eClinician Project Evaluation Report

Contents

Project Overview

A. What Led to the eClinician Project?

Beginning 2004, the Department of Health and Mental Hygiene (DOHMH), New York City began an extensive assessment of the Information Technology capacity of the Federally Qualified Health Centers (FQHCs) in the city. This assessment was undertaken as part of the primary care information project (PCIP). The DOHMH has been at the forefront in efforts to utilize non-traditional data for active syndromic surveillance since 2001. Despite major advances and accomplishments by 2004, the surveillance system did not include epidemiological data of 2 million encounters recorded at the FQHCs annually. The PCIP was initiated by the DOHMH with the goal of extending the reach of its syndromic surveillance activities to the community health centers and also to thus establish a mutually beneficial relationship to foster data and information exchange with the centers. The objectives of the project were:

1. To identify programs that were capable of supporting the Department of Health's Syndromic Surveillance Effort.
2. To determine the level of IT adoption, the needs and the barriers to IT adoption by FQHCs.
3. To determine the usefulness of Electronic Medical Records (EMRs) in improving the performance of the surveillance system.

A detailed IT assessment was performed to achieve these objectives. The assessment included over 20 FQHC agencies and included the measurement of a variety of technology adoption indicators. Among the several key findings of the PCIP assessment was the discovery that none of the agencies had a formal policy to support the use of Personal Digital Assistants (PDAs) among the provider community (Table 1) and had still not fully grasped the implications and benefits of digital information systems. In general, most centers scored only average numbers on IT readiness and adoption.

Table 1. Summary of Internet Facilities and Access Information among NYC FQHCs

Elements	Among NYC FQHCs[1]	
	Yes	No
Exam room connectivity	20%	80%
Providers with Internet access	80%	20%
Nurses with Internet access	65%	35%
Executive staff with Internet access	85%	15%
Providers with email access	65%	35%
Nurses with email access	50%	50%
Executive Staff with email access	70%	30%
Agency supports PDAs	**0%**	**100%[2]**

[1]Results from the 20 FQHCs surveyed

[2]As a result of the DOHMH initiative all FQHCs will soon support PDAs

[3]Only 80% of FQHCs have websites

The findings of the PCIP in 2004 clearly revealed that the FQHCs required significant financial and technical support to upgrade or increase their adoption of modern health information technology capacity. On the basis of these findings, the New York City (NYC) Department of Health and Mental Hygiene (DOHMH) initiated several projects, one of which is the eClinician Project.

B. Goals and Objectives of the eClinician Project

The eClinician project was started to promote the use of health information technology among the provider community in the FQHCs. The driving motivation of the project was to promote the use of PDA-based clinical decision support tools and to encourage providers to use an online resource, the eClinician web portal (www.eClinician.org), which is designed to let them stay abreast of the latest clinical decision support tools, guidelines,

medical software and health alerts provided by the DOHMH. The project plan was to introduce PDAs as a first line strategy for increasing technology adoption and to prepare the health care providers for more technology based initiatives like ePrescribing and electronic medical records in the future. The goals and objectives of the eClinician project are listed below:

eClinician Project Goals:
- Encourage adoption and awareness of healthcare information technology among providers in FQHCs in NYC
- Enhance access to information on emergency preparedness
- Improve patient outcomes by providing PDA-based clinical decision-support tools that support evidence-based care
- Encourage chronic care management and health promotion/disease prevention activities
- Increase productivity and efficiency

eClinician Project Objectives:
- Distribute public health-friendly PDAs to providers in FQHCs in the NYC area
- Create an online educational resource for providers to obtain quick and reliable clinical content
- Deliver health alerts from the NYC Department of Health and Mental Hygiene Health Alert Network (HAN) to PDAs
- Deliver clinical decision support software for the PDA
- Provide basic training to providers on how to use PDAs and to access online resources
- Create online CME training programs to be delivered via webcasts at www.CDNetwork.org, thus creating a resource for clinicians to learn about PDAs and various decision support tools
- Create "Wireless Hotspots" in FQHCs so as to provide connectivity at the point of care

C. Project Implementation and Timelines

In this project, the DOHMH worked with The Community Health Care Association of New York State (CHCANYS) and Clinical Directors Network (CDN) to distribute close to a thousand public health friendly, wireless (WiFi) enabled Personal Digital Assistants (PDAs) to primary care providers working in New York City FQHCs. These health centers serve minority underserved communities that suffer a disproportionate burden of chronic disease and lack access to health promotion and disease prevention services. In addition to providing PDAs to providers in the clinics, every participating health center also received a wireless router to create an onsite internet hot spot to enable clinicians to have internet access. The providers also received hands-on on-site orientation to PDAs and ongoing training was continued via online CME-accredited web casts (see www.CDNetwork.org). Clinical decision-support tools were made available for download via the eClinician web portal (see www.eClinician.org) and systems were programmed such that public health alerts can be delivered to the PDAs or to the clinicians' desktop computers. Pre and post surveys were used to assess knowledge, attitudes and practices to evaluate the extent to which clinicians incorporate the PDA into their practices. During the project roll-out, technical support was provided to the providers via email and phone.

On-site Training Sessions

The PDAs were distributed at a kick-off on-site training session organized for each FQHC. An overview of the project and an introduction to the PDA was presented in this session. This initial site visit was followed by a second visit in which ePocrates (a drug reference software application), eClinician Avantgo channel (for instant DOHMH alerts, news and updates) and a few other clinical tools available on the eClinician website were demonstrated to the participants. Based on the feedback from the initial training sessions modifications were made to the training process. PDAs were pre-loaded with selected applications before the start date of training session. During the session providers received hands-on training in using the PDAs and applications. eClinician project staff worked one-

on-one with the providers helping them get familiarize with each of the PDA applications. At the end of the session, a thirty-minute Provider Activity Sheet (see Appendix D) was given to the participants to test their skills in using the PDA and applications.

Online Webcast Training Sessions

To provide maximum availability of training and technical know-how, the on site training content was also made available as a web cast. To encourage providers to utilize these resources, CME credit was granted for participating in the live web casts or watching the archive versions. Special features were planned which included promotions like the tool of the month on topics like hypertension guidelines, the SHOTS immunization guide, asthma guidelines and smoking cessation and emergency preparedness guidelines. Interactive web discussions moderated by experts in health information technology were also provided to promote greater usage of resources.

eClinician Website and Newsletter

The eClinician website, www.eclinician.org, provides links to free, reliable and downloadable PC and PDA based clinical decision support tools, NYCDOHMH emergency preparedness information and public health alerts. There are sections for discussion forums, technical support, health information technology news and reviews about the latest medical software. Biweekly newsletters were forwarded to the project participants to provide updates on the project activities, latest tools and guidelines and other relevant activities related to PDAs and health information technology in general.

Project Timeline

The project was conducted in a phased manner beginning in September, 2004. The start and end dates for each of the three phases of the project are listed below:

> Phase 1: September 1, 2004 – December 31, 2004
> Phase 2: January 1, 2005 – August 31, 2005
> Phase 3: September 1, 2005 – Present

Since the start of eClinician Project in September 2004, 950 PDAs (as of June 2006) have been distributed. This includes 318 PDAs distributed in 2004, 361 in 2005 and 273 (as of June 2006) in 2006. 106 wireless routers were also distributed along with technical support to create 'hotspots' for wireless internet connectivity. In total twenty two (22) health centers were visited in the first phase and forty two (42) in the second phase. In addition, a total of thirty (30) technical site visits and fifteen (15) online trainings (webcasts) have been conducted.

