in New Zealand.

Loane MA, Oakley A, Rademaker M, Bradford N, Fleischl P, Kerr P, Wootton R.

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A randomized controlled trial was carried out to measure the societal costs of realtime teledermatology compared with those of conventional hospital care in New Zealand. Two rural health centres were linked to a specialist hospital via ISDN at 128 kbit/s. Over 10 months, 203 patients were referred for a specialist dermatological consultation and 26 were followed up, giving a total of 229 consultations. Fifty-four per cent were randomized to the teledermatology consultation and 46% to the conventional hospital consultation. A cost-minimization analysis was used to calculate the total costs of both types of dermatological consultation. The total cost of the 123 teledermatology consultations was NZ$34,346 and the total cost of the 106 conventional hospital consultations was NZ$30,081. The average societal cost of the teledermatology consultation was therefore NZ$279.23 compared with NZ$283.79 for the conventional hospital consultation. The marginal cost of seeing an additional patient was NZ$135 via teledermatology and NZ$284 via conventional hospital appointment. From a societal viewpoint, and assuming an equal outcome, teledermatology was a more cost-efficient use of resources than conventional hospital care.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 11506759 [PubMed - indexed for MEDLINE]

123: J Telemed Telecare. 2001;7(4):212-8.

Telemedical work and cooperation.

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In telemedicine, cooperation occurs via telecommunication. This represents a new situation for medical cooperation. Whether such cooperation works poorly or well will be important with an increasing volume of telemedicine. When personnel are involved in external cooperation, as in telemedicine, the question of cooperation within one's own organization also arises. To investigate these matters, qualitative interviews were performed with 30 persons working in teledermatology, telepsychiatry, a telepathology frozen-section service and tele-otolaryngology. The results showed that cooperating by telecommunication mainly worked well. The cooperation may be influenced by factors such as personality, knowing each other personally, preparation and experience. Telemedical teamwork may be improved by factors like experience and education. Working with telemedicine did not reduce the personnel's cooperation within their own organizations, but rather improved it, although this effect was slight and most commonly involved improved knowledge of others. In general, the findings concerning cooperation and telemedicine were positive.

PMID: 11506756 [PubMed - indexed for MEDLINE]

124: J Telemed Telecare. 2001;7(4):193-8.

Teledermatology as a tool for communication between general practitioners and dermatologists.

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A feasibility study of teledermatology was undertaken in Groningen. Six general practitioners (GPs) sent digital images by email, along with relevant patient information, to dermatologists at the Martini Ziekenhuis Groningen, a general non-academic hospital. The dermatologists returned their responses by email. A total of 89 cases were dealt with in this way. On average, the GPs took three photographs per patient. The time taken by the GP to produce and transmit the images, and to implement the telemedicine advice received from the dermatologist, was 9 min and 3 min, respectively. The time spent on diagnosis, provision of advice and response by email amounted to 10 min for the dermatologist. It was concluded that teleconsultations by email are feasible in the daily practice of GPs and dermatologists in a general non-academic hospital. Generally, GPs, dermatologists and patients were satisfied with teleconsultations. Furthermore, GPs reported that 63% of the teleconsultations were of educational value.

PMID: 11506753 [PubMed - indexed for MEDLINE]

125: J Telemed Telecare. 2001;7(3):181-3.

Teleradiology and teledermatology in Finnish military medicine.

Voipio V, Lamminen H, Ruohonen K, Autio P, Ahovuo J, Sahi T.

Publication Types:
    Letter

PMID: 11346479 [PubMed - indexed for MEDLINE]

126: J Telemed Telecare. 2001;7(2):108-18.

A randomized controlled trial assessing the health economics of realtime teledermatology compared with conventional care: an urban versus rural perspective.

Loane MA, Bloomer SE, Corbett R, Eedy DJ, Evans C, Hicks N, Jacklin P, Lotery HE, Mathews C, Paisley J, Reid P, Steele K, Wootton R.

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A randomized controlled trial was carried out to measure the cost-effectiveness of realtime teledermatology compared with conventional outpatient dermatology care for patients from urban and rural areas. One urban and one rural health centre were linked to a regional hospital in Northern Ireland by ISDN at 128 kbit/s. Over two years, 274 patients required a hospital outpatient dermatology referral--126 patients (46%) were randomized to a telemedicine consultation and 148 (54%) to a conventional hospital outpatient consultation. Of those seen by telemedicine, 61% were registered with an urban practice, compared with 71% of those seen conventionally. The clinical outcomes of the two types of consultation were similar--almost half the patients were managed after a single consultation with the dermatologist. The observed marginal cost per patient of

the initial realtime teledermatology consultation was 52.85 Pounds for those in urban areas and 59.93 Pounds per patient for those from rural areas. The observed marginal cost of the initial conventional consultation was 47.13 Pounds for urban patients and 48.77 Pounds for rural patients. The total observed costs of teledermatology were higher than the costs of conventional care in both urban and rural areas, mainly because of the fixed equipment costs. Sensitivity analysis using a real-world scenario showed that in urban areas the average costs of the telemedicine and conventional consultations were about equal, while in rural areas the average cost of the telemedicine consultation was less than that of the conventional consultation.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 11331049 [PubMed - indexed for MEDLINE]

127: J Telemed Telecare. 2001;7(1):18-26.

A qualitative study of the organizational consequences of telemedicine.

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The organizational consequences of telemedicine have frequently been mentioned in the telemedicine community, but there are few empirical studies. A study was therefore carried out of what happens in organizations when telemedicine is implemented. Qualitative interviews were undertaken with 30 persons working in teledermatology, telepsychiatry, a telepathology frozen-section service and tele-otolaryngology. Almost all respondents reported numerous organizational changes, some important. Changes in work processes were the most common. Examples of the organizational consequences of telemedicine were organizational restructuring, new organizational units, changed mechanisms for internal coordination, different flows of patients through the health-care system, improved coordination of care, new job descriptions, relocation of the place of work, employment of personnel living far away from the workplace, effects on employees not directly involved in telemedicine, sharing of experiences, minor staffing changes, clinical teamwork independent of co-location, administrative meetings arranged by telemedicine, merger of organizations independent of location, less travel by staff (and patients), a possible beneficial effect on the quality of care, and limited opposition to the adoption of the technology. Telemedicine may be important in the future organization of the disciplines studied and in health-care generally. The infrastructure of electronic networks may play an important role for organizations as the volume of telemedicine activity increases and economies of scale are realized.

PMID: 11265934 [PubMed - indexed for MEDLINE]

128: Br J Dermatol. 2000 Dec;143(6):1241-7.

A comparison of real-time and store-and-forward teledermatology: a cost-benefit study.

Loane MA, Bloomer SE, Corbett R, Eedy DJ, Hicks N, Lotery HE, Mathews C, Paisley J, Steele K, Wootton R.

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BACKGROUND: Increasing use of teledermatology should be based on demonstration of favourable accuracy and cost-benefit analysis for the different methods of use of this technique. Objectives To evaluate the clinical efficacy and

cost-effectiveness of real-time and store-and-forward teledermatology. METHODS: Patients attended their own health centre and in the company of a general practitioner (GP) were seen by a hospital dermatologist over the videolink (real-time). Before the videolink consultation commenced, the GP took instant photographs of the skin lesion and posted them along with a standard referral letter to a different hospital dermatologist (store-and-forward). In total, 96 patients were seen by both real-time and store-and-forward teledermatology. Comparative diagnoses, clinical management plans, clinical outcomes and associated costs were made between the two types of teledermatology consultation. RESULTS: There was agreement between the videolink diagnosis and the still image diagnosis in 51% of cases. The same or similar management plan was recommended at both types of consultation in 44% of cases. Following the store-and-forward consultation the dermatologist recommended that 69% of patients required at least one hospital appointment compared with 45% of those patients seen in real-time. The net societal cost of the initial real-time consultation was pound132.10 per patient compared with &pound26.90 per patient for the initial store-and-forward consultation. CONCLUSIONS: The store-and-forward consultation was cheaper, but less clinically efficient, compared with the real-time consultation. The absence of interaction in a store-and-forward consultation limits the dermatologist's ability to obtain clinically useful information in order to diagnose and manage a patient satisfactorily.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 11122028 [PubMed - indexed for MEDLINE]

129: J Am Acad Dermatol. 2000 Nov;43(5 Pt 1):875-8.

Comment in:
    J Am Acad Dermatol. 2002 Feb;46(2):313-6.

Losing touch with the healing art: dermatology and the decline of pastoral doctoring.

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Technological advance in society and medicine has brought tremendous improvements and convenience but also a degree of depersonalization. The personal and pastoral aspects of medical practice, which are probably more important in helping patients toward health than we realize, are becoming increasingly stifled by health care systems which are increasingly "scientific," technological, and "efficient." Clinical practice in dermatology requires pastoral as well as technical skills, art as well as science, and yet the balance of current medical culture increasingly favors and encourages "science" over "art." In dermatology, this bias is evident in a reductionist focus of research, the move towards evidence-based medicine and the emergence of teledermatology. Although all these developments are extremely important and valuable, their effect on the doctor-patient relationship needs to be considered carefully. Increasingly rapid scientific advance is paradoxically providing diminishing returns for patients and the healing art is still very much in demand.

PMID: 11050600 [PubMed - indexed for MEDLINE]

130: BMJ. 2000 Oct 7;321(7265):896-7.

Comment on:
    BMJ. 2000 May 6;320(7244):1252-6.

Social cost-benefit analysis of teledermatology. Costs were understated.

Jacklin P, Roberts J.

Publication Types:
    Comment
    Letter

PMID: 11021884 [PubMed - indexed for MEDLINE]

131: Int J Dermatol. 2000 Oct;39(10):774-8.

Teledermatology in Hong Kong: a cost-effective method to provide service to the elderly patients living in institutions.

Chan HH, Woo J, Chan WM, Hjelm M.

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PMID: 11095200 [PubMed - indexed for MEDLINE]

132: Clin Excell Nurse Pract. 2000 Sep;4(5):263-71.

Exploration of diagnostic techniques for malignant melanoma: an integrative review.

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The aim of this study is to explore the various diagnostic techniques for melanoma and assess their usefulness in the clinical practice of nurse practitioners. After a systematic review of the literature, 55 articles were closely reviewed, and from these, 26 studies were selected. These were original studies in English that examined diagnostic techniques that would improve accuracy for melanoma detection with a formal methods and results section. Six general categories dealing with diagnostic techniques for melanoma were found in the literature. These were naked-eye clinical examination alone, clinical examination with the aid of total-body photographs, epiluminescence microscopy (ELM), digital ELM, computer-assisted techniques, and teledermatology. Because of the research citing the poor diagnostic accuracy (DA) of nondermatologists, increased DA with dermatologists experienced in ELM techniques, and the importance of early melanoma diagnosis, the recommendation is to refer patients with suspicious pigmented skin lesions to experienced dermatologists, preferably those who use ELM or digital ELM.

Publication Types:
    Review

PMID: 11858447 [PubMed - indexed for MEDLINE]

133: Cutis. 2000 Jul;66(1):61-2.

Case report: teledermatology and epiluminescence microscopy for the diagnosis of scabies.

