



e-MEDICINE PROVIDES 24 HOURS WEEKLY NONSTOP SERVICE TO THE BEST OF MANKIND

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ABSTRACT

e-medicine is serving to the human by following 24 hours weekly without any fail for best and prompt medical help. Just as the printing press democratized information, the medicalized smartphone will democratize health care. Anywhere you can get a mobile signal, you'll have new ways to practice data-driven medicine. Patients won't just be empowered; they'll be emancipated.



eMedicine

eMedicine, acquired by WebMD in January 2006, is home to the largest and most current Clinical Knowledge Base available to physicians and other healthcare professionals. The eMedicine Clinical Knowledge Base contains 30,000 multimedia files and features the largest online repository of medical education credits for physicians, nurses and optometrists. eMedicine's subscription site for institutions is www.iMedicine.com. Nearly 10,000 physician authors and editors contribute to the eMedicine Clinical Knowledge Base, which contains articles on 7,000 diseases and disorders. The evidence-based content, updated 24/7 provides the latest practice guidelines in 59 medical specialties. eMedicine's professional content undergoes 4 levels of physician peer review plus an additional review by a Pharm.D. prior to publication. eMedicine, Inc. (<http://www.emedicine.com>), the medical-education network and developer of the first online peer-reviewed medical reference series, has announced that the U.S. Patent and Trademark Office has granted a patent to the company's proprietary Group Publishing System (GPS) software. The GPS enables collaborative, enterprise wide publishing and allows authors and editors to create large, multi-author projects—online content, journals, books and manuals—entirely on the Internet.

Jeffrey Berezin, chief technical officer and architect of the GPS system, said: "The software is unique—it is the only enterprise software that allows all production to take place on the Internet. The system allows authoring and editing within the GPS environment or through word-processing programs like Word." Software engineer Jeffrey Berezin, who co-developed the system, said, "This system is a complete authoring, editing and version-control system with complete management-tracking tools and a built-in communications network." eMedicine created the Group Publishing System to publish original, online medical textbooks that give physicians Internet access to up-to-date, clinical-decision-support tools and information. Each submission undergoes four levels of physician peer review for quality assurance. Authors and editors have instant access to their contributions and may update them whenever necessary. The content includes radiographic images, audio and video clips and links to other sites. The system has been used by 6,500 physician-contributors from 1,000 institutions to write, edit and peer-review 65 eMedicine online textbooks that are currently in development for the eMedicine site. The GPS system is not specific to medicine and can be used in other Internet and enterprise publishing projects. The company plans to market the software separately early next year.

KEYWORDS: eMedicine, WebMD, PubMed, Medscape, Medline, Medical-Journals, HR-QoL, UW-QoL.

INTRODUCTION

eMedicine.com, Incorporated is an online clinical medical knowledge base founded in 1996 by two medical doctors, Dr. Scott Plantz and Dr. Jonathan Adler and by Mr. Jeffrey Berezin, a computer engineer. The fundamental concept was to create a large repository of professional level medical content that could be both updated and accessed continuously to assist in clinical care and physician education.^[1] The eMedicine website consists of approximately 6,800 medical topic review articles, each of which is associated with one of 62 clinical subspecialty "textbooks". Pediatrics, for example, has 1,050 articles organized into 14 subspecialty "textbooks" (Pediatric endocrinology,

genetics, cardiology, pulmonology, etc.); the emergency medicine volume has 630 articles and internal medicine is near 1,400. The knowledge base includes about 25,000 clinically relevant images. Each article is authored by board certified specialists in the subspecialty to which the article belongs and undergoes three levels of physician peer-review, plus review by a Doctor of Pharmacy (Pharm.D.). The article's authors are identified with their current faculty appointments. Each article is updated yearly or more frequently as changes in practice occur and the date is published on the article. eMedicine.com was sold to WebMD in January, 2006 and is available as the Medscape Reference.^[2]