Project Evaluation

A. Focus of Evaluation

The eClinician project was a large and ambitious project. Also, since the eClinician project was a foundation study for the DOHMH to assess how technology is adopted among the provider community in FQHCs, it was necessary to evaluate some aspects of the project's impact. Theoretically, an evaluation can focus on the structure, process or outcome of any intervention. Providing PDAs and internet connectivity (the intervention in this study) could have potentially impacted several touch points in the provider's ways of practicing. However, since the project was really about promoting the adoption of a new technology, our evaluation was focused on measuring the provider's adoption of the PDA and its associated tools and the eClinician website. Given limited recourses and time, we did not measure the clinical outcomes of this intervention on say, patient outcomes or workflow processes. Our evaluation addressed the following issues:

1. Actual PDA Usage and Adoption

The crux of the evaluation was determining the actual use and adoption of the PDA among study participants. There were several ways in which one could measure real usage. For example, one potential solution discussed was to install a software agent that would run on every PDA device and keep track of every software program used. This agent would provide a very objective log of when and how the PDA device was being used. However, this method could be construed as an invasion of user privacy and hence was not employed. Other methods including direct observations of providers in their natural environment or reports from management were also considered. These methods too had drawbacks because of our limited resources. Hence it was decided that it was most prudent to employ a survey to assess actual adoption. The survey measured metrics like the number of providers who used the PDA and the frequency of use of the different software applications provided on the PDA. The evaluation also determined the common barriers to PDA usage, the main problems faced by users when using the device and the users' ability to perform common operations on the device.

2. eClinician Website Usage

The eClinician.org website was a key component of the entire project. The evaluation measured the usage of the website. Usage measurement included analysis of total views (hits) on the website by month, number of unique visitors, number of page views per visit, types of resources accessed, along with some other metrics.

3. Training Evaluation

Since training was an integral part of the eClinician project, an evaluation of the training methods and their impact were performed. The effectiveness and perceived usefulness of the training were determined using surveys (see below).

B. Methods Used for Evaluation

The evaluation consisted of two sub components. We used a variety of data sources and methods for the evaluation and these are listed below.

1. Logs

As part of the project's evaluation, we maintained several logs that provided very useful information about the project's rollout, growth and user adoption. Some of the logs used in the evaluation were:

- Online and On-site CME training logs – Clinical Directors Network organizes various CME training sessions which are either delivered in person or are available as online resources. Online sessions are logged and these logs can provide information about the usage of the eClinician.org website.

- eClinician web server logs – web sever logs are a very common method for analyzing the usage of a web site. The logs contain information on page views, the internet address (IP address) of the person making the web request, time of the web request and some other useful parameters. For the purpose of counting unique visitors, we assumed every unique IP address as a new person. This parameter is

an accepted proxy though a single user could access the website from several different computers (hence IP addresses).

- Distribution Logs – the distribution logs contained a detailed record of all the PDAs distributed and when and to whom they where given. At the time of distribution of the PDAs, recipients were asked about the use of the website.

2. Surveys

Surveys were the most important data gathering tool used in the evaluation. We used three different surveys as part of the evaluation. The details and focus of each are provided below:

i. Pre-training (Baseline) Survey

This survey was done to get a description of the population in which the PDAs were being distributed. Questions were asked to assess the demographics, qualifications and basic technology adoption. This survey was administered to almost all PDA recipients. A copy of the survey has been attached in Appendix A.

ii. Follow-up Survey

The follow-up survey (Appendix B) was conducted to determine the actual PDA adoption. The survey included the following:

a. Usage related questions that asked users to report if they used the PDA provided to them, the frequency of use, the impact on clinical decision making and the different types of software resources used (like calendar, address book, etc).

b. Users were asked to report **their familiarity with device operations** using a 5 point likert scale. An example operation included was the ability to access the internet by starting a wi-fi connection.

c. Questions about the most troubling aspects of using a PDA, like having to use a stylus to input long data items. Several such problems were presented with a 5 point likert scale for response.

d. A set of questions related to barriers to PDA adoption.

e. Miscellaneous questions that included users' opinion about the project, the training provided and asking for their comments and suggestions.

The survey was administered to all recipients and was programmed for online delivery. An email containing a cover letter and a hyperlink to the survey was sent to the recipients of the PDA. A follow-up email was sent 1 week later, requesting a response. An incentive program that included a lottery of a digital music player was included to ensure an acceptable response rate.

iii. Training Survey

A third survey (Appendix C) was conducted at only one FQHC to determine the users response to the training provided as part of the project. This survey included questions about the content, delivery mechanism and responsiveness of trainers to users' questions.

3. Case-Study: Hunt's Point Multi-Service Center

A case study was performed using one FQHC (Hunts Point Multi-Service Center) to evaluate the effectiveness of training sessions using the baseline, post-training and follow-up surveys. Based on the feed back from surveys and meetings with clinicians from previous training sessions, changes were made to the on-site training methods. The PDAs to be distributed were charged beforehand and loaded with clinical decision support tools including ePocrates, JNC VII Hypertension Guidelines, NEC Obesity Guidelines and Avantgo eClincian PDA channel. The training session was modified to include more hands-on training and demonstrations of clinical tools. At the end of the training sessions, clinicians were given exercises to test their understanding of important functions of PDA and other clinical decision support tools. Clinicians were also asked to find the DOHMH emergency preparedness information from the eClinician PDA channel on their PDA. A post training survey was conducted to analyze the effectiveness of the training session. 100 percent of the attendees opined that the training session was well organized, well presented and that each topic was adequately covered. When asked about the topic difficulty level 29% said the topics were too basic, 64% said reasonably difficult and 7% said they were too advanced. This shows the broad spectrum of expertise level in the health care providers and the need to develop more focused and customized training programs for providers at various levels of IT knowledge.

Results

This section describes the results of the various surveys and the log analyses. Most of the results have been depicted as graphs and charts for immediate visibility and communication of important findings.

A. Baseline Measurements

1. **Summary of Respondents Profile** – a total of 302 respondents were surveyed between the period of April 2005 – December 2005. The breakdown of these respondents with respect to gender, degree and specialty is shown in Table 2.

Table 2. Breakdown of Respondents by Specialty, Qualification and Gender

Break Down By Specialty

PRIMARY CLINICAL SPECIALTY	NUMBER OF PROVIDERS
FAMILY PRACTICE	72
GENERAL PRACTICE	12
INTERNAL MEDICINE	70
OB / GYN	28
OTHER	120
TOTAL	302

Break Down By Specialty
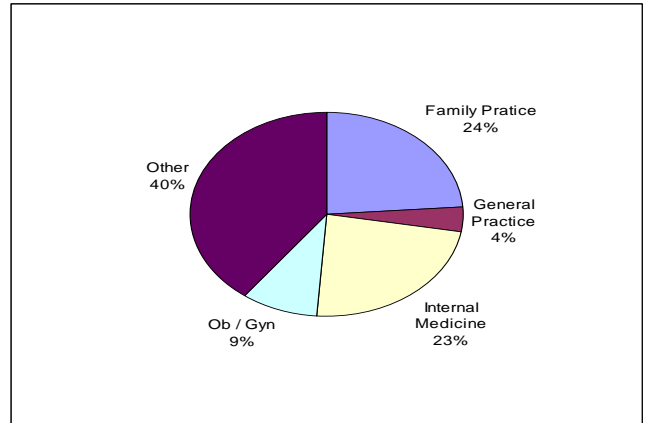
Break Down By Qualification

Degree	Number of Providers
MD	152
DO	4
NP	34
PA	27
Other	29

Break Down By Qualification
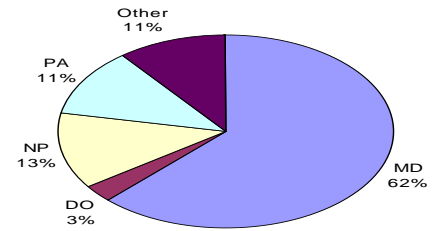
Break Down By Gender

