

Title: Information Rx: Evaluation of a New Informatics Tool for Physicians, Patients, and Libraries

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ABSTRACT

This paper reports selected results from two comprehensive evaluation studies of the Information Prescription (or “Information Rx”) Program implementation conducted from 2002-05 by the American College of Physicians Foundation (ACPF) and the U.S. National Library of Medicine (NLM). In this Program physicians are provided with Information Prescription pads, analogous to pads used to prescribe medications, that are used to direct patients to the MedlinePlus web site and its contents that are applicable to a patient’s health condition. The results describe the Program’s potential to enhance patient education and interpersonal communication from physician and patient perspectives. The findings suggest once physicians adopt the use of an information prescription, they perceive they are providing an additional clinical service that enhances patient education and interpersonal communication. For physicians, participation in information prescription may improve patient communication, encourage information seeking, and lessen the number of poor quality Internet searches that patients frequently self-perform and bring to a doctor’s office. Similarly, once patients receive a recommendation from a physician to seek health information on the web, patients may be more comfortable with health seeking on the Internet and discussing their findings with their doctor. The conclusions of the two evaluation studies imply an Information Prescription fosters a dialogue between providers and patients, helps patients use the internet more effectively and seems to favorably impact patient education. As the medical community and patient advocacy groups continue to emphasize the importance of evidence-based information as the gold standard for accepted care, it can be expected that informatics tools such as Information Rx will come to play an increasingly important role as a vehicle to help identify and access high quality health information on the Internet

Perceptions of the Internet as a source of vital health information and a resource for patient education, communication and empowerment are changing. In 2000, Shactman found physicians resisted turning to health information on the internet as a strategy to improve patient interpersonal communication and education. Three areas of concern were identified: the anticipated time demands of emails from patients, lost time in patient visits to discuss information from unknown or dubious sources, and the unreliability of much of the health-related information posted on the Internet.

Five years later, Wofford, Smith and Miller (2005) note physicians' reservations are changing rapidly. They predict the use of health information from the Internet will become an integral part of patient office visits and education. The computer:

"has become a symbol of patient empowerment. Patients view the information revolution, not just an alternative to personal interactions with physicians but also as a way to improve their relationship with medical professionals. This new connectivity may heighten the appreciation and demand for physician services, rather than reduce them. If office-based physicians can successfully adopt the role of healthcare informaticians, they may be better able to direct the educational process and make the practice more patient-centered at the same time" (Wofford, Smith and Miller, 2005)

Wiljer and Catton (2003) as well as Forkner-Dunn (2003) link the changing dynamics to use Internet based information within office visits to a conceptual shift in how physicians and health care providers perceive patient interpersonal communication and education. While physicians and other health providers viewed patient education and interpersonal communication in terms of a one way transmission of information (from provider to patients), Lee and Garvin (2003) note physicians now increasingly perceive office visits, patient education and patient communication in terms of a dialogue, or a

shared interaction. Since the American Medical Association and the Joint Commission on Accreditation of Healthcare Organizations standards assert that patient education is a fundamental obligation of physicians (Klein-Fedyshin, Burda, 2005) and patient centered communication is seen as a core component of high quality health care delivery (Epstein, Franks, Fiscella, Shields, Meldrum, Kravitz, Duberstein, 2005), Wofford, Smith and Miller (2005) describe the addition of new educational tools, including health websites, provide unprecedented opportunities for patients (to become better informed) and physicians (to encourage patient education and improve interpersonal communication).

Among other suggestions, Wiljer and Catton (2003), Gerber and Eiser (2001), Forkner-Dunn (2003) plus Wofford, Smith and Miller (2005) discuss the use of Internet based information within office visits as an especially viable strategy to encourage patient dialogue as well as improve patient education and patient communication. In contrast to the earlier concerns among physicians raised by Shactman (2000), there are high quality, evidence-based, sources of Internet based health information written for lay audiences available to patients, caregivers and health consumers (Gustafson, Hawkins, Boberg, McTavish, Owens, Wise, Herhe and Pingree, 2002; Huang, 2003).

