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INTRODUCTION

One day, your physician will be able to write a prescription, access your medical history, order lab tests, dictate, look up medical information, and buy movie tickets—all while you put your clothes back on. We believe wireless handheld devices—the first devices bringing information technology to patient care—will dramatically change the way physicians practice medicine. With less than 1% of U.S. physicians using handheld devices for transactional purposes today, we believe there are exceptional opportunities for companies developing handheld applications for the healthcare market. With a bevy of companies already attempting to exploit this emerging market, the race is on to capture the physician’s hand.

The healthcare industry, one of the largest industries in the United States, has a long way to go before it is automated. Physician use of Internet products in their daily workflow is close to non-existent. In order for the Internet to impact healthcare, physicians need to be involved. We believe wireless handheld devices, which fit seamlessly into a physician’s workflow, will not only involve physicians but get them addicted to Internet technologies. We expect adoption of handheld devices to sweep through the medical profession like it did in the business world. Already, approximately 15% of physicians are using handheld devices for reference uses (i.e., storing phone numbers and looking up drug information), an encouraging percentage given physicians’ notorious reputation of being technophobes.

By 2004, we project that 20% of U.S. physicians will be using handheld devices for transactions, generating over $2 billion in sales for handheld companies. This $2 billion estimate only includes transaction fees generated from clinical (i.e. electronic prescribing and lab ordering) and administrative (i.e. charge capture) transactions. Our estimate excludes marketing opportunities (e-detailing), selling aggregate data, clinical trials, and other electronic healthcare transactions, which all combined could significantly expand this market opportunity.

Our initial recommendation for investors is Allscripts. Allscripts, the only publicly traded pure-play company in this sector, was the first company to offer physicians an e-prescribing device. The Company currently has over 2,500 physician-users, the largest user base in the U.S. Other public companies aggressively entering this market are WebMD (HLTH, Market Neutral), Medscape (MDLI, Not Rated), and Data Critical (DCCA, Not Rated). Data Critical entered this sector with the acquisition of two privately held companies (PocketChart and Exilis) this year and expects its unwiredDr products, scheduled for launch in early 2001, to grab a significant piece of this growing market. In this report, we profile the 13 early leaders in the healthcare handheld market, discuss the different models, and point out the winning strategies. In addition, we discuss the pros and cons of the various handheld devices and networks that are available to physicians.

Opportunities for companies bringing technology to healthcare. Beyond handheld devices, we believe there is a multitude of opportunities for companies developing Web-based physician-focused products. One segment, e-detailing (electronic marketing to physicians), is particularly appealing given the pharmaceutical industry spent over $12 billion marketing drugs to physicians last year. We project online pharmaceutical marketing to hit $600 million in 2004. Other market segments, in our opinion, poised for exceptional growth are Web-based drug development products and healthcare Application Service Providers (ASPs).
MARKET OPPORTUNITY: THE SIZE OF THE HEALTHCARE INTERNET TRANSACTION MARKET

We project the addressable healthcare Internet transaction market will exceed $10 billion in the United States by the year 2004. We believe handheld companies are positioned to grab a significant share of this large market. These projections are based on pharmacy, hospital, physician, and dental transactions. This market projection excludes advertising opportunities, the selling of aggregate data, and other electronic healthcare transactions such as scheduling and clinical trials, which, combined, could significantly expand this market size.

We project that 20% of U.S. physicians will be using handheld devices for transactions by 2004, potentially generating $2.0 billion for handheld companies. This projection assumes that physicians will be using handheld devices for key daily transactions, such as writing prescriptions, checking lab results, dictating, and capturing charges. We believe our estimate is conservative, considering that approximately 15% of physicians use handheld devices today for reference purposes such as scheduling and checking of drug dosages. As a comparison, we estimate approximately 1%, or approximately 6,000, of U.S. physicians are currently using handheld devices for transactional purposes.

EXHIBIT 1: PROJECTED U.S. HEALTHCARE CLAIMS VOLUME

The handheld market of the future will differ from today’s market—the revenue model should evolve into a transaction-based model as critical mass is approached. We predict the future revenue model for handheld companies will evolve into one that is transaction-based, which we believe could be a more profitable route. For example, we project that the handheld electronic clinical market (this includes e-prescription and e-lab ordering) could be a $5.5 billion market opportunity by 2004. Our research findings suggest that this model may become a reality sooner than expected, but, first, we believe there has to be increased adoption of handheld devices by physicians. This projection assumes that payors would pay between $0.65 and $1.50 per electronic plan-verified prescription (this includes a bundle of services we discuss in the next section) and that pharmacies would pay approximately $0.25 per clean (properly formatted) prescription. For lab transactions, this $5.5 billion estimate assumes labs and payors will pay between $0.20-$0.60 per electronic plan-verified lab order.
The online administrative market should hit $4.5 billion by 2004. We project the market for online administrative services will be $4.5 billion, of which handheld companies with charge capture functionality should garner a significant share. This projection is based on blended per-transaction fees for all claims-related administrative transaction services, such as claims submission ($0.25–$0.40), eligibility ($0.30–$0.40), claims status ($0.20–$0.25), and referral/authorization/pre-certification ($0.40–$0.60). Referral, authorization, and pre-certification would include any electronic transaction that validates or grants specific permission, prior to receiving medical services or treatment, as permitted under a contract between a specific health plan and provider.

<table>
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<th>Transaction Services</th>
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<td><strong>Clinical Transactions</strong></td>
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<tr>
<td>Electronic plan-verified prescription (payors, PBMs)</td>
<td>$0.65–$1.50</td>
</tr>
<tr>
<td>Clean prescription (pharmacies)</td>
<td>Approx. $0.25</td>
</tr>
<tr>
<td>Electronic plan-verified lab test order (payors, labs)</td>
<td>$0.20–$0.60</td>
</tr>
<tr>
<td><strong>Administrative Transactions</strong></td>
<td></td>
</tr>
<tr>
<td>Claims submission</td>
<td>$0.25–$0.35</td>
</tr>
<tr>
<td>Eligibility</td>
<td>$0.30–$0.40</td>
</tr>
<tr>
<td>Claims status</td>
<td>$0.20–$0.25</td>
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<tr>
<td>Referrals/authorization/pre-certification</td>
<td>$0.40–$0.60</td>
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Source: WR Hambrecht + Co estimates

Subscription model prevails today—representing a $2.5 billion market. Until there is increased use of handheld devices, the majority of handheld companies generate revenues from monthly subscription fees, which are typically paid by physicians. Most of the handheld companies charge $100 to $200 per month. Recently, handheld companies have signed sponsorship deals with pharmaceutical companies’ pharmacy benefit managers (PBMs), under which the pharmaceutical company or PBM would sponsor (or subsidize) all or a large portion of a physician’s monthly fees.
REVENUE MODELS: WHO WILL PAY FOR HANDHELD DEVICES?

Pharmacy Benefit Managers (PBMs) and pharmaceutical companies, among others, are already lining up. There is much debate over whether or not to charge physicians for handheld devices. Some believe that doctors would balk and sales would suffer if doctors were made to pay. Others reason that if you give something away free, doctors’ perception will be that it is not worth using. Our opinion is that in order to achieve and maintain adoption of a new technology device, doctors should pay something. Based on all the handheld companies we researched, $50 to $100 a month appears to be the magic number. Below we analyze some of the likely healthcare payors and explain why they should be willing to pay for some or all of the software and hardware costs associated with handheld devices.

Internet transactions are more robust and should garner a higher per-transaction fee from payors. Our market projections may seem high when considering the current market price per EDI claim transaction is around $0.20 to $0.35. However, since Internet transactions offer a more robust functionality (we explain e-prescription and e-lab services in more detail in the next section) and cost less than paper- or phone-dependent processes, payors should experience administrative cost savings and, as a result, be willing to pay higher per-transaction fees.

We believe PBMs will pay high tolls for increased compliance and utilization. Our research findings indicate that payors, namely PBMs, would pay between $0.75 to $1.50 per plan-verified prescription (including patient profiles). PBMs appear willing to pay these higher transaction fees as handheld companies have the ability to 1) move new prescriptions and existing meds to mail order, 2) increase formulary compliance (PBMs receive higher margins for filling drugs on formularies), and 3) improve drug compliance (drug compliance leads to higher drug utilization). Handheld devices could significantly increase compliance, as handheld devices can track and show prescription histories, displaying whether a patient filled a new prescription and whether the patient got his or her refill on time. Industry studies show low compliance rates across the board, due commonly to laziness, forgetfulness, and cheapness (many older patients cut pills in half to save money).

Pharmacies, especially online pharmacies, would pay for prescriptions that are transmitted directly from a handheld device. Our research findings indicated that retail pharmacies would pay approximately $0.25 each for prescriptions that are electronically transmitted from handheld devices. Online pharmacies, desperate for new prescriptions, appear to be willing to pay $1.00 to $4.00 per clean prescription. With over 2.2 billion prescriptions written this year in the United States and growing at double-digit rates, this segment of the handheld market is attractive.

Laboratory companies are also eager to get a piece of the handheld market. We anticipate that lab companies, seeking to cut costs in the delivery of lab results, would pay handheld companies that can electronically order and receive lab tests. The two big lab players outside the hospital market are LabCorp and Quest Diagnostics. Our findings indicate that lab companies would pay handheld companies between $0.20 to $0.30 per transaction.

We project pharmaceutical companies will spend $600 million on online marketing, which includes handheld devices, by 2004. Of this $600 million, we estimate approximately half of online marketing will be spent on direct-to-consumer advertising and the balance on marketing directly to physicians (via e-detailing, for example) where handheld companies should play an integral role.

Why big pharma would spend on e-marketing. Given that pharmaceutical companies spent 86%, or $12 billion, of marketing budgets on physician marketing in 1999, we expect online marketing geared toward increasing mindshare among physicians to experience dramatic growth in the coming years. We strongly believe that over the next 18 months a significant number of high-prescribing physicians will choose to receive drug information in an electronic format, opening up a new and more efficient channel in which pharmaceutical companies can communicate with physicians. Additionally, with pharmaceutical sales representative saturation...
in most metropolitan markets (there are now over 80,000 drug representatives in the United States) and with an excess of representatives the result of recent mega-mergers like the Glaxo Wellcome-SmithKline Beecham and Pfizer-Warner-Lambert mergers, we believe pharmaceutical companies are looking for new ways to boost sales and increase returns. We think e-detailing would be a viable solution. (In the next section, we discuss the e-detailing market in more detail.)

Additional revenue opportunities, such as selling de-identified data, should evolve as critical mass is achieved. As physician adoption of handheld devices increases across the United States, a new channel through which to access physicians should emerge, one that is expected to provide additional revenue opportunities for handheld companies. Below we list other possible revenue opportunities:

- **Selling de-identified data**—the data captured on handheld devices should be valuable to pharmaceutical companies, which could use the data to measure prescription trends and better target marketing campaigns.

- **Revenue-share opportunities**—opportunities include sharing fees on purchases made via handheld devices, such as medical supplies, stocks, gifts, books, airplane tickets, and more.

- **Electronic appointments and registration**—hospitals could pay $2.00–$3.00 per electronic appointment.

- **Sharing percent savings**—payors, physicians, or hospitals could share a portion of savings reaped from using a handheld device; usually collection is elusive in these arrangements, but for charge capture companies, which can provide increased revenues, this model could work.

- **Other services**—other services that could be made available, such as formulary maintenance, treatment guideline set-up, disease management programs, patient education, and CME programs.
THE CONVERGENCE OF PHARMACEUTICAL AND HANDHELD COMPANIES AND THE INTERNET

We expect pharmaceutical companies, realizing the Internet’s potential as a cost-efficient medium for reaching targeted audiences, to invest significant dollars in Internet advertising in the near future. We project that online health advertising will likely grow to approximately $600 million by 2004, which includes direct-to-consumer (DTC) and physician marketing, such as online details (e-details). These tactics should increase access to physicians and enhance physician-patient communications by improving the continuity of pharmaceutical marketing programs. In addition, we expect pharmaceutical companies to increasingly invest in online interactive sponsorship programs that provide disease assessment, compliance, community, and content features.

EXHIBIT 3: ONLINE HEALTH-RELATED PROMOTIONAL SPENDING IN THE UNITED STATES
(IN MILLIONS)

The Evolving Health Online Advertising Market

Pharmaceutical companies have only dabbled with Internet advertising thus far, as two main concerns have held them back. First, pharmaceutical companies appear to need more evidence that doctors are really using the Internet. Second, pharmaceutical companies have struggled to get their arms around ROI models, as the ability to measure advertising effectiveness remains elusive. Interpreting Web site metrics—impressions, clicks, click-throughs, page views, page loads, and ad views—into an accurate ROI remains a challenge. These two concerns, coupled with the success pharmaceutical companies continue to experience with massive sales forces and DTC marketing campaigns, have kept pharmaceutical companies’ online spending at bay.

We estimate pharma companies will spend over $15 billion this year promoting products to physicians and patients. Of this $15 billion, more than 85% is spent attempting to influence physician prescription trends. A much smaller portion, about $2 billion, targets patients. To date, only a miniscule portion of pharmaceutical marketing dollars have been used on Internet advertising. According to healthcare market research firm Scott-Levin and WR Hambrecht + Co research, less than 0.7% of total pharmaceutical advertising marketing expenditures will be spent on Internet advertising in 2000.
EXHIBIT 4: HOW PHARMACEUTICAL COMPANIES MARKET DRUGS

$15.5 BILLION MARKETING EXPENDITURES IN 2000

Notes: U.S. pharmaceutical industry projected 2000 budget; Events include dinner meetings, symposia, and teleconferences; Physician detailing includes CSO representatives.
Sources: IMS Health, Jupiter Communications, Scott-Levin, and WR Hambrecht + Co estimates

Expecting continued growth of promotional spending by the pharmaceutical industry... The pharmaceutical industry has been on a hiring frenzy for the past several years, adding thousands to its already vast sales forces while increasingly dumping money into DTC advertising. Looking forward, we do not expect pharmaceutical companies to divert dollars from sales forces or DTC campaigns. Studies have proven physician detailing to be effective in changing physician prescription behavior, and the majority of DTC television ads have also been proven to boost sales. Furthermore, we expect pharmaceutical industry DTC budgets to continue growing at unprecedented levels and to be used increasingly to promote both new and existing products. Looking back at 1998, only ten products accounted for approximately half of the $1.5 billion spent in 1998 on DTC campaigns leaving, in our opinion, plenty of products that could benefit from marketing campaigns.

...However, expensive TV ads and massive sales forces are causing returns to slide. Given the high price tag of prime time television ads and the shrinking returns delivered by investments in sales forces, many pharmaceutical companies are looking for marketing alternatives. For example, we believe the number of pharmaceutical sales reps is reaching a saturation point in most markets; with the recent mega-mergers of Pfizer and WarnerLambert and GlaxoWellcome and SmithKline, pharmaceutical companies now have eight sales reps for each primary care physician in some major metropolitan cities. With an eight-to-one ratio, these companies should experience a dramatic reduction in “effective details.” Effective details are when a rep gets to talk with a physician for at least three minutes. Industry studies show that the average cost per detail is $250—we believe that the average cost per effective detail is much higher. As a result, we foresee pharmaceutical companies increasingly investing in the Internet, embracing it as a new medium through which to enhance DTC and physician marketing campaigns, reach specific audiences, and increase brand awareness. To date, pharmaceutical companies, for the most part, have only invested in pilot-sized Internet initiatives.

Pharmaceutical companies moving to the Internet, finally. Most top pharmaceutical companies have recently made their first strides toward developing Internet marketing strategies and have formed e-business departments in 2000. In addition, some pharmaceuticals companies have made initial investments in Internet initiatives. With e-business teams recently organized, we expect Internet spending to increase significantly in 2002, and we expect pharmaceutical companies to spend 2000 and the majority of 2001 investigating the many different Internet approaches, which we discuss below.
The Next-Generation Pharmaceutical Industry Marketing Tool: E-Detailing

We anticipate e-detailing and e-symposia will be the first Internet strategies used by pharmaceutical companies. We expect pharmaceutical companies, which spent over $12 billion last year promoting drugs to physicians in the United States, to spend marketing dollars on e-detailing, e-symposia, and other novel Internet strategies that increase physician access.

- **e-Detailing**—We expect e-detailing, which is in its nascent stages, to become commonplace in the industry over the next several years. E-detailing could take many forms, ranging from real-time video detailing at work to interactive Internet programs at home. In order to encourage physician compliance, these new Internet marketing techniques will likely be laden with incentives such as free computers, free DSL connections, and other freebies such as books, medical supplies, and other honorariums. Pharmaceutical companies expect e-detailing to enhance marketing effectiveness, when used in tandem with field sales reps, and to increase physician access in rural and other hard-to-reach areas (i.e., in some offices, physicians have “no sales rep” policies).

- **e-Symposia**—We expect the pharmaceutical industry to spend over $5 billion on physician event promotions in the United States this year, which includes dinner programs, symposia, and “lunch-and-learns.” The Internet can improve all these events, either by extending physician reach or by lowering costs. For example, pharmaceutical companies, which pick up the tab for flights, hotels, and meals, spend exorbitant amounts to get doctors to symposiums. We estimate pharmaceutical companies spend $1,000 to $2,000 per doctor for these events, with the average size of the events being 20 doctors. The Internet can be used to disseminate the same information communicated at these events, but at a much lower cost, and at the same time, reach doctors that never attend these events.

The Role of Handheld Companies in Internet Marketing

Over the next several years, we expect a population of physicians will emerge that prefers to receive medical information in an electronic format (either via handheld devices or the Internet), creating a new, effective, efficient channel for pharmaceutical companies to communicate with physicians. Handheld companies are positioned to deliver the information in the form of electronic messages. In addition, handheld devices can capture prescription data at the point of care, ensure formulary compliance, and increase patient compliance.