Gender	%
Male	35%
Female	65%

Break Down By Gender
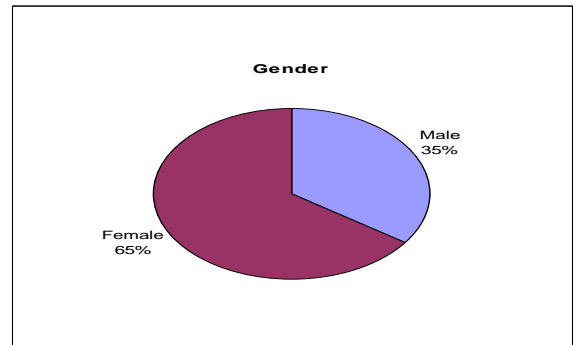
Survey period: April 2005 to Dec 2005. Total respondents: 302

2. Use of computers or related tools to provide patient care – we determined how many providers currently use either a computing device or related software for patient care activities. As can be seen from the results in Table 3, most of the providers rarely or never use a PDA or an Electronic Medical Records Systems.

Clinical Directors Network Inc.

Table 3. Use of Computer or related tools for Patient Care Activities

Tools	%
Personal Computers	
Always	27.48%
Sometimes	32.78%
Rarely/Never	39.74%
Personal Digital Assistant	
Always	14.57%
Sometimes	25.17%
Rarely/Never	60.26%
Electronic Medical Records	
Always	13.91%
Sometimes	10.60%
Rarely/Never	75.50%

Survey period: April 2005 to Dec 2005   N= 302

3. Use of Decision Support Systems – when asked to report the different types of clinical decision support tools that providers were willing to use, we received more than 30 names. Some of these requested tools are listed below:
- Drug Interactions and Dosage Reference tools (ePocrates)
- BMI Calculator
- Framingham Risk Assessment
- Cholesterol Guidelines

B. Actual PDA usage and adoption

The follow-up survey used to assess usage and adoption was mailed to approximately 500 PDA recipients. Ideally, we would have liked to email the survey to include all people who completed the baseline survey so as to get a good pre and post intervention measurement. However, due to the anonymous nature of the baseline survey, there was no way to completely know if all the baseline respondents were also covered in the follow up survey.

However, the final follow up survey respondents (166 out of 499) were similar to the baseline respondents (Table 4) in many respects and provide good evidence for a post intervention (after receiving the PDA) effect.

### Table 4. Comparison of Pre and Post Survey Respondents

Variable	Baseline Survey N=302	Follow-up Survey N=499
Response Rate	302 (100%)	166 (33%)
Gender:		
Male	35%	41%
Female	65%	59%
Age Range:	23-72	24-72
Clinician Type		
MD/DO	65%	73%
NP/PA	24%	19%
Other	11%	8%

The results of the individual sections of the follow-up survey are as in the figures and tables below.

1. Usage Indicators

One of the most important success metrics of the project was to demonstrate that there was an increase in the number of providers using a PDA after these devices were distributed and training sessions were conducted as opposed to the baseline. As Figure 1 shows, the number of providers using a PDA jumped to 72% as opposed to the 40% before the eClinician project was started.

Figure 1. Pre and Post Use of PDAs among the Providers
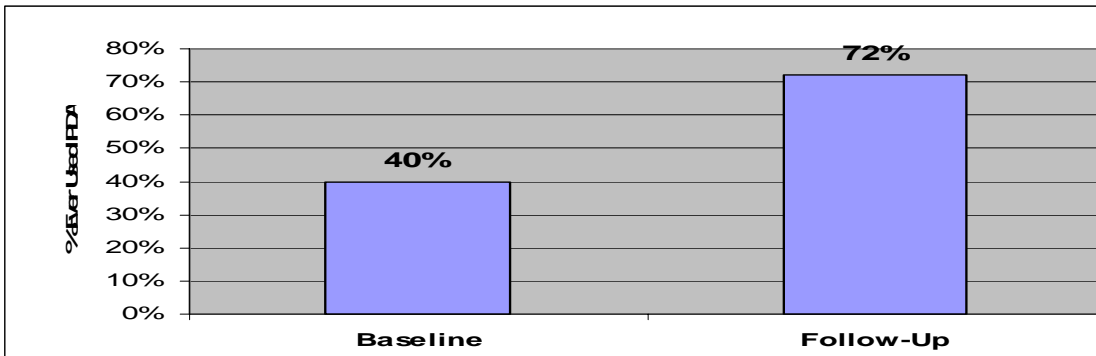
Based on the survey questions before (Baseline) and after (Follow-up) project implementation

Baseline Survey N=302   Follow-up Survey N=166

In addition, usage questions were also used to determine the basic profile of the respondents like gender, qualification, number of years of experience and age. Of the respondents, 59% were females and the rest males. Professional experience varied considerably with 10% of the respondents having less than 3 years of experience, 16% between 3-5 years, 20% between 6-10 years and 54% having more 10 years of experience. The mean age of respondents was 44.13. Importantly, of the 166 respondents, 72% or 120 used the PDA that was given to them as part of the project. Of these 120 (Figure 2), 45% (54) used the device almost always, 19% (22) used it often, 20%(25) used it a few times and the rest 16%(19) rarely used the device.

Figure 2. Frequency of Use of PDA among Users (n=120)
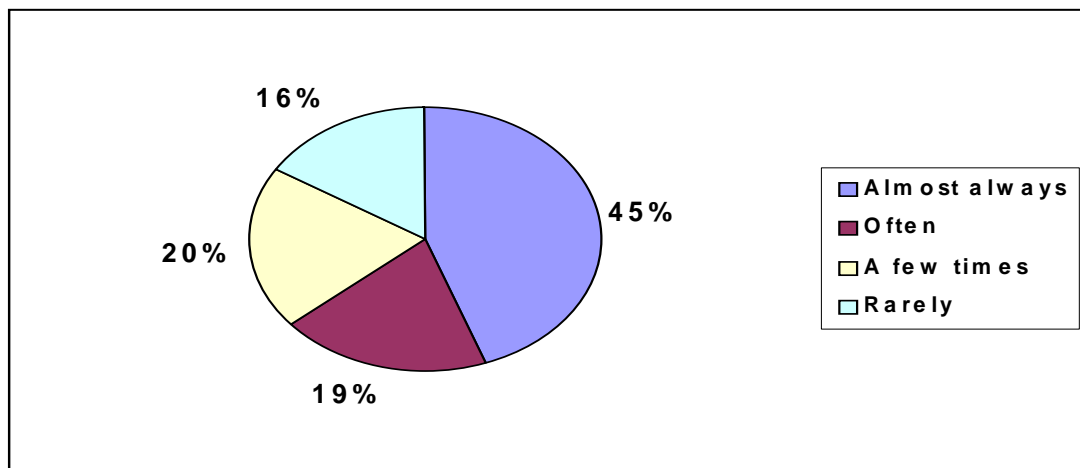
Survey period: Jan. 2006 - Present   N= 166

There was a clear difference between the ratio of users to non-users between the 40 year old and under category and those above 60 years in age. (Table 5).