emedicine[®]
from WebMD



Dr. Scott Plantz and Dr. Jonathan Adler

History: Dr. Plantz, Dr. Adler and Mr. Berezin evolved the concept for eMedicine.com in 1996 and deployed the initial site via Boston Medical Publishing, Inc., a corporation in which Plantz and Adler were principals. **Dr. Scott Plantz, M.D., FAAEM,** is the Chairman of eMedicine.com and the creator of the eMedicine concept. He is a former Vice Chairman and currently Research Director and Assistant Professor in the Department of Emergency Medicine, Chicago Medical School and Mount Sinai Medical Center. Dr. Plantz founded and serves as Vice President of the American Academy of Emergency Medicine, which in five years has grown to almost 3,000 members. The academy is dedicated to improving the quality of emergency care in the United States. In addition to overseeing the development of eMedicine, Inc. Dr. Plantz is the founder and CEO of Boston Medical Publishing, Corporation. Boston Medical Publishing was founded in 1992 and has published over 50 titles relevant to physician, attorney, accountant and health care professional board review and licensing. He has personally edited over 15 textbooks in the fields of emergency medicine, internal medicine, surgery, pediatrics and neurology. Dr. Plantz is also responsible for the Bonono/Plantz Act, now passed in several states, which allows health care reporting of intoxicated drivers. Dr. Plantz is a Summa Cum laude graduate of Creighton University with majors and minors in business, communication, human science and philosophy. He has done graduate work in medicine at the University of Nebraska Medical Center and in law at the DePaul University School of Law. He completed a residency in emergency medicine and is board certified by the American Board of Emergency Medicine.

Dr. Jonathan Adler, M.D. serves as Editor-in-Chief of Emergency Medicine at eMedicine.com, Inc. Dr. Adler serves as a Director of Winchester Hospital Inc. **Mr. Jeffrey Berezin, M.S.,** is Vice President of Internet Development of emedicine.com and has over 25 years experience in software design and development. He has a BS in Computer Science from Purdue University and a Masters Degree in Systems Engineering from the University of Lowell. He has been involved in design and programming projects for Medical Datamation, Krannart Institute of Cardiology at Indiana University Medical Center, Raytheon Scientific Computer Center, Genographics Corporation, Biomeasure Corporation, Kinerton, LTD., Expansia Corporation, Mapics Corporation and NetSite Systems, Inc. Jeffrey served as President of Syracomp, Inc. and was most recently a Vice President of NetSite Systems. Jeffrey has a rich skill set comprising programming skills in Java and Visual Foxpro, computer graphic visualization, wide area networking, and creation of distributed collaborative systems. He is also experienced in Windows NT, AS400e and Unix environments as well as in creating, capturing and serving streaming audio and video using Microsoft NetShow technology. He currently has two patents pending and has published several commercial software products. Over a period of 1.5 years the Group Publishing System was developed that allowed large numbers of contributors to collaborate simultaneously. That system was first used to create a knowledge base in Emergency Medicine with 600 contributing MDs creating over 630 chapters in just over a year. In 1997 eMedicine.com, Inc. was legally spun off from Boston Medical Publishing. Several key individuals made

