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Special Paper

An Evaluation of the NCI Physician Data Query (PDQ) Dissemination in Europe

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The Physician Data Query (PDQ) is a computerised medical database aimed at communicating cancer-related information through computer technology. PDQ has been distributed in Europe since 1988 and in the U.S. since 1985. A study aimed at evaluating whether PDQ had reached a wide medical community was conducted among European PDQ distributors in 1992 as part of an evaluation of PDQ use and impact. Results indicate that PDQ promotion was limited and that several countries were underserved. A preference was expressed for on-line systems. It was found that PDQ access was limited by the requirement of special equipment, by subscription costs and by language barriers. Subscribers were found mainly in the countries with the highest number of distributors. Among a total 12,205 reported subscribers, only 20% were physicians. The proportion of physicians subscribing to the system was, therefore, low (range 4–39.7/10,000). Altogether 453 searches (range 0–213) and 84.5 h of connection time (range 0–52.5) were reported per month for Europe. It is obvious that additional investigation is needed to further evaluate the impact of PDQ on clinical practice. © 1997 Elsevier Science Ltd.

Key words: cancer-related information, computerised medical database, information dissemination, information network, continuous medical education

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INTRODUCTION

THE DISSEMINATION of information on cancer is aimed at reducing and/or eliminating gaps between practitioners' knowledge and the latest available information. This should facilitate informed decision making, lead practitioners' behaviour in an appropriate direction and improve the quality of patient care [1, 2].

In 1982, the U.S. National Cancer Institute (NCI) made a major effort in communicating advances in cancer treatment through computer technology by introducing the Physician Data Query database (PDQ). This is a computerised medical database that provides up-to-date information on cancer prevention, diagnosis and treatment [3–6]. Ford [7] indicated that PDQ is one of the seven U.S. NCI programmes that address the issue of awareness and access to state-of-the-art information. In a recent survey, McFall and associates [8] used awareness of the PDQ system as one of four indicators of network-derived information about cancer treatment and research. PDQ's content and the technique used for its dissemination are innovative. The information it distributes is peer-reviewed and updated on a monthly basis. Accessible through different mechanisms, PDQ has been widely distributed in the U.S. since 1985 and was first launched in Europe in 1988.

In the U.S., PDQ has become one of the most frequently used databases of the U.S. National Library of Medicine (NLM) [9]. However, only very limited evaluation of PDQ has been performed to date, even though the programme has often been cited in the literature [10–13]. In Europe, no formal evaluation of the use of the database has yet been conducted. The purpose of this study was to evaluate how far communication of state-of-the-art information through PDQ was reaching the medical community in Europe.

This project is part of a more extensive evaluation of the use and the impact of the PDQ database on clinical practice.

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MATERIALS AND METHODS

A survey was organised to assess the dissemination process of the PDQ database in Europe in order to document critical characteristics of PDQ distribution. A standardised questionnaire was created and information collected included data on channels used for PDQ distribution, coverage zones, and techniques used to promote the use of the database. In addition, the accessibility of the database in terms of equipment, language and costs was studied and a quantitative evaluation of the use of the PDQ database included. A total of five questions was devoted to this aspect: the number of PDQ subscribers and actual users, the number of searches performed, the mean connection time and socio-demographic data.

European international and national distributors in 1992 were, as far as possible, identified and initially contacted by telephone. The standardised questionnaire was then sent out. An accompanying letter indicated the aim of the project.

In order to document the proportion of medical practitioners subscribing to PDQ, the number of active clinicians was collected from National Health Ministries of five targeted countries (Belgium, France, Germany, The Netherlands and U.K.) [14–18]. Information sub-grouped by speciality was also examined in the hope of being able to estimate what proportion of clinicians involved in cancer care was subscribing to PDQ. Specialities considered were internal medicine, oncology, radiotherapy, surgery, gastroenterology, gynaecology, pneumology and urology.

RESULTS

The PDQ database has been licensed by the U.S. NCI to commercial and non-profit organisations, which have developed their own features and have used specific networks for distribution. Out of the eleven PDQ distributors identified in Europe, eight were promoting an on-line system (distributor A–H) and three were distributing a CD-ROM (distributors I–K).

Of the eleven distributors contacted, ten also proposed other non-cancer-related databases as a service. Only one distributor was a non-profit research organisation. PDQ was made available through conventional networks (telephone connection through the national telecommunication system). Interestingly, two distributors proposed networks that were quite popular and widespread in their own country such as the Minitel in France or the Videotex in The Netherlands. On-line distributors usually covered only one country but two (A and E) covered Europe as a whole. However, when considering the density of coverage, several areas were still underserved: the southern part of Europe including Greece, Portugal and Spain, the Scandinavian countries and Ireland. Techniques used to promote the PDQ database were quite limited. The procedure which was the most frequently reported by distributors was presentation to small audiences (Table 1). The accessibility of the PDQ database was evaluated in terms of necessary equipment, time of access, language and costs. The necessary equipment to access PDQ on-line included: a personal computer, a telephone line, a communication software and an access code to a distributor. For CD-ROM systems, a CD-driver was also needed.