**Table 5. Difference Between Users and Non-users Across Age Groups**

Age group	% Users	% Non-users	Number of Users	Number of Non users	Ratio Users to non-users
40 and Under	45%	31%	53	14	3.85
41-60	49%	43%	59	20	2.95
60 plus	6%	26%	7	12	0.59

No appreciable difference existed between male and female non-users. By professional qualifications, the ratio of users to non users was the highest for physician assistants numbering approximately 9 followed by doctors with a ratio of around 3. As part of the evaluation we only briefly touched on the possible impact the use of PDAs had on clinical decision making. 61 users (51%) of respondents (among those who used the PDA, that is 120 of the 166) believed the PDA had indeed influenced clinical decision making, 44 (37%) reported no influence and 15 (13%) were not sure. The PDA influenced changes in treatment for 37 users (59%), prevented adverse events for 31 users (51%), shortened a patient visit for 25 users (41%) and changed the diagnosis for 8 users (14%). As can be see from the results, this is encouraging evidence that the PDA did have some positive impact on clinical decision making. However, more detailed studies will need to be performed to accurately quantify this effect.

2. Frequency of Use of Resources

In the survey we also asked users to report which PDA based software tools they used and how frequently. Frequency was measured using a scale starting from routinely (meaning many times a day), often, rarely and ending at never. Calendar, Address book and ePocrates (a drug information reference software) were some of the most frequently used tools on the PDA (Figure 3). Most users did not use clinical decision support software or the inbuilt wireless connectivity to connect to the internet. As will be described below, many users had difficulty in understanding how to use the device for connecting to the internet or downloading new software.

Figure 3. Frequently Used PDA Software Tools


Routinely ■ Often ■ Occas ■ Never
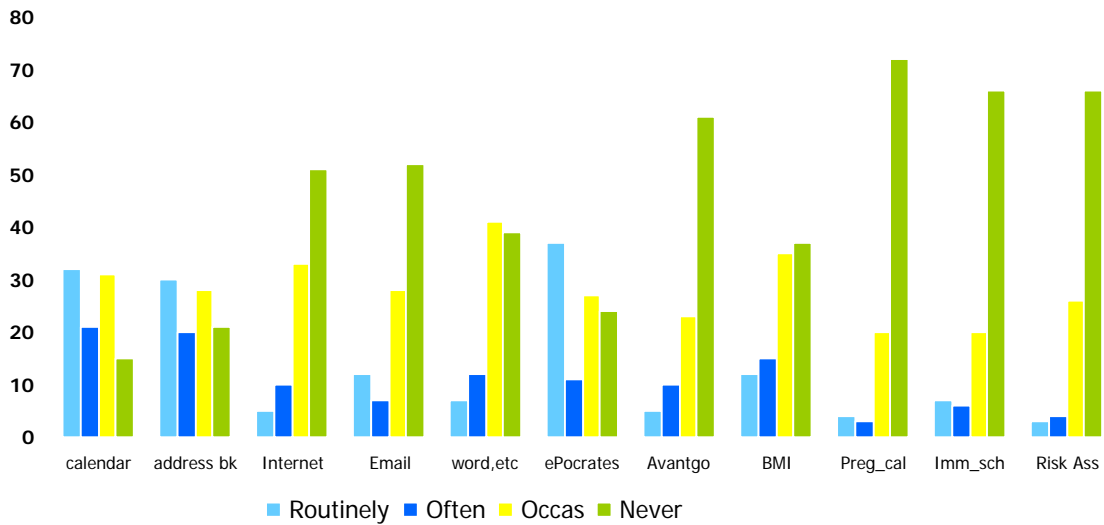
Survey period: Jan. 2006 to Feb. 2006   Total respondents: 166

3. Familiarity with Device Operations

Almost all users were comfortable with switching the device on or off or to change simple preferences or device settings (Figure 4). Users, however, experienced difficulty in being able to cut/copy and paste data between applications when required with almost 35 users reporting that they were not able to perform this operation. Many users also had difficulty in being able to use the infrared/Bluetooth features or downloading software on the PDA.

Figure 4. Frequently Used PDA Software Tools

■ not try ■ unable ■ some diff ■ no diff
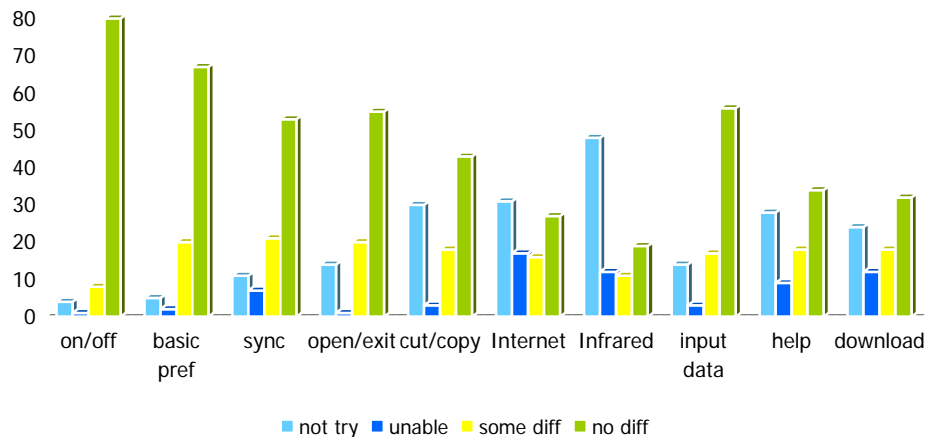
Survey period: Jan. 2006 to Feb. 2006   Total respondents: 166

4. Barriers to Adoption

PDA users reported that the short battery life of the device was one of the most troubling aspects of the PDA. Similarly having to recharge the device was found to be quite annoying with 17 respondents reporting this to be a considerable problem (Figure 5). A few commented that "*Battery life is a major problem. Backup battery is a must if PDA is to be used in the clinical setting as you lose all the additional programs on it once you lose power".* Similarly, another user reported that "*Difficulty accessing wireless internet/Slow speed of internet connection"* was a troubling aspect. In general as can be seen from the graph, there was no such aspect which was reported as considerably troubling by more users as compared to those for whom the aspect was of minor trouble (i.e. ratio of considerable trouble to minor trouble was less than 1 for all aspects). Overall, the device was acceptable to the users.

Figure 5. Troubling Aspect of Using a PDA
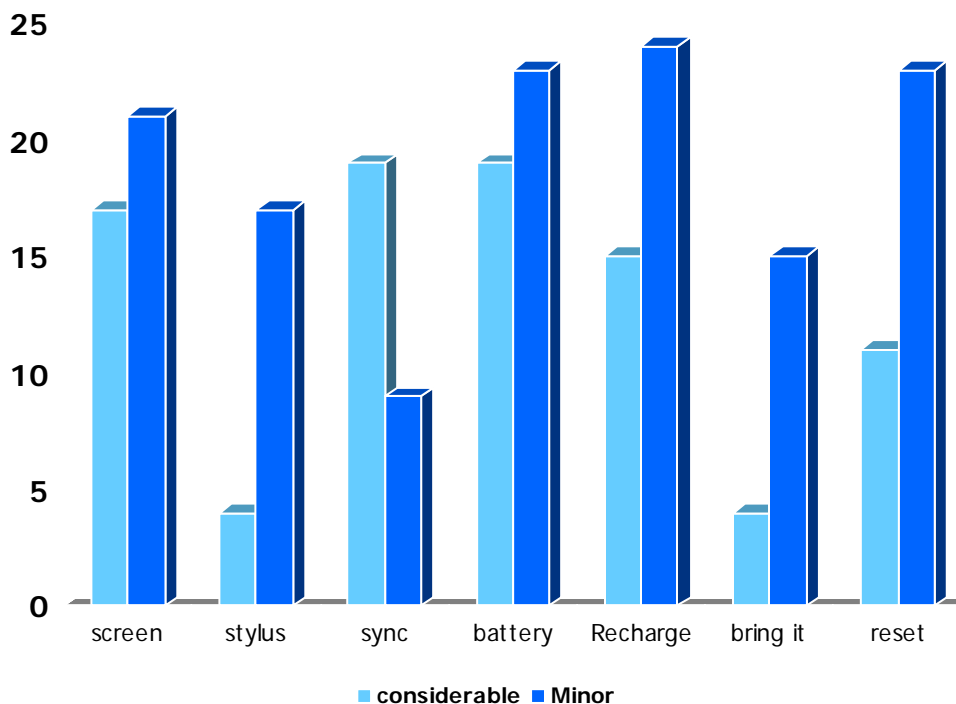
Survey period: Jan. 2006 to Feb. 2006   Total respondents: 166

Providers Attitudes to Adoption

The most significant barrier to adoption of PDAs and technology in general is the lack of adequate training and a perception of a lack of organization support for embracing information technology.