**Pharmaceutical Internet activity:**

- **Glaxo Wellcome** is using an Internet marketing strategy to help promote the potential blockbuster drug, Lotronex, which was launched in March 2000.
- **Bristol-Myers Squibb** announced a $50 million multi-year contract with Mediconsult, in which Mediconsult would provide Bristol with new Internet-based marketing solutions targeting physicians.
- **Merck** has numerous beta Internet marketing programs underway.
- **Eli Lilly** has pilots underway with Mediconsult, PocketScript, and ePocrates that explore the use of handheld devices with physicians.
- **Johnson & Johnson** recently announced partnerships with two private handheld companies, ParkStone and iScribe.
- **Glaxo Wellcome, AstraZeneca, Searle, Novartis and Merck** signed multi-year agreements with iPhysicianNet, a private company that provides electronic video detailing to primary physicians.
e-SERVICES PROVIDED BY HANDHELD COMPANIES

Clinical Services Market

**e-Prescription & e-Lab services**

The clinical market is comprised of three key applications: e-prescribing, e-lab, and e-dictation. Handheld companies are attempting to remove paper from the many daily clinical tasks performed by physicians. The electronic clinical services market consists primarily of electronic prescription (e-prescribing) and laboratory (e-lab) services, both of which are traditionally time consuming processes. In addition, dictating notes directly into handheld devices could also be another important function that doctors would use on a daily basis. We view e-dictation as an added convenience feature for doctors but do not expect handheld companies to profit much on dictation and transcription services, which have thin margins.

**The many behind the scene values e-prescribing brings.** On most handheld devices, e-prescribing is a three-step, sub-minute, point-and-click process. Behind the scenes, e-prescribing ensures formulary and drug interaction compliance, submits online claims to payors and electronically routes to pharmacies (retail, online, or mail order). We believe the added value of these services is tremendous; they include 1) reducing call backs from patients and pharmacists (this can add up to an hour a day); 2) reducing and preventing medical errors caused by illegible handwriting or adverse drug interactions; 3) saving money for patients and payors; and 4) saving money for doctors (some malpractice insurance companies offer discounts if a physician e-prescribes). Below we describe the many facets of clinical e-services.

**Electronic Clinical Services**

- **e-Prescribing**—enables physicians to electronically write, order, and renew prescriptions and review information related to the selected drug on a real-time basis.
- **e-Lab ordering and viewing**—enables physician offices to write, modify, and order laboratory tests, view laboratory test results, and review information related to the selection of a laboratory test.
- **Clinical, financial, and administrative rules**—services include host and display of formularies, drug utilization review, treatment guidelines, and other rules and present physicians with alerts or advisories relevant to such rules.
- **Patient medication histories**—enables hosting of patient medication histories and presentation to physicians, enabling physicians to conduct services specific to the patient and health plan-specific rules.
- **Patient consent**—enables obtaining of patient consent and storing of records, which is required by the government if companies want to use confidential patient information that is captured by the system and used in de-identified aggregate form.
- **Automated customized messages**—provides physicians with health plan-specific and patient-specific messages, such as drugs renewals, interchanges, and formulary compliance, and general messages intended for many users, such as drug recalls or new indication approvals.
- **Content**—enables hosting and presentation of medical information for physicians (drug dosage and interactions) and lists of pharmacies for the purpose of automating the transmission of messages and prescriptions.
The Cure Is In Hand

Charge Capture Market

Charge capture is the first step of building a medical claim. Charge capture refers to the process of accurately documenting and classifying clinical activities performed by physicians and other healthcare professionals. The key piece to charge capture is that it automatically codes the services performed by physicians. Charge capture and coding are an essential first step in the system of filing claims with both commercial and government payors. It is a complex and time consuming process that, nonetheless, is triggered up to 30 or more times per day for an active practitioner. The ramifications of inaccurate charge capture and coding are profound and significant: lost billings, denied claims, protracted reimbursement cycles, excess administrative expenses, and potentially, prosecution under Medicare fraud and abuse statutes.

Charge capture can provide fast returns to physicians by increasing revenue. Numerous industry studies and HCFA data indicate that practicing physicians are currently losing in excess of $25 billion per year in denied or reduced fee-for-service claims. These lost billings are a direct result of physicians having inadequate documentation for their patient encounters; providing inaccurate, invalid, or mutually exclusive codes for various procedures or tests; and failing to bill for services rendered outside of their office setting. In addition, administrative expenses for practicing physicians, much of which relate to tasks necessary for claims submission and collection, often consume in excess of 40% of gross physician revenues.

Physicians are letting money fly out the door. According to Synergy Medical Informatics, a typical physician with average annual billings of $650,000 is currently losing an estimated $35,000 to $100,000 in annual collected revenues due to claim denials. Lost billings average approximately $60,000 per year for each of the roughly 450,000 physicians in active clinical practice in the United States.

The legal implications for inaccurate charge capture and coding have risen due to a much stricter regulatory environment. Recent legislation passed by Congress—including the Health Insurance Portability and Accountability Act (HIPAA 1996), the Balanced Budget Act (1997), and the False Claims Act (revised 1997)—has dramatically complicated the ability of healthcare providers to be reimbursed by Health Care Finance Administration (HCFA) intermediaries. Physicians are required to code their diagnoses and procedures in compliance with complex and continuously changing guidelines set by HCFA. Failure to comply with these regulations exposes physicians to extensive penalties, fines, and possible criminal prosecution. The publication on June 12, 2000, of the Office of Inspector General Draft Compliance Program Guidance for Individual and Small Group Physician Practices confirms the Federal Government’s determination to drive improved compliance all the way through the healthcare provider system.

Charge Capture application functionality. Charge capture application creates a virtual superbill in the palm of a user’s hands. Charge capture software usually includes diagnosis (ICD9-CM) codes, procedure (CPT 2000 & HCPCS) codes, fee schedules, CCI data and Local Medical Review Policy guidelines. Users of charge capture devices are able to capture coding accurately, which improves physicians’ cash flow through both enhanced revenues and reduced office expenses.
SALES AND MARKETING STRATEGIES

Fast, efficient sales is the Holy Grail in the handheld market. How to grow physician-users should be the number one priority for every CEO in the healthcare handheld market. Why is selling technology products to physicians so challenging? (1) Physicians are spread out—approximately 65% of physicians practice in small groups (6 physicians or less); (2) Difficult to access—physicians are busier than ever; (3) Technology products are not that important to physicians; and (4) Large medical groups take a long time to make decisions.

Doctors will need some initial cajoling, training, and hand-holding. We do not expect many physicians to quickly incorporate handheld devices into their daily workflow. Instead, we feel many physicians will require a good amount of training and reminding. Furthermore, depending on the required change to a physicians’ daily behavior, a utilization team may be needed to ensure that a physician is really integrating this new device into her/her everyday life.

Need to hook physicians first. Before pounding the pavement, there has to be strong incentives for the physician to use a new device, such as increasing revenue, lowering costs, improving collections, saving time, or freebies (such as dinners, books, supplies, etc.). Once the incentives are in place, handheld companies need to employ an aggressive marketing approach to combat the many challenges associated with selling to physicians. Besides building an internal sales team, which is effective but expensive, handheld companies have employed creative selling strategies for selling efficiently to physicians, which we discuss below.

Effective Selling Strategies:

• Leverage infrastructure already in place—for example, partner with pharmaceutical companies and leverage their massive sales reps (there are over 80,000 reps in the U.S.); Eli Lilly and Johnson & Johnson have already signed deals; other partners with good size sales forces could be the drug distributors, medical supply distributors, or healthcare IT companies.

• Sell to large hospital systems—some IDNs can have thousands of affiliated physicians; targeting IDNs that own or employ physicians is the better route, as these IDNs have more influence over the physicians.

• Partner with companies that have existing physician clients—such as healthcare IT companies, managed care companies, and HMOs.

• Target physicians by specialty—one size does not fit all in healthcare, each specialty has unique needs.

• Target office managers—-with the growth of multi-specialty medical groups in the 1990s and physician practice management (PPM) companies, office managers/administrators have gained more decision power.

• Viral marketing works with physicians—viral marketing means creating focused messages that target a specific audience, which compels the audience to pass the message on; conferences and the Internet are two mediums where viral marketing works well; ePocrates, having had 80,000 physician-users download its drug database, has been very successful using viral marketing.

Stagnant Selling Strategies:

• Partnerships with medical associations or IPAs are usually ineffective—these types of partners that tend to have loose affiliations with physicians are usually ineffective.

• The best technology products to not sell themselves in healthcare—a great product can get lost in the crowd, especially in the handheld market where there are many competing products.
OVERVIEW OF THE HANDHELD DEVICE MARKET

The history of handheld devices is short but successful, yielding unit sales of over $436 million in 1999, which are expected to double for 2000. Since the two leading vendors in the industry, Palm and Microsoft, launched their handheld operating systems (OS) in 1996, there have been three revisions of Microsoft, and Palm has assembled a device line of four major product series. The fundamental difference between Palm and Microsoft is that Palm licenses its OS and carries a line of handhelds, while Microsoft’s PocketPC provides an operating environment for hardware manufactured by other companies such as Compaq, NEC, HP, and Casio.

Palm with dominating market share numbers. PalmOS-based devices, namely Palm’s own Palm Pilot systems, have historically dominated market share for years. According to NPD Intelect, in August 2000, Palm devices held 70.3%, Handspring 15.5%, Compaq 6.6%, Hewlett Packard 1.7%, and Casio 1.4%. Combined, handhelds based on Palm OS carry over 85% market share, while PocketPC devices are a distant second with approximately 10% market share. However, PocketPC-based devices are making a move. With Compaq’s new iPaq product, introduced in July 2000, Compaq has sprung from negligible market share into third place behind Palm and Handspring. Also, Microsoft’s recent initiatives may propel a larger user base towards PocketPC.

Wireless connectivity is a near-term priority. The near-term goals for PalmOS, PocketPC and their competitors are based on the need to capture and maintain market share, particularly as the fiercely competitive holiday selling season approaches. Importantly, these companies are focused on snaring corporate users with their new wireless efforts. Even though Palm is currently ahead with its integrated wireless offerings, Microsoft has recently announced a large speech and mobile access infrastructure initiative. Besides developing infrastructure, other wireless priorities include partnering with mobile service providers, modem, and other hardware vendors.

Handhelds for Healthcare. For many corporate markets, simplicity, price, and functionality override the need for more extensive multimedia features. However, in healthcare and other markets, the requirements are more complex, particularly since the device must service many functions. Extended battery life and operating power are also key characteristics of a good healthcare handheld, but in addition, flexibility and multimedia options are similarly important. Since handhelds are used in healthcare to address a variety of needs, from e-prescribing to lab results to e-detailing, different features are required to fulfill each of the different needs. Physicians must carry handhelds around all day on their rotation, thus the handhelds must be compact and weigh as little as possible. In the future, multimedia should become increasingly important, as advanced protocols and other technologies develop, allowing physicians to fully utilize the convenience of speech beyond dictation.

Emerging technologies: Smartphones. Among the many rival devices to PDAs, smartphones, wireless phones with integrated PDAs, are playing a dominant role in device manufacturers’ efforts. Although Symbian OS is emerging as the worldwide leader with its integrated wireless technology interface, security, and support for voice and multimedia applications, PalmOS and PocketPC are making their moves to partner and expand their capabilities. As smartphones develop and more services are made available, these devices may become very useful to healthcare, but currently palm-sized handhelds are better options due to the greater quantity and quality of available applications, as well as their superior integration capability with wireless LANs.
### EXHIBIT 5: OPERATING SYSTEM SUMMARY MATRIX

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Pros</th>
<th>Cons</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **PocketPC** *(Windows CE 3.0)* | • Microsoft launching huge speech and wireless initiative (server infrastructure)  
• Better audio support (mp3s), wider range of multimedia applications  
• Continuous syncing  
• Reads Word and Excel documents | • System crashes  
• No integrated wireless connectivity yet  
Performance lag when multi-tasking  
• Built-in character recognizer problematic  
• Lack of supply (i.e., iPaq) | Better multimedia PDAs – richer applications, broader sound, and video support. |
| **Palm** | • Stable system (very few crashes). Headstart with wireless connectivity; wireless Web access for all models by year-end  
• Better battery life  
• Easy interface  
• Does not require as much power and memory | • No audio support, low image quality  
• 16-bit, lack 32-bit power  
• Less memory than most PocketPC devices  
• No Java support | Current leader in the PDA race  
Best PDA for power users focused on maximizing basic personal information manager (PIM) functionality and mobility (tend to weigh less) |
| **Symbian (EPOC)** | • More easily integrated w/ local networking standards such as Bluetooth & IrDA  
• Focus on telecom integration, technologies such as WAP  
• Very stable, very few crashes  
• Requires little memory  
• Runs much faster on comparable speed chip than competitors  
• 32-bit interface  
• More extensible & flexible | • Currently, few handhelds based on this OS (Psion Revo is major)  
• Relatively new, Ericsson R380, first smartphone started shipping in late September  
• Currently not deployed by healthcare handheld vendors  
• Many products still in development stage (especially co-branded products) | OS more dominant for smartphones, but there are two versions of the OS for palm-sized devices (Quartz and Crystal)  
Many companies utilizing Symbian technology in their equipment, including Ericsson, Matsushita Electric, Motorola, Nokia, Philips Electronics, Sony and most recently, Sanyo |

Source: WR Hambrecht + Co estimates
**PalmOS-based handhelds** tend to be smaller and lighter than their PocketPC-based counterparts. While they have less power and memory, Palm and other compatible third-party applications generally require lower system resources, so battery life on these handhelds are longer on average.

### EXHIBIT 6: SELECTED PALM-BASED HANDHELDs

<table>
<thead>
<tr>
<th>Handheld</th>
<th>Release Dates</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| Palm III series, (later release: IIIxe) | 3/98, 2/00 | • Good value for power users  
• Optional external modem available  
• Flash ROM on IIIxe model (allow quick OS upgrades) | • Lacks internal expansion slot  
• Few multimedia capabilities  
• Four-gray-scale screen limits text and graphics |
| Palm IIIc | 2/00 | • Improved color display, good lighting  
• Thinner and smaller than most PocketPC devices | • Image quality not as good as PocketPC displays  
• Lower battery life  
• Lacks audio capabilities |
| Palm VII series | 12/98 | • Integrated wireless connectivity, Palm.Net service  
• Useful Web-clipping feature | • Uses disposable alkaline batteries  
• Wireless access requires monthly charge  
• Limited coverage areas |
| Palm V series | 2/99 | • Most portable palm model, light  
• Infrared communications port  
• External attachable modem available | • No built-in expansion capability  
• Low memory – basic Palm V model has 2 MB of RAM  
• Wireless modem doubles size |
| Handspring Visor | 3/00 | • Plug-and-play Springboard slot  
• Good basic Personal Information Manager (PIM) features  
• Low-priced  
• Small wireless modem | • Customer service unreliable  
• Design and manufacturing problems  
• Springboard modules are expensive |

*Source: WR Hambrecht + Co estimates, Palm, Inc.*
**PocketPC-based devices** generally have larger, color displays with better lighting and resolution than PalmOS-based handhelds. PocketPC handhelds have greater multimedia support—these are typically equipped with Microsoft Media Player, and hardware such as microphone, speakers, and a stereo ear-phone jack. In addition, these devices boost greater memory, faster processor speeds, and enhanced storage capacity.

### EXHIBIT 7: SELECTED WINDOWS CE/POCKETPC-BASED HANDHELDs

<table>
<thead>
<tr>
<th>Handheld</th>
<th>Release Dates</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compaq iPaq H3600 series</td>
<td>4/00</td>
<td>• Fast processor (206 MHz)</td>
<td>• Lacks expansion slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Easy expandability</td>
<td>• Supply issues; problems meeting demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Good (perhaps even best) backlit reflective display</td>
<td>• Pricey compared to Palms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Extensive storage capacity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Operates well in wireless LANs</td>
<td></td>
</tr>
<tr>
<td>Casio Cassiopeia E-100</td>
<td>5/99</td>
<td>• Many multimedia features</td>
<td>• Too many buttons and controls; cluttered interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Only PocketPC capable of displaying 65,536 colors</td>
<td>• Performance lags when multitasking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Good audio support</td>
<td>• No built-in wireless LAN capability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Integrated battery charger</td>
<td></td>
</tr>
<tr>
<td>NEC Mobile Pro 780</td>
<td>4/00</td>
<td>• Large display</td>
<td>• Many manufacturing defect problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Spacious keyboard facilitates input</td>
<td>• Heavy and bulky – 1.7 lbs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Plenty of memory</td>
<td>• 5 – 6 hour battery life</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fast processor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Good wireless card</td>
<td></td>
</tr>
<tr>
<td>HP Jornada 540 series</td>
<td>4/00</td>
<td>• Great CompactFlash card that can hook up many devices</td>
<td>• Applications require a lot of memory, performance may lag</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Good color display</td>
<td>• Heavy for a small handheld (9 ounces)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Many integrated HP applications available</td>
<td></td>
</tr>
<tr>
<td>HP Jornada 680/690</td>
<td>3/99, 11/99</td>
<td>• Large display</td>
<td>• Much costlier than smaller handhelds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Better input (comfortable keyboard)</td>
<td>• Larger size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Internal modem, good wireless card</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Good battery life for handheld PC (8 – 10 hrs)</td>
<td></td>
</tr>
</tbody>
</table>

Sources: WR Hambrecht + Co estimates, Hewlett-Packard, Casio, NEC, Motorola, and Compaq
WIRELESS NETWORKING PRIMER

Introduction: Networks

A network involves a number of devices linked together to form a communications system for information and device sharing. Local Area Networks (LANs) are small, limited to about 500 meters, and are commonly deployed in corporate offices to facilitate low-cost, high-bandwidth information transfer within a company. Cities and other metropolitan regions can be connected via Metropolitan Area Networks or (MANs), and Wide Area Networks (WANs) involve systems communicating across large geographic regions such as states or countries. Globally, computers in networks interlink to form what we refer to as “the Internet.”

Networks are widely used in both the business and consumer landscapes. In the corporate environment, LANs are commonly used to share resources, including electronic files and devices such as printers. These LANs are generally connected to other networks via WANs and the Internet to facilitate global data access. In healthcare, LANs are used in the clinical environment to provide information such as patient medical records and drug formularies for doctors and nurses, while WANs provide the capabilities for transmitting claims between payors and physician groups.