investments in the company, including **Dr. Richard Lively**, MD, JD, MS, MPH who led recruitment and execution for the Internal Medicine volume, Julie Bohlen who ran editorial operations for many years and became a board member and others. Dr. Richard Lively is a physician, business executive and lawyer. He has founded and managed three successful health care companies. He has accepted appointment by the Governor of Connecticut to the State Medico legal Investigations Commission. He is a member of the faculty of the Yale University School of Medicine and had previously been on the faculty of the Medical Schools of the University of Maryland, the University of Connecticut and the University of Massachusetts. He is currently practicing law. In that year the decision was made to broaden the scope of eMedicine to effectively all specialties. Several years were then spent creating the tables of contents, recruiting expert physicians and in the creation of the additional 6,170 medical articles. Operation was based out of a main office in Omaha, NE and the company was operated "virtually" with key staff in multiple sections of the US. After earning his undergraduate degree in Mathematics from the University of Notre Dame, he went on to the University of Michigan where he simultaneously earned his MD as well as an MS in Mathematics. After gaining experience in Emergency Medicine, Dr. Lively founded the Temple Urgent Care Center in New Haven, a business he grew and managed until 1992. During this time, he also earned his MPH at the Yale University School of Medicine and completed the prestigious OPM (Owner/ President/ Manager) Program at the Harvard Business School. This is a post MBA program offered to a select few outstanding business executives. In 1993, he founded ELI Consulting, which specialized in operations management improvement in the emergency department. At the same time, he completed the requirements for his JD, awarded to him by the University of Connecticut in 1994. He is a member of the Connecticut State Bar, the Federal Second Circuit Bar and the US Supreme Court Bar. In 1997, he redirected his energy and co-founded eMedicine.com. Recognizing the potential of the internet and its incredible possibilities for the medical profession, he was among the first to wed what, in 1997, was an emerging medium with the medical profession and its spiraling need for information. As the SVP of Marketing and the #2 man in the company, he played a key role in growing the company to the number one med site used by doctors on the web.

eMedicine.com became widely trafficked. In 2005, eMedicine entered into discussions for acquisition. The board of directors at the time of sale, consisting of Jonathan Adler, Jeffrey Berezin, Craig Burson, Lilian Shackelford Murray and Michael P. Tierney, unanimously recommended approval for sale of the company to WebMD. The sale was completed in January 2006 and the content is available via WebMD's Medscape site. Content now includes allergy and immunology, cardiology, clinical procedures, critical

care, dermatology, emergency medicine, endocrinology, gastroenterology, genomic medicine, hematology, infectious diseases, nephrology, neurology, obstetrics/gynecology, oncology, pathology, perioperative care, physical medicine and rehabilitation, psychiatry, pulmonology, radiology, rheumatology and sports medicine. Surgical subspecialties include neurosurgery, ophthalmology, orthopedic surgery, (ENT) and facial plastic surgery, plastic surgery, thoracic surgery, transplantation, trauma, urology and vascular surgery. The site is free to use, requiring only registration. More than 10,000 physician contributors from several countries participated in the creation of the articles. Novel at the time, eMedicine content could also be accessed as an e-book and could be downloaded into a palm top device.

Usage among specialists: In 2012 Volsky *et al.* evaluated the most frequently used internet information sources by the public, (1) identifying the three most frequently referenced Internet sources; (2) comparing the content accuracy of each of the three sources and (3) ascertaining user-friendliness of each site; and (4) informing practitioners and patients of the quality of available information. They found Wikipedia, eMedicine, and NLM/NIH MedlinePlus were the most referenced sources. For content accuracy, eMedicine scored highest (84%; $p < 0.05$) over MedlinePlus (49%) and Wikipedia (46%). The highest incidence of errors and omissions per article was found in Wikipedia (0.98 ± 0.19), twice more than eMedicine (0.42 ± 0.19 ; $p < 0.05$). Errors were similar between MedlinePlus and both eMedicine and Wikipedia. On ratings for user interface, which incorporated Flesch-Kincaid Reading Level and Flesch Reading Ease, MedlinePlus was the most user-friendly (4.3 ± 0.29). This was nearly twice that of eMedicine (2.4 ± 0.26) and slightly greater than Wikipedia (3.7 ± 0.3). All differences were significant ($p < 0.05$). There were 7 topics for which articles were not available on MedlinePlus.^[3] They concluded "Knowledge of the quality of available information on the Internet improves pediatric otolaryngologists' ability to counsel parents. The top web search results for pediatric otolaryngology diagnoses are Wikipedia, MedlinePlus and eMedicine. Online information varies in quality, with a 46-84% concordance with current textbooks. eMedicine has the most accurate, comprehensive content and fewest errors, but is more challenging to read and navigate. Both Wikipedia and MedlinePlus have lower content accuracy and more errors, however MedlinePlus is simplest of all to read, at a 9th Grade level. In 2012 Laraway and Rogers reported a structured review of journal articles that quoted The University of Washington Quality of Life Scale for head and neck cancer patients. "The University of Washington Quality of Life Scale (UW-QoL) is one of the most frequently reported health-related quality of life (HR-QoL) questionnaires in head and neck cancer, and since its first publication in 1993 has been used in many different cohorts. There is a considerable amount of