Table 6.Clinician Attitudes Towards Using PDAs

Attitudes	% Who Strongly Agree or agree
Big learning curve/need one-on-one training	32%
Lack organizational support	29%
Worry about breaking/losing	24%
Lack of patient information	21%
Like the ubiquity, simplicity and speed of paper	13%
Lack comfort in front of patient	11%
Distracts from work	10%
Low security	9%
Not computer savvy	9%
Not much value to PDA	8%

Survey period: Jan. 2006 to Feb. 2006   N= 166

5. Miscellaneous

Did non-users make an effort to use the device?

- 8/42 made no attempt
- 22/42 made some effort (a few hours)
- 12/42 made substantial effort to learn

Do they think it is useful despite non-use?

Overwhelmingly yes (40/42)

Do they use computers in general?

Yes. All reported using a computer with 28 reporting as routine users

Perform basic internet, email and word processing tasks

What did the users feel about the eClinician Project?

100/141 felt that the project was a good initiative

74/141 felt that this could lead to increased IT adoption by providers

58/141 felt that this effort should be expanded with time

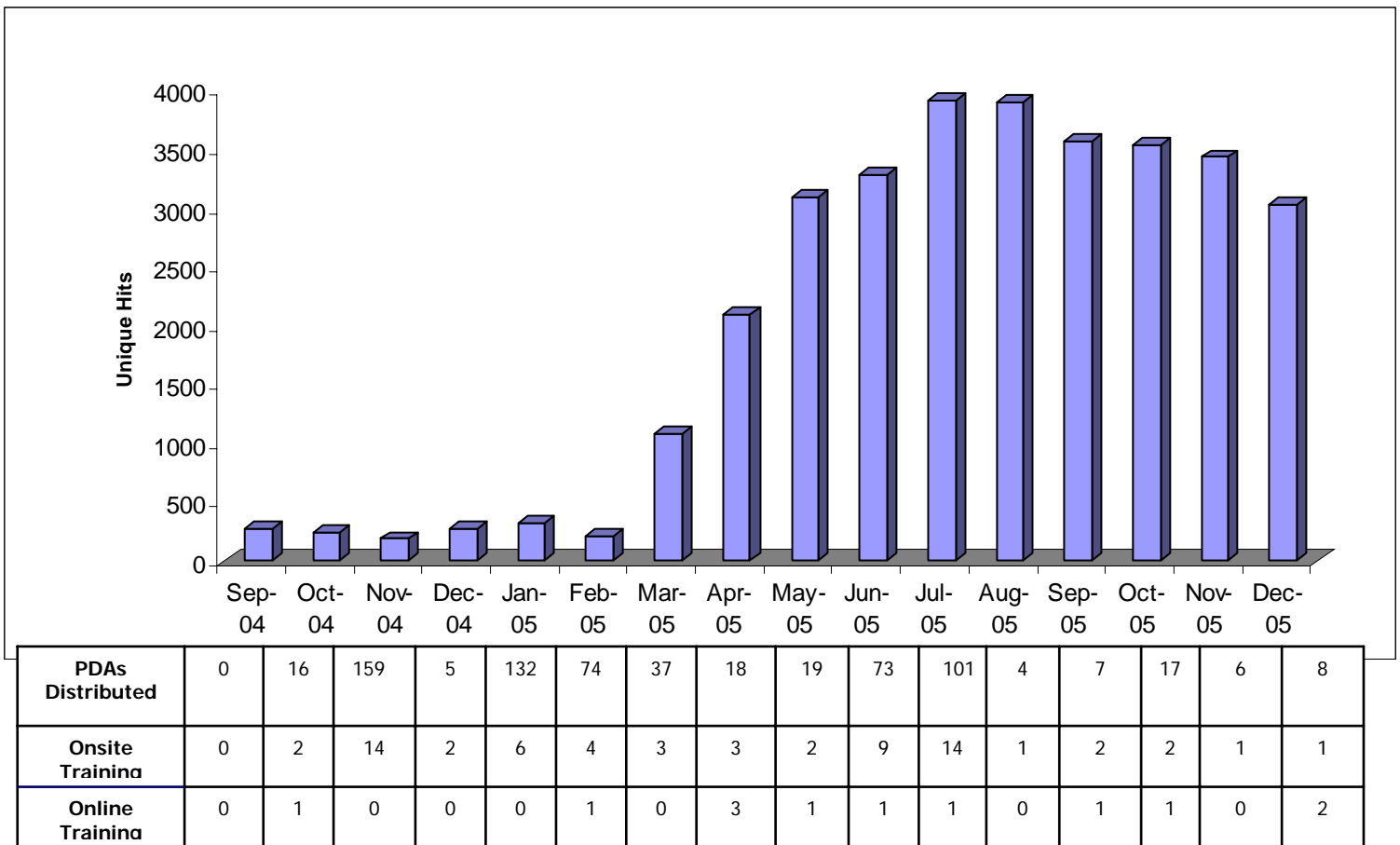**Some respondents comments**

"Great device and overall idea!!"

"Please come back and help us again! I would love to get more out of this!"

C. eClinician Website Usage

1. Number of site visitors:

The project website, www. eClinician.org, had seen a gradual increase in the number of visitors since the start of the project (Figure 6). The website started with 274 unique site visits in September 2004 and received 3036 visits in December 2005. There is a correlation between the number of trainings and the website visits. For example, the month of July 2005 had the most number of on site training sessions and the website had 3911 unique visits in that month. There is also a surge in the website visits with the start of a second round of training sessions in March 2005.

Figure 6. eClinician Website evaluation chart

	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
PDAs Distributed	0	16	159	5	132	74	37	18	19	73	101	4	7	17	6	8
Onsite Training	0	2	14	2	6	4	3	3	2	9	14	1	2	2	1	1
Online Training	0	1	0	0	0	1	0	3	1	1	1	0	1	1	0	2

Unique visits September 2004 to December 2005

Figure 7 provides a cumulative report on the unique site visits from September 2004 to December 2005.