Indeed, one of the Institute of Medicine's recent suggestions to physicians intending to promote greater patient health literacy was to direct patients, who are increasingly motivated to obtain health information on the internet, to high quality resources (Nielsen-Bohlman, Panzer, Kindig, 2004). Ninety-three million adult Americans who are Internet users (80 percent) have searched on the Internet for at least one of 16 major health topics (Ginsberg, 2002). Searches for health and medical information are only slightly less frequent than product or service purchasing research (83 percent) and email (93 percent)

(Pew Internet and American Life Project, 2003). Moreover, Manhattan Research recently found 70 percent of patients who seek health information on the Internet report a recommendation by their physician fosters more trust in a health site (Cybercitizen Health, 2003). A physician's direction to an evidence-based Website may help patients seek and have confidence in the health information they find, which provides a basis for the productive patient visit interactions suggested by Wofford, Smith and Miller (2005).

Murray, Burns, See Tai, Lai and Nazareth (2005) as well as Forkner-Dunn (2003) report there is emerging evidence that physician directed patient education resources improve patient self-efficacy and foster interpersonal communication with providers. Wofford, Smith and Miller (2005) as well as Murray, Burns, See Tai, Lai, Nazareth, 2005) add the evidence is preliminary and more research is needed to demonstrate the clinical efficacy and impact on providers and patients of patient directed educational resources, including health information services on the Internet. Either way, the value of a physician direction to patients to obtain health information on the Internet currently is acknowledged as an important topic in the medical informatics and clinical practice literature.

Mindful of the changing attitudes and clinical practice patterns noted above, the American College of Physicians Foundation (ACPF) and the U.S. National Library of Medicine (NLM) began an information prescription pilot experiment in 2002-03 to inform physicians about the availability of high quality, evidence-based, consumer health information on the Internet. This paper reports selected results from two comprehensive evaluation studies of the Information Prescription Program that occurred in 2003-05. The

results reported below focus on the Program's potential to enhance patient education and interpersonal communication first from physician and then, from patient perspectives.

From the Program's inception in 2002, ACPF and NLM decided to use MedlinePlus.gov as an evidence-based, web resource that physicians could introduce or recommend to patients in patient visits. MedlinePlus.gov (hereafter called MedlinePlus) is produced by NLM. Since its launch in 1998, MedlinePlus has expanded to include a wealth of information on more than 700 health topics, along with news reports, tutorials, information on clinical trials, and prescription and over-the-counter drugs – all from the U.S. National Institutes of Health (NIH) and other trusted organizations. The ACPF is affiliated with the American College of Physicians (ACP), the largest medical specialty organization in the U.S., with 116,000 members, representing all subspecialties of internal medicine.

To help achieve a health-literate population that is empowered to take an active and positive role in its health care, NLM and the ACP Foundation adopted two programmatic goals: 1) create awareness of MedlinePlus among selected regional ACP members, and 2) provide internists with a valuable patient education tool that directs patients to an Internet site which organizes and filters evidence-based health information. The concept of an information prescription received support from the governance of the ACP, ACPF as well as collaborating health science and public libraries that actively provide health information to patients, families and the general public (Jones and Shipman, 2004). Library support of the Information Prescription Program enables access to a computer or an Internet connection for patients without other web entry points.

NLM's and ACPF's concept of an Information Prescription (hereafter called "Information Rx") was straightforward. When a patient sees a physician, the doctor often prescribes a medication. With Information Rx, a physician uses a second prescription pad to direct the patient to MedlinePlus content that helps explain the patient's condition -- in English or Spanish. The direction, or prescribing information, was designed to meet varying objectives, such as helping a patient prevent a debilitating illness, understand a new diagnosis, become comfortable with a new treatment plan, or better manage a chronic condition. Similarly, Information Rx was envisioned broadly to improve patient-physician communication and interaction, encourage compliance, as well as lessen the number of poor quality Internet searches that patients frequently self-perform and bring to a doctor's office. A physician-directed information prescription process was seen as a long range strategy for doctors to save time, inform patients, and enhance the quality and outcome of interaction -- during both an office visit and after a patient returns home.

However, the more immediate impact of an information prescription was seen as possible improvements in patient education and patient-provider interpersonal interaction, which formed the basis of the findings reported below.