Wireless networks provide the next step in utility and convenience for many industries, including healthcare. In general, wireless networks provide the power and freedom of mobility, with the setbacks of reduced speed and unpolished functions (as compared to wired networks). While wireless networks have existed for decades, only the recent boom of handheld and mobile devices has spurred the demand necessary to create robust networks. Thus, many new wireless technologies, hardware, protocols and standards are currently still in the developmental phase. Until these new protocols and standards are refined and adoption becomes more widespread, these fundamental issues concerning latency in data transfer will remain.

The sections below will provide a general overview of the existing state of wireless networks, a more detailed discussion of wireless LANs (WLANs) and wireless WANs, (WWANs), and a short discussion of emerging wireless technologies.
Overview of Wireless Networks

**Types of wireless networks.** Wireless networks operate on the same hierarchy as their wired counterparts; small networks of three or more devices are referred to as Wireless LANs (WLANs), while the global wireless network is referred to as the wireless Internet. Other basic types of wireless networks include the Wireless Personal Area Network (WPAN), the Wireless Metropolitan Area Network (WMAN), and the Wireless Wide Area Network (WWAN) (*see Exhibit 8 below*).

**EXHIBIT 8: COMMON WIRELESS NETWORKS**

<table>
<thead>
<tr>
<th>Wireless Networks</th>
<th>Description</th>
<th>Features</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bluetooth (WPAN)</strong></td>
<td>Bluetooth is a standard created with the support of many industry leaders who form the Bluetooth SIG (Special Interest Group). This specification provides for low-power, short-range connectivity between mobile devices (phones, computers, etc), and the Internet.</td>
<td>Bluetooth is a short-range, ad hoc network that provides spontaneous connectivity. In WPANs, as devices move, the network moves. Range: 20–350 feet (depending on whether the interaction is client-to-client or client-to-access point, and if the network is outdoors or in a building). Transfer speeds: up to 1 mbps.</td>
<td>Next generation technology; first Bluetooth devices in beta-launch.</td>
</tr>
<tr>
<td><strong>Wireless Local Area Network (WLAN)</strong></td>
<td>WLANs use electromagnetic waves (typically radio or infrared), to enable communication between devices in a limited area. Spread spectrum technology, based on radio transmission is most commonly used to deploy WLANs today.</td>
<td>Unlike Bluetooth, WLANs provide continuous coverage for devices in the network. As devices may roam freely within the coverage areas, these coverage areas remain fixed. Range: 100 – 500 feet indoors and up to 1000 feet outdoors. Transfer speeds: up to 10 mbps. (New products based on the 802.11a chip set accelerate possible transfer rates up to 54 mbps)</td>
<td>The better solution for healthcare today, plus it costs less than wireless WAN solutions.</td>
</tr>
<tr>
<td><strong>Wireless Wide Area Network (WWAN)</strong></td>
<td>Today’s WWANs generally use digital cellular phone networks to enable notebooks and handheld computers to access the Internet across extensive geographic areas.</td>
<td>Unlike WLANs, which are unlicensed and typically administered privately by the customer, WWANs are generally operated by public carriers, and use open standards such as AMPS, GSM, TDMA, and CDMA. Range: miles rather than feet. Transfer speeds: from 5 kbps ~ 20 kbps.</td>
<td>Provides the greatest range but there are coverage holes and speed issues.</td>
</tr>
</tbody>
</table>

Other types: WMAN (wireless metropolitan area network), Wireless Internet (global)

Source: WLANA, Bluetooth, Network Computing and WR Hambrecht + Co
How do they work? In contrast to wired networks where signals pass from one device to another through a finite set of existing physical cables, wireless data transmission occurs in the open air and is enabled within a given coverage area, allowing for the unrestricted movement of the “connected” device within a given coverage area. Within these coverage areas, information is transferred using electromagnetic waves, most commonly via radio and infrared signals. Of the two, radio-based wireless LANs and WANs are more commonly deployed, as infrared signal propagation requires either 1) a direct line of sight or 2) short distances (see Exhibit 9 below).

### EXHIBIT 9: INFRARED VERSUS RADIO TRANSMISSION

<table>
<thead>
<tr>
<th>Infrared</th>
<th>Radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Higher bandwidth, but more easily obstructed</td>
<td>▪ Slower but more reliable</td>
</tr>
<tr>
<td>▪ The requirements for infrared transmission are more stringent. Directed infrared networking requires line of sight (signal cannot pass through opaque objects), while diffuse/ reflected infrared requires much shorter distances (than radio).</td>
<td>▪ WLANs are generally radio based, utilizing spread spectrum technology. (see glossary for more information).</td>
</tr>
</tbody>
</table>

Sources: WR Hambrecht + Co, 3COM Corporation technical papers, Techguide.com

The following pages will include a more detailed exploration of wireless WANs and wireless LANs, as these wireless technologies are used most extensively in healthcare today.

**Wireless Local Area Networks (WLANs)**

Wireless LANs (WLANs) utilizes electromagnetic waves, particularly spread-spectrum technology based on radio waves, to transfer information between devices in a limited area. There are two types of WLANs, infrastructure WLANs and independent WLANs. Infrastructure WLANs, where the wireless network is linked to a wired network, is more commonly deployed today. In an infrastructure WLAN, the wireless network is connected to a wired network such as Ethernet, via access points, which possesses both Ethernet links and antennas to send signals. These signals span microcells, or circular coverage areas (depending on walls and other physical obstructions), in which devices can communicate with the access points, and through these, with the wired network (see Exhibit 10). In a wireless LAN, devices can move within and between coverage areas without experiencing disruption in connectivity as long as they stay within range of an access point or extension point (similar to an access point) at all times.
In an (infrastructure) wireless LAN, devices communicate wirelessly with access points, which are connected to the wired network. Devices can maintain network connectivity while roaming in the shaded region.

*Source: WR Hambrecht + Co*

This model can be compared to those of wired LANs where devices connect via cables to hubs, or common wiring points, and from these to a central server. However, in wired networks, each hub has a finite number of jacks, and thus, can only connect a preset number of devices. Wireline networks are also confined by the existence of fixed cables, which limit connection to specified locations (*see Exhibit 11*).
In a wired LAN, devices are connected to the network via cables. Devices are generally anchored to a set location depending on the placement of the network lines.

*Source: WR Hambrecht + Co*

While WLANs provide some key benefits, including security, mobility, and scalability, they are currently much slower than wired LANs. For example, a wired LAN using 10BaseT Ethernet ranges from 10 – 100 Mbps. Other pros and cons of wireless LANs (in comparison with wired LANs) are listed in the table below:

<table>
<thead>
<tr>
<th>EXHIBIT 12: WIRELESS LAN PROS AND CONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
</tr>
<tr>
<td>Easier to deploy and configure</td>
</tr>
<tr>
<td>More secure</td>
</tr>
<tr>
<td>Ultimately more cost-effective (scalable)</td>
</tr>
<tr>
<td>Facilitates office relocation (network portability)</td>
</tr>
<tr>
<td>Easier to maintain</td>
</tr>
<tr>
<td>Makes available real-time data in broader range of coverage areas</td>
</tr>
</tbody>
</table>

*Source: WR Hambrecht + Co*
EXHIBIT 13: WIRELESS LAN GLOSSARY

access point—a device that connects the wireless network to the wired network. As a transceiver, it sports an antenna to send and receive signals from the various devices, providing coverage areas in which devices can roam freely.

extension point—a device that acts like an access point and connects the wireless network. Unlike access points, extension points do not connect the wireless network to the wireline but rather extend coverage areas between and beyond access points.

infrastructure network—the more common form of a wireless LAN. Infrastructure networks are comprised of WLANs connected to wired LANs and contain access points to channel network traffic.

independent network—a peer-to-peer network containing devices (with network adapters) connected to one another, independent of a managing server or other form of administration.

LAN adapter—generally a PC card in the portable device with an integrated antenna to receive signals from the access point/extension point. Can also be integrated into handhelds.

microcell—a coverage area in which devices can roam freely with a wireless connection. Microcells are generally circular (depending on the existence of interfering objects such as walls) and overlap to enable seamless connection as a user wanders through the wireless network.

spread spectrum—a radio frequency technology most commonly used in WLANs. Frequency Hopping Spread Spectrum (FHSS) and Direct Sequence Spread Spectrum (DSSS) are two examples of the spread-spectrum technique.

transceiver—a device, such as a LAN adapter, used to receive signals sent by the transmitter.

transmitter—a device that sends signals to the transceiver (typically an access point or an extension point in WLANs).

Source: WR Hambrecht + Co

Wireless Wide Area Networks (WWANs)

Wireless WANs, which can bridge branch offices of a company, cover a much more extensive area than wireless LANs. Unlike WLANs, which offer limited user mobility and instead are generally used to enable the mobility of the entire network, WWANs facilitate connectivity for mobile users such as the traveling businessman. In general, WWANs allow users to maintain access to work-related applications and information while away from their office.

In wireless WANs, communication occurs predominantly through the use of radio signals over analog, digital cellular, or PCS networks, although signal transmission through microwaves and other electromagnetic waves is also possible. Today, most wireless data communication takes place across 2G cellular systems such as TDMA, CDMA, PDC, and GSM, or through packet-data technology over old analog systems such as CDPD overlay on AMPS. Although traditional analog networks, having been designed for voice rather than data transfer, have some inherent problems, some 2G (second generation) and new 3G (third generation) digital cellular networks are fully integrated for data/voice transmission. With the advent of 3G networks, transfer speeds should also increase greatly.

WWAN connectivity requires wireless modems and a wireless network infrastructure, provided as a fee-for-service by a wireless service carrier. Portable devices receive communications as the connected wireless modems and wireless networks interact via radio waves. The modem directly interfaces with radio towers, which carry the signal to a mobile switching center, where the signal is passed on to the appropriate public or private network link (i.e., telephone, other high speed line, or even the Internet). From here, the signal can be transferred to an organization’s existing network (see Exhibit 14).
Similarly, WWANs can communicate with the Internet. For small devices such as handelds and mobile phones, a universal specification known as wireless application protocol (WAP) exists to facilitate the delivery and presentation of Web content. The request for Web content is sent through the wireless network to a WAP gateway, where it is processed and the required information is retrieved and returned. WAP supports most wireless networks and mobile device operating systems.

As with wireless LANs, wireless WANs have many interference problems related to their reliance on terrestrial radio networks. Inclement weather conditions, rugged terrain, and other naturally occurring conditions can cause prolonged latency and other disruptions to a radio channel. And since the radio channel’s spectral characteristics differ from those of a landline copper wire connection, conventional modem modulation and error control do not work well and new protocols must be developed. Nevertheless, wireless WANs have many intrinsic benefits, namely the hallmark of enhancing productivity through real-time information access. Exhibit 15, below, outlines the pros and cons of WWANs, compared against their wired counterparts.

<table>
<thead>
<tr>
<th>EXHIBIT 15: WIRELESS WAN PROS AND CONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
</tr>
<tr>
<td>• Mobility allows broader availability of connectivity (and faster access to information on demand)</td>
</tr>
<tr>
<td>• Avoids physical constraints of cables and other hardware issues</td>
</tr>
<tr>
<td>• Easy to deploy additional units (scalability)</td>
</tr>
<tr>
<td>• Pricey—approx. $50/month for carrier fees</td>
</tr>
</tbody>
</table>

*Source: WR Hambrecht + Co*
EXHIBIT 16: GLOSSARY OF WWAN TERMS

**2G or second generation**—a term for analog and digital current networks operating on 800 MHz or 1900 MHz spectrums. These include Advanced Mobile Phone Service (AMPS), Time Division Multiple Access (TDMA), Global System for Mobile Communications (GSM), and Code Division Multiple Access (CDMA).

**3G or third generation**—also known as Universal Mobile Telecommunications System (UMTS). 3rd Generation standards boost additional services, more extensive roaming capabilities, and transfer rates 26x faster than those allowed by current CDMA networks. 3G networks should be implemented in the United States over the next three to five years.

**analog systems**—includes older cellular systems such as Advanced Mobile Phone Service (AMPS), which have been in operation since the late 1970s, and can only utilize the 800 MHz spectrum.

**CDPD**—operates as an overlay on analog cellular networks (AMPS) to allow packetized data transfer, which increases the speed and efficiency of old analog networks.

**digital cellular systems**—standards which utilize digital transmissions such as TDMA, CDMA, IS, and GSM.

**PCS spectrum**—personal communication services (PCS) operates at the 1900 MHz spectrum and is entirely digital (includes digital cellular standards such as TDMA, CDMA, and GSM but not analog standards).

**switching center**—mobile system sends radio signals to switching center. Switching center chooses the appropriate network link to propagate signal (public/private network via telephone or other high speed line). The signal is then passed onto an organization’s existing LAN/WAN infrastructure.

**WAP**—a universal specification to facilitate the delivery and presentation of Web-based data and services on mobile phones and devices with small displays and limited input facilities. It is compatible with more wireless networks.

**WML**—content delivered to handhelds using WAP is formatted in wireless markup language (WML), a programming language based on HTML.

Source: WR Hambrecht + Co

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**Emerging Technologies**

**Bluetooth**—Based on the short-range transmission of radio signals, Bluetooth is a Wireless Personal Area Network (WPAN), which allows devices to achieve point-to-point connections, forming ad hoc networks. This wireless technology allows mobile products to quickly achieve connectivity, forming a highly mobile network that moves as devices move.

**Metricom Ricochet**—Metricom’s Ricochet falls in the category of a wireless WAN, but unlike the public wireless networks, it is a proprietary wireless system owned and operated by Metricom. Other proprietary wireless WANs include Motorola’s ARDIS and RAM Mobile Data (a joint venture between RAM Corporation and BellSouth). Although at 28 kbps, Ricochet is much faster that existing pager and mobile phone networks, availability is confined to a handful of cities areas across the United States. Unveiled last summer, Ricochet’s new service boosts rates of up to 128 kbps, and is currently available in San Diego, Atlanta, Baltimore, Dallas, Houston, Philadelphia, Phoenix, and the San Francisco Bay Area.
Wireless Networks in Healthcare

Today, the most practical and prevalent form of wireless network in healthcare is the wireless LAN. WLANS are best suited for many clinical and administrative in-office applications, including e-prescribing. WLANS are relatively quick to deploy, more cost-effective, and many packaged products are available. WWANs, on the other hand, have many useful aspects, but are too slow and riddled with too many complications at this time. However, after the next three to five years’ implementation phase, when 3G networks should be rampant in the United States, many of these problems will be resolved by the faster and more reliable communications networks. With reliable WWANs, integrated solutions and inter-network information exchange will be possible with WWAN and WLAN compatibility. Similarly, many of the other wireless technologies, such as Bluetooth, should provide numerous benefits when polished and integrated with the wireless Internet. Until then, we believe WLANS are more useful as they more successfully address the critical requirements of deployment, stability, and speed that are essential for mobile physicians.

BURNING QUESTIONS

- **How big is the handheld healthcare market?** We estimate that the total addressable market for handheld companies to be $10.5 billion by 2004. We project 20% of U.S. physicians will be using handheld devices for transactional uses in their daily workflow, generating $2.0 billion in sales to handheld companies.

- **Which is the bigger opportunity—reducing administrative costs or clinical costs?** Both are big opportunities, but the bigger opportunity, which is more difficult to quantify, is on the clinical side. We believe handheld devices that can increase patient compliance and utilization of medications will be rewarded by pharmaceutical companies.

- **How many companies can the handheld market support?** It’s early, but we think the market is big enough to support 3-5 public companies. Before this happens, there needs to be more physicians using handheld devices in their daily workflows.

- **What is the best way to grow the number of physician users fast and efficiently?** Besides building an expensive internal sales force, the strategies we like are viral marketing, leveraging infrastructure already in place (get pharmaceutical reps selling your product), and partnering with companies that have existing physician clients, healthcare IT companies, managed care companies, distributors and HMOs. (See the Sales and Marketing Strategies section for more detail.)

- **How long will it take before a majority of doctors are using handheld devices?** We conservatively project that 20% of U.S. physician will be using handheld devices for daily transactions by 2004.

- **With so many private companies in the market, is consolidation around the corner?** In order for some handheld companies to pull away from the pack (there are a lot of companies with a couple hundred users), we could see merger activity pick up in the near future.

- **What are the main hurdles hampering growth?** The two biggest hurdles we identified are integrating handheld applications with legacy PMS systems and other technology holes, such as short battery life and inadequate wireless networks.

- **Is there a “killer handheld app” for physicians?** We think charge capture, with its strong ROI proposition, and e-prescribing, with its multiple revenue streams, are the two best applications out today. In the future, the “killer app” will likely be a handheld device that can perform all applications.

- **Will PocketPC or PalmPilot dominate the healthcare market?** It appears Palm devices are winning so far, but longer-term, PocketPC devices, which have more memory capacity and can run more applications, could be what the doctor ordered.
What kind of wireless network is best for physicians—LAN or WAN? Today, wireless LANs, offering good speed and reliability for mobile-in-office use, are the best for healthcare. We expect WAN usage to grown as next generation infrastructure advances, but that is probably two to three years away.

What is the best incentive for a doctor to use a new device? Key factors include ease of use, reliability, saves time, just as fast as paper, increases revenue, and affordability.

What is the best revenue model? Generating revenue from pharmaceutical companies, pharmacies, PBMs, and laboratories is ideal. We believe doctors will and should pay for devices, but $100 a month appears to be the maximum.

Why will pharmaceutical companies pay for handheld devices for physicians? Handheld devices should open a new channel to communicate with physicians, and pharmaceutical companies are expected to pay large amounts for increased access to deliver marketing messages. In addition, handheld devices should increase patient compliance and drug utilization—two hot buttons for pharma companies.