**Figure 7. eClinician Website evaluation chart (Cumulative)**
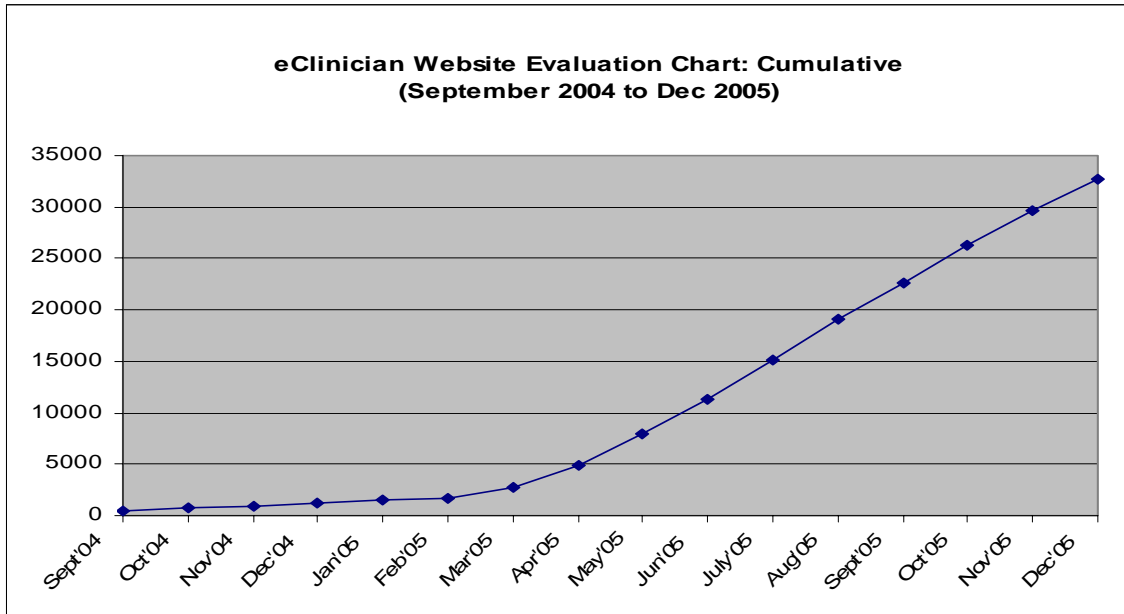
September 2004 to December 2005

2. **Pages visited per visit:**

As the project progressed, the website functionality was enhanced. More content has been added to the website on a regular basis. This includes DOHMH alert updates, clinical decision support tools, medical software reviews, new letters, and health information technology news. This coupled with the increased promotion of the website in the training sessions has resulted in increased unique site visits along with increased page views per visit (Figure 8). On an average, pages viewed per visit have increased from 1.92 in September 2004 to 12.77 in December 2005.

Figure 8. Pages Viewed Per Visit
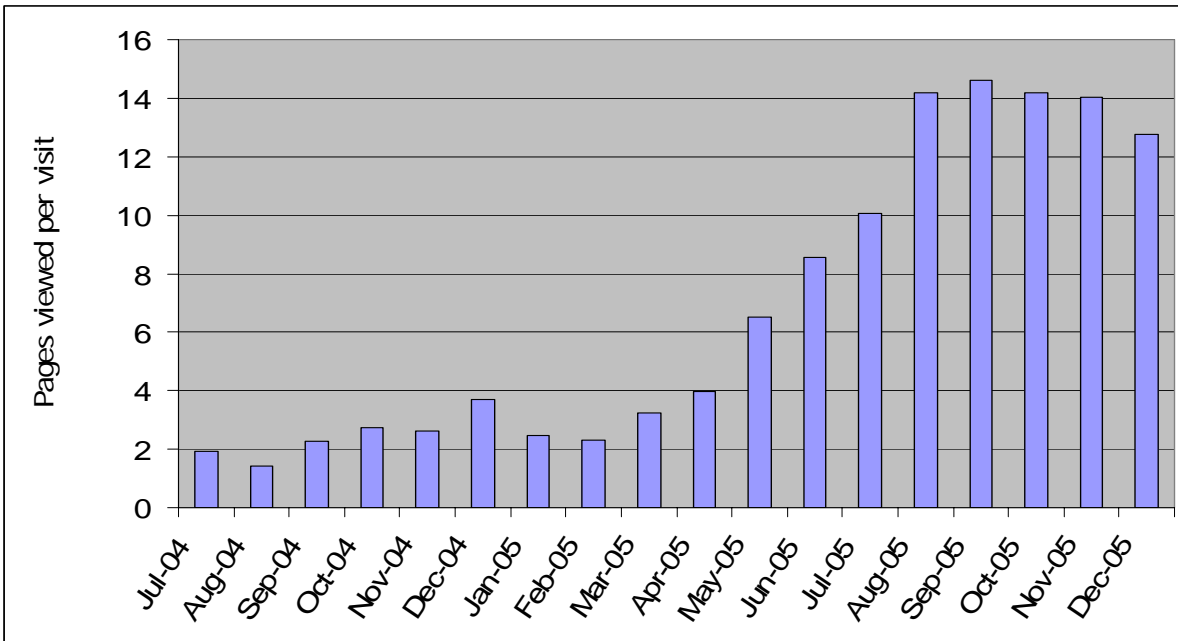
July 2004 to December 2005

3.   Online (webcast) training analysis

From September 2004 to February 2006, 15 online training sessions have been conducted. These trainings have been provided via webcast modules where the participants were able to hear the speaker and see PowerPoint slides on the computer screen. Each month, one clinical-decision support tool was selected as the 'eClinician tool of the Month' and speakers from health care agencies like DOHMH, and the US Preventive Services Task Force (USPSTF) have been invited to discuss these tools. Online tool-sharing technology was used to give live demonstration of the tool functionality to the attendees. The 15 training sessions were attended by a total of 1073 providers (444 live participants and 629 archive participants). 209 continuing education (CME) credits have been issued for both onsite and online sessions (Table 7).

Table 7. CME Trainings

	Onsite	Online Live	Online Library	Total
# of Trainings	64	15	15	**94**
# of Participants	626	444 *	629*	**1699**
# of CME Certificates Issued	153	50	6	**209**

* Underestimate since more than one participant can view a webcast at the same time on the same computer.

4. Decision support tools (ePocrates and Avantgo) usage analysis

An Avantgo eClinician Channel was created in March 2006. Since then, providers were trained on downloading this channel and reviewing DOHMH health alerts on their PDA. As of January 2006, the eClinician channel had 275 subscriptions. ePocrates: of the total 500 licenses distributed (as of January 2006) 127 licenses have been redeemed. Lack of time, expertise and IT resources have been expressed as the potential causes for this low redemption of ePocrates licenses. Based on this feedback, for the next round of trainings, ePocrates licenses were redeemed by the project staff before the training date and loaded on the PDAs.

Conclusions and Recommendations

A. Conclusions

The eClinician project has been successful in reaching its goal of increasing IT awareness, interest and some adoption in NYC CHCs. Although 28% of the providers never used the PDA they received, almost all the clinicians see the value in the initiative and the technology. 96% of the providers opined that there is a value in using PDAs for patient care. There are significant internal and external barriers to the adoption of PDAs and information technology in general at community health centers. Some of the major barriers are time and organizational support. Although barriers exist, some efforts have been made by the clinicians to adopt the technology. Clinicians expressed a strong need for ongoing and onsite technical support and in-service trainings. More intensive and focused training is necessary to sustain the PDA usage or the usage of any IT intervention in general

B. Recommendations

- Develop and implement more intensive and interactive training activities for the providers.
- Focus on multi-level training. Along with specific device and specific application training, training should also include basic computer training and other basic computer skills.
- Create online webcast trainings for small focus groups of participating clinicians
- Build a plan based on predisposing, enforcing and re-enforcing factors for IT adoption. Any strategy should fit under these three categories and over three periods (immediate, mid and long-term). Predisposing means strengthening existing facilities related to IT. Enforcing would include identifying local champions and using their services to keep up the interest in users and reinforcing would mean continuously providing stimulus to stay connected to technology.

- Create more intensive training and provide more support for the IT staff of the health centers.
- Promoting information technology and providing support should not be an external effort promoted by the DOHMH alone –steps should be taken to make the program an internal part of health centers. This can be achieved by focusing on aligning end-user goals, organizational IT goals and other clinical initiatives at the organization with project goals.