Methods

In the first evaluation of the Information Rx Program undertaken in 2003, the protocol requested the use of a promotional materials kit that was mailed to physician-members of the American College of Physicians (ACP) in two project pilot states of Iowa and Georgia. The package was sent to ACP members who responded positively to a letter from the state chapter governors who invited their participation. Approximately 20

percent of those eligible to participate responded. The kit contained Information Rx pads, along with supporting examining room posters, and bookmarks for the waiting room that were designed and pre-tested in 2002 with physician, office staff, and patient focus groups in those two states.

Physicians were asked to use the Information Rx pads to “prescribe” specific health information (e.g., diabetes; high blood pressure) for patients to find on MedlinePlus. Prescription pads were provided free of charge to participating physicians by NLM. Figure 1 depicts a sample Information Rx for diabetes information on MedlinePlus.

Insert Figure 1 Here

The first comprehensive evaluation of the Information Rx Program in Iowa and Georgia included pre- and post-intervention Information Rx mail surveys, telephone interviews and additional physician focus groups. (Operationally, the intervention is defined as acceptance and use of at least one element of the Information Rx kit and/or referral of patients to the MedlinePlus website.) Automated web log analyses were also utilized in a not entirely successful effort to detect hits on MedlinePlus that could be attributed to the pilot project interventions in those states. All evaluation instruments were co-developed by ACP and NLM and were critiqued by a research division within ACP.

Participants for the comprehensive evaluation in 2002 and 2003 were self-selected and chosen non-randomly. The aggregate findings led to modifications of the initial referral materials and encouragement to extend the program to additional groups and then nationally.

The selected physician findings reported below are based primarily on the pre-intervention mail surveys completed in 2003 by ACP members in Iowa (n=116) and Georgia (n=373), and approximately nine months after the Information Rx program was launched in both states (n=270 combined total respondents for the post-intervention survey).

A second comprehensive evaluation of the Information Rx project occurred in 2005, following the national launch of the NLM-ACP Foundation's Information Rx Program in April 2004. The second comprehensive evaluation was intended to assess the Information Rx program from the perspective of a small number of providers' practices selected for intensive study, and especially of their patients' (n=907) acceptance and use of the Information Rx Program. The second evaluation included questions about the Information Rx program's perceived impact on patient-physician relationships and its possible perceived health outcomes from both provider and patient perspectives. The results reported here, which are selected from the second comprehensive evaluation, focus solely on attitudes among patients who received an Information Rx from participating providers.

In the second evaluation, the ACP Foundation non-randomly contacted ninety-two physician practices to encourage patients to visit MedlinePlus.gov. Similar to the procedure in the first comprehensive evaluation, participating physicians used

Information Rx materials that were provided free, and wrote a prescription for health information on a prescription pad that provided information for patients to contact MedlinePlus. Physicians were then urged to ask patients to complete a web-based survey about their experience to access and use MedlinePlus. The self-selected practices and non-randomly surveyed patients were from 30 different states. Participating physicians were asked to obtain feedback from surveys of patients with chronic medical conditions and/or patients who were likely to have more than one recent office visit. As a result, 67 percent of the n=907 surveyed patients were diagnosed with a chronic condition and 36 percent of the respondents visited their physician more than once in the 30 day period prior to the survey's implementation.

Physicians and patients were compensated for participation. The instrument was co-developed by ACP and NLM and was critiqued by a research division within ACP. More than 900 patient survey responses were received during a six month data collection period.

Results

In the first evaluation study carried out in 2003 with physicians in Iowa and Georgia, participating physicians referred patients to MedlinePlus more than any other Internet health source. In contrast, in the pre-intervention survey, MedlinePlus was only the sixth most frequently referred website among participants. Selected findings from the pre- and post intervention surveys include the following changes *in physician attitudes and behaviors:*

- For 52 percent of participating physicians, MedlinePlus became the most frequently referred Internet health resource; it was the second most referred site by an additional 15 percent of participants.
- 52 percent of physicians reported making more patient web referrals.
- 92 percent of physicians referred patients daily (up from 59 percent); the proportion of patients referred daily increased from 6 percent to 17 percent (reflecting differences between pre- and post-intervention surveys)
- Physicians' concerns about discovering a suitable health website to recommend to patients was reduced to 18 percent from 55 percent.
- Participating physicians believed that other physicians would benefit very much (45 percent) or somewhat (54 percent) from referring their patients to MedlinePlus.
- Participating physicians perceived MedlinePlus as useful for promoting patient self-efficacy (54 percent), explaining difficult concepts/procedures (43 percent), and improving patient-physician communication (42 percent).
- Physicians' reasons for not referring patients to MedlinePlus generally centered on the perception that a patient lacked access to a computer or the Internet (84 percent), and a concern that the patient lacked the necessary cognitive or language skills (71 percent).
- 59 percent of participating physicians used the Information Rx pad in making a disease-specific referral to MedlinePlus; other physicians used non-standard materials or simply noted the MedlinePlus URL to their patients.