QUICK VIEW OF THE COMPETITIVE LANDSCAPE

The landscape today—a mix of private and public companies fighting for market share. Allscripts, which has over 2,500 physicians using its handheld prescription solution, has a good size lead in this market today, a lead it hopes to extend with the marketing muscle of IDX Corp. Recently, Allscripts entered a 10-year exclusive marketing agreement with IDX Corp, which has over 100,000 physician-users of its practice management systems. In addition, Allscripts plans to introduce three more applications (charge capture, lab ordering, and dictation) by year-end, which should also foster its growth.

WebMD, Medscape, and Data Critical ramping up. WebMD and Medscape both have access to large numbers of doctors but both lag Allscripts in handheld application development. Furthermore, in both cases, it is unclear how many physicians are actually using Internet applications today. For example, WebMD says it has over “130,000 physician subscribers,” while Medscape says it has “over 10,000 doctors that have signed up for its Internet or handheld applications.” Below we summarize each company’s handheld strategies:

- WebMD plans to launch iPaq handheld devices with wireless LAN cards in early 2001. WebMD says physicians will be able use these devices for all key daily tasks, including viewing patient information (lab results, dictation notes, drug history), writing prescriptions, ordering lab tests, and creating patient encounters (the first steps of building a claim). This handheld device is in pilot launch (full launch is planned for early 2001) and works seamlessly with Medical Manager practice management systems (Medic systems are next). For outside office access, WebMD intends to offer WAP-enabled phones.

- Medscape acquired an unknown, private handheld company and expects to offer wireless Palm-based handheld applications. Its first product, which was launched in early October, offers clinical references, such as drug information and Medscape.com articles. Future clinical applications will be WAP-enabled cellular access to patient chart summaries, drug formulary management and e-prescribing.

- Data Critical Corporation, a developer wireless devices for hospitals and physicians, entered the physician handheld market in 2000 with the acquisitions of Physix and Elixis. The Company currently offers PocketChart and WebChart to solo practitioners and physicians specializing in cardiovascular medicine and urology, and, in early 2001, it expects to launch unwiredDr.com, a suite of Web-based wireless products that will address the broader physician market. Currently, the Company has over 4,300 physician users, including 800 WebChart users and 3,500 PocketChart users.
A pack of private companies, each with similar goals but different strategies, emerge. A slew of private handheld companies have emerged over the past year, each touting the next generation handheld device for doctors. None, however, has much of a physician-user base yet (most seem to only have a couple hundred users), except for ePocrates, which boasts a physician-user base of over 80,000. ePocrates, a private company, provides drug information, such as dosages, interactions, and formularies that can be downloaded from the Internet onto a doctor’s Palm Pilot. Other private companies that seem to be gaining traction in the handheld prescription market are iScribe, ePhysician, ParkStone, and PocketScript, while MDeverywhere, VirtMed, and PocketCode appear to be the early leaders in the handheld charge capture market. (Refer to the “Company Profile” section for more detail on these companies.)

Aether Systems, Inc. dives head first into the healthcare handheld market in a big way. Aether Systems, a leading provider of wireless products and services, aggressively entered the healthcare handheld market this year. In June, Aether made a $10 million equity investment in Data Critical, forming a strategic alliance to develop, integrate, and market wireless technology in the healthcare market. In August, Aether made another announcement, partnering with ParkStone, a private handheld company, in which Aether would make a $15 million investment in ParkStone and wirelessly enable its handheld device. ParkStone committed to deploying 10,000 devices using Aether’s Intelligent Messaging (AIM) software platform, Aether’s network operations, and customer care center. We expect Aether to make additional partnerships with healthcare companies in the future.

**EXHIBIT 17: HANDHELD COMPANY LANDSCAPE**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Main Product</th>
<th>Approx. # Physician Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allscripts</td>
<td>e-Prescribing</td>
<td>2,500</td>
</tr>
<tr>
<td>iScribe</td>
<td></td>
<td>400</td>
</tr>
<tr>
<td>ePhysician</td>
<td></td>
<td>600</td>
</tr>
<tr>
<td>ParkStone</td>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>PocketScript</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>VirtMed</td>
<td>Charge capture</td>
<td>5 sites</td>
</tr>
<tr>
<td>PocketCode</td>
<td></td>
<td>6,000*</td>
</tr>
<tr>
<td>MDEverywhere</td>
<td></td>
<td>5,000*</td>
</tr>
<tr>
<td>ePocrates</td>
<td>Reference information</td>
<td>80,000</td>
</tr>
<tr>
<td>PHT Clinical Networks</td>
<td>Clinical trial</td>
<td>20 clinical trials</td>
</tr>
<tr>
<td>Scheduling.com</td>
<td>Scheduling</td>
<td>1,500*</td>
</tr>
<tr>
<td>Data Critical</td>
<td>Clinical notes</td>
<td>4,300</td>
</tr>
<tr>
<td>WirelessMD</td>
<td>2-way pager</td>
<td>2,000</td>
</tr>
</tbody>
</table>

Note: *Represents contracted backlog not yet deployed
Source: WR Hambrecht + Co estimates
COMPANY PROFILES
PROFILES:
HANDHELD COMPANIES
COMPANY DESCRIPTION
MDeverywhere provides a handheld charge capture solution, EveryCharge™, to hospital-based physicians and large medical groups via Palm OS or PocketPC devices. The Company plans to launch a dictation application on its handheld device soon and intends to continue to expand its clinical offerings for physicians. Impressively, MDeverywhere has proven that its products can deliver a strong ROI of $12,000 per physician. In addition, its charge capture product has reduced charge entry by an impressive 80% (based off its current users). These proven metrics provide incentives that should help drive physician adoption. Furthermore, the Company’s exclusive alliance with Shared Medical Systems Corporation (SMS), which entails co-marketing by SMS sales representatives and access to 25,000 SMS physician-customers, should also drive growth. The Company has signed contracts with 24 clients representing over 5,000 physicians, and ten sites have been deployed.

APPLICATIONS
A leader in charge capture. The Company’s flagship product is EveryCharge, a charge capture application that operates on Palm OS and PocketPC devices. A dictation function and patient index (a brief summary of patient information that is automatically populated) are to be the next products unveiled. Other applications in the Company’s development pipeline include formulary management, clinical messaging, and order entry (ordering products and tests). For e-prescription writing, the Company expects to partner with other handheld companies.

TECHNOLOGY
ASP or client-server solution—whichever the client desires. EveryCharge’s first version was an ASP solution, requiring minimal hardware at client sites. MDeverywhere also provides clients the option to have data stored on-site, which requires a server on-site. The Company does not yet use a wireless LAN. For charge capture, a doctor needs only to synchronize the device at the beginning of the day to download his/her schedule and patient information. At the end of the day, the doctor synchronizes the device once again to deliver the captured information (such as diagnoses, treatments, and other billing information) back to the practice management system, which is then sent on to the appropriate payors.

IMPLEMENTATION TIME
Fast for large groups using SMS or IDX practice management systems. The Company says it has tight, two-way interfaces to IDX and SMS practice management systems, which are necessary for charge capture applications. The first pilot SMS implementation, which includes
50 doctors, is expected to be initiated in early November. On average, it takes the Company six weeks to fully implement its solution to large clients. Implementation of 10- to 30-physician medical groups takes about four weeks.

**REVENUE MODEL**

**Transaction-based and subscription-based revenue model.** MDeverywhere collects a fee in the range of a $1.00–$2.00 per physician for each claim transmitted (paid by the physician) or charges a monthly subscription fee. The Company does not charge up-front fees or consulting/integration fees. Uniquely, the Company does not plan to sell aggregate data or advertise on its devices.

**KEY ISSUES**

Since doctors only need to synchronize twice a day, cradle synchronize works fine for charge capture, but we believe MDeverywhere will need to offer a wireless LAN option for e-prescribing.

**KEY ANNOUNCEMENTS**

- **September 12, 2000**—MDeverywhere was selected to provide a mobile charge capture solution to Shared Medical Systems Corporation (SMS), one of the largest international healthcare information system companies. Through the alliance, SMS would integrate its SIGNATURE® practice management system and NOVIUS® Physician Enterprise Manager solutions with MDeverywhere’s EveryCharge service. SMS’ field sales organization plans to sell the MDeverywhere solution to new and existing customers.

- **July 12, 2000**—MDeverywhere plans to integrate its EveryCharge service with Millbrook Corporation’s system to allow physicians to capture diagnoses, treatments, and other billing information on handheld devices. Dictation, order entry, and prescription services is expected to be integrated in the second half of 2000.

- **June 14, 2000**—MDeverywhere allied with Beacon Partners, a national healthcare management consulting firm, to combine Beacon Partners’ business and technical integration expertise in implementing large physician group practices with MDeverywhere’s mobile computing platform.

- **June 12, 2000**—Hart Associates, a well-established physician billing company in Norwood, MA, has implemented MDeverywhere’s EveryCharge for The Children’s Sports Medicine Foundation.

- **May 30, 2000**—MDeverywhere announced an exclusive partnership with CRAssociates, Inc., to provide tools for the Veterans Affairs healthcare system to refine its medical coding and billing procedures. CRAssociates is a management and professional services Company serving the Department of Veterans Affairs (VA) Medical Centers in the establishment and operation of community-based outpatient clinics (CBOC) and in database verification and validation.

- **February 17, 2000**—Five healthcare corporations have signed contracts to utilize MDeverywhere’s EveryCharge. These companies include Brigham Surgical Group, Boston, MA; Hart Associates Inc., Norwood, MA (a practice management group servicing 30 New England physician groups); University of South Florida Physicians Group, Tampa, FL; PhyCor, Charlotte, NC (a group practice management company with 48 affiliated clinics); and Robert Wood Johnson University Medical Group, New Brunswick, NJ. Over 5,000 physicians are affiliated with these institutions. In addition, the University of Virginia Health Sciences Center has signed a letter of intent to contract with the Company.

- **February 7, 2000**—MDeverywhere raised an additional $11 million in equity financing through leading venture capitalists Advent International, Acacia Venture Partners, and its first venture investor, Monarch Capital Partners.

- **June 4, 1999**—Monarch Capital Partners closed a $2 million investment in MDeverywhere (then known as ClinEffect Systems).
COMPANY DESCRIPTION

ePhysician was founded by a physician, Stuart Weisman, to develop an easy-to-use handheld device for doctors that could enhance workflow and reduce costs. In April 2000, after a year of development, the Company launched a Palm OS-based electronic prescription pad that operates on a LAN or WAN. Ultimately, ePhysician plans to create a completely Web-based, mobile practice management system using wireless handheld tools that connect to the Internet. The Company currently has over 600 paying physician-users.

APPLICATIONS

ePad, the Company’s first product, is a handheld prescription writing tool. ePad is a handheld prescription writing and formulary management device. It is unique in that doctors can send prescriptions to all U.S. pharmacies (the prescription is sent from the physician handheld device to an off-site server, which automatically faxes it to a chosen pharmacy). In addition, ePhysician offers eDR™, an electronic drug reference application. Applications under development include eLab (ordering and receiving lab results), eCharge (capturing patient charges), and eTalk (dictation). No dates have been set for launch, but we expect eCharge will be ePhysician’s next product.

TECHNOLOGY

Thin-client solutions—first to offer WAN devices. ePhysician’s products operate on Palm or Handspring devices. Doctors can choose between a cradle device (the least expensive product) or a LAN or WAN device. The Company only offers thin-client solutions, which require a PC and Internet connection in a physician’s office.

IMPLEMENTATION TIME

Deploys via the Internet, requires little handholding. According to ePhysician, its thin-client prescription solution can be remotely integrated with practice management systems in a timely fashion—the Company touts integration time in minutes. ePhysician ships a handheld device, which, according to the Company, can be installed (including linking to PMS systems) with minimal IT support. ePhysician’s interface strategy is unique in that it simply pulls the patient and schedule information from the PMS system to a PC that transmits via the Internet to the Company’s server located off-site. When the user synchronizes it in the morning, the data is downloaded onto the user’s handheld device.
The Cure Is In Hand

REVENUE MODEL

**Charges physicians small monthly fees and pharmaceutical sponsorships.** ePhysician charges $20 per month for a cradle-based device or $50 for a wireless WAN device. In addition, the Company expects to generate revenue from selling aggregate data (when it builds its usage data) and pharmaceutical sponsorships.

KEY ISSUES

**Cradle synchronize adds steps to e-prescribing.** Some doctors may not like to cradle synchronize each time they write a prescription. We believe using a wireless LAN or WAN device is a way around this problem, but both devices cost more (i.e., WAN telecom access can add an additional $50 a month). In addition, since its PMS interfaces are one-way, the Company may have problems with its charge capture application, in our opinion.

KEY ANNOUNCEMENTS

- **June 6, 2000**—ePhysician launched eDR 150, the second in its suite of offerings. This electronic drug reference system allows physicians to access critical drug information, such as dosing by indication, contra-indications and warnings, drug-to-drug interactions, and adverse reactions via a secure, wireless Palm OS handheld.

- **May 19, 2000**—ePhysician partnered with Kaiser Permanente, the Mid-Atlantic Permanente Medical Group (MAPMG), to supply ePhysician’s prescribing, scheduling, allergy, drug interaction, formulary, and reference information to more than 40,000 patients in the Mid-Atlantic region. This program is expected to pave the way for a comprehensive MAPMG installation of ePhysician’s handheld prescribing technology.

- **April 25, 2000**—ePhysician signed an agreement with Pharmaceutical Care Network (PCN) to expand individual patient drug therapies and formulary prescribing options available to healthcare professionals who use ePhysician.

- **April 7, 2000**—ePhysician announced a strategic alliance with PlanetRx.com, Inc., an online pharmacy, allowing physicians to transmit patients’ prescriptions via ePhysician directly to the PlanetRx.com pharmacy team.
ePocrates, founded in 1999, develops clinical applications for doctors that run on the Palm OS operating platform. The Company’s first product, its qRx drug database, has been a huge hit among physicians—over 80,000 physicians have downloaded it in less than a year, with limited marketing. We believe ePocrates’ business plan is quite unique. While many of its competitors invested more time developing the killer application for doctors, ePocrates launched an easy-to-use product (that requires no integration with legacy PMS systems) and quickly grabbed a significant piece of the physician market. In order to grow its market share, ePocrates plans to use pharmaceutical sales representatives as a primary sales channel, leveraging the drug industry’s large infrastructure already in place (there are over 80,000 sales representatives in the United States today).

APPLICATIONS

ePocrates’ first product is qRx, a clinical drug database that can be used to check drug dosages, interactions, and adverse reactions. The Company’s next products are expected to be formulary decision-support tools, electronic drug refills, and up-to-date medical and general news service. Electronic prescription writing and charge capture are also in the development pipeline. Most likely, ePocrates will partner with another handheld company for the latter two applications. ePocrates gets formulary information directly from PBMs. The Company has agreements with five of the six largest PBMs in the United States.

TECHNOLOGY

ePocrates technology is straightforward and easy for doctors to use. ePocrates uses Palm Pilot’s HotSync cradle technology to download its drug database from the Internet to handheld devices. When users hot-sync, ePocrates can update or send messages to the user. Since the Company does not offer electronic prescribing or charge capture, there is no need yet to interface with PMS systems or for wireless modems.

IMPLEMENTATION TIME

Doctor is ready to go in minutes. Since ePocrates does not need to interface with PMS systems as of yet, implementation is accomplished by simply downloading the qRx product, requiring only a few minutes.
REVENUE MODEL

ePocrates software products are free. The Company generates revenue through sponsored messaging (a.k.a. advertisements) and sponsorships with pharmaceutical companies. The Company’s pharma-sponsorships are unique—not only do the companies pay for the hardware, but their extensive sales forces distribute ePocrates handheld products. ePocrates has agreements with Eli Lilly and Parke-Davis and is in discussions with other leading pharmaceutical companies. ePocrates also expects to generate revenues from transaction fees (for refills, CME, etc.) and from data fees for access to usage data for marketing.

KEY ISSUES

Developing a stronger revenue model and demonstrating stickiness. How loyal will its physician users be when ePocrates introduces more robust applications, such as e-prescribing? We believe one thing is for certain: ePocrates has done a tremendous job getting doctors to adopt a new technology device into their daily lives; a feat that has not been duplicated since the Dictaphone.

KEY ANNOUNCEMENTS

- **August 10, 2000**—Advance Paradigm, Inc., a leading independent PBM, announced it entered into a licensing agreement to provide its proprietary formulary data to ePocrates physician-users.

- **June 27, 2000**—MD Consult, the premier online clinical information resource, and ePocrates announced they partnered to deliver specialized medical content prepared by MD Consult directly to physicians using ePocrates Internet enabled Palm devices.

- **June 22, 2000**—Caremark Inc., one of the nation’s leading prescription benefit managers (PBM), entered into a licensing agreement to provide its proprietary formulary data to ePocrates.

- **June 20, 2000**—drugstore.com, an online drugstore, and ePocrates partnered to provide physicians within the ePocrates network with retail pricing data for medications at the point of care.

- **April 25, 2000**—PCS Health Systems, one of the nation’s leading pharmacy benefits managers, and ConnectiCare, one of the nation’s highest-rated health plans, joined with ePocrates to offer a pilot project of Internet-connected Palm devices to a group of 100 Connecticut physicians working with ConnectiCare patients.

- **April 10, 2000**—Palm, Inc. and ePocrates have agreed to manufacture and distribute customized Palm™ handheld computers for physicians. ePocrates is the first healthcare company to enter into an original equipment manufacturer (OEM) agreement with Palm.

- **Feb. 17, 2000**—With the sponsorship of Eli Lilly, ePocrates announced plans to launch a program to improve patient care. The program, which began this month (October), involves a select group of Lilly’s specialized pharmaceutical representatives who are to introduce their customers to the ePocrates Network. Through this network, ePocrates plans to distribute hundreds of customized Palm devices to selected physicians.
COMPANY DESCRIPTION

iScribe was launched in 1999 to provide platform-independent mobile handheld solutions that help improve key day-to-day activities of physicians, such as prescribing drugs and capturing charges at the point-of-care. The Company’s first product, a handheld prescription solution, was launched in March 2000. The Company targets high prescribing physicians and currently has over 400 physicians using its handheld device. Importantly, the Company has interfaces with Medic and Medical Manager practice management systems, which are key for scalability. Uniquely, iScribe offers a compelling incentive for physicians—doctors can receive discounts on malpractice insurance if they use iScribe products.