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We wish to share images from a patient seen in our teledermatology program. Due to the absence of on-site dermatology services at the Togus, Maine, Department of Veterans Affairs, and associated community clinics for veterans in Aroostook, Bangor, Calais, and Rumford, we created a program to provide dermatologic expertise from Providence, Rhode Island. Patients referred for this service were evaluated by a nurse practitioner, who obtained a history, performed a physical examination, and captured digital images of the affected area of skin, including epiluminescence microscopic images where indicated. These data were then retrieved at the Providence (host) site and reviewed by a dermatologist, who formulated an impression and plan that was then implemented by the remote site in Maine. This approach, which involves image capture at the remote site and later review of images at the host site, is the "store-and-forward" method, which appears to be a relatively cost-effective means of providing this service from a distance.

Publication Types:
    Case Reports

PMID: 10916694 [PubMed - indexed for MEDLINE]

134: IEEE Trans Med Imaging. 2000 Jul;19(7):722-30.

An imaging system with calibrated color image acquisition for use in dermatology.

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We propose a novel imaging system useful in dermatology, more precisely, for the follow-up of patients with an increased risk of skin cancer. The system consists of a Pentium PC equipped with an RGB frame grabber, a three-chip charge coupled devices (CCD) camera controlled by the serial port and equipped with a zoom lens and a halogen annular light source. Calibration of the imaging system provides a way to transform the acquired images, which are defined in an unknown color space, to a standard, well-defined color space called sRGB. sRGB has a known relation to the CIE1 XYZ and CIE L*a*b* colorimetric spaces. These CIE color spaces are based on the human vision, and they allow the computation of a color difference metric called CIE deltaE*ab, which is proportional to the color difference, as seen by a human observer. Several types of polynomial RGB to sRGB transforms will be tried, including some optimized in perceptually uniform color spaces. The use of a standard and well-defined color space also allows meaningful exchange of images, e.g., in teledermatology. The calibration procedure is based on 24 patches with known color properties, and it takes about 5 minutes to perform. It results in a number of settings called a profile that remains valid for tens of hours of operation. Such a profile is checked before acquiring images using just one color patch, and is adjusted on the fly to compensate for short-term drift in the response of the imaging system. Precision or reproducibility of subsequent color measurements is very good with (deltaE*ab) = 0.3 and deltaE*ab < 1.2. Accuracy compared with spectrophotometric measurements is fair with (deltaE*ab) = 6.2 and deltaE*ab < 13.3.

PMID: 11055787 [PubMed - indexed for MEDLINE]

135: Tidsskr Nor Laegeforen. 2000 Jun 20;120(16):1893-5.

[Teledermatology--experiences from Northern Norway]

[Article in Norwegian]

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BACKGROUND: Distant diagnosing by two-way interactive motion video (videoconference) appeared in the 1980s, the last four years with weekly teleconsultations to Hammerfest and Kirkenes. MATERIAL AND METHODS: Patients are mostly referred from general practitioners. A physician with a 20% position is responsible for organising the videoconferences and participates in the consultation. A close-up camera is used for detailed examination of skin lesions. Photographs of skin areas may be transmitted directly to the specialist screen (still images). The studio physician writes prescriptions and sick leave notes. The specialist writes a reply to the referring physician. Referrals using still images are as yet at a pilot stage. RESULTS: Patients view early diagnosis, time saved, reduced costs, and less need for leave from work as important advantages with videoconferences. Patient satisfaction is high, although 10% are dissatisfied. Having a physician in the studio makes patients feel safer, and they understand the specialist better. This is a new role for the specialist; the doctor/patient relationship is often taken care of by the studio physician. Comparisons between videoconference and face-to-face consultations have shown up to 90% diagnostic agreement. A pilot study using still image referrals showed similar results. INTERPRETATION: Videoconferences are well suited in everyday dermatology, when follow-up by specialist is necessary, and for patients in regular treatment at local clinics for skin disease. Still image referral seems promising. The studio physician's diagnostic abilities are enhanced. Many patients are not suited for teleconsultation, but telemedical solutions will have a role in the years to come.

PMID: 10925620 [PubMed - indexed for MEDLINE]

136: J Intern Med. 2000 Jun;247(6):615-28.

Telemedicine: barriers and opportunities in the 21st century.

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This paper aims to examine how health telematics will develop in the first 10 years of the new millennium and, in particular, to assess what operational, ethical and legal barriers may lie in the way of this development. A description of the key principles and concepts involved in telemedicine and a short historical overview of telemedicine's evolution over the past century are followed by consideration of why empirical research into 'info-ethics' and other deontological and legal issues relating to telemedicine is being necessarily catalysed by, amongst others, the European Commission. Four evolving health telematics applications are examined in some detail: electronic health records; the transmission of visual media in disciplines such as teleradiology, teledermatology, telepathology and teleophthalmology; telesurgery and robotics and the use of call centres and decision-support software. These are discussed in the light of their moral, ethical and cultural implications for clinicians, patients and society at large. The author argues that telemedicine presents unique opportunities for both patients and clinicians where it is implemented in direct response to clear clinical needs, but warns against excessive reliance upon technology to the detriment of traditional clinician-patient relationships and against complacency regarding the risks and responsibilities - many of which are as yet unknown - that distant medical intervention, consultation and diagnosis carry.

Publication Types:
    Review

PMID: 10886483 [PubMed - indexed for MEDLINE]

137: BMJ. 2000 May 6;320(7244):1252-6.

Comment in:
BMJ. 2000 Oct 7;321(7265):896-7.

Multicentre randomised control trial comparing real time teledermatology with conventional outpatient dermatological care: societal cost-benefit analysis.

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OBJECTIVES: Comparison of real time teledermatology with outpatient dermatology in terms of clinical outcomes, cost-benefits, and patient reattendance. DESIGN: Randomised controlled trial with a minimum follow up of three months. SETTING: Four health centres (two urban, two rural) and two regional hospitals. SUBJECTS: 204 general practice patients requiring referral to dermatology services; 102 were randomised to teledermatology consultation and 102 to traditional outpatient consultation. MAIN OUTCOME MEASURES: Reported clinical outcome of initial consultation, primary care and outpatient reattendance data, and cost-benefit analysis of both methods of delivering care. RESULTS: No major differences were found in the reported clinical outcomes of teledermatology and conventional dermatology. Of patients randomised to teledermatology, 55 (54%) were managed within primary care and 47 (46%) required at least one hospital appointment. Of patients randomised to the conventional hospital outpatient consultation, 46 (45%) required at least one further hospital appointment, 15 (15%) required general practice review, and 40 (39%) no follow up visits. Clinical records showed that 42 (41%) patients seen by teledermatology attended subsequent hospital appointments compared with 41 (40%) patients seen conventionally. The net societal cost of the initial consultation was pound132.10 per patient for teledermatology and pound48.73 for conventional consultation. Sensitivity analysis revealed that if each health centre had allocated one morning session a week to teledermatology and the average round trip to hospital had been 78 km instead of 26 km, the costs of the two methods of care would have been equal. CONCLUSIONS: Real time teledermatology was clinically feasible but not cost effective compared with conventional dermatological outpatient care. However, if the equipment were purchased at current prices and the travelling distances greater, teledermatology would be a cost effective alternative to conventional care.

Publication Types:
Clinical Trial
Multicenter Study
Randomized Controlled Trial

PMID: 10797038 [PubMed - indexed for MEDLINE]

138: BMJ. 2000 May 6;320(7244):F.

Teledermatology costs more than hospital consultation

[No authors listed]

PMID: 10797072 [PubMed - as supplied by publisher]

139: J Am Acad Dermatol. 2000 May;42(5 Pt 1):833-5.

Teledermatology as a new tool in sub-saharan Africa: an experience from Tanzania.

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Large areas of sub-Saharan Africa suffer a substantial lack of skin care. Hence teledermatology, meaning the online visual exchange of clinical and histologic data, could develop into a powerful medical resource. We report the first established teledermatologic connection in this area: between the Regional Dermatology Training Centre (RDTC) in Moshi, Northern Tanzania, and the Department of Dermatology, University Hospital of Zurich, Switzerland. This report illustrates local difficulties as well as the considerable potential of teledermatology in such a setting.

PMID: 10775865 [PubMed - indexed for MEDLINE]

140: J Am Acad Dermatol. 2000 May;42(5 Pt 1):776-83.

Assessment of the accuracy of low-cost store-and-forward teledermatology consultation.

High WA, Houston MS, Calobrisi SD, Drage LA, McEvoy MT.

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BACKGROUND: Telemedicine has the potential to revolutionize the delivery of dermatologic care to underserved areas. OBJECTIVE: Our purpose was to compare diagnoses from two types of dermatology consultations: telemedicine using store-and-forward (SAF) technology, and traditional face-to-face (FTF) office visits. METHODS: Skin conditions were imaged with a consumer-grade digital camera. A standardized template was used to collect historical data. Information was stored in a secured database for access by 2 or 3 board-certified dermatologists. Results from the FTF visit were used to assess the accuracy of the SAF diagnoses. RESULTS: A total of 106 dermatologic conditions in 92 patients were included. Concordance between FTF and SAF diagnoses was high, ranging from 81% to 89% for all 3 dermatologists. Clinically relevant disagreement occurred in only 4% to 8% of cases. Remaining disagreements did not affect patient care. Diagnostic confidence and image quality affected agreement. When cases of high confidence were analyzed separately, agreement increased to 88% to 100%. This increase was substantiated by means of a chi-square test between the high confidence and low confidence groups, which demonstrated statistical significance (P <. 005) for all dermatologists. Similarly, when cases of above average image quality were considered, agreement increased to 84% to 98%. Again this difference was substantiated by means of a chi-square test between adequate and poor images, with statistical significance for two dermatologists (P <.001). Accuracy was comparable between disease types with the exception of benign neoplasms, which demonstrated agreement of 22% to 46%. CONCLUSION: These data support the use of existing digital technology to construct an accurate SAF teledermatology system. The inexpensive camera and widely available computer equipment make this an extremely affordable system. Furthermore, participating dermatologists appear well aware of system limitations, as reflected in the increased agreement for high confidence cases. Additional investigation of the accuracy of teledermatology for benign neoplasms is warranted.

PMID: 10775853 [PubMed - indexed for MEDLINE]

141: J Am Acad Dermatol. 2000 May;42(5 Pt 1):770-5.

Teledermatoscopy in Switzerland: a preliminary evaluation.

Braun RP, Meier M, Pelloni F, Ramelet AA, Schilling M, Tapernoux B, Thurlimann W, Saurat JH, Krischer J.

Pigmented Skin Lesion Unit, Department of Dermatology, University Hospital Geneva and DHURDV Geneva/Lausanne, Switzerland.