APPENDIX A

Baseline Clinician Survey
CLINICAL DIRECTORS NETWORK
NYC DEPARTMENT OF HEALTH & MENTAL HYGIENE

1. What is your primary clinical specialty? (check **ONE**)
    - i ___ Family Practice
    - ii ___ General Practice
    - iii ___ Internal Medicine
    - iv ____ Ob/Gyn
    - v ____ Other:_____

2. Please indicate your degree.
    1 ___ MD   2 ___ DO   3 ___ NP   4 ___ PA   5 ___ Other: _____

3. In what year did you complete your clinical degree?   year: _____

4. In what year were you born?   year: _____

5. What is your gender?   1 ___ Male   2 ___ Female

6. With what ethnic or cultural group do you identify yourself? (check **ONE**)

    - 1___ American Indian or Alaskan native
    - 3___ Native Hawaiian or other Pacific Islander
    - 5___ White
    - 7___ Other
    - 2___ Asian
    - 4___ Black or African American
    - 6___ Mixed

7. Approximately how many ambulatory patient visits do you personally provide during an average week in your office?   _____ patients/week

8. If you do use a computer, please mention how often do you use it?
    - ❑$_1$ Hardly at all (maybe once a week)
    - ❑$_2$ Somewhat (maybe 2-3 times a week)
    - ❑$_\#$ Frequently (maybe once a day)
    - ❑$_4$ A lot (many times a day)

9. What kind of tasks do you perform using your computer? (check all that apply)
    - ❑$_1$ Use word processing and/or other office applications
    - ❑$_2$ Access Clinical Applications
    - ❑$_3$ Use electronic mail (email) services
    - ❑$_4$ Access the Internet
    - ❑$_5$ Use multimedia applications (video, games)
    - ❑$_6$ Do computer programming

10. How often do you use the following information management methods and tools to provide patient care at the point of service? (Circle **ONE item on the scale for each method**).

	Always	Sometimes	Rarely/Never
a. Personal Computer	1	2	3
b. Personal Digital Assistant (PDA)	1	2	3
c. Electronic Medical Record	1	2	3
d. E-prescribing software	1	2	3
e. Other (Specify:_____)			

11. If you own a PDA, how often do you use your PDA in providing clinical care in a typical patient care session --i.e., for what percentage of your patients? _____ %

12. If you own a PDA, which clinical decision-support software do you currently use?
   Check all that apply
   ___ Epocrates   ___ Depression Screen
   ___ Avantgo   ___ Framingham Risk Assessment
   ___ BMI Calculator   ___ Growth Chart
   ___ Immunizations   ___ Pregnancy Date Calculator
   ___ Other: Specify: _____

13. Have you been to the following websites at least once within the last month?
a. eClinician	___No	___Yes
b. CDN (Clinical Directors Network)	___No	___Yes
c. CHCANYS	___No	___Yes
d. NYC Department of Health & Mental Hygiene	___No	___Yes
e. Health Alert Network (HAN)	___No	___Yes
f. AHRQ/Guidelines	___No	___Yes

14. Have you watched any online CME-accredited webcasts at least one time within the last month?
a. CDN	___No	___Yes
b. Other: Specify: _____	___No	___Yes

15. Have you downloaded any clinical decision support tool within the last month?
   ___No ___Yes → SPECIFY: _____

16. What clinical decision support tools would be helpful to you in your practice?
   a.
   b.
   c.
   d.

17. What CME courses would be helpful to you in your practice?
   a.
   b.
   c.
   d.

18. COMMENTS/OTHER SUGGESTIONS:

eClinician PDA Adoption Follow-up Survey

Please answer all questions to the best of your judgment. We hope you enjoy completing the survey. Once again, we would like to thank you for your effort. You will be automatically enrolled in the raffle at the end of this survey.

Usage Related Questions

Have you used the PDA that was provided to you by DOHMH and CDN?
- ❑₁ Yes. (**If yes, please answer question F onwards**)
- ❑₂ No. **(If no, please answers Questions B-E in this section and then proceed to section IIB page 6)**

Did you make some effort to familiarize yourself with the device?
- ❑₁ None at all
- ❑₂ Maybe a few hours
- ❑₃ Substantial effort

How often do you use a computer?
- ❑₁ Never
- ❑₂ Hardly at all (maybe once a week)   ❑# Somewhat (maybe 2-3 times a week)
- ❑₃ Frequently (maybe once a day)
- ❑₄ A lot (many times a day)

If you use a computer, what kind of tasks do you perform on your computer? (check all that apply)
- ❑₁ Use word processing and/or other office applications
- ❑₂ Access Clinical Applications
- ❑₃ Use electronic mail (email) services
- ❑₄ Access the Internet (other than email)
- ❑₅ Use multimedia applications (video, games)
- ❑₆ Do computer programming

Even though you didn't use the PDA, do you see any value to using it for personal and clinical work?

❑₁ Yes ❑₂ No ❑₃ Maybe

How often do you use you PDA?

❑₁ Almost Always (many times a day)
❑₂ Often (about once daily)
❑₃ A few times (about once a week)
❑₄ Rarely (about once a month)
❑₅ Never

Has the use of your PDA influenced your clinical decision-making?

❑₁ Yes ❑₂ No ❑₃ Don't know

If yes, did the use of your PDA (check all that apply)?

❑₁ Change the diagnosis of a patient?

❑₂ Change a patient's treatment?
❑₃ Shorten a patient's clinic visit?
❑₄ Other_____

What kind of applications do you use on the PDA and how frequently do you use each of them? Choose a check box from one of the four increasing frequency levels for every tool that you use (or don't use).

Resource	Never	Occasionally (once a week)	Often (1-2 times a day)	Routinely (Many times a day)
1. Calendar	❏₁	❏₂	❏₃	❏₄
2. Address book/Contacts	❏₁	❏₂	❏₃	❏₄
3. Internet Browser	❏₁	❏₂	❏₃	❏₄
4. Email/Outlook	❏₁	❏₂	❏₃	❏₄
5. Notes/Word/Excel/PDF	❏₁	❏₂	❏₃	❏₄
6. ePocrates	❏₁	❏₂	❏₃	❏₄
7. Avantgo	❏₁	❏₂	❏₃	❏₄
8. Pregnancy Date Calculator	❏₁	❏₂	❏₃	❏₄
9. Immunization Scheduling tool	❏₁	❏₂	❏₃	❏₄
10. BMI Calculator	❏₁	❏₂	❏₃	❏₄
11. Framingham Risk Assessment tool	❏₁	❏₂	❏₃	❏₄
12. Other (specify)_____	❏₁	❏₂	❏₃	❏₄
13. Other (specify)_____	❏₁	❏₂	❏₃	❏₄
14. Other (specify)_____	❏₁	❏₂	❏₃	❏₄

Familiarity with Device Operations

Please indicate your ability to perform each of the operations mentioned below. You can rate your familiarity for each action using the 5 item scale given in the table.

Operations	Did not try	Unable to do so	with much difficulty	without some difficulty	without any difficulty
I. Manage power operations (Power on and off, Recharge the device)	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
II. Set time, date and other basic preferences	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
III. Synchronize your PDA with your desktop	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
IV. Open and exit different applications (e.g.: Word, Excel)	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
V. Perform file manipulations (cut, copy, delete, paste etc)	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
VI. Open the browser and access the internet	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
VII. Use Bluetooth or Infrared connectivity to beam contact information or files	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
VIII. Input data using the keyboard on the screen or other writing options	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
IX. Access help pages when needed	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$
X. Download software applications and install them on the PDA	$\square_1$	$\square_2$	$\square_3$	$\square_4$	$\square_5$

Barriers and Problems to PDA use

The questions in this section address potential barriers and/or problems that you may have when using the PDAs.