APPLICATIONS

The Company’s first product, i3000, is a handheld electronic prescribing product. Its Palm platform, i5000, is slated to be launched soon. Charge capture is expected to be the next application launched, followed by dictation, lab tests, patient referral, and patient information. In addition, iScribe plans to launch a wireless two-way pager in a partnership with WirelessMD that can be used to write prescriptions and view lab results. iScribe accesses formularies from third parties and attaches plan-level data to each patient. The Company hopes to partner with all the leading PBMs.

TECHNOLOGY

iScribe’s first product, iScribe i3000, operates on the Windows CE OS. It is not yet completely wireless; doctors must cradle-synchronize to download each day’s schedule and patient data. In addition, iScribe prints prescriptions to on-site printers via infrared transmission, which limits physician mobility. The Company’s next-generation i5000 products are to use the Palm OS platform and be wireless (as would the CE device) featuring both LAN and WAN cards, providing increased mobility and access (its WAN product can be used outside the medical office). Uniquely, the Company offers a light version of its i5000 product for doctors that can be downloaded from the Web to a Palm Pilot, requiring little memory (about 1 MB) and no interfacing. However, this product has its limitations: physicians must manually enter each patient name, and patient medication histories are not stored.
IMPLEMENTATION TIME

**Ahead of the pack.** With established interfaces to Medic and Medical Manager systems, two of the leading practice management systems, iScribe can implement its solutions relatively quickly. Interestingly, iScribe’s i3000 (its Windows CE device) does not require an on-site server; instead, it uses wireless modems. However, the Company’s i5000 (its Palm OS) devices require on-site servers.

REVENUE MODEL

**Free to doctors, for now.** Transaction fees paid by sponsors are expected to drive the bulk of revenues, with PBMs and pharmacies contributing the most.

KEY ISSUES

While some of its competitors have recently raised fresh rounds of capital, iScribe has not. It remains to be seen whether iScribe will have enough fuel in its tank to compete for market share while continuing to invest in its technology and applications.

KEY ANNOUNCEMENTS

- **September 2000**—iScribe announced a marketing agreement with Johnson & Johnson (J&J). In return for sponsorship, advertising, and other health-related information delivered via the handheld device, J&J would pay iScribe a fee for each physician-user. J&J is to market iScribe’s products, while iScribe would be responsible for the delivery, installation, and training of its handheld solution. Financial details of the partnership were not disclosed.

- **June 28, 2000**—iScribe and The Doctors’ Company (TDC), the nation’s largest physician-owned medical malpractice insurer, formed a program to provide discounts on medical malpractice insurance premiums to TDC physicians who use the iScribe system for over a year. TDC would initially offer the iScribe system to its highest-prescribing physicians. The first installations would begin in the third quarter of 2000.

- **April 3, 2000**—WirelessMD and iScribe formed an exclusive three-year partnership to jointly market the new integrated system comprised of iScribe’s electronic prescription writing application and WirelessMD’s renewal software. The first systems were launched June 2000 to 15,000 physicians.

- **January 10, 2000**—iScribe acquired eMedicus, the electronic prescribing technology company. This acquisition allows iScribe to provide healthcare professionals a choice of electronic prescribing platforms.
The Cure Is In Hand

PARKSTONE MEDICAL INFORMATION SYSTEMS Private

2141 North Commerce Parkway
Weston, Florida 33326
Tel: 954.389.3800
www.parkstonemed.com

CEO John Johnson

COMPANY DESCRIPTION

ParkStone was founded in 1998 by a physician to develop a wireless handheld device that would be intuitive to a physician’s workflow, have no boundaries, and reduce medical errors. The Company’s mission is to develop a handheld device for physicians that is as valuable as the stethoscope. ParkStone currently counts over 1,000 physicians using its handheld electronic prescription device, and with its MediSoft, InfoCure, Aether, and Johnson & Johnson partnerships, ParkStone expects to rapidly grow the number of users of its product.

APPLICATIONS

ParkStone currently markets an electronic handheld prescription device. Services include formulary management and drug-to-drug interactions. Formulary information comes from a third party and is either pre-loaded on the handheld or the patient tells the physician during the prescription process the appropriate health plan. Dictation, charge-capture, and lab ordering applications are expected to launch soon.

TECHNOLOGY

Not wireless, yet. The Company says it is device independent; however, its first product was designed on a Windows CE operating system. Due to its large 32MB memory capacity, a Windows CE device is better equipped for ParkStone’s platform. ParkStone is unique in that it stores a medical group’s patient and formulary data on each group members’ handheld device. In one example, information for 40,000 patients was stored on each handheld device, which only “guzzled” 16MB of memory, leaving ample room for other applications. This strategy makes the initial prescription writing steps very efficient. For printing a prescription, the user needs to be within five feet of a printer for successful infrared transmission. For sending the prescription directly to a pharmacy (via fax), the user needs to synchronize the handheld device in a cradle. Both printing and transmitting to a pharmacy add extra steps. The Company’s technology, along with its mobility, should improve when the devices are launched with Aether’s wireless software.
IMPLEMENTATION TIME

The Company seems to be getting a little ahead of itself. There is no doubt that ParkStone has the right vision (its Aether and NDC partnerships), but its current product has its shortcomings, and, except in offices using InfoCure systems, we believe the Company cannot implement it in a timely fashion. Today, the Company installs a server (or servers) at medical sites that interface with the practice management system. However, ParkStone only has one interface established with one PMS vendor (InfoCure) so, in some cases, nurses or office workers have to double input data from new patients in order to load it into ParkStone’s product. As ParkStone introduces more applications, such as charge capture, its lack of a two-way interface could be problematic. However, with its recent partnership with NDC’s MediSoft systems, ParkStone is on the right track to rectify this interface issue.

REVENUE MODEL

Devices and software are free to physicians. The Company expects to derive revenue from selling sponsorships and aggregate data to PBMs, pharmaceutical companies, and managed care companies. This strategy is quite obvious when looking at its device, as approximately one-quarter of the handheld screen is dedicated to advertising. In addition, the Company plans to generate fees on a per-prescription basis from PBMs and pharmacies. We believe ParkStone will most likely pass Aether’s $50 monthly fee on to the pharmaceutical companies when it deploys devices with Aether’s wireless software in the future. Currently, ParkStone counts deals with Glaxo Wellcome and a pilot with Merck-Medco. More partnerships are expected soon.

KEY ISSUES

Parkstone can only operate on Windows CE devices, as Palm OS devices do not have the memory capacity to run its applications. In addition, the Company’s wireless technology for in-office use is slower than its competing devices (the Aether partnership should help). Since all patient data is stored on the handheld device, physicians would need to synchronize constantly to download fresh patient data, which could be a problem while away from the office or when on call.

KEY ANNOUNCEMENTS

- **September 11, 2000**—ParkStone announced a marketing agreement with Johnson & Johnson (J&J). In return for sponsorship advertising and other health-related information presented on the handheld device, J&J is to pay ParkStone a fee for each physician user. Financial details of the partnership were not disclosed.
- **August 30, 2000**—ParkStone and MediSoft physician practice management systems (a division of NDC Corp.) agreed to co-develop and co-market wireless handheld devices to MediSoft’s 100,000 physician customers. The companies are to develop interfaces that synchronize ParkStone’s devices with MediSoft’s systems.
- **August 14, 2000**—Aether Systems committed to make a $15 million investment in ParkStone and to wirelessly enable its handheld device. ParkStone committed to deploying 10,000 devices using Aether’s Intelligent Messaging (AIM) software platform, Aether’s network operations, and customer care center. Aether wireless software usually costs $50 a month.
- **May 4, 2000**—ParkStone signed an exclusive agreement with InfoCure Corporation to offer ParkStone’s wireless devices to InfoCure’s 70,000 physician users.
- **February 23, 2000**—ParkStone signed an alliance with Glaxo Wellcome, in which Glaxo would sponsor ParkStone’s electronic prescribing devices for physicians. Details of the alliance were not disclosed.
- **November 9, 1999**—ParkStone signed a pilot program with Merck-Medco.
COMPANY DESCRIPTION

Pocketcode.com, launched in late 1999, was the first Windows CE handheld charge capture and medical coding product for physicians. The Company’s patent-pending coding technology evaluates compliance with Local Medical Review Policy, conducts CCI edits, and flags invalid code combinations. The Company employs a three-prong distribution strategy: 1) national distribution agreements with PSS Worldwide Medical, Inc and Allegiance Healthcare (a subsidiary of Cardinal Health, Inc.)—both are in place and launches are being implemented; 2) a VAR program has been created to tap both practice management consultants and the coder/educator market (pilots are underway); and 3) the Company has begun building a specialized direct sales force. PocketCode Version 1.0 is live in 12 medical sites and Version 2.0 is being launched in the fourth quarter of this year at six reference sites, which collectively represent over 6,000 physicians. Pocketcode.com is owned by Synergy Medical Informatics, Inc., a privately owned investment vehicle formed in October 1998.

APPLICATIONS

PocketCode is a charge capture product. PocketCode creates a virtual Superbill in the palm of a physician’s hand. The innovative software includes diagnosis (ICD9-CM) codes, procedure (CPT 2000 & HCPCS) codes, fee schedules, CCI data, and Local Medical Review Policy guidelines. For each user, the relevant LMRP guidelines are incorporated into the product’s database, as are the fee schedules for the appropriate Medicare fiscal intermediary. For other clinical applications, the Company will most likely partner with other leading handheld companies.

TECHNOLOGY

The first to use PocketPCs. PocketCode version 1.0 operates on Windows CE systems and Version 2.0 (launch expected for the second half of 2000) operates on the newer PocketPC systems. PDAs supported by PocketCode™ include Casio’s Cassiopeia, Compaq’s iPaq and Aero handheld devices, and the Hewlett Packard Jornada 540 Series. These allow PocketCode™ users to benefit from PocketPC’s new suite of horizontal applications, including Internet Explorer 4.0, Microsoft Outlook, PocketWord, and PocketExcel. The Company’s system is Web-based and can operate independently of any local or remote server. In addition, PocketCode provides a high degree of connectivity through multiple synchronization technologies, notably Ether-IR, which provides usable wireless connectivity.
IMPLEMENTATION TIME

Interfacing by Healthcare.com. PocketCode’s products are easily interfaced to most leading PMS systems through a special partnership with Healthcare.com (formerly HIE) and its Cloverleaf® gateway technology, which provides tight two-way interfaces with legacy PMS systems—a necessity for proper charge capture functionality. PocketCode is also ready to leverage other new wireless technologies, such as “Wireless CDPD/CDMA” and “Bluetooth,” as they become proven and more widely available over the next 12-24 months. The Company employs thin-client (off-site server) or thick-client (on-site server) deployment, whichever the customer chooses.

REVENUE MODEL

PocketCode charges users a monthly subscription fee. PocketCode is offered on a 12-month, all-inclusive rental basis (approximately $200 a month) that includes hardware, software and product support, and software revisions.

KEY ANNOUNCEMENTS

• April 19, 2000—DynaMedix and CompuSense Inc., a designer and integrator of information management system solutions for the physician office, have partnered to integrate DynaMedix’s PocketCode™ portable coding and healthcare information system with CompuSense’s line of MediSense™ practice management systems.
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CEO Gary F. Foster

COMPANY DESCRIPTION
Founded in 1997, VIRTMED delivers administrative and clinical solutions that integrate handheld computing, Internet technology, and legacy clinical information systems. VIRTMED is unique in that it targets physicians and other providers at large institutions, such as IDNs and large medical groups, representing over five million potential users in the United States. VIRTMED signs long-term service agreements with customers, which include managing an array of administrative and clinical applications and providing two-way data flow to and from legacy information systems and handheld devices. VIRTMED’s first product, a charge capture system launched in April 2000, enhances revenues via decrease of lost charges, improved cash flow, and improved compliance with HCFA guidelines. The Company has installed five sites and reports to have a strong backlog of customers.

APPLICATIONS
Charge capture and patient profiling. The Company’s first application is the VIRTMED Billing Card, a charge capture product that eliminates paper billing cards with a handheld device. The Company also offers Patient Keeper, a software application that stores patient information on a Palm device. VIRTMED, through partners or internal development, plans to offer a complete suite of applications that impact clinician workflow, such as lab ordering, e-prescribing, and more.

TECHNOLOGY
Uses Palm OS devices now, developing Windows CE devices. The Company’s first charge capture applications operate on the Palm OS, although a Windows CE device should be available soon. VIRTMED currently uses cradle-synchronizing technology but intends to offer wireless LANs soon. The key piece to VIRTMED’s technology strategy is its GlobalSync Server, which directs two-way data flow to-and-from legacy information systems and handheld devices. Usually two servers are installed per site, located either within an institutional firewall or at VIRTMED’s secure facility. The GlobalSync Server provides HIPAA-compliant transmission of data, HTTP-based administration, and Web-based reporting features.
IMPLEMENTATION TIME

Six-week average time frame. The Company reports average implementation of six weeks, although this time frame varies with the size of the customer. Since VIRTMED establishes tight, seamless, two-way interfaces with legacy information systems, implementation typically takes longer than its competitors.

REVENUE MODEL

Service revenue and user fees. VIRTMED acts as the Internet handheld partner with institutional facilities and typically signs three service agreements. Under these agreements, VIRTMED is responsible for all aspects of a client’s handheld solution, which includes the hardware and software, installation, integration, and management of all handheld applications. The Company also collects nominal monthly user fees.

KEY ISSUES

How fast can VIRTMED deploy its solutions? Since VIRTMED integrates complex information management systems for institutional facilities, scalability may be a concern. For example, in most cases each institution facility will likely have unique architectures requiring customized solutions that can require significant re-configuring. However, once VIRTMED integrates a large facility, switching costs are very high and the potential number of users can be in the thousands per facility (includes physicians, nurses, therapists, and other clinicians). If VIRTMED can successfully implement large sites in a six-week time frame, it should be able to grow the fastest among the handheld companies that we have profiled here.

KEY ANNOUNCEMENTS

- **August 8, 2000**—VIRTMED announced that it had secured over $43 million in its second round of funding from investors including Whitney & Co., eHealth Technology Fund, New Enterprise Associates, Frazier & Company, 3Com Corporation, Mosaix Ventures, Riggs Capital, Child Healthcare Corporation of America, Thomas Weisel Partners, and Pacific Ventures Group.

- **April 11, 2000**—Children’s Specialized Hospital implemented the VIRTMED service in its physical therapy, occupational therapy, speech therapy, and psychology departments to record, access, and transmit billing information at the point of care.

- **March 27, 2000**—3Com Ventures selected VIRTMED as its sole handheld-related investment in the healthcare market. 3Com Ventures is 3Com Corporation’s business development group that invests in emerging technology companies around the world.

- **February 28, 2000**—VIRTMED announced that it had secured $8.6 million from investors including New Enterprise Associates, Frazier & Company, 3Com Ventures, and e-Health Technology Fund.
DATA CRITICAL CORPORATION
NASDAQ: DCCA
RATING: NOT RATED

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Investors          NA

COMPANY DESCRIPTION
Data Critical Corporation develops and distributes wireless devices for hospitals and physicians. The Company has been selling wireless patient monitoring solutions to hospitals since 1997 and currently markets three solutions to the hospital market. Through two acquisitions, Physix and Elixis, Data Critical entered the physician handheld market in 2000. The Company currently offers PocketChart and WebChart to select physicians and, in early 2001, it plans to launch unwiredDr, a suite of Web-based wireless products that will address the broader physician market. Data Critical is expected to generate revenue of approximately $22 million and $48 million in 2000 and 2001, respectively, and should be profitable by mid-2001. The Company has more than 20 partnerships, including industry leaders such as Aether Systems, Agilent Technologies, Boston Scientific, Medtronic, and GE Marquette.

TARGET MARKET
Data Critical’s total addressable market is more than $5 billion (this includes both the hospital and physician market). The Company targets solo practitioners and physicians specializing in cardiovascular medicine and urology through its two products, PocketChart and WebChart, respectively. The Company’s unwiredDr products (expected launch is early 2001) will address the broader physician market. Currently, the Company has over 4,300 physician users, including 800 WebChart users and 3,500 PocketChart users.

APPLICATIONS
WebChart is designed for physicians specializing in cardiovascular medicine and urology, while PocketChart is for solo practitioners. PocketChart is a virtual charting tool that operates on the Windows CE platform and captures critical-patient information and outputs legible clinical notes and prescriptions. PocketChart includes a formulary of more than 1,200 medications, updated short-description E&M codes, and ICD-9 billing code chapters. WebChart is a Web-based eMR application that includes clinical notes, E&M coding, and drug refill functionality. WebChart is only available for cardiovascular and urology specialists, but the Company’s unwiredDr products is expected to offer much of the same functionality as WebChart to the general physician population. unwiredDr will initially include four “mobile” modules: dictation, lab tests, prescription writing, and charting and should be available in early 2001.
For the hospital market, Data Critical markets three wireless patient monitoring products. Its lead product, StatView, installed in over 228 hospitals in the U.S., generates the majority of the Company’s revenue. The Company’s two other products, AlarmView and FlexView, were both recently launched.

TECHNOLOGY

WebChart seamlessly incorporates the Internet into a physician’s mobile workflow. Using WebChart, physicians can access patient records from any Internet connected computer or wireless handheld device. PocketChart operates on Windows CE devices with LAN cards; servers do not need to be installed on-site. In addition, the Company plans to offer physicians other wireless devices (like pagers, cell phones, and Palm VII) for simple tasks, such as renewing prescriptions and checking lab results.

IMPLEMENTATION TIME

Fast for WebChart and PocketChart. PocketChart interfaces with Medical Manager and IDX practice management systems and can deploy its solutions relatively fast. WebChart requires only a fast Internet connection and does not need to interface with PMS systems. The Company expects that users will be able to download unwiredDr applications from the Internet in a matter of minutes.