BACKGROUND: Since devices for digital epiluminescence microscopy and for telemedicine have become affordable, a critical evaluation of this new method has been needed. OBJECTIVE: Our aim was a critical evaluation of teledermatoscopy under routine conditions in private practice. METHODS: Pigmented skin lesions (PSLs) scheduled for excision were documented with a digital epiluminescence microscopy (DELM) system. Images were sent to the PSL consultation at the Department of Dermatology of the University Hospital Geneva, where a diagnosis was established. The histopathologic report including the initial diagnosis was sent afterward. Both approaches were compared concerning diagnostic accuracy. RESULTS: Over a period of 6 months, 55 lesions on 51 patients have been included in this study. Picture quality was good or very good in more than 90%. Diagnostic accuracy of the teledermatoscopy approach was superior to that of the conventional approach for malignant melanocytic lesions. CONCLUSION: We have shown the feasibility of a teledermatoscopic consultation. The gain of diagnostic accuracy in this teledermatoscopic approach, especially for malignant melanocytic lesions, suggests that patients might benefit directly from such a consultation at distance.

PMID: 10775852 [PubMed - indexed for MEDLINE]

142: Australas J Dermatol. 2000 Feb;41(1):8-13.

Australian teledermatology: the patient, the doctor and their government.

Lim AC, Egerton IB, Shumack SP.

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Telemedicine is an emerging technology within Australia. We review the historical development of telemedicine and discuss the clinical and non-clinical issues surrounding its practice in this country. Teledermatology is one application of telemedicine. We discuss the potential impact of teledermatology on patients, doctors and third parties such as government. So far, teledermatology has received little attention from Australian dermatologists. By contrast, the Government and other organizations are showing keen interest in establishing infrastructure within this country. We believe it is time for dermatologists to become more involved in the practice and politics of telemedicine within Australia.

Publication Types:
    Review

PMID: 10715894 [PubMed - indexed for MEDLINE]

143: J Formos Med Assoc. 2000 Feb;99(2):128-34.

Survey of infectious skin diseases and skin infestations among primary school students of Taitung County, eastern Taiwan.

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BACKGROUND: There are no complete records on the prevalence of childhood skin diseases in Taiwan. We conducted a survey of infectious skin diseases and skin infestations among primary school children in Taitung County, which is located in southeastern Taiwan. METHODS: From March 1998 through October 1998, a total of 3,029 students from four rural districts (Changbin, Yanping, Lanyu, and Dawu) and one urban area (Taitung City of Taitung County) were examined by

dermatologists. Treatment and instructions for disease care were given immediately after the diagnosis of dermatoses, when appropriate. RESULTS: The most common infectious skin diseases and infestations were pediculosis capitis (12.9%), verruca vulgaris (5.1%), tinea versicolor (4.4%), tinea pedis (4.1%), verruca plantaris (1.8%), and scabies (1.4%). Most skin diseases, including pediculosis capitis, scabies, verruca vulgaris, verruca plantaris, folliculitis, pyoderma, tinea pedis, and tinea versicolor, were significantly more common in rural areas than in the urban area ($p < 0.05$ for all). Pediculosis capitis was more common among girls ($p < 0.001$), but tinea pedis and tinea versicolor were more common among boys ($p < 0.05$). CONCLUSIONS: The prevalence of most skin infections and infestations are much higher in rural Taitung County than in Taitung City. Prevention and treatment of these skin diseases should be reemphasized in the education of teachers, as well as students and their families. Adequate dermatologic training of nurses and physicians and the development of teleconsultation and teledermatology in rural areas might decrease the prevalence of these skin diseases in school children.

PMID: 10770027 [PubMed - indexed for MEDLINE]

144: J Telemed Telecare. 2000;6(5):273-7.

A cost-minimization analysis of a realtime teledermatology service in northern Norway.

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Realtime teledermatology has been a routine service provided by the University Hospital of Tromso to a primary-care centre in Kirkenes since 1989. The cost of the teledermatology service was compared with the costs of three alternative methods of treatment for the patients. The first was a combination of a visiting service and patient travel to hospital. The second was patient travel to the nearest secondary-care centre. The third was a locally employed dermatologist. At the actual 1998 workload of 375 patients, the total cost of teledermatology was NKr470,780, while the three alternatives cost NKr880,530, NKr1,635,075 and NKr958,660, respectively. Analysis of the unit costs showed that the realtime teledermatology service, including local phototherapy, was less costly than the three alternatives for annual workloads above 195 patients per year. A sensitivity analysis showed that the results were robust to changes in the assumptions about the cost structure.

PMID: 11070588 [PubMed - indexed for MEDLINE]

145: J Telemed Telecare. 2000;6(3):138-41.

Teledermatology--the requirements of dermatologists in private practice.

Glaessl A, Schiffner R, Walther T, Landthaler M, Stolz W.

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Eighty-four dermatologists in private practice in Bavaria were surveyed by postal questionnaire. Of the 45 who responded (a 54% response rate), 96% used a computer in their private practice. Fifty-seven per cent of respondents owned systems with Pentium processors, while 23% were still using 386 or 486 processors. Most of them used the Windows 95, UNIX or Apple operating system. Of the respondents who had a modem, 74% used ISDN. There were few modems connected to the ordinary telephone network. Of all respondents, 56% used email regularly. Several possible teledermatology applications were proposed in the survey (i.e. teleconsultation, on-line/off-line videoconferencing, email attachments). Fifty-six per cent of respondents said that they would perform teleconsultations

with dermatology clinics, 40% preferred a teleconsultation via telephone and computer, and 42% sending files via email. The survey demonstrated that a high proportion of dermatologists in private practice would use a teledermatology service.

PMID: 10912330 [PubMed - indexed for MEDLINE]

146: J Telemed Telecare. 2000;6(3):132-7.

Teledermoscopy--results of a multicentre study on 43 pigmented skin lesions.

Piccolo D, Smolle J, Argenziano G, Wolf IH, Braun R, Cerroni L, Ferrari A, Hofmann-Wellenhof R, Kenet RO, Magrini F, Mazzocchetti G, Pizzichetta MA, Schaeppi H, Stolz W, Tanaka M, Kerl H, Chimenti S, Soyer HP.

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We performed a multicentre study to evaluate the agreement between the direct clinical diagnosis and the telediagnosis of 43 cutaneous pigmented lesions. Digital clinical and dermoscopic images of the 43 pigmented skin lesions (11 melanomas, 23 melanocytic naevi, three basal cell carcinomas, three lentigines, two seborrhoeic keratoses and one angiokeratoma) were sent by email to 11 colleagues (six dermatologists, two residents in dermatology, one oncologist, one specialist in internal medicine and one general practitioner) in 10 centres. These 11 colleagues had different degrees of experience in dermoscopy. With histopathology as the gold standard, an average of 85% of the telediagnoses were correct, with results varying from 77% to 95%, whereas face-to-face diagnosis by an expert dermatologist was correct in 91% of cases. The kappa value for all participants ranged from 0.35 to 0.87. The results confirm that teledermoscopy can be a reliable technique for the diagnosis of pigmented skin lesions but one that will depend on the expertise of the observer.

Publication Types:
    Multicenter Study

PMID: 10912329 [PubMed - indexed for MEDLINE]

147: J Telemed Telecare. 2000;6(1):50-3.

General practitioners' perceptions of store-and-forward teledermatology.

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We studied the views of 26 general practitioners (GPs) towards store-and-forward tele-dermatology before its introduction into their practices. A postal questionnaire was developed using Likert-type questions with respondents able to explain their answers in free text. Questions related to the GPs' knowledge, perceptions and expectations of tele-dermatology, as well as their attitudes towards being part of a research trial. Most of the GPs had limited prior knowledge of tele-dermatology. They perceived its role to relate to quicker access to specialist opinions, decreased referrals, increased convenience for patients, diagnosis, and education and teaching. There was an overwhelming view that any system needed to be quick, easy to use, efficient and reliable. Concerns were expressed about being part of the clinical trial, using new technology and an increased workload. The future of tele-dermatology was thought to depend on the clinical adequacy of the system.

PMID: 10824392 [PubMed - indexed for MEDLINE]

148: J Telemed Telecare. 2000;6(2):102-7.

A feasibility study of realtime teledermatology in Finland.

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We conducted a feasibility study of teleconsultation in dermatology using low-cost equipment. Patients and their general practitioners took part in consultations from the Primary Health Care Centre in Ikaalinen with a dermatologist 55 km away at the Tampere University Hospital (TAUH). Consultations were performed using standard commercial videoconferencing equipment, a modified document camera and a dermatoscope. A single ISDN line (128 kbit/s) was used for the connection. During the eight months of the study, 25 patients participated in a teledermatology consultation. Their mean age was 45 years (range 4-92). The average time the patient spent in travelling to the videoconsultation (i.e. one way) was 24 min (range 5-65 min). The mean time spent in the teleconsultation was 15 min (range 5-30 min). After the teleconsultation, patients' treatments changed in 19 cases (76%), diagnoses were changed in 13 cases (52%) and 18 patients (72%) did not need to go to the TAUH. The equipment was generally reliable and easy to use. However, the dermatoscope was not very useful and only one of the consultations relied mainly on it. The cost of the teleconsultations for the 18 patients who avoided travel to the TAUH was FM18,627. The total costs for the 18 conventional consultations in the TAUH would have been FM18,034. The main economic benefits of the videoconferencing were attributable to the reduced travelling and hospital costs. The economic benefits of medical education were more difficult to quantify.

PMID: 10824378 [PubMed - indexed for MEDLINE]

149: J Telemed Telecare. 2000;6(2):97-101.

Patient cost-benefits of realtime teledermatology--a comparison of data from Northern Ireland and New Zealand.

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As part of a randomized controlled trial of the costs and benefits of realtime teledermatology in comparison with conventional face-to-face appointments, patients were asked to complete a questionnaire at the end of their consultation. One hundred and nine patients took part in an initial teledermatology consultation and 94 in a face-to-face consultation. The proportion of patients followed up by the dermatologist was almost the same after teledermatology (24%) as after a hospital appointment (26%) and for similar reasons. Two hundred and three questionnaires were completed after the first visit and a further 20 after subsequent visits. Patients seen by teledermatology at their own health centre travelled an average of 12 km, whereas those who attended a conventional clinic travelled an average of 271 km. The telemedicine group spent an average of 51 min attending the appointment compared with 4.3 h for those seen at the hospital. The results of the present study, as in a similar study conducted in Northern Ireland, show that the economic benefits of teledermatology favour the patient rather than the health-care system.

Publication Types:
    Clinical Trial
    Randomized Controlled Trial

PMID: 10824377 [PubMed - indexed for MEDLINE]

150: J Telemed Telecare. 2000;6 Suppl 1:S74-6.

An assessment of the potential effect of a teledermatology system.

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The potential effect of a commercial teledermatology system was assessed. The system allowed general practitioners to send dermatologists a set of digital images, accompanied by a short patient history. Patients were seen, in the normal way, by consultant dermatologists. The system was then used to capture a set of images. These were viewed by two dermatologists, 13 months later. Reasonably high levels of agreement were found between the dermatologist seeing the patient and the dermatologist using the telemedicine system (77%). The two dermatologists were also asked to indicate whether, had the system been in use, the patient would have been seen urgently or routinely, or whether the general practitioner would have been advised that an outpatient appointment was not required. The results showed that fewer patients would have been called for urgent appointments (32% compared with 64%) and that 31% of cases could have been managed by the general practitioner. Assuming that the introduction of the system would have had no effect on the overall number of referrals, nor on the number of follow-up appointments, these figures suggest that the total number of appointments could be cut by 13%. It took approximately an hour to view 20 cases and it would be necessary to devote one consultant session a week to viewing images. This system would therefore not lead to significant savings, nor reduce the waiting list for outpatient appointments. The idea would have potential if the review of images could be made as easy as the triage of referral letters.