Information Rx Pad users generally reported more favorable experiences with the Program. Of those physicians who used the Information Rx pad vs. those who did not:

- 74 percent compared to 40 percent agreed that MedlinePlus improves a patient's understanding of difficult concepts and procedures.
- 42 percent compared to 14 percent reported referring patients to MedlinePlus reduced office time needed for patient education.
- 50 percent compared to 19 percent reported referring patients to MedlinePlus improved patient communication.
- 47 percent compared to 26 percent reported referring patients to MedlinePlus helped explain difficult concepts.
- 70 percent compared to 24 percent reported an increase in the proportion of patients they referred to the Internet daily.

The second evaluation study was a nationwide, non-random survey of patients and providers in 2005 who participated in the Information Rx Program. In contrast to the first study that focused almost exclusively on physician behavior and attitudes, the selected findings from the second evaluation reported below replicated several of the physician queries, but also focused more narrowly on patient attitudes about Information Rx. It was confirmed that patients are turning to the Internet on a regular basis to find health related information. They also report reading health information on a computer as easy as reading printed information. Patients are particularly receptive to physicians' recommendations and instructions, and their level of trust with health information recommended by their doctors can impact positively their willingness to seek information outside the office setting, including information on a recommended website. The

importance of the *physician as a high credible source of health information for patients* is underscored by the finding that:

- 74 percent of the patients indicated that they respond quickly to a doctor's recommendation to try something new to improve their health care.
- 75 percent of respondents indicated that they first learned about MedlinePlus from their physician.
- 84 percent also stated that they were more inclined to trust the information on MedlinePlus because it was prescribed to them by their physician.
- 91 percent indicated that they were likely to recommend MedlinePlus to others and 93 percent stated that they would use MedlinePlus again.

Findings having to do explicitly with *patient-physician communication* include the following:

- 58 percent of patients surveyed report that they frequently discuss the medical information they look up with their doctor.
- 89 percent of responding patients agreed that a high quality source of health information helps them talk to their doctor.
- Those patients finding needed information on MedlinePlus did or plan to discuss it with their doctor (56 percent), or with family or friends (46 percent).

Similarly, the physicians who participated in the Information Rx Program reported that patients who receive an Information Rx and visit MedlinePlus are likely to feel more comfortable discussing their conditions with a physician. Dr. Joan Goering, a physician based in Morris, Minnesota stated, "*My patients were happy to have an address for valid*

medical information. They felt more comfortable discussing their diagnosis after reading the material on MedlinePlus and seemed to have better questions."

As a tool for *patient education*, an Information Rx referral to MedlinePlus was found by:

- 93 percent of patients to help them make better health decisions.
- 75 percent of patients found the information relating to their condition very helpful or helpful.
- 70 percent of patients reported that the information found on MedlinePlus improved their understanding of an illness or health condition.
- 45 percent of patients reported that the information they found on MedlinePlus may influence their future health decisions.
- 36 percent of patients said the information found on MedlinePlus influenced if they will look for more health information.

Discussion

The findings from the first evaluation study surveys and supporting focus groups suggest participating physicians in the Information Rx Program readily perceived the potential of an Information Prescription and MedlinePlus for patient education and interpersonal communication. In contrast, the 80 percent of eligible physicians in Iowa and Georgia who elected not to participate in the Information Rx Program can be assumed to possess attitudes and prior experiences that made them less conducive to perceiving those benefits now, but may be more receptive in the future, especially with the benefit of reports from fellow physicians and patients who cite positive experiences

with the Program. As the medical community and patient advocacy groups continue to emphasize the importance of evidence-based information as the gold standard for accepted care, it can be expected that informatics tools such as Information Rx will come to play an increasingly important role as a vehicle to help identify and access high quality health information on the Internet.