information to assimilate and, to date, we know of no attempt that has been made to summarise publications specific to its use in a peer review journal. The aim of this review was to systematically search published papers that report its use, identify common themes, and present a tabulated summary. Several search engines were used (PubMed, Medline, Medical-Journals.com, eMedicine), and 222 abstracts were found and hand searched. A total of 66 papers were eligible for inclusion, 21 on functional outcome, 25 on predictors of HR-QoL, 19 on development or validation of the questionnaire, and one clinical trial. The review includes a diversity of studies and a range of HR-QoL outcomes following head and neck cancer. It provides clinicians and their colleagues in multidisciplinary teams with a source of quick reference to relevant papers reporting the UW-QoL, and gives a short summary of the pertinent conclusions drawn from each paper."

What is significant for eMedicine, is that Laraway and Rogers used PubMed, Medline Medical Journals.com and eMedicine as primary sources of information.^[4] This is significant because medline is the compendium of all NIH sponsored research. Emedicine is made up of articles translating the body of current research in medline into clinical practice guidelines from the perspective of each subspecialty. Cao, Liu, Simpson, et al revealed that medline and emedicine were used as primary resources in developing the online system AskHERMES.^[5] Health care providers often have questions regarding the care of their patients and published medical literature and online medical resources are important sources for answering such questions and consequently improve quality of patient care. Although there are some annotated medical knowledge databases, including UpToDate and Thomson Micromedex, available to health care providers with questions, studies have found that health care providers often need to consult primary literature for the latest information in patient care. To meet this need, information retrieval systems including PubMed return lists of retrieved documents in response to user queries, but such searches often yield large sets of documents numbering in the hundreds and sometimes thousands or more. While health care providers usually have limited time to browse retrieved information and studies indicate that physicians are likely to abandon a search if it takes longer than two minutes.^[6,7]

In order to help health care providers quickly and efficiently answer the questions that arise during their meetings with patients, AskHERMES, a computational system that automatically analyzes large sets of documents pertaining to specific questions and generates short text from them as output. The system is designed to enable providers to efficiently seek information in clinical settings. Physicians were asked to solve complex clinical problems using three different sources of information: AskHermes, Google and UpToDate. UpToDate® is the premier evidence-based clinical

decision support resource, trusted worldwide by healthcare practitioners to help them make the right decisions at the point of care. It is proven to change the way clinicians practice medicine, and is the only resource of its kind associated with improved outcomes. Surveys of the physicians who used all three systems were asked to score the three systems by ease of use, quality of answer, time spent, and overall performance.^[8] UpToDate is an evidence-based, physician-authored clinical decision support resource which clinicians trust to make the right point-of-care decisions. More than 6,500 world-renowned physician authors, editors and peer reviewers use a rigorous editorial process to synthesize the most recent medical information into trusted, evidence-based recommendations that are proven to improve patient care and quality. Over 1.3 million clinicians in 187 countries and nearly 90% of major academic medical centers in the United States rely on UpToDate to provide the best care. More than 80 research studies confirm widespread usage of UpToDate and the association of its use with improved patient care and hospital performance — including reduced length of stay, fewer adverse complications and lower mortality. UpToDate has earned the trust of the healthcare community over more than 25 years because of the integrity of its recommendations, including the fact that we never accept funding from pharmaceutical companies, medical device manufacturers, or other commercial entities. A 2009 study showed that "89.1% of ophthalmologist respondents accessed peer-reviewed material online, including Emedicine (60.2%)." A 2007 study showed that 12% of radiology residents used eMedicine as their first source when doing research on the Internet. UpToDate topics are viewed more than 32 million times per month and in 2016 subscriber survey found that clinicians find the answers to their question over 94% of the time. This success reflects the breadth (24 specialties) and depth of our clinical content (over 10,500 topic reviews, each of which answers multiple clinical questions). One, a study by researchers at Harvard published in the *Journal of Hospital Medicine* in 2011, showed that hospitals using UpToDate experienced shortened hospital stays, fewer deaths and better quality performance than non-UpToDate hospitals. Wolters Kluwer N.V. (AEX: WKL) is a global leader in information services and solutions for professionals in the health, tax and accounting, risk and compliance, finance and legal sectors. It helps the customers to make critical decisions every day by providing expert solutions that combine deep domain knowledge with specialized technology and services. Wolters Kluwer reported 2016 annual revenues of €4.3 billion. The company, headquartered in Alphen aan den Rijn, the Netherlands, serves customers in over 180 countries, maintains operations in over 40 countries and employs 19,000 people worldwide. He shares are listed on Euro next Amsterdam (WKL) and are included in the AEX and Euronext 100 indices. He has a sponsored Level 1 American Depositary Receipt program. The ADRs are