PMID: 10793979 [PubMed - indexed for MEDLINE]

151: J Telemed Telecare. 2000;6 Suppl 1:S1-3.

A randomized controlled trial to assess the clinical effectiveness of both realtime and store-and-forward teledermatology compared with conventional care.

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The clinical effectiveness of realtime teledermatology, store-and-forward teledermatology and conventional outpatient dermatological care were evaluated in a randomized control trial. A total of 204 patients took part--102 patients were randomized to the realtime teledermatology consultation, 96 of whose cases were also referred using a store-and-forward technique, and 102 to the conventional outpatient consultation. There were no differences in the reported clinical outcomes of realtime teledermatology and conventional dermatology. Of those randomized to the realtime teledermatology consultation, 46% required at least one subsequent hospital appointment compared with 45% of those randomized to the conventional outpatient consultation. In contrast, the dermatologist requested a subsequent hospital appointment for 69% of those seen by store-and-forward teledermatology. An analysis of costs showed that realtime teledermatology was clinically feasible but more expensive than conventional care, while the store-and-forward teledermatology consultation was less expensive but its clinical usefulness was limited. Sensitivity analysis indicated that realtime teledermatology was as economical as conventional care when less artificial assumptions were made about equipment utilization, costs and travel distances to hospital.

Publication Types:

Clinical Trial
Multicenter Study
Randomized Controlled Trial

PMID: 10793956 [PubMed - indexed for MEDLINE]

152: Arch Dermatol. 1999 Dec;135(12):1467-71.

Face-to-face diagnosis vs telediagnosis of pigmented skin tumors: a teledermoscopic study.

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Department of Dermatology, University of L'Aquila, Italy.

BACKGROUND: Teledermoscopy uses telecommunication technologies to transfer images of pigmented skin lesions, including clinical and anamnestic data, via e-mail to specialized centers for teleconsultation. DESIGN: Sixty-six pigmented skin lesions examined on a face-to-face basis in a skin lesion clinic in L'Aquila, Italy, were sent via e-mail on a standard-resolution color monitor for consultation at a university dermatology department in Graz, Austria. INTERVENTION: Digital photographs of the clinical and dermoscopic images of all pigmented tumors were taken with a stereomicroscope connected to a high-resolution video camera in Truevision advanced graphic array (Targa) format file and converted successively into a Joint Photographic Expert Group (PEG) format file. All lesions were excised surgically and diagnosed histopathologically. MAIN OUTCOME MEASURE: Diagnostic concordance between face-to-face diagnosis and telediagnosis. RESULTS: The diagnostic concordance was 60 (91%) of 66 cases. The number of correct telediagnoses was lower, but the difference was not statistically significant (Wilcoxon test, P = .10). The accuracy of the telediagnoses was not related to the quality of the images, but highly depended on the level of diagnostic difficulty of a given pigmented skin tumor (Spearman correlation, P= .01). CONCLUSION: Teleconsultation of clinical and dermoscopic images of skin tumors via e-mail provides a similar degree of diagnostic accuracy as face-to-face diagnosis.

PMID: 10606051 [PubMed - indexed for MEDLINE]

153: Australas J Dermatol. 1999 Nov;40(4):190-3.

Pilot study of store and forward teledermatology services in Perth, Western Australia.

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In remote areas, telemedicine services can improve the quality of access to specialist medical care and dermatology is well suited to the use of this technology. There is no published work on teledermatology services in Australia. Our purpose was to investigate the reliability of dermatological diagnoses obtained using a store and forward telemedicine system, which is being developed to offer specialist consultative services to patients in remote areas of Western Australia. We report on a small prospective non-randomized pilot study conducted at Royal Perth Hospital, Western Australia which compared diagnoses reached following telemedicine consultations with diagnoses reached following traditional face-to-face consultations. In 25 out of 50 consultations, identical diagnoses were reached. In the remaining five cases, the preferred diagnosis and first differential diagnosis were reversed in order of preference. We feel this system is sufficiently promising to trial more extensively in the field.

PMID: 10570553 [PubMed - indexed for MEDLINE]

154: J Am Acad Dermatol. 1999 Nov;41(5 Pt 1):693-702.

Reliability and accuracy of dermatologists' clinic-based and digital image consultations.

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BACKGROUND: Telemedicine technology holds great promise for dermatologic health care delivery. However, the clinical outcomes of digital image consultations (teledermatology) must be compared with traditional clinic-based consultations. OBJECTIVE: Our purpose was to assess and compare the reliability and accuracy of dermatologists' diagnoses and management recommendations for clinic-based and digital image consultations. METHODS: One hundred sixty-eight lesions found among 129 patients were independently examined by 2 clinic-based dermatologists and 3 different digital image dermatologist consultants. The reliability and accuracy of the examiners' diagnoses and the reliability of their management recommendations were compared. RESULTS: Proportion agreement among clinic-based examiners for their single most likely diagnosis was 0. 54 (95% confidence interval [CI], 0.46-0.61) and was 0.92 (95% CI, 0. 88-0.96) when ratings included differential diagnoses. Digital image consultants provided diagnoses that were comparably reliable to the clinic-based examiners. Agreement on management recommendations was variable. Digital image and clinic-based consultants displayed similar diagnostic accuracy. CONCLUSION: Digital image consultations result in reliable and accurate diagnostic outcomes when compared with traditional clinic-based consultations.

PMID: 10534630 [PubMed - indexed for MEDLINE]

155: Telemed J. 1999 Fall;5(3):257-63.

Diagnostic accuracy and image quality using a digital camera for teledermatology.

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OBJECTIVE: The study was designed to evaluate the effectiveness of digital photography for dermatologic diagnoses and compare it with in-person diagnoses. MATERIALS AND METHODS: Patients referred for specialty consultations (n = 308) were recruited from a university dermatology clinic. Patients were examined in-person by one of three board-certified dermatologists who provided clinical diagnoses. Digital photos were obtained on all patients and were evaluated as computer images by a panel of dermatologists. RESULTS: There was 83% concordance between in-person versus digital photo diagnoses. Intradermatologist concordance averaged 84%, and interdermatologist concordance averaged 81%. Decision confidence was rated as "very definite" to "definite" 62% of the time. Concordance with biopsy results was achieved in 76% of the cases. Image sharpness and color quality were rated "good" to "excellent" 83% and 93% of the time, respectively. CONCLUSION: Digital photography for store-and-forward teledermatology produces high-quality images and diagnostic concordance rates that compare favorably with in-person clinical diagnoses.

PMID: 10908439 [PubMed - indexed for MEDLINE]

156: Bull Acad Natl Med. 1999;183(2):357-67; discussion 368-70.

[Teledermatology--importance of telemedicine and dermatology]

[Article in French]

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Due to a constantly improving technology the transfer of clinical images associated with histological images represents the actual answer to the expectation of Dermatologists. The authors give their personal experience regarding the use of telemedicine in Dermatology: discussion of clinical cases, histopathological presentation, diagnostic assistance, follow-up of patients, teaching, and research. Perspectives and development offered by telemedicine as well as the advantages of patient care, and of presenting research topics are mentioned. Also aspects which have to be clarified before telemedicine takes up are presented: as far as that goes for practicing Medicine and Dermatology, technical applicability, credibility, acceptance, confidence and responsibility.

PMID: 10371782 [PubMed - indexed for MEDLINE]

157: Dermatol Clin. 1999 Jan;17(1):113-24, ix.

The history of teledermatology in the Department of Defense.

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The Department of Defense (DoD) healthcare system supports the medical needs of service members while engaged in a variety of missions frequently in isolated, remote, and austere locations. As a result, the DoD has been a leader in the development of telemedicine, including teledermatology as a way to provide "good medicine in bad places." A brief technical history of teledermatology, representative DoD experiences including military unique concerns, and a novel approach to increase the access of DoD teledermatology consultation are presented in this article.

Publication Types:
    Historical Article

PMID: 9986999 [PubMed - indexed for MEDLINE]

158: J Healthc Inf Manag. 1999 Winter;13(4):59-69.

Teledermatology in Department of Defense Health Services Region 10.

Carlos ME, Pangelinan SI.

Office of the Lead Agent, TRICARE Golden Gate, Health Service Region 10, Travis Air Force Base, California, USA.

PMID: 10747703 [PubMed - indexed for MEDLINE]

159: J Telemed Telecare. 1999;5 Suppl 1:S57-8.

Digital teledermatology for skin tumours: a preliminary assessment using a receiver operating characteristics (ROC) analysis.

Lewis K, Gilmour E, Harrison PV, Patefield S, Dickinson Y, Manning D, Griffiths C.

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A low-cost store-and-forward teledermatology system using digital images for the remote diagnosis and management of skin tumours was evaluated. Two hospitals participated in the trial. Patients were seen face to face at one hospital, and had their images and clinical history viewed remotely by a different dermatologist at a second hospital. A preliminary receiver operating characteristics (ROC) analysis revealed clinical agreement between the teledermatologist and face-to-face dermatologist in 93% of cases in terms of their assessment of the benign/malignant nature of the lesions. Sensitivity of the judgements was 88% and specificity was 80%. These preliminary findings indicate the potential for remote management of skin tumours using a low-cost system in the National Health Service.

PMID: 10534843 [PubMed - indexed for MEDLINE]

160: J Telemed Telecare. 1999;5 Suppl 1:S8-9.

The legal and risk management conundrum of telemedicine.

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A store-and-forward teledermatology service was established between two general practices and the department of plastic surgery at Derriford Hospital in Plymouth. An academic lawyer and an expert in risk management made an assessment of the service. They looked at the following issues: medicolegal problems; security; confidentiality; and risk. None of them was considered insoluble and there is no reason why such issues should prevent the National Health Service from developing telemedicine services. All organizations considering telemedicine need to ensure that the proposed telemedicine service satisfies the issues raised in this study.

PMID: 10534824 [PubMed - indexed for MEDLINE]

161: J Telemed Telecare. 1999;5 Suppl 1:S1-3.

Patient cost-benefit analysis of teledermatology measured in a randomized control trial.

Loane MA, Bloomer SE, Corbett R, Eedy DJ, Gore HE, Hicks N, Mathews C, Paisley J, Steele K, Wootton R.

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A randomized controlled trial of the costs and benefits of teledermatology consultations compared with traditional hospital consultations was carried out. Over a nine-month period, 197 patients were referred from general practice for a dermatological opinion, 98 for a teledermatology consultation and 99 for a hospital consultation. Eighty patients required an additional subsequent hospital appointment. Patients were asked to complete an economic questionnaire after each consultation, and 164 questionnaires were returned: 62% of those randomized to the teledermatology consultation responded compared with 58% of those randomized to the hospital consultation. Patients seen by teledermatology at their own health centre had shorter distances to travel and spent less time overall attending the appointment compared with those seen at the hospital. However, the teledermatology consultations were more time-consuming for the general practitioner and dermatologist. These findings indicate that teledermatology has more benefits for the patient than for the health-care

delivery team.