In terms of patient education, physicians who used the Information Rx consistently found MedlinePlus benefited their practice by promoting patient-efficacy, explaining difficult concepts, procedures and medications, encouraging patient compliance, and curbing office time needed for patient education and reducing patient anxiety.

Interestingly, an equal proportion of reporting physicians expressed concern that additional information could increase anxiety for some patients. Information Rx participating physicians agreed MedlinePlus improves a patient's understanding of difficult concepts and procedures. They found MedlinePlus' interactive tutorials were helpful for patient education, as is MedlinePlus' availability in Spanish.

Participants agreed it is a good thing when patients bring the results of Internet searches with them and participating providers demonstrated more self-engagement in education efforts by looking up health topics on MedlinePlus to determine their suitability for patients.

Turning to physician-patient communication, physician participants in the Information Rx Program found referring patients to MedlinePlus improved patient communication. They consistently agreed that patients who access health information on the internet are more engaged patients. Participants reported a high percentage of patients who

shared health information from the Internet during office visits and they, in turn, referred a high percentage of patients daily to find health-related information. Their patients also shared more Internet-derived health information with them. The increase in internet referrals and patients who shared health information with their physicians suggests health seeking behaviors (which are components of encouraging both patient education and interpersonal communication) may have been influenced favorably by participation in the Information Rx program.

The findings from the second evaluation study suggest patients participating in the Information Rx program consistently were positive about the potential of an information prescription and MedlinePlus to assist both patient education and interpersonal communication with providers. Patients who participated in Information Rx and used MedlinePlus reported they found helpful information about their specific medical condition and agreed the website helped them make better health decisions.

Patients reported a physician directive to find health information on MedlinePlus helped foster trust in seeking health information on the Internet. Patients who participated in the Information Rx Program frequently looked up sources of medical information and reported the Internet was not a barrier to finding the health information they sought.

In terms of provider-patient communication, patients who participated in the Information Rx Program frequently discussed the medical information they look up with a doctor. Participants agreed that a high quality source of health information helped them talk to a doctor, or initiated interpersonal communication. Participants in the Information Rx Program additionally reported some of the following specific communication and related behaviors; participants noted the information they found on MedlinePlus fostered

discussions with a doctor, family or friends. MedlinePlus also was seen to influence health decisions, help a patient think through decisions to take a drug or medication, seek more health information and improve an understanding of an illness or health issues.

Finally, it should be emphasized that the library community, both health science libraries that maintain close ties with physicians, and public libraries that are a frequent resource for patients seeking health information, stand ready to serve as powerful allies in supporting the adoption and use of the Information Rx Program by physicians and patients alike. These libraries have established programs to assist physicians and patients in locating quality health information. They are particularly well equipped to offer a needed computer and Internet connection when none are available, and to provide supportive training to patients who may lack familiarity and ease of use of computers or MedlinePlus. These are two of the principal barriers identified by physicians for not making an information referral to patients. As part of their outreach activities, librarians are also eager to introduce physicians and other health professionals to MedlinePlus and other credible sources of health information for their patients. NLM worked closely with librarians in Iowa and Virginia who were enthusiastic participants in implementing the Information Rx Program in their states.

Conclusions

The findings suggest once doctors adopt the use of the Information Rx they perceive they are providing an additional clinical service that enhances patient education and interpersonal communication. For physicians, participation in Information Rx may improve communication with patients, encourage information seeking, and lessen the

incidence of questionable or incorrect web information that patients frequently bring to a doctor's office. Similarly, once patients receive a recommendation from a physician to seek health information on the web, patients may be more comfortable with health seeking on the Internet and discussing their findings with a provider. In other words, the Information Rx process affects a patient's comfort level to share information and talk with his or her doctor.

Patients in the second study agreed that a physician recommendation (or directive) to a specific health website fostered source credibility and was a catalyst for health information seeking.

Since the sampling methods used in the reported studies are not generalizable to all ACP members in Iowa or Georgia or all patients of ACP members, the findings suggest, but do not demonstrate, that Information Rx improves patient education and provider-patient interpersonal communication for participating physicians and their patients. Clearly, more research is needed to demonstrate the clinical efficacy and impact on providers and patients of patient directed educational resources, including health information services on the Internet.