REVENUE MODEL

Small monthly fees and transaction fees. Data Critical expects to collect small monthly fees (approx. $20 per month per unwiredDr module, plus cellular network fees) and transaction fees from pharmacies, labs (LabCorp), PocketScript, and managed care companies. Data Critical charges doctors a monthly fee of $250 for the WebChart product while PocketChart costs physicians a $2,500 one-time fee. Data Critical plans to migrate PocketChart’s 3,500 users to unwiredDr products.

KEY ISSUES

Data Critical expects unwiredDr to be a big hit among physicians. Data Critical could emerge as a leader in the handheld physician market in 2001 if the Company can deploy unwiredDr in a timely manner.

KEY ANNOUNCEMENTS

- **August 10, 2000**—Data Critical Corporation expanded its agreement with Edward Lifesciences Corporation, a leading cardiovascular products and services group, to co-market its WebChart(TM) Internet-based tool to cardiovascular specialists.

- **July 20, 2000**—Data Critical announced an agreement with Provider Select, an affiliate of Premier Inc., to offer its Internet-based patient charting tools to member healthcare organizations and affiliated physicians. Under the agreement, Data Critical’s WebChart™ product will be available to the more than 14,000 non-acute care practices, representing over 44,000 physicians within Provider Select’s membership.

- **June 27, 2000**—Kaiser Permanente, America’s largest not-for-profit health maintenance organization, has selected Data Critical’s StatView™ Alarm Notification System as its standard of care for wireless telemetry patients in its northern California hospitals. Kaiser Permanente has already purchased the StatView system for 15 of its California hospitals and plans to rapidly expand the number of its associated facilities using the system.
• **June 6, 2000**—Data Critical announced a partnership with Speech Machines, the leading speech-to-data Application Service Provider (ASP), that will integrate Speech Machines’ DictationNet™ technology with Data Critical’s WebChart™ physician charting tool, permitting physicians to dictate patient encounter notes directly into an on-site-based patient chart.

• **June 1, 2000**—Medtronic Physio-Control, the world’s largest manufacturer of external defibrillators, and Data Critical Corporation announced that Medtronic Physio-Control will handle sales, service, and distribution of Data Critical’s wireless communication technology products in Europe. In addition, Data Critical will interface its wireless technologies with Physio-Control defibrillators and information systems, which Physio-Control has agreed to exclusively distribute worldwide.

• **April 12, 2000**—Sunquest Information Systems Inc. signed a distribution agreement with Data Critical in which Data Critical will market Sunquest’s Clinical Event Manager (CEM), a wireless, on-site-enabled clinical alerting system that automatically sends vital clinical data to clinicians via e-mail or pager.

• **March 14, 2000**—Data Critical Corporation agreed to buy privately held Elixis Inc., a provider of Internet-healthcare tools such as WebChart, which automates tasks such as coding, prescription writing, and referral letters. Through its distribution partnerships with leading healthcare companies, such as Baxter Healthcare Corporation and Boston Scientific, Elixis offers tailored solutions for physicians in specialized practices. The Company has more than 800 users across the country, including prestigious institutions such as the University of Washington Medical Center and the University of Pennsylvania Health System.

• **February 16, 2000**—Data Critical Corporation expanded its five-year partnership agreement with the Nellcor Oximetry Business of Mallinckrodt, Inc., a provider of pulse oximetry monitoring devices.

• **January 24, 2000**—GE Marquette Medical Systems and Data Critical Corporation signed a four-year extension of their distribution and licensing agreement. GE Marquette distributes Data Critical’s StatView™ system under the trade name IMPACT.wf™ to its customers globally. Data Critical will also continue to directly sell and support the equivalent StatView product to existing GE Marquette customers.
COMPANY DESCRIPTION

Allscripts’ TouchScript Personal Prescriber solution, a wireless handheld prescription solution, is one of the first clinical products that doctors are using today in their daily practice workflows. And this is only the beginning. Through a flurry of acquisitions and partnerships, Allscripts expects to be marketing four wireless handheld products—prescribing, dictation, lab ordering, and charge capture—to doctors by the end of 2000. Currently, the Company has approximately 2,500 physician users, the most users in this market, and, with its Express Scripts and IDX Corporation partnerships, Allscripts expects to accelerate the growth of its user base.

APPLICATIONS

- **e-Prescription was first; dictation, lab ordering and charge capture out soon.** The Company’s first product is the TouchScript Personal Prescriber, a wireless handheld e-prescription device. By the end of the year, Allscripts expects to also offer dictation, lab ordering, and charge capture on its handheld device. In addition, if a medical site has an Internet connection, physicians can wirelessly surf the Internet for medical or general news. Uniquely, Allscripts is the only handheld company that allows medical sites to dispense drugs on-site to patients, providing physicians a way to supplement their income.

TECHNOLOGY

- **Using the larger HP Jornada now; plans to introduce smaller devices soon.** Allscripts uses the HP Jornada handheld PC (about twice the size of a Palm Pilot) for its long battery life (approximately 8 hours) and its compatibility with a LAN card. As the next-generation wireless technology and handheld devices come to market, the Company plans to move to smaller handheld devices (if the physician chooses). As part of its handheld solution, the Company installs a server on-site and PC touch-screen workstations, if the client chooses.

IMPLEMENTATION TIME

- **The IDX partnership should speed up deployment.** Allscripts can usually implement its solution in several weeks; however, large sites can take longer, especially if the group has a PMS system that Allscripts has not previously encountered. With the Company’s recent partnership with IDX Corp., we expect integration to speed up as IDX brings interfaces that should allow Allscripts to more quickly integrate its wireless handheld device with IDX systems. We believe this will be even more important as the Company rolls out additional applications (such as charge capture and lab ordering functionality) that require seamless, two-way interfaces.
REVENUE MODEL

Receives monthly fees from physicians and MCOs, plus transaction fees. Allscripts charges physicians approximately $200 a month for its e-prescription solution (includes software and hardware) and dispensing solution. In some cases, Allscripts’ partners subsidize this monthly fee. In addition, the Company generates revenue from dispensing prescriptions online, e-detailing, and its traditional drug dispensing business.

KEY ISSUES

Scalability, improved functionality, and battery life are some of the near-term challenges facing Allscripts. The Company needs to tackle a number of near-term issues, including (1) scalability – it needs to demonstrate that it can implement physicians at a faster rate (the IDX partnership should help); (2) improved functionality – dictation and charge capture should be available by year-end; and (3) increased battery life – as Allscripts introduces more applications on its device, battery life may be compromised.

KEY ANNOUNCEMENTS

- **July 13, 2000**—Allscripts announced an agreement to acquire ChannelHealth, a subsidiary of IDX Corp., for approximately $260 million (or 8.6 million shares). This deal is expected to close in the fourth quarter of 2000. In addition, Allscripts and IDX entered a 10-year strategic alliance whereby Allscripts would be IDX’s exclusive provider of Internet and point-of-care clinical applications.


- **May 17, 2000**—Allscripts acquired Medifor, a provider of Internet-delivered software for patient care and education, for 936,000 shares of common stock.

- **May 9, 2000**—Allscripts acquired MasterChart, a software developer of point-of-care applications for providers, in a transaction valued at $125 million. MasterChart’s dictation, interface engine, and patient record applications should complement Allscripts’ prescription solution.

- **April 2000**—Dendrite International, a provider of specialized sales force management solutions to the pharmaceutical industry, agreed to globally market Allscripts’ e-detailing product.

- **April 26, 2000**—Express Scripts, the nation’s largest independent pharmacy benefit manager with 38.5 million members, signed a three-year agreement to market Allscripts’ TouchScript solution and will subsidize 10,000 physician subscriptions. The Company did not disclose the fee arrangement with ESI, though we believe ESI will subsidize Allscripts’ $200 monthly rate for physicians.

- **February 2000**—IMS Health (IMS), the world’s leading provider of pharmaceutical-based information solutions, made a $10 million equity investment and partnered with Allscripts to jointly develop and market new Internet-based information solutions for the pharmaceutical industry.

- **January 20, 2000**—Allscripts and PlanetRx.com announced a multi-year agreement that would enable all physicians using Allscripts’ TouchScript® and the TouchScript Personal Prescriber™ to create and route a prescription directly from the exam room to PlanetRx.com.

- **November 5, 1999**—Allscripts and San Jose Medical Group (SJMG), one of the largest providers of medical care in Silicon Valley (Santa Clara County, CA), signed an agreement to enable San Jose’s 136 physicians to write electronic prescriptions using the TouchScript® Personal Prescriber™.

- **August 21, 1998**—Merck-Medco, the largest pharmacy benefit manager in the U.S. with more than 60 million members, signed a non-exclusive pilot agreement to evaluate the effectiveness of TouchScript by targeting high-volume prescribing physicians.
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CEO
John Holton

Investors
InterWest Venture Partners, and New Enterprise Associates

COMPANY DESCRIPTION
Scheduling.com provides Web-based scheduling and registration systems to hospitals, physicians, payors, and consumers. Scheduling.com’s mission is very focused when compared to other handheld companies — scheduling.com wants to be the Sabre of healthcare and dominate the computer scheduling system business. (Sabre is the world’s largest computer reservation system.) The Company’s sales approach is unique in that it sells directly to IDNs (integrated delivery networks), which push scheduling.com’s solutions to affiliated hospital-based and office-based physicians. Since April 2000, the Company has been gaining momentum, signing up eight IDNs, representing over 1,500 potential users. Scheduling.com has over 90 employees in three locations (two in California, one in Arizona) and boasts a seasoned management and technology team. The Company is close to completing its second round of venture funding.

APPLICATIONS
Scheduling, registration, reminders, and eligibility. The Company’s applications focus around front-end administrative tasks for physicians, such as patient scheduling and registration. Using the Company’s Web-based system, patients schedule offices visits on physicians’ Web sites and physicians schedule hospital-based, clinic-based, and specialist appointments via a wireless PDA on a real-time basis, which also functions as a gateway for eligibility and authorization checks. (The Company pre-populates its systems with existing payor data for eligibility verification, medical necessity determination, and referral and authorization verification.) Scheduling.com also reminds patients about appointments and offers an outsourced billing option for physicians. For clinical applications, such as e-prescribing, the Company plans to partner with other leading handheld companies.

TECHNOLOGY
Platform independent. The Company is platform independent, although it has a longer operating history with Palm products. Scheduling and registration is performed through the Internet or through Palm’s wireless WAN modems.
IMPLEMENTATION TIME

One the fastest integrators out there. The Company boasts integration time of 1-3 days with hospital and physician legacy systems, primarily a result of a well-seasoned technology team. Four of its eight IDN customers are live, though the Company estimates an 18-month time frame for complete deployment to all affiliated providers.

REVENUE MODEL

Hospitals pay per transaction; physicians pay $35 per month for wireless devices. The Company’s revenue model, in our opinion, is one of the best that we have encountered. The Company offers no risk contracts (no multi-year contracts) and hospitals pay a small fee (approximately $2.30) per appointment scheduled. Physicians pay a small monthly fee (approximately $35) for the entire solution, which includes wireless PDA, software, and installation.

KEY ISSUES

Experiencing short sales cycles with staunch hospitals. Typically the sales cycle in the hospital market has been painfully slow. Since scheduling.com’s solutions are not capital expensive and are risk free, the Company, so far, has had good success in selling to hospitals in much shorter cycles.

KEY ANNOUNCEMENTS

- **August 22, 2000**—Escondido, California-based, Palomar Pomerado Health System's Rehabilitation Department went "live" with scheduling.com's scheduling services. The two companies signed an agreement in March and the system went live on April 12. Plans to expand the system to all other areas of the hospital in 2001 are already underway.

- **August 15, 2000**—Holmdel, New Jersey-based, Bayshore Community Health Services' Radiology Department went "live" with scheduling.com’s registration and scheduling services and plans to expand the system to all other areas of the hospital. The two companies signed an agreement in March, under which scheduling.com will provide software and system maintenance as well as technical support.

- **June 13, 2000**—Shared Medical Systems Corporation (SMS), the premier Application Service Provider (ASP) in healthcare, and scheduling.com will partner to offer SMS NOVIUS® Scheduling ASP to healthcare facilities worldwide, including SMS’ established customer base of over 5,000 healthcare organizations. The seven-year agreement includes an upfront investment of $5 million by SMS in scheduling.com.

- **June 1, 2000**—scheduling.com and Syntellect, Inc., a leading global provider of call center technology and hosted service solutions, plan to interface scheduling.com’s technology with Syntellect’s hosted service bureau to more efficiently facilitate appointment compliance for hospitals, doctors, and patients via voice, fax, or e-mail.
COMPANY DESCRIPTION

PHT Corporation (PHT), founded in 1994, provides data capture and management technology for clinical trials using Palm devices and the Internet. The Company offers two handheld products, Esendant Patient Logpad and Esendant Investigator LogPad, that expedite the paper-intensive clinical trial process and improve patient compliance. We estimate that the outsourced clinical trial market is a $6 billion market. PHT has conducted over 20 clinical trials and partnered with PAREXEL International, a leading CRO, and Scirex Corporation, a private CRO, to co-promote PHT’s services to pharmaceutical companies. Early customers of PHT include Novartis and Janssen, and the Company expects more than eight large companies to begin pilot trials soon.

APPLICATIONS

Palm devices for patients and investigators improving the clinical trial process. The Company’s Esendant™ Clinical Network is an open system for end-to-end clinical trial data collection and management. PHT offers the following applications as part of its Esendant network: (1) Patient LogPad—a handheld direct data capture device based on the PalmPilot that enables study subjects to communicate with researchers in real time via the Web, improving accuracy of data and patient compliance; (2) Investigator LogPad—enables mobile data entry and retrieval from any location and contains built-in range checks that alert the user to invalid information; (3) Study Designer Software—facilitates rapid study set-up (easy to use, no programming needed), including the site’s clinical forms and workflow; and (4) StudyWorks—an electronic data capture and control system with an intuitive graphical user interface that allows the user to view and keep track of all data for each study.

TECHNOLOGY

Handhelds and the Internet. For patient devices, all that is needed is a Handheld and a phone jack (PHT is developing a wireless Palm option). For investigators, handheld devices (slightly larger and more powerful than the handhelds used by patients) are used to capture data, which is transferred via the Internet to PHT servers. PHT notes that with this system there are fewer equipment requirements than with conventional systems because computer workstations are not required at the investigator site for data collection. PHT uses XML (extensible markup language) to enable increased data interchange, archiving, storage, and management.
IMPLEMENTATION TIME

As easy as handing a Palm Pilot to a patient. Since PHT does not need to link its products to legacy PMS systems (in most cases), implementation is relatively easy. For its patient LogPad, the patient either plugs it into a phone jack or uses a wireless modem for data transmission. The investigator LogPad synchronizes with a PC, which transmits the data via the Internet. The more important part for PHT is adoption by pharmaceutical companies.

REVENUE MODEL

Charges pharmaceutical companies for each clinical trial. Depending on the number of patients, PHT charges anywhere from $250,000 to $750,000 for a typical clinical trial. In addition, as PHT builds its user patient data, it should possess some valuable data for which many companies would likely pay large amounts to access.

KEY ISSUES

Newest product is in beta launch. PHT appears to have relatively minimal competition in the handheld clinical trial market, but we believe the Company’s future hinges on the success of the Esendant™ Clinical Network, its system for end-to-end clinical trial data collection and management, which was launched in June 2000.

KEY ANNOUNCEMENTS

- **July 24, 2000**—PHT Clinical Networks received $8.0 million in venture capital financing from Boston Millennia Partners, Rho Management, U.S. Bancorp Piper Jaffray Ventures, Kestrel Venture Management, and DelTech Management.

- **June 13, 2000**—PAREXEL International Corporation and PHT Clinical Networks have signed a collaborative agreement to provide pharmaceutical clients with access to new electronic data capture systems for clinical research.

- **April 5, 2000**—PHT Clinical Networks acquired Clinical Data Solutions (CDS), a clinical research software firm based in Natick, Massachusetts. CDS’s lead product, Clinical Trials Manager™, enhances PHT’s functionality by significantly improving the system’s patient management, scheduling, adverse event tracking, and study site reporting capabilities.

COMPANY DESCRIPTION

PocketScript, founded in 1998 in Ohio, develops handheld devices for physicians. The Company’s first product is a voice response (IVR) electronic prescription device that operates on four Windows CE devices. In our opinion, the Company’s technology, highlighted by IVR prescribing, wireless Internet surfing, long battery life and fast wireless speed, edges out its competitors. The Company has orchestrated good partnerships with Express Scripts, Eli Lilly, and Protocall, a contract sales organization. In addition, PocketScript has been approved by 40 states to electronically transmit prescriptions directly to pharmacies. PocketScript has over 100 users, a number that should accelerate as Pocketscript is expanding its sales strategy.

APPLICATIONS

The Company’s first application is electronic prescription writing. Dictation will be its next application, followed by lab test and charge capture. Most likely, PocketScript will either “partner or acquire” for charge capture functionality. PocketScript gets formulary information from each PBM and matches each patient with the appropriate plan-level formulary, which is downloaded to the server in the physician’s office. Drug formularies are displayed to physician on three tiers—preferred, on formulary, and not on formulary.

TECHNOLOGY

Best technology on the market today. The Company’s handheld devices operate on the Windows CE operating system. PocketScript applications require the memory, color screens, and Web surfing capabilities offered by CE devices. The Company installs a server on the medical group site and integrates with the PMS system. Key technologic aspects include a long battery life (this is important for surfing the net, powering the color display, and using other applications); wireless voice response technology (the doctor simply says the patient’s name and the name is retrieved from the on-site server, faster and easier than using a stylus and touch screen); and, LAN cards for wireless in-office prescribing.

IMPLEMENTATION TIME:

Three days in some cases. PocketScript can interface with Medical Manager and Medic systems relatively fast. Medical Manager systems update on a real-time basis, while patient information for other PMS systems are downloaded each night onto the server.
REVENUE MODEL

PocketScript’s devices are free to physicians. The Company generates revenue primarily through its ESI agreement, in which ESI pays PocketScript a monthly fee for each physician user. Other revenue streams come from e-detailing (via Eli Lilly pilot) and transaction fees from both PBMs and pharmacies.