Publication Types:
    Clinical Trial
    Multicenter Study
    Randomized Controlled Trial

PMID: 10534821 [PubMed - indexed for MEDLINE]

162: Stud Health Technol Inform. 1999;64:185-91.

Are dermatologists in private practice interested in teledermatological services?

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Diagnosing dermatologic skin conditions can be difficult, especially in pigmented skin lesions. Therefore, the consultation of an expert via teledermatology could prove vital. For this purpose, a rapid transfer of medical data including high resolution images is essential. This transfer can be performed with a variety of modern telecommunication technologies, including ISDN, highspeed-ISDN, Internet, and Intranet. As the levels of both communication software and camera-systems can be quite different, our survey investigated the equipment of 84 dermatologists in private practice. A questionnaire was distributed on computer equipment, operating system software, and any image documentation systems used, as well as required telecommunications equipment and possible applications of tele-dermatology. This survey showed a response rate of 54% and proves that dermatologists in private practice are interested in telemedicine services. Most dermatologists surveyed use Windows 95 operating software and 74% have access to modern ISDN modems or PC-cards. Dermatologists currently prefer applications with low-tech communication hardware and software requirements. Consultation of dermatological centers was the favored application with 59%. Our survey clearly demonstrates that a high percentage of dermatologists in private practice would use tele-dermatology. In our experience, for the excellence of this service an image documentation system is essential to provide the tele-dermatological expert with standardized images with constant illumination.

PMID: 10747538 [PubMed - indexed for MEDLINE]

163: Stud Health Technol Inform. 1999;64:179-84.

Web-based teledermatology consult system: preliminary results from the first 100 cases.

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The TRICARE Region 1 Teledermatology Consortium has developed a secure web-based "store and forward" consult system designed to allow medical treatment facilities throughout the region to submit dermatology consults. Realizing that there is very little objective data on teledermatology, we have begun to evaluate our system through the integration of questionnaires for patients, referring physicians, and consultants in addition to telephonic patient follow up. We report the preliminary data from the first 100 cases received in the first two months since partly deploying the web based teledermatology consult system in the Tricare Region I (Northeast United States). We primarily address system effectiveness (percentage of cases that required follow up to dermatology and/or primary care physicians, adequacy of evaluating pigmented lesions)

diagnostic agreement, acceptance, effect on access to care, and educational value to the primary care physicians.

PMID: 10747537 [PubMed - indexed for MEDLINE]

164: Stud Health Technol Inform. 1999;68:274-7.

Teledermatology--UK experience of setting up an integrated teledermatology service.

Clarke M, Jones RW, Lioupis D, George S, Cairns D.

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Telemedicine has traditionally been seen as an all or nothing solution to the problem of providing medical service to remote communities. In the UK, however, the majority of the population lives within easy travelling distance of medical service, and it is inappropriate to apply telemedicine for the same reasons and in the same way. We describe an alternative approach, where telemedicine is used to complement the existing clinical infrastructure of the outreach clinic and hospital visit, and the patient may opt to have any follow up appointments by video conference. We also describe the concept of the virtual consultation that we have developed to support our work.

PMID: 10724887 [PubMed - indexed for MEDLINE]

165: Telemed J. 1999 Winter;5(4):375-83.

The effect of decreasing digital image resolution on teledermatology diagnosis.

Vidmar DA, Cruess D, Hsieh P, Dolecek Q, Pak H, Gwynn M, Maggio K, Montemorano A, Powers J, Richards D, Sperling L, Wong H, Yeager J.

Department of Military and Emergency Medicine and Dermatology, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA.

OBJECTIVE: To determine the effect of degraded digital image resolution (as viewed on a monitor) on the accuracy and confidence of dermatologic interpretation. MATERIALS AND METHODS: Eight dermatologists interpreted 180 clinical cases divided into three Logical Competitor Sets (LCS) (pigmented lesions, non-pigmented lesions, and inflammatory dermatoses). Each case was digitized at three different resolutions. The images were randomized and divided into (9) 60-image sessions. The physicians were completely blinded concerning the image resolution. After 60 seconds per image, the viewer recorded a diagnosis and level of confidence. The resultant ROC curves compared the effect of LCS, level of clinical difficulty, and resolution of the digital image. One-way analysis of variance (ANOVA) compared the curves. RESULTS: The areas beneath the ROC curves did not demonstrate any consistently significant difference between the digital image resolutions for all LCS and levels of difficulty. The only significant effect observed was amongst pigmented lesions (LCS-A) where the ROC curve area was significantly smaller in the easy images at high resolution compared to low and medium resolutions. For all other ROC curve comparisons within LCS-A, at all other levels of difficulty, as well as within the other LCS at all levels of difficulty, none of the differences was significant. CONCLUSION: A 720 x 500 pixel image can be considered equivalent to a 1490 x 1000 pixel image for most store-and-forward teledermatology consultations.

PMID: 10908453 [PubMed - indexed for MEDLINE]

166: Telemed J. 1999 Winter;5(4):357-66.

Teledermatology in a capitated delivery system using distributed information

architecture: design and development.

Kvedar JC, Menn ER, Baradagunta S, Smulders-Meyer O, Gonzalez E.

Department of Dermatology, Harvard Medical School, Massachusetts General Hospital, Boston, Massachusetts, USA.

OBJECTIVE: This report describes the design, development, and technical evaluation of a teledermatology system utilizing digital images and electronic forms captured through, stored on, and viewed through a common web server in an urban capitated delivery system. MATERIALS AND METHODS: The authors designed a system whereby a primary care physician was able to seek a dermatologic consultation electronically, provide the specialist with digital images acquired according to a standardized protocol, and review the specialist response within 2 business days of the request. The settings were two primary care practices in eastern Massachusetts that were affiliated with a large integrated delivery system. Technical evaluation of the effectiveness of the system involved 18 patients. Main outcome measures included physician and patient satisfaction and comfort and efficiency of care delivery. RESULTS: In 15 cases, the consultant dermatologist was comfortable in providing definitive diagnosis and treatment recommendations. In 3 cases, additional information (laboratory studies or more history) was requested. There were no instances where the dermatologist felt that a face-to-face visit was necessary. CONCLUSIONS: This novel approach shows promise for the delivery of specialist expertise via the internet. Cost-effectiveness studies may be necessary for more widespread implementation.

Publication Types:
    Clinical Trial

PMID: 10908451 [PubMed - indexed for MEDLINE]

167: Telemed J. 1998 Fall;4(3):249-58.

Telemedicine in Nova Scotia: report of a pilot study.

Reid DS, Weaver LE, Sargeant JM, Allen MJ, Mason WF, Klotz PJ, Langille DB.

Nova Scotia Department of Health, Halifax, Nova Scotia.

OBJECTIVE: To provide and evaluate telemedicine services for rural physicians and patients in Nova Scotia. MATERIALS AND METHODS: As a pilot project, three telemedicine services (videoconference continuing medical education [CME], teledermatology, and teleradiology) were provided to four hospitals in Nova Scotia communities. All four sites received CME (a total of 269 physicians, 53 other health care professionals); three sites received teledermatology (66 consultations), and two sites received teleradiology (808 radiologic examinations). At the consulting site, 12 faculty members presented 24 one-hour videoconferences, and there was one consulting radiologist and dermatologist. Each service was evaluated independently. Methods included participant questionnaires; focus groups; numbers and categories of participants or examinations; comparison of operational costs, capitol costs (teledermatology and teleradiology), and travel costs (CME); technical assessments of hardware, software, and telecommunications; assessment of clinical diagnostic procedures (teledermatology); and comparative study of original and digitized films (teleradiology). RESULTS: Despite growing pains, the technologies effectively provided the three services: the services were acceptable to referring and consulting physicians and patients. Improvements in patient care and outcomes comparable to those of traditional methods were demonstrated in teleradiology and teledermatology, especially for emergencies. Physician access to CME and patient access to dermatology consultation services were improved. Financial savings were demonstrated for CME, but further investigation is required to determine the savings attributable to teleradiology and teledermatology. CONCLUSIONS: The telemedicine services supported rural physicians, their

patients, and their communities. Although telemedicine is not a panacea for all concerns of rural physicians, the pilot project provided a strong foundation for further development and study.

PMID: 9831749 [PubMed - indexed for MEDLINE]

168: Br J Dermatol. 1998 Jul;139(1):81-7.

Comparison of teleconsultations and face-to-face consultations: preliminary results of a United Kingdom multicentre teledermatology study.

Gilmour E, Campbell SM, Loane MA, Esmail A, Griffiths CE, Roland MO, Parry EJ, Corbett RO, Eedy D, Gore HE, Mathews C, Steel K, Wootton R.

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The objective of this multicentre study was to undertake a systematic comparison of face-to-face consultations and teleconsultations performed using low-cost videoconferencing equipment. One hundred and twenty-six patients were enrolled by their general practitioners across three sites. Each patient underwent a teleconsultation with a distant dermatologist followed by a traditional face-to-face consultation with a dermatologist. The main outcome measures were diagnostic concordance rates, management plans and patient and doctor satisfaction. One hundred and fifty-five diagnoses were identified by the face-to-face consultations from the sample of 126 patients. Identical diagnoses were recorded from both types of consultation in 59% of cases. Teledermatology consultations missed a secondary diagnosis in 6% of cases and were unable to make a useful diagnosis in 11% of cases. Wrong diagnoses were made by the teledermatologist in 4% of cases. Dermatologists were able to make a definitive diagnosis by face-to-face consultations in significantly more cases than by teleconsultations (P = 0.001). Where both types of consultation resulted in a single diagnosis there was a high level of agreement (kappa = 0.96, lower 95% confidence limit 0.91-1.00). Overall follow-up rates from both types of consultation were almost identical. Fifty per cent of patients seen could have been managed using a single videoconferenced teleconsultation without any requirement for further specialist intervention. Patients reported high levels of satisfaction with the teleconsultations. General practitioners reported that 75% of the teleconsultations were of educational benefit. This study illustrates the potential of telemedicine to diagnose and manage dermatology cases referred from primary care. Once the problem of image quality has been addressed, further studies will be required to investigate the cost-effectiveness of a teledermatology service and the potential consequences for the provision of dermatological services in the U.K.

Publication Types:
    Clinical Trial
    Controlled Clinical Trial
    Multicenter Study

PMID: 9764153 [PubMed - indexed for MEDLINE]

169: Adv Clin Path. 1998 Apr;2(2):162-163.

Teledermascopy: a preliminary study.

Piccolo D, Wolf IH, Peris K, Hofmann-Wellenhof R, Dell Eva G, Burroni M, Smolle J, Kerl H, Chimenti S, Soyer PH.

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PMID: 10359618 [PubMed - as supplied by publisher]

170: Arch Dermatol. 1998 Apr;134(4):471-6.

Teledermatology and in-person examinations: a comparison of patient and physician perceptions and diagnostic agreement.

Lowitt MH, Kessler II, Kauffman CL, Hooper FJ, Siegel E, Burnett JW.