Table 1. Promoting actions reported by PDQ distributors

Promoting action	On-line $n = 8$	CD-ROM $n = 3$	Total n actions
Distribution of educational material	0	1	1
Participation in large meetings	2	0	2
Presentation to small audiences	5	2	7
Publication in scientific journal	2	0	2
Publication in newsletter	3	0	3
Distribution of advertising material			
upon request	7	2	9
by mailings	1	2	3

Except for one distributor, the PDQ access was open to the entire biomedical community 24 hours per day. With regard to the language, English was the most frequently used (10/11 distributors). Only a French translation was proposed by one distributor. Costs for accessing and using the database varied between distributors and systems. On the on-line systems, the access was free of charge for the non-profit research organisation, while it cost between the equivalent of £22 ($33) and £278 ($421) per year through vendors. Charges related to the use of the database varied between £1.30 to £48.80 ($2–$74) per hour overall. Regarding CD-ROM systems, yearly subscription costs varied between £690 to £2200 ($1045 to $3333) depending on vendor policies.

A total of 12,205 on-line PDQ subscribers were reported by distributors in Europe for 1992. CD-ROM distributors only reported 6 subscriptions for that year. For on-line systems, the number of subscribers varied widely between distributors. Highest figures were reported by distributors B

Table 2. Number of subscribers (on-line systems)

Distributor	n Subscribers	Costs Access/year	Costs Connection/h	Widespread system
A	368	free	£1.3 ($2)	No
B	6700	free	£2.6 ($4)	Yes
C	4976	£22 ($33)	free	Yes
D	67	—	—	No
E	—	£58 ($88)	£20 ($3)	No
F	3	£218 ($330)	free	No
G	0	£61 ($92)	£48.8 ($74)	No
H	91	£278 ($421)	free	No

(— Information not made available).

Table 3. Percentage of clinicians subscribing to PDQ by distributor (on-line system)

Distributor	*n* Clinicians/ *n* subscribers (%)
A	138/278 (50)
C	800/4976 (16)
D	55/67 (82)
H	91/91 (100)
Total	1084/5412 (20)

Table 4. Proportion of clinicians subscribing to PDQ

Country	Overall proportion per 10 000	Proportion by selected specialities (per 10 000)
Belgium	11.1	65.7
France	11.4	—
Germany	2.4	13.4
Netherlands	39.7	97.5
U.K.	4.0	—

and C who were using widespread connection systems (Minitel, Videotex); no subscribers were reported by distributors F and G (Table 2).

Subscribers were unevenly distributed throughout Europe. They were mainly located in countries with a higher number of distributors, namely The Netherlands, France, Switzerland and Belgium.

The actual number of PDQ users among subscribers was reported by only one distributor (B), as the majority of on-line systems do not allow the retrieval of such information. In this specific case, 3.8% of subscribers were reported to use the PDQ system (252 out of 6700).

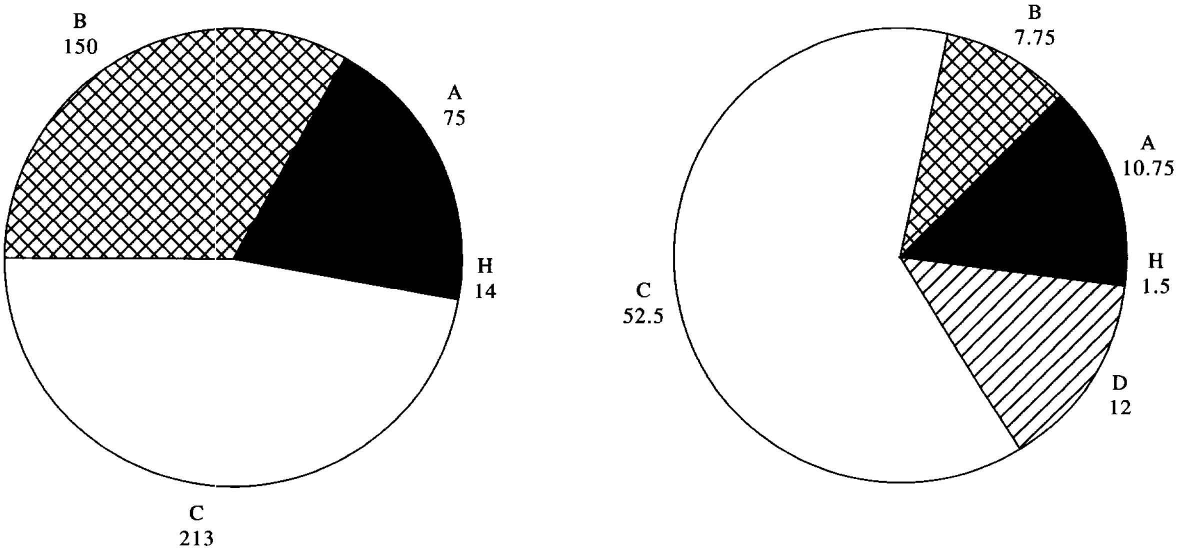
For the targeted countries (Belgium, France, Germany, The Netherlands and U.K.), out of the five distributors with more than 50 subscribers (A–D and H), four were able to report the percentage of clinicians among subscribers (Table 3). Other subscribers were: pharmacists, nurses, clinical trial coordinators, medical secretaries, medical librarians, etc. Data suggest that the percentage of clinicians is lowest for distributors with the largest subscriber figures.