KEY ISSUES

PocketScript, with its leading-edge technology, could be a force in this market, but it needs to scale up fast. The Company needs to bolster sales and marketing efforts in order to grow its user base. Announcements are expected soon.

KEY ANNOUNCEMENTS

• September 20, 2000—PocketScript partnered with Eli Lilly to provide clinical information, patient education, and therapeutic compliance programs about Eli Lilly pharmaceuticals to physicians through its PocketScript platform.

• September 13, 2000—Data Critical and PocketScript announced an agreement to distribute and develop integrated wireless systems that allow physicians to carry out a full range of clinical functions. PocketScript will purchase Data Critical’s unwiredDr services and PocketChart applications for distribution with PocketScript’s handheld devices. Also, PocketScript will provide transaction support for the unwiredDr prescription-writing module.

• June 22, 2000—Express Scripts and PocketScript agreed to make PocketScript’s e-prescribing system available to more than 15,000 Express Scripts’ physicians.

• March 3, 2000—PocketScript and the Primary Care Network (PCN), a not-for-profit group of 5,500 physicians, arranged to install the PocketScript system in the offices of 1,000 physicians. This technology will be provided over Connect2Health.com, an Internet site related to PCN.
COMPANY DESCRIPTION

WirelessMD, Inc. is a software developer of two-way medical data applications for physicians. The Company’s first product, launched in August 1999, allows physicians to use a variety of handheld devices to communicate on a real-time basis with hospital systems, MCOs, pharmacies, and the Internet. An important aspect of WirelessMD’s strategy is that it uses mobile devices, such as pagers, that physicians already use in their daily workflow, avoiding adoption issues that many of its peers are fighting. Equally as important is that the Company’s wireless devices are FDA approved for use in hospitals. The Company targets both small medical practices and large hospital systems. The Company is currently deploying 50,000 wireless devices to physicians and other medical professionals with its strategic partners that include iScribe, Devon Health Services, Healthcare.com, and Masterpiece Technologies. WirelessMD expects to end the year with 4,000 paying customers.

APPLICATIONS

Patient information, lab results, e-prescribing, CME credits, and news updates. Using WirelessMD’s applications, physicians can admit and discharge patients, write e-prescribing, complete CME credits and retrieve patient information, lab results, and general news. WirelessMD uses iScribe’s e-prescription engine. (WirelessMD and iScribe signed an exclusive partnership to co-promote 15,000 Motorola PageWriter and Handspring systems to physicians.) It appears that WirelessMD’s first generation e-prescription application requires significant data input by the physician.

TECHNOLOGY

Available on numerous devices using pagers and WANs. The WirelessMD network is available through several platforms, including Motorola’s PageWriter® 2000x, the Palm VII™, Handspring’s Visor with Glenayre’s @ctive wireless module, Dell laptops, and WAP phones.
**IMPLEMENTATION TIME**

**Compatible with legacy hospital systems.** Using Cloverleaf Gateways from Healthcare.com Corporation, WirelessMD can retrieve medical data from legacy systems and incorporate the data onto its devices. Healthcare.com and WirelessMD signed a four-year partnership in April 2000.

**REVENUE MODEL**

**Charges monthly fees to physicians.** The majority of WirelessMD’s revenue comes from monthly fees paid by physicians for its pager and answering service, which cost $100 a month. The Company also expects to generate revenue from e-prescribing fees (paid by iScribe) and from pharmaceutical companies, which will pay for drug data and electronic messaging.

**KEY ISSUES**

**WirelessMD’s main device, Motorola PageWriter 2000X, has it limitations.** Writing a prescription on wirelessMD’s first generation pager requires significant data entry (such as patient and drug information) by the doctor. We believe there is definitely a place for WirelessMD in this emerging market, the question is how big of a place. We see physicians using WirelessMD devices for quick tasks (i.e., prescription refills or viewing lab results) when out of the office but not for everyday clinical transactions, which is the bigger opportunity.

**KEY ANNOUNCEMENTS**

- **August 25, 2000**—WirelessMD signed a letter of intent to acquire certain assets of RxSheets.com from MedCare Technologies, Inc for an estimated $6.5 million.
- **August 16, 2000**—WirelessMD plans to deploy Nokia’s WAP technology to provide customers with enhanced wireless data access and retrieval capabilities of patient and medical information.
- **July 26, 2000**—WirelessMD completed a financing round from a group of investors led by Dauphin Capital Partners.
- **April 10, 2000**—WirelessMD announced the immediate deployment of 50,000 wireless interactive devices for physicians and other medical professionals across the country.
- **April 5, 2000**—Healthcare.com, an enterprise application integration (EAI) software and services provider, signed a four-year, $4.4 million Application Service Provider (ASP) contract with WirelessMD to combine Healthcare.com’s Integration Sourcing™ and Application Sourcing™ services, and the hosting of WirelessMD’s proprietary application. In addition, WirelessMD licensed multiple Cloverleaf Gateways for $864,000. WirelessMD should be able to incorporate multiple patient records from various facilities, retrieve medical data from legacy systems as well as non-medical information and translate it into their own connectivity platform with CloverNet.
- **April 4, 2000**—Metrocall, Inc., and WirelessMD have partnered to provide the framework for a mutual co-marketing effort to upgrade the one-way pagers (that physicians currently use) to the two-way interactive state-of-the-art ReFLEX 25 system.
- **April 3, 2000**—WirelessMD and iScribe announced an exclusive three-year partnership to co-market a new integrated system to a minimum of 15,000 physicians. This system will feature iScribe’s electronic prescription writing and renewal software on WirelessMD’s two-way interactive wireless platforms.
PROFILES:
LEADING TECHNOLOGY-BASED HEALTHCARE COMPANIES
COMPANY DESCRIPTION

Founded in 1993, CB Technologies provides strategic and technical solutions (including electronic clinical intelligence™ (eCI™) tools, e-business consulting and integration services) to the pharmaceutical, medical device, biotechnology, and healthcare industries. In 1999, the Company launched MetaTrial, a hybrid electronic data capture and management system for clinical trials. CB Technologies has already participated in over 20 trials. The Company’s applications, which support thousands of users globally, are in use at some of the top healthcare and pharmaceutical companies in the world, including Warner Lambert, Pfizer, and Johnson & Johnson. Recently, CB Tech announced the acquisition of ClinPhone Group Limited, expanding CB Technologies’ presence in Europe.

APPLICATIONS

**MetaTrial**—an advanced hybrid electronic data capture system for clinical trials to help pharmaceutical, biotechnology, and medical device manufacturers to get their products to market more quickly. With the hybrid client/server and Web technologies platform, MetaTrial is able to perform its function at remote locations whether an Internet connection is intermittent, slow, or not available at all. MetaTrial combines Client/Server and Web technologies to allow real-time data acquisition via the Internet. MetaTrial includes a Study Builder that allows users to create Case Report Forms (CRFs) for clinical trials in days, rather than weeks.

CB provides support services to integrate MetaTrial, including help desk services around the clock, creation, and maintenance of a central database, implementation/installation on numerous servers, training, customization options, and outsourcing of technology and support services.

KEY PARTNERSHIPS

**Microsoft Corporation**—CB is a Microsoft Certified Solution Provider and actively works with Microsoft to develop systems and services.

**Cognos Business Intelligence**—CB partnered with Cognos to offer its clients access to Cognos’ data. Cognos software adds multi-dimensional database reporting and Web integration.
COMPANY DESCRIPTION

Formed in 1999, Firekey (formerly known as Notre) develops Internet-based systems that enable real-time data exchange between all health participants. Notre’s flagship e-commerce solution, the n-Suite, supports administrative and clinical transactions, including scheduling, claims processing, and e-prescription writing, and EMR applications.

APPLICATIONS

n-Suite—integrated clinical suite includes the following modules:

- **Administrative Electronic Data Interchange (EDI)**—simplifies diagnosis and treatment by combining eligibility checking and claims submission.
- **Clinical Laboratory**—routes and stores patient data, clinical results, and other patient information
- **Electronic Prescriptions**—access to drug information, process prescriptions, review health plan formularies, drug interaction analysis, and conduct drug utilization reviews (DUR) online, and in real-time, using wireless Internet access devices.
- **Disease Management**—Health Information Portals in waiting rooms for patients (soon to launch on-site).

KEY ANNOUNCEMENTS

- **September 1999**—Notre signed an agreement for $10 million to acquire a clinical information system (CIS) from North Arundel Health System in Maryland. This software will help Notre manage online real-time medical records, pharmacy orders, clinical lab results, and other critical healthcare data. Additionally, the CIS provides a significant portion of n-Suite’s overall development and greatly accelerates the system’s time to market.
- **May 1999**—Notre agreed with Merck-Medco Managed Care, LLC (MMMC) to develop an Internet-based prescription management service for physician offices. Notre’s electronic prescription application solution will be initially deployed to over 100 physicians in the Philadelphia metropolitan area.
COMPANY DESCRIPTION

iKnowMed serves patients, pharmaceutical companies, and physicians, and offers various clinical solutions including charting, trend analysis, and other information presentation services, based on its capability to collect, store, report, and share data gathered by physicians. The Company initially specialized in oncology and has made significant progress, recently announcing agreements with 21 M.D. Anderson cancer centers and SouthWest Oncology Group, a national clinical research group. iKnowMed plans to expand into cardiology, infectious disease, diabetes and other complex, chronic disease states.

APPLICATIONS

iKnowChart—Integrated electronic health record simplifies data input and access at the point of care.

iKnowChart contains four core components:

2. Nurse Charting—flow sheet management (dose calculations) and encounter documentation (patient assessment).
3. Regimen Library—library of treatment regimens, create specific regimens.
4. Clinical Trial Screening—high level eligibility screening, practice/non-practice trial screening.

iKnowChart Advance Modules include:

• Dictation/Transcription—enter prescriptions and orders through iKnowChart.
• Clinical Trial Management—embedded clinical trials.
• Interfaces—interfacing with other systems such as billing, scheduling, and laboratory systems.

iKnowMyChart—personalized on-site resource for patients to access related treatment information and manage the administrative aspects of their care, such as scheduling appointments, refilling prescriptions, completing surveys, and communication with the clinical staff.

The Reporting Center, presents blinded data on treatment outcomes to provide physicians with an outlook on overall prescribing patterns and clinical outcomes.
KEY PARTNERSHIPS
Texas Cancer Care (M.D. Physicians Network), OnCare, Maine Medical Center, The University of Texas MD Anderson Cancer Center, SouthWest Oncology Group.

KEY ANNOUNCEMENTS

• **August 30, 2000**—iKnowMed and Southwest Oncology Group (SWOG), a national clinical research group, partnered under a $1.3 million grant from the National Cancer Institute (NCI). Under the grant, physicians from SWOG-affiliated oncology centers will utilize iKnowChart to screen patients for more than 40 clinical trials and to facilitate the management of 20 clinical trials.

• **August 28, 2000**—iKnowMed, the Clinical Knowledge Network, and The University of Texas M. D. Anderson Cancer Center signed an agreement to deploy iKnowMed's Web-based knowledge tool physician software at the cancer center.
COMPANY DESCRIPTION

Formed by the merger of AccentHealth and Axolotl in October 1999, Axolotl Corporation provides both professional services for physicians as well as consumer information products. The Company’s Professional Division includes the Elysium product line, which includes tools for automating clinical and administrative processes, and Physician Practice Solutions, an office management system. AccentHealth, the Company’s Media Products division, provides consumer information through its Web site www.accenthealth.com and healthy lifestyle television programming (AccentHealth Waiting Room Television Network), produced exclusively in conjunction with CNN and Turner Private Networks.

APPLICATIONS

**Elysium:** Clinical Messaging—a secure digital messaging system that allows healthcare providers to deliver data to their physician partners over the Internet or an intranet.

**Elysium Products include:**

- **Elysium**—provides electronic results delivery and communication, authorizations and referrals, and access to patient demographic, insurance, and clinical information.

- **Elysium Workstation**—automates clinical and administrative processes and allows physicians to more easily receive, store, and manage clinical information.

- **Elysium Prescription Management System (Prescription Writer)**—provides physicians with applications to accurate prescribe medications. This includes price reference, interaction, and formulary checking, access to patient prescription history, and patient education information.

- **Elysium Intelligent Ordering**—online ordering and tracking system for lab tests or supplies.

- **Elysium Managed Care**—automated system for processing referrals, with online eligibility access and automatic benefit checking to approve or deny authorization requests.

Axolotl’s Physician Practice Solutions allow physicians to schedule patients, file claims, check eligibility, and referral authorizations, order and review lab tests, order and refill prescriptions, review patient medical records, and more efficiently procure medical and office supplies.
AccentHealth products include:

- **AccentHealth Waiting Room Television Network**—The AccentHealth Waiting Room Television Network programming, which is produced exclusively in conjunction with CNN and Turner Private Networks, promotes healthy living while patients sit in the waiting room. This media property is audited by Nielsen and supported by leading brand sponsors such as Procter & Gamble, Merck, and Warner Lambert.

- **Accenthealth.com Web Site**—The AccentHealth Web site (www.accenthealth.com) delivers health and wellness information, tools, and resources. Key features include a personalized health profile, interactive tools, answers to health questions, the latest health news, widespread information about medical tests, procedures and pharmaceuticals, and locators for physicians, message boards, and support groups.

**KEY PARTNERSHIPS**

- **Technology partners**: (software partners) IBM, Lotus, Microsoft, and TSI Software. (Database partners) MediSpan and American Medical Association.


**KEY ANNOUNCEMENTS**

- **July 19, 2000**—Axolotl signed an ASP agreement with Franciscan Health System to provide its Elysium Clinical Messaging system to Franciscan Health System’s affiliated physicians in greater Tacoma. The initial rollout for 400 physicians commenced in May.

- **May 23, 2000**—Axolotl signed an agreement with Bethesda Healthcare System to deploy the Elysium Clinical Messaging system to 210 Bethesda affiliated physicians.

- **May 1, 2000**—Axolotl announced a strategic partnership with Passport Health Communications, Inc., an Internet healthcare technology company providing online healthcare administrative data, including information on patient eligibility, claims status, claims submission, level of benefits, referrals, provider panels, and medical codes.
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COMPANY DESCRIPTION

MyDrugRep.com provides physician marketing services through e-detailing programs and other educational services for pharmaceutical companies via the Internet. MyDrugRep.com connects physicians and other healthcare professionals to drug information from 200 pharmaceutical companies and their respective resources through one marketplace.

APPLICATIONS

Virtual Detail—interactive, educational, drug presentations that last approximately 5 minutes, delivered at home or at work.

Drug library—a drug resource providing drug search tools and current information on any drug approved in the United States, including indications, patient monographs, drug interactions, and more. Provided by First DataBank, AHFS, and the Company’s own proprietary database.

Request Samples, Request a Rep, Request Info—schedule drug representative visits, receive more drug information, and arrange to receive samples.

CME (through Medcases)—e-learning platform where physicians can earn CME credits.

KEY ANNOUNCEMENTS

• September 6, 2000—MyDrugRep.com and Salu.net signed a three-year partnership where Salu physicians may freely access the MyDrugRep.com marketplace via their existing Salu Hub. The new co-branded Salu/MyDrugrep.com interface is scheduled to launch in mid-October and will be available to Salu’s allergy and other specialists.

• August 1, 2000—MyDrugRep.com partnered to become iPhysicianNet’s preferred provider of alternative Web-based detailing services and to work with 6,000 high prescribing primary care physicians already under contract with iPhysicianNet. MyDrugRep.com will now be able to serve targeted physicians through the iPhysicianNet system, and iPhysicianNet physicians will be able to directly access MyDrugRep.com’s Web site.

• July 26, 2000—Siebel has selected MyDrugRep.com to join the Siebel Alliance Program as a Premier Partner. MyDrugRep.com will utilize Siebel ePharma, a pharmaceutical version of Siebel eBusiness Applications, to provide an integrated Internet-based sales channel for pharmaceutical customers.
COMPANY DESCRIPTION

iPhysicianNet works with pharmaceutical companies and other strategic partners to provide free e-detailing and other Internet-based communication applications to physician clients. By launching the physicians’ on-site initiative, the Company intends to reinforce the relationship between doctors and drug representatives through the convenience of PC-based videoconferencing meetings. Through the sponsorship of pharmaceutical companies, iPhysicianNet provides tools and services to facilitate electronic network presence within the office and enables Internet connectivity for accessing other healthcare resources.

APPLICATIONS

iPhysicianNet’s solution provides free services and resources for physicians, including video computers, Internet access through high speed/ISDN data lines (IPNet SM), email accounts, healthcare references, CME presentations (educational videos), video-detailing, news and articles, and other physician resources. To date, the Company has signed multi-year agreements with five “big pharma” companies, including Glaxo Wellcome, Searle, Merck, AstraZeneca, and Novartis.

KEY PARTNERSHIPS/ANNOUNCEMENTS

- **February 22, 2000**—Axolotl partnered with iPhysicianNet to promote one another’s products and jointly deploy a complete solution for physician offices.
- **Feb. 9, 2000**—iPhysicianNet signed an exclusive agreement with the contract sales organization Professional Detailing, Inc. to provide e-detailing capabilities, contract video sales representatives, video call center facilities, and other services to iPhysicianNet’s clients.
- **August 1, 2000**—MyDrugRep.com partnered to become iPhysicianNet’s preferred provider of alternative Web-based detailing services and work with 6,000 high-prescribing primary care physicians already under contract with iPhysicianNet.
- **March 16, 2000**—Hitachi Data Systems, a wholly owned subsidiary of Hitachi, Ltd. agreed to provide the information technology infrastructure for iPhysicianNet’s communications network.
• **September 15, 1999**—Glaxo Wellcome and iPhysicianNet signed an agreement to provide videoconferencing capabilities to enhance communication between more than 30,000 primary care physicians and Glaxo Wellcome’s sales representatives.

• **April 19, 1999**—UniMed Management Company, a 5,000-physician, multi-specialty group, has signed a letter of intent to utilize iPhysicianNet’s services.