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OBJECTIVE: To compare physician and patient impressions and interphysician diagnostic agreement between live teledermatology and in-person examinations. DESIGN: Paired video and in-person examinations with different dermatologists. SETTING: An urban Veterans Affairs dermatology clinic. PATIENTS: One hundred thirty-nine patients. MAIN OUTCOME MEASURES: Satisfaction questionnaires and interphysician diagnostic agreement. RESULTS: Patient and physician satisfaction was high. Agreement between video and in-person diagnoses was 80%. CONCLUSIONS: Physicians and patients were satisfied with teledermatology examinations. Diagnostic agreement between in-person and video dermatologists was high.

Publication Types:
    Review

PMID: 9554300 [PubMed - indexed for MEDLINE]

171: J Cutan Med Surg. 1998 Apr;2(4):225-8.

Comment on:
    J Cutan Med Surg. 1998 Apr;2(4):224-5.

Point-counterpoint. A walk down the garden path of telederm prologue.

Gregory BW.

Publication Types:
    Comment

PMID: 9678964 [PubMed - indexed for MEDLINE]

172: Telemed Today. 1998 Apr-May;6(2):12-5.

Teledermatology survey 1998.

[No authors listed]

PMID: 10181173 [PubMed - indexed for MEDLINE]

173: Dermatology. 1998;196(3):299-304.

Comparison of conventional photographs and telephonically transmitted compressed digitized images of melanomas and dysplastic nevi.

Provost N, Kopf AW, Rabinovitz HS, Stolz W, DeDavid M, Wasti Q, Bart RS.

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BACKGROUND: One of the most difficult problems in the in vivo diagnosis of cutaneous tumors is the differentiation clinically between early malignant melanoma (MM) and atypical (dysplastic) melanocytic nevi (AMNs) because these lesions share clinical features. High-quality digital imaging systems and store-and-forward technology have the potential for use in a teledermatology

system with which experts would be able to immediately transmit their diagnostic opinions concerning these challenging lesions. OBJECTIVE: The main purpose of this study was to determine if the clinical and dermoscopic diagnoses and the dermoscopic features of AMN and early MM are unaltered after telephonic transmission of their digitized images. METHODS: Conventional and dermoscopic photographic transparencies of 22 AMNs and 9 early MMs, viewed on rearview projectors and then scanned, compressed, transmitted (Internet) and viewed on color monitors, were evaluated. RESULTS: The concordance in the diagnosis of AMN and of early MM by all four observers, both clinically and dermoscopically, when comparing rearview-projected conventional transparency slides to transmitted, compressed, digitized images, was high. For most specific dermoscopic features, the concordance was good, although less so for the presence or absence of some dermoscopic creatures, namely 'dots', 'blue/gray' color and 'red' color. CONCLUSION: The results reported support the conclusion that Internet transmission of digitized images of MMs and AMNs retains sufficient information for diagnostic purposes. This study is a step in the creation of an international teledermoscopy network for pigmented cutaneous lesions.

PMID: 9621136 [PubMed - indexed for MEDLINE]

174: J Telemed Telecare. 1998;4(2):108-12.

A pilot trial of digital imaging in skin cancer.

Whited JD, Mills BJ, Hall RP, Drugge RJ, Grichnik JM, Simel DL.

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We have used inexpensive off-the-shelf equipment for store-and-forward teledermatology and compared the precision and accuracy of digital image consultations with conventional, clinic-based consultations. Thirteen lesions were studied on 12 patients referred to a dermatology clinic for a suspected skin cancer. Patients were examined by two dermatologists. Subsequently, digital images were examined by two different dermatologists. There was almost complete agreement, both among and between the clinical and digital examiners, on different diagnosis and biopsy recommendations. Agreement on the single most likely diagnosis was also good. Digital imaging shows promise in teledermatology.

PMID: 9744167 [PubMed - indexed for MEDLINE]

175: J Telemed Telecare. 1998;4(2):95-100.

Diagnostic accuracy and clinical management by realtime teledermatology. Results from the Northern Ireland arms of the UK Multicentre Teledermatology Trial.

Loane MA, Corbett R, Bloomer SE, Eedy DJ, Gore HE, Mathews C, Steele K, Wootton R.

Institute of Telemedicine and Telecare, Queen's University, Belfast, UK.

Diagnostic accuracy and management recommendations of realtime teledermatology consultations using low-cost telemedicine equipment were evaluated. Patients were seen by a dermatologist over a video-link and a diagnosis and treatment plan were recorded. This was followed by a face-to-face consultation on the same day to confirm the earlier diagnosis and management plan. A total of 351 patients with 427 diagnoses participated. Sixty-seven per cent of the diagnoses made over the video-link agreed with the face-to-face diagnosis. Clinical management plans were recorded for 214 patients with 252 diagnoses. For this cohort, 44% of the patients were seen by the same dermatologist at both consultations, while 56% were seen by a different dermatologist. In 64% of cases the same management plan was recommended at both consultations; a sub-optimum

treatment plan was recommended in 8% of cases; and in 9% of cases the video-link management plans were judged to be inappropriate. In 20% of cases the dermatologist was unable to recommend a suitable management plan by video-link. There were significant differences in the ability to recommend an optimum management plan by video-link when a different dermatologist made the reference management plan. The results indicate that a high proportion of dermatological conditions can be successfully managed by realtime teledermatology.

Publication Types:
    Multicenter Study

PMID: 9744165 [PubMed - indexed for MEDLINE]

176: J Telemed Telecare. 1998;4 Suppl 1:31-2.

Teledermatology--high technology or not?

Harrison PV, Kirby B, Dickinson Y, Schofield R.

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As an alternative to attending a conventional dermatology clinic, patients had a high-resolution conventional photographic image taken by a professional medical photographer. The photographic images were viewed by a dermatologist together with referral details from the general practitioner and any other relevant information from the patient's notes. From the images, a dermatological diagnosis was derived and a management plan for each patient instituted. After treatment, histological assessment of the tumours allowed diagnostic accuracy to be determined. The preliminary diagnostic accuracy (71%) was greater than that of the referring general practitioners (49%). However, when the diagnostic ability of the method to detect the nature of malignant lesions was examined, telemedicine was able to detect malignancies in 94% of cases compared with only 70% detected by general practitioners. The results of the present study indicate that teledermatology is achievable using a low-technology, low-cost approach.

PMID: 9640726 [PubMed - indexed for MEDLINE]

177: J Telemed Telecare. 1998;4 Suppl 1:3-5.

Preliminary results from the Northern Ireland arms of the UK Multicentre Teledermatology Trial: is clinical management by realtime teledermatology possible?

Loane MA, Gore HE, Bloomer SE, Corbett R, Eedy DJ, Mathews C, Steele K, Wootton R.

Institute of Telemedicine and Telecare, Queen's University, Belfast, UK.

Results from phase 1 of the UK Multicentre Teledermatology Trial demonstrated the diagnostic accuracy of realtime teledermatology using low-cost equipment. Phase 2 of the trial aimed to assess its effectiveness as a management tool for dermatological disease. Teledermatology consultations were organized between two health centres and two hospitals in Northern Ireland using low-cost videoconferencing equipment. For 205 patients seen by a dermatologist over the video-link a diagnosis and management plan were recorded. A subsequent face-to-face consultation was arranged on the same day to confirm the diagnosis and treatment regime. A comparison of these management plans revealed that the same plan was recommended in 64% of cases; the teledermatologist was unable to advocate a suitable management plan in 19% of cases; a suboptimal treatment plan was suggested by the teledermatologist in 6% of cases; and in 11% of cases, the teledermatologist suggested an inappropriate treatment plan. These findings indicate that appropriate clinical management was possible in approximately two-thirds of dermatology consultations via the video-link.

Publication Types:
    Clinical Trial
    Multicenter Study

PMID: 9640716 [PubMed - indexed for MEDLINE]

178: J Telemed Telecare. 1998;4(1):36-40.

Patient satisfaction with realtime teledermatology in Northern Ireland.

Loane MA, Bloomer SE, Corbett R, Eedy DJ, Gore HE, Mathews C, Steele K, Wootton R.

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Teledermatology consultations were organized between two health centers and two hospitals in Northern Ireland using low-cost videoconferencing equipment. A prospective study of patient satisfaction was carried out. Following each teleconsultation, patients were asked to complete a questionnaire assessing their satisfaction with the service. Over 22 months, 334 patients were seen by a dermatologist over the video-link, and 292 patients (87%) completed the 16-item questionnaire. Patients reported universal satisfaction with the technical aspects of teledermatology. The quality of both the audio and the display was highly acceptable to patients. Personal experiences of the teledermatology consultation were also favourable: 85% felt comfortable using the video-link. The benefits of teledermatology were generally recognized: 88% of patients thought that a teleconsultation could save time. Patients found the teledermatology consultation to be as acceptable as the conventional dermatology consultation. These findings suggest overall patient satisfaction with realtime teledermatology.

PMID: 9640708 [PubMed - indexed for MEDLINE]

179: J Telemed Telecare. 1998;4(1):1-17.

A survey of research in telemedicine. 1: Telemedicine systems.

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Published work in telemedicine has been surveyed in order to consider the range of current research, highlight some pitfalls and point out areas where it seems that more work is required. This article deals with tests of the safety and efficacy of telemedicine systems. This work can be seen as moving through three phases: first, identify the technical specification of equipment required for the particular telemedicine application; second, test that this is appropriate in particular settings; third, establish a set of standards and guidelines to ensure that the telemedicine system is used to the best advantage. Work in teleradiology seems to be in the second phase. Work in teledermatology, for example, is still in the first phase. Telemedicine is an important and growing area of academic research. The quality of the research ought also to be increasing. While there have been a number of well designed, robust studies with clear conclusions that show the value of telemedicine in certain settings, much more remains to be done.

Publication Types:
    Review

PMID: 9640705 [PubMed - indexed for MEDLINE]

180: Medinfo. 1998;9 Pt 1:290-3.

The effect of a teledermatology program on rural referral patterns to dermatologists and the management of skin disease.

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Teledermatology can be defined as the use of imaging and telecommunications technologies to provide skin care services at a distance. The potential value of teledermatology is especially great in rural and medically underserved areas that do not have, or cannot support, providers specializing in the diagnosis and management of skin diseases. Rural patients and primary care providers should be able to use teledermatology as a greatly simplified and potentially less expensive means of referral to an urban dermatologist. In an effort to gauge the impact of a simple teledermatology system on referral patterns and the management of rural patients with skin disorders, we studied baseline rates of referral to dermatologists from five primary care clinics in rural Oregon. Economical, easy-to-use teledermatology systems were subsequently installed, and the effects on patient referral and management were recorded over time. The interim results suggest that primary care providers (PCPs) are reluctant to refer patients with skin conditions, even when the primary care providers confidence in the correct diagnosis and treatment plan for that condition are relatively low. The installation of a teledermatology system increases the number of patients referred for specialist evaluation dramatically, even while the number of in-person visits to specialists fell. Although diagnostic agreement between dermatologists and primary care providers was mixed, a marked difference was found in their recommended treatment plans. A number of cases were found in which use of the telemedicine technology system resulted in reversing conditions that had been poorly controlled for a number of years prior to teleconsultation. This work is important as an indicator that referral rates to dermatologists may be inappropriately low in rural areas of the U.S., and that use of teledermatology may improve this trend.