Socio-demographic characteristics of subscribing clinicians were not routinely collected. None of the distributors was able to provide data on subscribers' age. Based on data from distributors A, B and D, the following can be reported: 260 (81%) of clinicians subscribing to PDQ were men, 51 (16%) were women, and for 11 (3%) the gender was not known; 137 (43%) worked in teaching hospitals and 185 (57%) in non-teaching hospitals. Medical speciality was not routinely collected by distributors. Estimated percentage of clinicians involved in the treatment of cancer was 100% for distributor A and D, and 19% for distributor C. In this latter case, 55% were general practitioners and 26% had a non-cancer-related speciality (anaesthesiology, cardiology, etc.). The overall proportion of clinicians subscribing to PDQ by country was very low: it ranged between 4 and 39.7/10,000 (Table 4). The proportion of MD subscribers involved in cancer care could only be calculated for Belgium, Germany and The Netherlands (Table 4). Values were still very low, ranging from 13.4 to 97.5/10,000.

Statistics on the use of the PDQ database

Altogether, for on-line systems, 453 searches per month were reported by distributors. The number of searches, which varied between 0 and 213, was mainly related to the number of subscribers. Distributors B and C reported the highest figures. The overall connection time was estimated at 84.5 h per month. The number of hours of connection ranged between 0 and 52.5 h according to the distributor. Highest use was reported by distributors C and D (Figure 1). Comparative data from 1991 and 1992 indicate an overall increase of 6% in the number of hours used (79.8 to 84.5 h per month).

However, this should be considered only as a rough indicator as the duration of connection might vary with the speed of the modem, the experience of the searcher, and



Number of searches/month (total 453)

Number of hours use/month (total 84.5)

Figure 1. PDQ reported use by distributor.

the ability to download information locally for later consultation.

DISCUSSION

Information dissemination using modern technology is a rather innovative approach in medicine. The NCI rationale to implement structured dissemination techniques, such as PDQ, to reach the medical population in oncology has been described by Hubbard [19]. This study was devoted to the evaluation of the PDQ Database dissemination in Europe.

While, in the U.S., there is a uniform approach to PDQ promotion and distribution, the European context is quite different. Lombardo and associates [20] described the European situation in terms of resistance to information databases. Reasons were considered to be related to the fragmentation of the European area (12 languages, entrenched traditions, etc.). In this study, it was observed that there was no uniform approach to PDQ distribution in Europe as a whole.

Large differences in promotion actions were noted among distributors, each one being independent and developing its own actions. This was considered to generate competition, which would result in improving the services proposed. However, competition did not develop as expected and most distributors in Europe are not even present during the large conferences now organised in the cancer field (ECCO, ESMO, etc.) where promotion and direct contact with subscribers could be established. The reported preferred promotion technique is the presentation to small audiences. Promotion is, therefore, sporadic, no main strategic plan having been routinely developed by most distributors to increase the number of subscribers. This is probably related to the fact that PDQ is only one of the databases the distributors are concerned with.

As regards the coverage zone, results of this survey indicate that several parts of Europe are not appropriately covered as distributors do not promote the use of PDQ in those areas. However, in 1994, a licence agreement was reached between NCI and a Spanish company using a videotex system (Meditex). This may lead to a better coverage.

The accessibility of PDQ was evaluated in terms of equipment, language and costs. For the equipment, although there is a growing interest in using computer technology in the medical field [19], medical doctors still complain about barriers to access modern technology (modems, telephone lines, etc.) in order to access the PDQ database. There is mandatory minimum equipment, which is not necessarily available and accessible by all health care professionals.