The findings also fail to corroborate Wofford, Smith and Miller's optimism or Shactman's pessimism that physicians soon will embrace patient health information seeking on the Internet as an integral part of clinical interactions and care (Wofford, Smith and Miller, 2005; Shactman, 2000). Nevertheless, both Information Rx studies contribute to a needed accumulation of evidence regarding the clinical viability of tools needed to foster the acceptance of internet-based patient education by physicians. In addition, the two evaluation studies suggest some of the reservations noted by Shactman

(2000) might be ameliorated if physicians adopt a procedure similar to Information Rx -- where patients receive a formal written prescription to learn more about an illness and condition from a recommended, evidence-based, non-commercial website and this counsel occurs within a routine office visit.

Finally, the two studies imply an information prescription fosters a dialogue between providers and patients, helps patients use the internet more effectively to find credible health information, and seems to favorably impact patient education. While limited, these may be useful, initial steps in a larger challenge to improve health literacy, patient compliance, health outcomes and physician acceptance by making health information on the internet an increasing staple of doctor-patient interaction.

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References

- Cybercitizen Health v3.0, Manhattan Research. No.36, 2003.
- Epstein RM, Franks P, Fiscella K, Shields CG, Meldrum SC, Kravitz RL, Duberstein PR. Measuring Patient-Centered Communication in Patient-Physician Consultations: Theoretical and Practical Issues. Social Science & Medicine. October 2005 61:7:1516-1528,
- Forkner-Dunn J. Internet-based Patient Self-care: The Next Generation of Health Care Delivery. Journal of Medical Internet Research. 2003 5:2: e8.
- Gerber BS, Eiser AR. The Patient Physician Relationship in the Internet Age: Future Prospects and the Research Agenda. Journal of Medical Internet Research. April 2001 9:3 (2): e15.
- Ginsburg P. Center for Studying Health Systems Change. Rough Seas Ahead for Purchasers and Consumers, Navigating a Changing Health System: Mapping Today's Markets for Policy Makers. Available at: www.hschange.org/content/452. Accessed November 16, 2005.
- Gustafson DH, Hawkins RP, Boberg EW, McTavish FM, Owens B, Wise M, Berhe H, Pingree S. CHESS: 10 years of Research and Development in Consumer Health Informatics for Board Populations Including the Underserved. International Journal of Medical Informatics. November 2002 65:3:169-177.
- Huang, QR. Creating Informed Consumers and Achieving Shared Decision Making. Australian Family Physician. May 2003 32:5: 335-41.
- Jones S, Shipman J. Health Information Referral Project: Librarians and Physicians Collaborate to Empower Patients with Quality Health Information. Virginia Libraries. April-June 2004:50-51.
- Klein-Fedyshin M, Burda ML, Epstein BL, Lawrence B. Collaborating to Enhance Patient Education and Recovery. Journal of the Medical Library Association. October 2005 93:4: 440-445.
- Lee RG, Garvin T. Moving from Information Transfer to Information Exchange in Health and Health Care. Social Science & Medicine. February 2003 56:3: 449-464.
- Murray E, Burns J, See Tai S, Lai R, Nazareth I. Interactive Health Communication Applications for People with Chronic Disease (Review). The Cochrane Library. 2005:4.

Nielsen-Bohlman L, Panzer AM, Kindig DA, eds. *Health Literacy: A Prescription to End Confusion*. Institute of Medicine, Washington, DC: National Academy Press. 2004.

Pew Internet and American Life Project. *Internet Health Resources*. Washington, DC, 2003.

Shactman N. Why Doctors Hate the Internet. *Wired News*. 2000, April 12. URL: <http://www.wired.com/news/print/0,1294.35516.00.html> (accessed Nov 16 2005).

Wiljer D, Catton P. Multimedia Formats for Patient Education and Health Communication: Does User Preference Matter? *Journal of Medical Internet Research*. 2003 5:3: e19.

Wofford JL, Smith ED, Miller, DP. The Multimedia Computer for Office-Based Patient Education: A Systematic Review. *Patient Education and Counseling*. November 2005 59:2 148-157.