PMID: 10384464 [PubMed - indexed for MEDLINE]

181: Telemed Virtual Real. 1997 Nov;2(11):123.

Teledermatology demonstrates its potential in Oregon.

[No authors listed]

Publication Types:
    Case Reports
    News

PMID: 10174636 [PubMed - indexed for MEDLINE]

182: Telemed J. 1997 Fall;3(3):227-33.

Telemedicine for dermatology care in rural patients.

Burgiss SG, Julius CE, Watson HW, Haynes BK, Buonocore E, Smith GT.

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BACKGROUND: Rural patients who develop dermatologic disorders often do not seek specialty care because of multiple logistical and economic factors. OBJECTIVE: To assess the effect of teledermatology consultations on the cost of care for a

given episode of illness. METHODS: Telemedicine records were reviewed for 119 visits by 87 patients referred for teledermatology consultation over a 17-month period. RESULTS: Seven patients (8%) required follow-up in the dermatologist office for extended care, while 20 patients (23%) (52 visits) underwent follow-up teledermatology evaluation. The average duration of the dermatologic condition for each patient prior to the telemedical consultation was 17 months. The average of care for the diagnosed dermatologic condition, for all patients during an average period of 8 months prior to teledermatology was $294, compared with $141 for the 6 months after diagnosis by teledermatology. CONCLUSIONS: Telemedicine can be effective for dermatology consultation in new patients referred from rural communities. Our data indicate teledermatology can decrease the cost of care for the diagnosed condition.

PMID: 10174347 [PubMed - indexed for MEDLINE]

183: J Am Acad Dermatol. 1997 Sep;37(3 Pt 1):398-402.

Comment in:
    J Am Acad Dermatol. 1998 Jul;39(1):136-7.

Reliability of dermatology teleconsultations with the use of teleconferencing technology.

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BACKGROUND: Recent advances in telecommunications technology allow physicians to consult on patients at a distance via an interactive video format. Few data exist as to the reliability of this form of consultation. OBJECTIVE: Our purpose was to measure the degree of concordance between a dermatologist seeing a patient in a clinic and another dermatologist seeing the same patient over a commercially available videoconferencing system. METHODS: Patients referred to a general dermatology clinic were seen by both a "live" dermatologist and a "teledermatologist" via a T1 connection. Diagnosis and recommendations were recorded by both physicians and compared. The physicians were also asked to rate the degree of confidence they had in their diagnosis. RESULTS: Seventy-nine diagnoses were made on 60 patients. The two physicians were in absolute agreement on 61 of the diagnoses (77.2%). Race or sex of the patient, nature of the skin problems, or which of the two physicians was the teledermatologist did not statistically correlate with the concordance of the two physicians. CONCLUSION: There was a reasonable degree of agreement between the two examining physicians. Despite the relatively high degree of concordance the teledermatologist had a significantly lower degree of confidence in his diagnoses.

PMID: 9308553 [PubMed - indexed for MEDLINE]

184: Telemed Virtual Real. 1997 Sep;2(9):105-6.

Teledermatology solves a nasty skin problem at the bottom of the world.

[No authors listed]

Publication Types:
    Case Reports
    News

PMID: 10170468 [PubMed - indexed for MEDLINE]

185: Clin Exp Dermatol. 1997 Jul;22(4):163-5.

Digital imaging and teledermatology: educational and diagnostic applications of a portable digital imaging system for the trainee dermatologist.

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Teledermatology is no longer a futuristic curiosity; several general practices across the UK are now preparing to be electronically linked to other medical services for the purposes of referral and telediagnosis. Further, digital imaging in dermatology has been the subject of considerable research in recent years, largely because of its application to telemedicine. Indeed in the UK, geographically isolated general practices in North Powys have already demonstrated the effective delivery of dermatological expertise through a video-conferencing link to a consultant dermatologist at Aberystwyth Hospital, thereby reducing the need for patients or the consultant to travel long distances.

Publication Types:
    Clinical Trial
    Controlled Clinical Trial

PMID: 9499603 [PubMed - indexed for MEDLINE]

186: Telemed J. 1997 Summer;3(2):173-8.

Plea for standardization in teledermatology: a worm's eye view.

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Like any clinical interaction, teledermatology requires accurate, timely, and relevant information. The need to provide reliable, representative, diagnostic-quality images to the consultant is obvious. Predetermined patient views for a given clinical presentation and optimal hands on techniques to acquire them are not standardized. As a result, the training provided to those who take the images is inconsistent. Anecdotal evidence from the author's telemedicine practice is employed to support this contention. A formal collaboration between the telemedicine and medical photography communities is proposed to generate such standards and a relevant curriculum.

Publication Types:
    Case Reports

PMID: 10168282 [PubMed - indexed for MEDLINE]

187: Telemed J. 1997 Spring;3(1):27-32.

Dermatopathology via a still-image telemedicine system: diagnostic concordance with direct microscopy.

Berman B, Elgart GW, Burdick AE.

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OBJECTIVE: To determine the concordance of dermatopathology diagnosis by still-image telemedicine technology and direct microscopy. MATERIALS AND METHODS: Skin specimens (N = 79) were examined by a dermatopathologist using a still-image phone system, and the diagnoses were compared with those made by the same dermatopathologist 1 year earlier by direct microscopy. The telemedical diagnoses were reached first without, and then with, patient histories. RESULTS:

When the patient history was available, identical diagnoses were made in 66 of the 79 cases (84% concordance rate). Without patient history, the concordance rate was 80%. The diagnostic concordance rate for the diagnosis of benign nevocytic nevi, inflammatory diseases, and benign and malignant non-squamous cell carcinoma neoplasms was statistically significantly greater than the concordance rate for the diagnosis of squamous cell carcinoma and squamous cell carcinoma in situ (P = 0.005). CONCLUSIONS: The diagnostic concordance rate achieved by teledermatopathology using a still-image phone system fell short of the 99% intraobserver diagnostic concordance rate using direct microscopy.

PMID: 10166442 [PubMed - indexed for MEDLINE]

188: N Z Med J. 1997 Feb 28;110(1038):51-3.

Diagnostic accuracy of teledermatology: results of a preliminary study in New Zealand.

Oakley AM, Astwood DR, Loane M, Duffill MB, Rademaker M, Wootton R.

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AIM: To determine the accuracy of a video conferencing system (telemedicine) in diagnosis of dermatological disorders. METHODS: New patients referred to a dermatology clinic were initially examined by telemedicine and then by a standard face to face consultation. The diagnoses made by each type of consultation were compared and accuracy of telemedicine determined. RESULTS: One hundred and four patients with 135 dermatological conditions were analysed. Seventy five percent of conditions were correctly diagnosed by telemedicine. In a further 7% a differential diagnosis was made, which included the final diagnosis made face to face. In 12%, the diagnosis was incorrect using the telemedicine system, and in 3% no diagnosis was made. Four per cent of diagnoses were only made when the patient was seen face to face. CONCLUSION: This preliminary study suggests that video conferencing equipment can be used with a reasonable degree of accuracy for the diagnosis of dermatological disease.

PMID: 9076285 [PubMed - indexed for MEDLINE]

189: Arch Dermatol. 1997 Feb;133(2):197-200.

Erratum in:
    Arch Dermatol 1997 Jul;133(7):819.

Teledermatology and underserved populations.

Norton SA, Burdick AE, Phillips CM, Berman B.

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BACKGROUND: The dermatologic needs of many communities in the United States and worldwide are underserved. Telemedicine enables physicians and non-physician primary care providers to use modern telecommunications devices to gain access to specialist consultations promptly and with much less travel. The independently developed telemedicine programs described herein support 3 traditionally underserved populations: Pacific Islanders, migrant farmworkers, and prison inmates. OBSERVATIONS: In 3 independently designed telemedicine programs, dermatology emerged as the specialty most used by remote practitioners. Patients were presented for both diagnosis and treatment and in the setting of initial evaluation and as part of follow-up care. CONCLUSION: Teledermatology is a useful way to provide dermatologic support to remote or underserved communities.

PMID: 9041833 [PubMed - indexed for MEDLINE]

190: Arch Dermatol. 1997 Feb;133(2):171-4.

Teledermatology in the nursing home.

Zelickson BD, Homan L.

Department of Dermatology, University of Minnesota, Minneapolis, USA.

OBJECTIVE: To examine a still-image store-and-forward teledermatology system for use in the care of nursing home residents. DESIGN: Diagnosis and treatment plans made from a teledermatology system were compared with those made from an on-site dermatology consultation. SETTING: This study involved the dermatologic care of nursing home residents. PATIENTS: Dermatologic consultations sent to the senior author's office from the participating nursing home were eligible for the study. In a consecutive manner, 29 residents with a total of 30 skin conditions were enrolled. INTERVENTION: A nurse collected and sent the histories and images using the teledermatology system. A diagnosis and treatment plan was determined by examining a transmitted still image and patient history alone and in combination by 2 to 3 dermatologists independently. An independent dermatologist made an on-site dermatologic consultation within 2 days after the images had been collected. MAIN OUTCOME MEASUREMENT: The diagnosis and treatment plans made from the teledermatology system were compared with those made by the on-site dermatologist. RESULTS: Twenty-nine patients with 30 skin conditions were enrolled in the study. Correct diagnoses were made for 60 (67%) of 90, 51 (85%) of 60, and 53 (88%) of 60 patients given the history alone, image alone, and both, respectively. The correct treatment plan was seen in 63 (70%) of 90, 52 (87%) of 60, and 54 (90%) of 60 patients given the history alone, image alone, and both, respectively. No incorrect diagnoses or treatment plans would have given rise to substantial morbidity. The dermatologists felt comfortable in making a diagnosis and treatment plan in all cases in which they had access to both the image and patient history. CONCLUSION: This study provides evidence that nursing home teledermatology consults may replace some on-site consultations by offering quality care in a cost-effective manner.

Publication Types:
    Clinical Trial

PMID: 9041829 [PubMed - indexed for MEDLINE]

191: Adv Dermatol. 1997;12:19-45; discussion 46.

Teledermatology.

Burdick AE, Berman B.

Department of Dermatology and Cutaneous Surgery, University of Miami School of Medicine, Florida, USA.

Publication Types:
    Historical Article
    Review

PMID: 8973734 [PubMed - indexed for MEDLINE]

192: Health Technol Assess. 1997;1(14):i-vi, 1-149.

When and how to assess fast-changing technologies: a comparative study of medical applications of four generic technologies.