traded on the over-the-counter market in the U.S. (WTKWY).

A 2005 study ranking 114 sites rated it the second-highest Internet-based source of information for pediatric neuro-oncology, after the site of the National Cancer Institute.^[9]

A 2002 study described the site's coverage of dermatology as "excellent and comprehensive."

In 2000 an article in the Journal of Ear Nose and Throat by AD Meyers from the University of Colorado School of Medicine, Denver, CO, announced the unveiling of the ENT textbook online at emedicine.com.

eMedicine Specialties: (a) Allergy and Immunology (b) Nil (c) Cardiology, Clinical Procedures, Critical Care (D) Dermatology (e) Emergency Medicine, Endocrinology (g) Gastroenterology, General Surgery, Genomic Medicine (h) Hematology (i) Infectious Diseases (j)/(k)/(l)/(m) (n) Nephrology, Neurology, Neurosurgery (o) Obstetrics-Gynecology, Oncology, Ophthalmology, Orthopedic Surgery, Otolaryngology & Facial Plastic Surgery (p) Pathology, Pediatrics [Cardiac Disease & Critical Care Medicine, Developmental & Behavioral, General Medicine, Genetics & Metabolic Disease, Surgery], Perioperative Care, Physical Medicine & Rehabilitation, Plastic Surgery, Psychiatry, Pulmonology (q) Nil (r) Radiology, Rheumatology (s) Sports Medicine (t) Thoracic Surgery, Transplantation, Trauma (u) Urology (v) Vascular Surgery (w) Nil (x) Nil (y) Nil (z) Nil.

eMedicine Health Centers: Allergies, Arthritis, Asthma, Blood Pressure, Brain & Nervous System, Cancer, Children's Health, Cholesterol, Cold & Flu, Depression, Diabetes, Digestive Disorders, Ear, Nose, & Throat Conditions, Eye Health, First Aid & Emergencies, Headaches & Migraines, Healthy Living, Heart Health, Heartburn & GERD, Infections, Lung Disease & Respiratory Health, Men's Health, Mental Health, Oral Health, Osteoporosis, Pain Management, Pregnancy, Sexual Health, Skin Conditions & Beauty, Sleep Disorders, Thyroid & Metabolism Conditions, Women's Health.^[10]

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CONCLUSION

eMedicine.com, Inc. operates a consumer health Website to provide point of care medical reference to physicians and other healthcare professionals. The company offers Clinical Knowledge Base, which contains articles on diseases and disorders; multimedia files; and repository of medical education credits for physicians, nurses and optometrists. It also provides professional and institutional subscriptions via its subscription site, www.iMedicine.com. The company was founded in 1996 and is based in Omaha, Nebraska with an additional office in New York, New York. eMedicine.com, Inc. operates as a subsidiary of Medscape, LLC.

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