• **April 14, 1999**—Pacific Foundation for Medical Care has signed a letter of intent to deploy an Internet-based healthcare and videoconferencing network through iPhysicianNet.
COMPANY DESCRIPTION

iMcKesson, formally established in June 2000, is a business unit of McKesson HBOC formed to provide and accelerate the deployment and adoption of Web-based physician office and medical management solutions. iMcKesson employs over 2,000 people nationwide and consists of businesses formerly known as Abaton.com, Physician Office Manager and Pathways Practice Manager, the Electronic Data Interchange (EDI) Clearinghouse, Prospective Health, Inc., Access Health (including InterQual) and Medical Management Division (formerly known as HPR). iMcKesson had an operating loss of $6.0 million on $68.5 million in revenues for the quarter ending June 2000, compared to an operating profit of $16.7 million on $75.2 million in revenues last year.

APPLICATIONS

Physician office solutions include clinical connectivity (lab test ordering, view results, electronic prescription, patient medical records maintenance), administrative connectivity (patient insurance eligibility, referral confirmation, claims editing and submission, and expedited processing), and communications connectivity (Web-based practice management, consumer health content).

Medical management products and services include targeted on-site-based offerings that provide assessment tools and disease specific content and resources.

KEY ANNOUNCEMENTS

- **July 5, 2000**—McKesson HBOC signed a definitive agreement to acquire MediVation, Inc., which possesses a fully automated Web-based communications system to educate and communicate with patients securely online.

- **August 3, 2000**—The Medical Management Group of iMcKesson announced that it has acquired High Performance Healthcare (HPH), a provider of telephone and Internet-based programs for the health and human services sector in Australia and New Zealand. The acquisition significantly expands iMcKesson’s international reach to include delivery of health management services to approximately 8 million people in Australia and New Zealand.

- **May 16, 2000**—The Access Health Group of McKesson HBOC (now the Medical Management Group of iMCK) announced an agreement to provide Capital Blue Cross, Harrisburg, Pennsylvania, comprehensive health management services for asthmatics.

- **May 8, 2000**—CHW’s case management and discharge planning staff will license iMcKesson’s Intensity/Severity/Discharge (ISD®) Acute Level of Care Criteria for adult and pediatric patients to communicate to the 8,600 clinicians in its 48 hospitals.
COMPANY DESCRIPTION

Salu creates business hubs for physician specialty areas including allergy, neurology, dermatology, physical medicine, reproductive medicine, and cardiology. These hubs provide Web-based business services customized for each specialty and offer free communications tools for interacting with colleagues, patients, and other partners via the Internet. Salu’s services are used by 55% of the country’s office-based allergists, 17% of U.S. office-based cardiologists, 17% of physiatrists, and 15% of neurologists. In addition to extending its business into other specialty areas, Salu is developing an online Medical and Supply Store to make specialty-specific products, office supplies and services available to physicians and practice staff.

APPLICATIONS

Web site builder, Medical Messaging, Care Center, Practice Promoter, other physician tools (Tools for You).

KEY PARTNERSHIPS

American College of Allergy, Asthma and Immunology
American College of Cardiology
American Academy of Physical Medicine and Rehabilitation
American Society of Bariatric Physicians
American Society for Reproductive Medicine

KEY ANNOUNCEMENTS

• **September 6, 2000**—Salu formed a three-year partnership with MyDrugRep.com to provide its member physicians with a Salu-branded version of MyDrugRep.com's online pharmaceutical applications. Also, Salu physicians will have the ability to utilize the MyDrugRep.com marketplace (via their Salu Hub) to access resources and services such as requesting drug samples and patient education material.

• **August 25, 2000**—Salu and Ziment partnered to offer Ziment's new service called WebSurveyMD.com, an online panel of physicians through which primary research to assess physician awareness, attitudes and behaviors is conducted. Salu members that choose to participate in the surveys will be paid a cash honorarium for their time.

• **August 17, 2000**—Salu and ZirMed.com partnered to add online claims processing services to Salu’s suite of practice-enhancing services available on its Web-based business hubs.
COMPANY DESCRIPTION

Founded in 1998, PhysicianAccess provides ASP-based solutions to support small medical practices’ administrative and clinical functions, including scheduling, registration, building clinical notes, billing, and even prescription writing. PhysicianAccess’ products can be deployed in part or as an integrated system and users have the option to use wireless handheld devices for many of its functions. In addition, patients can access their personalized Web sites, where they can update their own health page, interact with their medical records, and communicate with their physician’s office.

APPLICATIONS

PhysicianAccess’s core solution, PAxNet™, includes patient management functions to directly assist physicians as well as patient communications tools.

- **Practice Management**: business applications automating practice management solutions such as front office tasks (scheduling, call logging, and patient registration) and back office tasks (billing and claims processing). For example, clinical data captured at the point of care, such as diagnoses tests ordered, drive and update business processes like billing and accounts receivable.

- **Clinical Capture**: clinical applications include tools that facilitate critical clinical information capture, clinical transactions, charting, ordering of labs, prescriptions, and referrals. Longitudinal patient data can be viewed instantly via their Electronic FaceSheet™ (an NCQA-compliant summary).

- **Connectivity**: provides wide-ranging bi-directional links with clinical labs, radiology, pharmacies, claims processing centers, and hospitals.

- **Decision Support**: allows physicians to stay compliant with clinical practice guidelines without disturbing workflow.

- **Patient Communications**: secure personalized Web site where patients can view physician office data to review and edit their personal medical profiles, submit requests for appointments and prescription refills, and receive annotated test results, instructions, and office reminders.

KEY ANNOUNCEMENTS

- **August 7, 2000**—The San Francisco Medical Society, which supports Bay area physicians, announced its endorsement of an Internet-based productivity and communications application developed by PhysicianAccess.com.

- **April 10, 2000**—The Santa Clara County Medical Association announced sponsorship of PAxNet™. The Santa Clara County Medical Association, which supports Silicon Valley physicians, and PhysicianAccess.com are also providing individual Web sites for each of the 3,000 physician members.
CONFER SOFTWARE

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COMPANY DESCRIPTION

Redwood City-based Confer Software assists health plans, provider organizations, and healthcare suppliers optimize health management through its Internet-based applications. Confer’s five core applications, including disease management, congestive heart failure management, case management, utilization management, and self care, interoperate on its customizable ConferWeb™ Platform, an XML-based platform. In addition, the Company offers professional services, such as consulting, implementation, training, and technical support, to supplement its ConferWeb system. On average, Confer’s applications can be deployed in four months.

APPLICATIONS

- **ConferWeb Disease Manager (DM)**—provides patient management tools for health plan and provider organizations that serve patients with chronic illnesses, such as congestive heart failure, diabetes, and asthma. These tools automate many processes such as pre-authorization, auto-approval, member eligibility lookup, clinical guidelines, and other queries.

- **ConferWeb Utilization Manager (UM)**—integrates with existing legacy systems and incorporates clinical guidelines to enable managed care organizations, self-insured employers, and intermediaries to manage the utilization of healthcare resources and deliver Web-based self-service capability to their affiliated providers.

- **ConferWeb Case Manager (CM)**—facilitates an organization’s case management process by providing an automated framework for care coordination.

- **ConferWeb Self Care (SC)**—allows consumers to track their own health status, retrieve summaries, take assessments, and receive relevant reminders and educational information at appropriate points in the self-care process.

- **ConferWeb CHF**—a system for disease management containing a validated protocol for congestive heart failure (CHF), allowing for proactive, evidence-based interventions and patient self-management.

- **ConferWeb Platform 5.0 XML**—technology services and tools for automating and managing the interactions and information related to patient care.

- **Confer's Professional Services** include consulting, implementation, training and technical support.
KEY PARTNERSHIPS

Confer customers and partners include national healthcare providers such as Anthem Blue Cross Blue Shield, Caremark Rx, Matria Healthcare, MatureWell, and PacifiCare Health Systems.

KEY ANNOUNCEMENTS

- **August 14, 2000**—W3Health and Confer Software partnered to integrate Confer's Web-based process automation (eProcess) applications for utilization, disease, and case management, and W3Health’s Web-based reporting and analysis system, W3 DRS.

- **June 12, 2000**—Confer Software and Anthem Blue Cross and Blue Shield in New Hampshire (Anthem BCBS) partnered to provide an integrated package consisting of the ConferWeb™ Platform and validated clinical protocols and operational procedures developed by Anthem BCBS. This integrated application is designed to improve outcomes and the quality of life of patients with congestive heart failure (CHF).

- **March 8, 2000**—Confer Software joined the Exodus Communications Alliance Partner Program. This alliance should allow improvements in the speed of implementation of Confer’s Internet-based applications with a lower risk of deployment.

- **October 12, 1999**—Caremark Therapeutic Services and PacifiCare Health Systems selected Confer Software to provide its Web-based solutions.

- **July 14, 1999**—Blue Cross and Blue Shield of New Hampshire (BCBSNH) selected Confer to provide secure Internet-based care chain management solutions. Confer is providing a disease management solution for BCBSNH’s Health Risk Management Department, which plans to offer customized health management, health promotion, and prevention information to the Plan’s chronically ill members.
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COMPANY DESCRIPTION

Accordant Health Services provides technology-enabled disease management programs focusing on complex, chronic diseases. Accordant’s “tele-on-site” system integrates Internet and call center technologies to enable information sharing among patients, providers, and health plans. At present, Accordant offers programs for 14 complex, chronic diseases in the areas of neurology, rheumatology, pulmonology, and hematology and serves approximately 10,000 chronic patients from 7 million health-plan members.

APPLICATIONS

Disease Management—Risk stratification of diagnosed members, disease specific education, toll free line, development of individual care plans, disease management, and outcome reports.

Specialized Patient Management—designed for patients with severe diseases. Services include treatment compliance monitoring, counseling, complications monitoring, benefit management, coordination of ancillary services, and patient status and care plan reports.

Data Analysis Services—applies disease-specific algorithms to analyze a health plan’s claims data.

KEY PARTNERSHIPS/ANNOUNCEMENTS

• **August 28, 2000**—Accordant has partnered to utilize TriZetto’s hosting application integration services. Accordant intends to use TriZetto’s expertise to enhance the integration of its disease management technology within the operating systems of new and existing managed care customers.

• **April 20, 2000**—Accordant signed a five-year contract with Anthem® Blue Cross Blue Shield in Colorado (BCBSCO), in which Accordant will provide disease management for approximately 300 BCBS members in the state of Colorado.

• **March 23, 2000**—Accordant extended its services to 500 of patients in the southeast with the addition of Winston-Salem, North Carolina-based PARTNERS National Health Plans, Inc. as a managed care customer.

• **June 30, 1997**—Oxford Health Plan, the nation’s ninth largest health plan, teamed with Accordant Health Services, Inc. to provide disease management services for Oxford members with rare chronic diseases.
athenahealth.com is an ASP providing Web-based workflow automation services to physicians, including patient registration and scheduling, insurance eligibility verification, claims processing, payables management, financial reporting, credentialing, billing, and collections. The Company charges its clients on a subscription basis and offers tutorial, equipment leasing, and data transfer from existing systems.

**APPLICATIONS**

*athenaNet*, the Company’s flagship service automates business office functions such as registration, scheduling, eligibility verification, referral rule management, referring provider management, expected revenue and payment management, and claims submissions.

*athenaNet-Collector* expedites claim collections through the Company’s virtual insurance management center.

*athenaNet-Ledger* is a Web-based general ledger accounting system customized especially for medical groups. Clients can track their group costs by site, provider, or other identifiers.

*athenaNet-Controller* allows medical groups to outsource their accounting, purchasing, and cash management.

**KEY PARTNERSHIPS/ANNOUNCEMENTS**

- **August 15, 2000**—athenahealth.com announced ten contract wins in the Northeast region, including 85 physicians at Anchor Medical Associates; Bald Hill Pediatrics, Brigham/Faulkner OB/Gyn, Broadway OB/Gyn, Deborah Wooten, MDPC, Koh Health Center, Mass Walk-in and Primary Care, South Shore Midwifery, Seacoast OB/Gyn, and Women’s Care of Rhode Island recently signed on.

- **May 1, 2000**—Helios Health, Inc, a provider of Internet-based health information and services to consumers in the healthcare delivery setting, and athenahealth.com partnered to offer Web-based business services for medical groups.

- **March 28, 2000**—Anchor Medical Associates, a Lifespan affiliate, implemented athenahealth.com’s flagship service, athenaNet.
COMPANY DESCRIPTION

IC Axon, founded in Montreal in 1995 by Jean Lalonde and Pierre Bernier, began operations as a developer of Web-based and multimedia health education and training programs for pharmaceutical companies and has since evolved into a prominent provider of e-learning solutions and continuing medical education (CME) to the healthcare industry. The Company has developed online patient education programs, customized intranets, and both CD-ROM- and Internet-based sales representative training programs for leading pharmaceutical companies, including AstraZeneca, Glaxo Wellcome, Merck, Novartis and Pfizer. IC Axon is on track to surpass $6 million in revenues this year and expects to generate $15 million in revenues next year.

APPLICATIONS

PharmaCampus is a vertical e-learning portal designed to meet the training needs of pharmaceutical industry sales representatives, sales trainers, and product managers.

Development Services business involves the development of online patient education programs, customized intranets, CD-ROM/Internet-based training programs for healthcare professionals, online evaluation programs and services, and other e-learning solutions demanded by pharmaceutical companies.

mypatient.com, an online learning system jointly sponsored by I.C. Axon and the University of Virginia School of Medicine, enables customized CME programs to be created, managed, and delivered over the Internet. The system is designed to provide problem-solving medical skills to primary care physicians and other healthcare professionals through the use of realistic patient scenarios. In addition, mypatient.com offers an integrated authoring and review environment, called CaseMaker™, which allows online collaborative development of content.

TriviaMedica is an online medical trivia game offering fast-paced weekly quizzes for healthcare professionals. TriviaMedica also serves as a market research tool for pharmaceutical companies, providing “just-in-time” market data for brand managers.

KEY PARTNERSHIPS/ANNOUNCEMENTS

- **July 11, 2000**—The American Academy of Ambulatory Care (AAAC) chose mypatient.com as the association’s preferred online continuing medical education system for its 2,000 physician members.
The companies referenced in this report include: 3Com Corporation (COMS, $19.44; Not Rated), Advance Paradigm (ADVP, $43.00; Not Rated), Aether Systems (AETH, $75.38; Buy), Agilent Technologies (A, $46.44; Not Rated), Allscripts (MDRX, $13.63; Buy), AstraZeneca PLC (AZN, $50.88; Not Rated), Aventis S.A. (AVE, $75.75; Not Rated), Baxter International (BAX, $86.13; Not Rated), BellSouth Corporation (BLS, $40.50; Not Rated), Boston Scientific (BSX, $15.69; Not Rated), Bristol-Myers Squibb (BMY, $60.00; Not Rated), Cardinal Health (CAH, $89.94; Not Rated), Caremark Rx (CMX, $11.69; Not Rated), Cognos Incorporated (COGN, $41.81; Not Rated), Compaq (CPQ, $25.41; Not Rated), Data Critical (DCCA, $6.50; Not Rated), Dendrite International (DRTE, $26.44; Not Rated), Drugstore.com (DSCM, $2.97; Not Rated), e-MedSoft.com (MED, $2.00; Not Rated), Edward Lifesiences Corporation (EW, $22.06; Not Rated), Eli Lilly (LLY, $89.81; Not Rated), Exodus Corporation (EXDS, $38.13; Not Rated), Express Scripts (ESRX, $77.38; Not Rated), General Electric (GE, $57.75; Not Rated), Glaxo Wellcome (GLX, $58.13; Not Rated), Glenayre Technologies (GEMS, $7.00; Not Rated), Healthcare.com (HCDC, $2.06; Not Rated), Hewlett-Packard (HWP, $92.69; Not Rated), Hitachi, Ltd. (HIT, $116.50; Not Rated), IDX Systems (IDXC, $19.50; Not Rated), IMS Health (RX, $21.19; Not Rated), InfoCure Corporation (INCX, $3.81; Not Rated), Johnson & Johnson (JNJ, $96.94; Not Rated), Mallinckrodt (MKG, $44.75; Not Rated), Matria Healthcare (MATR, $2.66; Not Rated), McKesson HBOC (MCK, $30.50; Not Rated), Medscape (MDLI, $2.75; Not Rated), Medtronic (MDT, $52.06; Not Rated), Merck (MRK, $76.88; Not Rated), Metromic (MCOM, $19.88; Buy), Metrocall (MCLL, $1.97; Not Rated), Microsoft (MSFT, $50.38; Not Rated), Motorola (MOT, $22.38; Not Rated), NEC Corporation (NIPNY, $105.00; Not Rated), Nokia Corporation (NOK, $32.94; Not Rated), Novartis AG (NVS, $38.00; Not Rated), PacificCare Health Systems (PHSY, $11.94; Not Rated), Palm (PALM, $54.94; Not Rated), PAREXEL International Corporation (PRXL, $8.38; Not Rated), Pfizer (PFE, $43.69; Not Rated), Pharmacia Corporation (PHA, $55.19; Not Rated), PlanetRx.com (PLRX, $0.34; Not Rated), The Proctor & Gamble Company (PG, $71.94; Not Rated), PSS World Medical (PSSI, $2.81; Not Rated), Quest Diagnostics (DGX, $133.88; Not Rated), Siebel Systems (SEBL, $103.63; Not Rated), SmithKline Beecham (SBH, $65.44; Not Rated), Sunquest Information Systems (SUNQ, $13.00; Not Rated), Syntellect (SYNL, $6.75; Not Rated), and WebMD (HLTH, $8.50; Market Neutral).
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**Strong Buy**
We anticipate the stock will outperform its peer group in the next 6 months, with the potential for a near-term catalyst.

**Buy**
We anticipate the stock will outperform its peer group over the next 12 months.

**Neutral**
We anticipate the stock will perform in-line its peer group over the next 12 months.

**Underperform**
We anticipate the stock will underperform its peer group over the next 12 months.

**Arbitrage Positive**
We believe the announced transaction offers positive investment returns.

**Arbitrage Negative**
We do not believe the announced transaction offers positive investment returns.

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