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OBJECTIVES. To try to identify the optimal time at which to start assessing new and fast-evolving health technologies. To provide insight into factors influencing the timing of assessments and the choice of methods for assessing new and fast-changing technologies. HOW THE RESEARCH WAS CONDUCTED. A series of literature reviews were undertaken covering the general principles involved in the timing of health technology assessments (HTAs). Additionally, the reported assessments of laparoscopic cholecystectomy, chorionic villus sampling (CVS), teleradiology, teledermatology, genetic screening for predisposition to breast cancer, and gene therapy for cystic fibrosis were reviewed to try to identify the factors that influenced the timing of these assessments. Key individuals in each field were also interviewed. The selected technologies allowed comparison between those that were new and evolving and those that were relatively well-established. A bibliometric study of publication trends was also undertaken to see whether these trends would suggest points in the development of a technology that could be used as indicators that assessment should be started. RESEARCH FINDINGS. TIMING. The precise point at which assessment should start was not identified but the bibliometric study suggested that extending this approach might give useful results. For all health technologies, more regular reporting of outcomes and side-effects should be encouraged during the period after initial assessment and, where the technology is fast-changing, reassessment should take place from time to time. The precise intervals were not identified and the problem remains of deciding when a technology has changed enough to warrant reassessment. FACTORS INFLUENCING TIMING. Published reports of assessments did not generally specify the reasons for their timing, but a number of factors appear to have influenced the timing of those assessments, directly or indirectly. Product champions and opinion leaders pioneer the introduction of new technologies into clinical practice, and their reports may lead to the rapid diffusion of such technologies before they have been adequately evaluated, as was the case with laparoscopic cholecystectomy; this diffusion may limit the methods of evaluation that can then be used. It is therefore important to assess new health technologies before diffusion takes place. The extent to which regulatory control is imposed on the introduction of new health technologies can also influence the timing of assessments. Such controls might have helped to restrict the diffusion of laparoscopic cholecystectomy, making a large and widely generalisable randomised controlled trial (RCT) feasible. The source and availability of funding for studies may influence the nature and timing of trials. Many telemedicine evaluations were funded by commercial telecommunications organisations and were thus restricted in their timing (and biased towards the technological aspects of the applications) by the availability of funds. Media coverage undoubtedly has an influence although this influence is not always predictable; it may generate 'favourable' publicity about new health technologies, which can lead to immediate demands for the new technique, as was the case with laparosocpic cholecystectomy with its apparent benefits. Thus assessments should be made before media coverage exerts popular pressure on purchasers to adopt the technology and dissuades patients from participating in RCTs (because of fear they may be randomised to the standard treatment as occurred in a US trial of CVS). Innovators should also be cautious in the claims that they make to the media.(ABSTRACT TRUNCATED)

Publication Types:
    Review

PMID: 9483162 [PubMed - indexed for MEDLINE]

193: J Telemed Telecare. 1997;3 Suppl 1:73-5.

Preliminary results from the Northern Ireland arms of the UK Multicentre Teledermatology Trial: effect of camera performance on diagnostic accuracy.

Loane MA, Gore HE, Corbett R, Steele K, Mathews C, Bloomer SE, Eedy DJ, Telford RW, Wootton R.

Institute of Telemedicine & Telecare, Queen's University, Belfast, UK.

The diagnostic accuracy of realtime teledermatology was measured using two different video cameras. One camera was a relatively low-cost, single-chip device (camera 1), while the other was a more expensive three-chip camera (camera 2). The diagnosis obtained via the videolink was compared with the diagnosis made in person. Sixty-five new patients referred to a dermatology clinic were examined using camera 1 followed by a standard face-to-face consultation. A further 65 patients were examined using camera 2 and the same procedure applied. Seventy-six per cent of conditions were correctly diagnosed by telemedicine using camera 2 compared with 59% using camera 1. A working differential diagnosis was obtained in 12% of cases using camera 2 compared with 17% using camera 1. The percentage of 'no diagnosis', wrong and missed diagnoses was halved using camera 2 compared with camera 1. These results suggest that the performance of camera 2 was superior to that of camera 1 for realtime teledermatology.

Publication Types:
    Clinical Trial
    Multicenter Study

PMID: 9218392 [PubMed - indexed for MEDLINE]

194: J Telemed Telecare. 1997;3(2):83-8.

Effect of camera performance on diagnostic accuracy: preliminary results from the Northern Ireland arms of the UK Multicentre Teledermatology Trial.

Loane MA, Gore HE, Corbett R, Steele K, Mathews C, Bloomer SE, Eedy DJ, Telford RW, Wootton R.

Institute of Telemedicine and Telecare, Queen's University, Belfast, Northern Ireland.

The diagnostic accuracy of realtime teledermatology was measured using two different video cameras. One camera was a relatively low-cost, single-chip device (camera 1), while the other was a more expensive, three-chip camera (camera 2). The diagnosis obtained via the videolink was compared with the diagnosis made in person. Sixty-five new patients referred to a dermatology clinic were examined using camera 1 followed by a standard face-to-face consultation on the same day. A further 65 patients were examined using camera 2 and the same procedure implemented. Seventy-six per cent of conditions were correctly diagnosed by telemedicine using camera 2 compared with 62% using camera 1. A working differential diagnosis was obtained in 12% of cases using camera 2 compared with 14% using camera 1. The percentage of 'no diagnosis', wrong and missed diagnoses was halved using camera 2 compared with camera 1. These results suggest that the performance of the more expensive camera was superior for realtime teledermatology.

Publication Types:
    Clinical Trial
    Controlled Clinical Trial
    Multicenter Study

PMID: 9206278 [PubMed - indexed for MEDLINE]

195: J Telemed Telecare. 1997;3(1):61-2.

Teledermatology trial in Finland.

Suhonen R.

Publication Types:
    Letter

PMID: 9139764 [PubMed - indexed for MEDLINE]

196: J Telemed Telecare. 1997;3(1):1-22.

Telemedicine in northern Norway.

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The University Hospital of Tromso has been involved in a variety of telemedicine activities since the late 1980s, including teleradiology, telepathology, teledermatology, remote endoscopy, remote gastroscopy, teleechocardiography, transmission of electrocardiograms, telepsychiatry, electronic delivery of laboratory results and distance learning for health professionals. Since 1993 the department of telemedicine in Tromso has been designated the national centre of competence in telemedicine. With a wealth of experience to draw from, a critical number of health-care professionals exposed to and using telemedicine routinely, the support of the Norwegian health authoriues, a national centre guiding telemedicine research, no licensing barriers within the country, nationwide ISDN and reimbursement for telemedicine services, the future of telemedicine in Norway looks promising.

Publication Types:
    Historical Article
    Review

PMID: 9139756 [PubMed - indexed for MEDLINE]

197: Telemed Today. 1996 Jul-Aug;4(4):18-21.

Store-and-forward teledermatology.

Perednia DA.

PMID: 10165140 [PubMed - indexed for MEDLINE]

198: J Telemed Telecare. 1996;2 Suppl 1:7-9.

Teledermatology in the Highlands of Scotland.

Jones DH, Crichton C, Macdonald A, Potts S, Sime D, Toms J, McKinlay J.

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A pilot study of telemedicine consultations of 51 dermatology patients showed that the technology worked well, with the diagnosis being able to be made in most patients and over half of the patients being able to be dealt with through this medium only. It could therefore have a valuable screening role. However, many of the patients, in spite of the obvious advantage of an immediate consultant opinion, felt it would be more appropriately used as a review technique.

PMID: 9375077 [PubMed - indexed for MEDLINE]

199: Wien Klin Wochenschr. 1996;108(17):532-40.

[Telemedicine]

[Article in German]

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Telemedicine includes all medical activities in diagnosis, therapeutics or social medicine undertaken by means of an electronic transfer medium, thereby enabling the transmission of visual and acoustic information in these fields over long distances without the doctor being personally present at the requested consultation. Most experience in telemedicine has been gathered in diagnosis, especially with respect to teleradiology and telepathology; however, an increasing number of institutions have obtained experience in teledermatology, telepsychiatry, telecardiology, telesurgery, etc. The quality of the transmitted images is adequate for diagnostic application. However, the transfer rates of normal telephone lines are not satisfactory and these telephone nets will be replaced by ISDN and broad band or satellite connections in the near future. The lack of uniform transfer standards is the most important constraint in telepathology. This fact is one explanation for the fast growth of the Internet, which is based on unified transmission standards. The rapid expansion of telemedicine is inevitable and the increased use of this tool will induce profound changes in the medico-social environment. There is a fear of institutional concentration, at the expense of small institutions. This development can be minimised by augmenting the scope to encompass telemedicine in all interdisciplinary fields, with the consequent full integration of small institutions. Telemedicine is an appropriate technique for quality assurance in all areas of medicine, since it permits simultaneous "soft" quality control, in conjunction with assumption of co-responsibility by the control institution.

Publication Types:
    Review

PMID: 8992786 [PubMed - indexed for MEDLINE]

200: Arch Anat Cytol Pathol. 1995;43(4):285-7.

Telemedicine project in the Azores Islands.

Goncalves L, Cunha C.

Telemedicine projects and programmes began in Portugal only in 1992 with a telepathology programme in real time frozen section service. The main purpose and challenge of the telemedicine is to allow the access of a special and specific health care to populations as the 250,000 inhabitants of the Azores archipelago. We wish to start with telepathology, teledermatology, telecardiology, tele ORL, telepsychiatry, telematernal and foetal medicine in all islands of the archipelago, also connected with the Major University Centers in Lisbon. The system must be composed of a video conferencing station working in ISDN at 384 kb/sec connectors via a switch to the video camera applied to different video-cameras. Telemedicine improves the human, economical, social and cultural life quality to the people of the European, but depressed ultraperipherical region of Azores.

PMID: 8526570 [PubMed - indexed for MEDLINE]

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Teledermatology: one application of telemedicine.

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Telemedicine can be defined as the use of telecommunications technologies to

provide medical information and services. This field has recently begun a period of explosive growth. Oregon's teledermatology program within the National Library of Medicine's high-performance computing and communications initiative is designed to generate much-needed basic and clinical research information about one specific telemedicine application. The background of this program is discussed, and the research objectives are described.

PMID: 7703938 [PubMed - indexed for MEDLINE]

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Teledermatology in Scotland.

Crichton C, Macdonald S, Potts S, Syme A, Toms J, McKinlay J, Leslie D, Jones DH.

Publication Types:
    Case Reports
    Letter

PMID: 9375141 [PubMed - indexed for MEDLINE]

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Teledermatology in a changing health care environment.

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To avoid marginalization and an attendant decline in the quality of care delivered, dermatologists must take the lead in defining those services that can be delivered remotely and move aggressively to create standards of nomenclature, protocols for imaging, and methods of care delivery that can be implemented in a primary-care setting. Because of the rigorous training of its practitioners in visual analysis, it may be possible for dermatology to shift from its traditional face-to-face model to an image-based, remotely practiced one. Transition to remote practice may even be critical to the survival of the specialty. Chief among the issues in the implementation of teledermatology is whether the use of video conferencing or store-and-forward technology provides the most efficient, high-quality remote diagnosis. Ancillary issues, including image protocols, bandwidth requirements, reimbursement, licensing, liability, and patient and provider satisfaction, are important as well. These issues are discussed in a framework of capitated payment in urban, integrated delivery systems. Teledermatology has many challenges to meet before competing with face-to-face delivery of dermatologic care.

PMID: 10165339 [PubMed - indexed for MEDLINE]

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[The skin and television: teledermatitis.]

[Article in Spanish]

GUNCHE FF.

PMID: 13709763 [PubMed - OLDMEDLINE for Pre1966]