The language issue is a recurrent problem in Europe and very few solutions are available at low cost. The French translation of PDQ is one of the attempts to respond to this concern. However, this initiative is quite unique and unfortunately the French version is only available through a single distribution system. More flexibility and collaboration should be urged in this field. Initiatives for other languages should be promoted and endorsed by European and national authorities. For instance, the Spanish version, which was developed by the NCI is not currently available in Europe. Much more could be done in this area if European authorities and leading European groups in the oncology field would endorse the use of the PDQ system, and further discuss an adaptation to the European context and specific needs.

Costs to access PDQ through several distributors were considered as high and this may well be one of the major barriers limiting the access to the information database.

In Europe and for the year 1992, a strong preference was observed for on-line systems. Access costs for CD-ROM technology and subscription fees may, in this instance, have encouraged practitioners to select an on-line system whenever possible. In the U.S., Zerbe [9] reported that the overall general trend of usage was increasing; the number of actual users on the NLM increased from 300 in 1985 to 700 in 1989. More recently, Hubbard and associates [21] indicated that, for 1994, more than 60,000 domestic and 7,000 foreign centres had access to the PDQ database through the MEDLARS system of the NLM. In Europe, it appeared that the stimulation to access PDQ information came from the distributor. When distributors promoted the system, a larger number of individuals subscribed to it. However, it was also observed that the percentage of clinicians subscribing to PDQ was the lowest in those instances and that their involvement in cancer care was more limited.

Data from this study indicated that, among all subscribers, the percentage of medical doctors was around 20%. In the U.S., Shaw and Czaja [22] reported slightly higher figures. According to their data, 376 (28%) PDQ user codes on the NLM were assigned to physicians between 1985 and 1987.

Except for one distributor, it was not possible to estimate the actual number of clinicians using the system as this information was not made available by the other distributors. Meaningful conclusions cannot be based on the single figure obtained. Regarding subscribers' socio-demographic characteristics, very limited information was made available by distributors. This was related to the fact that they did not initially plan an evaluation of the dissemination mechanism. In addition, concerns were expressed about the protection of their market share and about laws and regulations on confidentiality of subscribers' data. This study further highlights the importance and the difficulties of accessing such data for research purposes.

The actual use of the database can be estimated in number of connection hours. This measure reflects the time spent by the user on-line. However, it is also dependent on technical aspects of the communication between the user and the central system (mainly the speed of the modem). It can, therefore, be used as a rough indicator only. Large differences were observed in the average number of connection hours between the U.S. and Europe. In this survey (for 1992), the overall number of hours was estimated at almost 85 h per month. In the U.S., Zerbe [9] reported that on the NLM system, the total on-line time for PDQ searches increased from 400 h in 1985 to 1200 h in 1989.

The analysis of consultation of PDQ by distributor indicates differences in patterns of use. The non-profit research organisation reported a higher number of searches by subscriber and one of the highest number of hours use by subscriber. This suggests that this group has a particular interest in information included in PDQ.

Differences in the number of subscribers and of the actual use of the system might reside in the fact that, in the

U.S., financial incentives are proposed for continuous education. PDQ users obtain Continuous Medical Education Credits (CME credits), which are tax deductible when using the database. In Europe, no incentives are used to promote the subscription to and the use of PDQ. In addition, PDQ is not yet recognised as an educational tool [23].

Furthermore, it should be taken into account that in Europe, the proportion of clinicians who are connected to such a system is still negligible. The median number of clinicians subscribing to PDQ was 11.1/10,000 overall. As regards to the proportion of subscribers among specialists for countries, where this information was available, rates were still very low and disappointing (13.4–97.5/10,000).

Recently, the NCI launched new methods of dissemination [21]. The innovative "Information Associates Program" provides customer services, marketing and production and delivery of NCI, International Cancer Information Center (ICIC) publications including PDQ. The PDQ database is now directly accessible through INTERNET at very limited costs. The marketing of the programme and the improved accessibility through a widely available system (INTERNET) will probably have an impact on the number of subscribers in the future.

However, major assumptions underlie the dissemination of information through the PDQ database. It was assumed that practitioners are active consumers of information, that they want to be aware of new medical developments, that they devote time and efforts gathering new information, that when they encounter information suggesting the need to change some aspects of patient treatment, they are mostly willing to do so. These assumptions, which were already reported as the weakness of dissemination of information through journals by Kanouse and Jacoby [1], should be taken into account.

PDQ includes important information on prevention and supportive care, which is essential for the health care professionals at large. However, the direct impact on clinical practice might be limited if no strategy is defined for reaching clinicians involved in the treatment of cancer patients and for increasing the use of the system. Although new "Information Superhighways" should facilitate the access to the PDQ system, further investigation on its impact in clinical practice is needed.

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