A. What are the some of the most troubling aspects of using a PDA? Please indicate your response to each potential problem by choosing one of the five options. Choosing the option 'Considerable Problem' implies that you consider the mentioned aspect to be very troubling

Problems	Considerable problem	Minor Problem	Neutral	Acceptable	Not a problem at all
1. Small Screen to read through information	❑₁	❑₂	❑₃	❑₄	❑₅
2. Using the stylus to navigate the screens and input data	❑₁	❑₂	❑₃	❑₄	❑₅
3. Synchronizing the PDA to keep my information up-to-date	❑₁	❑₂	❑₃	❑₄	❑₅
4. PDA battery life	❑₁	❑₂	❑₃	❑₄	❑₅
5. Remembering to recharge the PDA	❑₁	❑₂	❑₃	❑₄	❑₅
6. Remembering to bring the PDA to work	❑₁	❑₂	❑₃	❑₄	❑₅
7. The system need to be reset often	❑₁	❑₂	❑₃	❑₄	❑₅
8. Other (specify problem)	❑₁	❑₂	❑₃	❑₄	❑₅
9. Other (specify problem)	❑₁	❑₂	❑₃	❑₄	❑₅

B. The next set of questions is to identify your attitudes towards using PDAs Please indicate your response to each item listed by choosing one of the agreement options.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I. I am personally not very computer savvy so I don't want to use the PDA	❑1	❑2	❑3	❑4	❑5
II. There is a big learning curve. So, I need one-on-one intensive training to learn a new device	❑1	❑2	❑3	❑4	❑5
III. I don't see much value in using a PDA for my daily work	❑1	❑2	❑3	❑4	❑5
IV. I think PDAs have low security which may compromise my personal and clinical information	❑1	❑2	❑3	❑4	❑5
V. I constantly worry that I may lose my PDA or it will slip out of my hand and break	❑1	❑2	❑3	❑4	❑5
VI. I like the ubiquity and simplicity of paper and would like to stick with it	❑1	❑2	❑3	❑4	❑5
VII. There is not enough organizational support for this device and I feel I am the odd one out	❑1	❑2	❑3	❑4	❑5
VIII. There is not enough patient information available on the PDA like labs, meds etc	❑1	❑2	❑3	❑4	❑5
IX. I am not comfortable using the PDA in front of my patients	❑1	❑2	❑3	❑4	❑5
X. I think PDA distracts me from my work	❑1	❑2	❑3	❑4	❑5
XI. Other (specify barrier)	❑1	❑2	❑3	❑4	❑5
XII. Other (specify barrier)	❑1	❑2	❑3	❑4	❑5

Clinical Directors Network Inc.

<u>Miscellaneous</u>

I. Did you attend the training session provided by the eClinician Project staff (CDN and DOHMH)?

☐₁ Yes. ☐₂ No

II. Did you find the sessions informative and useful?

☐₁ Not much ☐₂ Somewhat ☐₃ A lot

III. Did you find the CDN staff responsive to questions by the audience?

☐₁ Not much ☐₂ Somewhat ☐₃ A lot

IV. Do you think you need more training to use the PDA comfortably?

☐₁ Yes ☐₂ No

V. Have you visited eClinician website (www.eClinician.org) to access educational material like clinical decision support tools, support center, news links, newsletters etc.?

☐₁ Rarely/Never ☐₂ less than a month ☐₃ Monthly ☐₄ Weekly ☐₅ Daily

VI. If yes, what are some of the resources that you have accessed on the eClinician Website? Please list them?_____

VII. Did you attend any webcasts (online training sessions at www.CDNetwork.org) delivered by CDN?

☐₁ Yes ☐₂ No

VIII. Do you find the webcasts useful and informative?

☐₁ Yes ☐₂ Somewhat ☐₂ No

IX. Overall, what is your opinion of the technology promotion effort made by the DOHMH and CDN. (check all that apply)

❑₁ I think it is a good initiative

❑₂ I believe this will enable increased penetration of technology among providers

❑₃ I hope to see this be expanded into other technology implementations

❑₄ have no opinion about this initiative

❑₅ Other, Please Specify _____

Clinical Directors Network Inc.

Respondent Demographics

1. Please indicate which best describes your qualification
   ☐₁MD   ☐₂Nurse   ☐₃DO   ☐₄PA   ☐₅Other _____

2. In what year were you born?   ___ ___ ___ ___ (example: 1973)

3. Please indicate your gender
   ☐₁   Male   ☐₂   Female

4. For how many years have you been in your current profession?
   ☐₁< 3 yrs   ☐₂ 3-5 yrs   ☐₃ 6-10 yrs   ☐₄ >10 yrs

If you have any additional comments, questions or suggestions, please fill them in here.

_____

_____

Email of the provider: _____

APPENDIX C

Post-Training Survey

CLINICAL DIRECTORS NETWORK
NYC DEPARTMENT OF HEALTH & MENTAL HYGIENE
eClinician Project

To be administered to ALL health care providers who attended the training session.

1. Please indicate your degree:
   ❑$_1$MD   ❑$_2$ Nurse   ❑$_3$DO   ❑$_4$PA   ❑$_5$Other _____

2. Did you find the training session helpful. Do you think you learnt something useful in general?
   ❑$_1$ Yes, very much   ❑$_2$ Somewhat   ❑$_3$ Not at all

3. Did the training leave you with a feeling of increased knowledge and awareness about computers and PDAs in particular?
   ❑$_1$ Yes, very much   ❑$_2$ Somewhat   ❑$_3$ Not at all

4. Did the training session meet your expectations?
   ❑$_1$ Yes, it did   ❑$_2$ Somewhat   ❑$_3$ No. It didn't

5. How would you rate the topics covered in the training session as per your current knowledge levels?
   ❑$_1$ Topics were too basic ❑$_2$ Topics were reasonably difficult ❑$_3$Topics   were   too
advanced

6. Do you think the speaker(s) presented the material articulately and covered the topics reasonably well?
   ❑$_1$ Yes   ❑$_2$ Somewhat   ❑$_3$ No

7. Did the training session cover each topic adequately?
   ❑$_1$ Yes   ❑$_2$ Somewhat   ❑$_3$ No

8. Were the presentation and training materials well prepared?
   ❑$_1$ Yes   ❑$_2$ Somewhat   ❑$_3$ No

9. Were the speakers responsive to questions asked by the audience?
   ❑$_1$ Yes   ❑$_2$ Somewhat   ❑$_3$ No

10. Did the session include adequate practical hands-on training?
   ❑$_1$ Lots of demonstrations   ❑$_2$ Limited   ❑$_3$ None at all

11. Was the training session well managed?

☐₁ Yes   ☐₂ Somewhat   ☐₃ Yes

12. Was the size of the training class adequate?
    ☐₁ Yes   ☐₂ Somewhat   ☐₃ Not at all. There were too many people

13. Was the length of the training session adequately reasonable?
    ☐₁ Yes   ☐₂ Somewhat   ☐₃ Not at all. It was too long

14. Do you feel that you need more training sessions like this one to learn more about PDAs and clinical
    decision support tools?
    ☐₁ yes   ☐₂ No

15. What were the three important take home lessons for you?

A)

B)

C)

16. Were there any glaring deficiencies in the training materials/presentations?

17. Are there any other Comments/suggestions you would like to make?

Thank you for your time and effort in filling out the survey. For more information about the survey you can contact Dr. Raj Adusumilli at Clinical Directors Network at cme@CDNetwork.org

APPENDIX D

<u>Provider Activity Sheet</u>

Total Time: 25 mins

1. Go to the eClinician Avantgo channel on your PDA. Click on the **Emergency Preparedness Information** link and note down the **Terrorism Hotline** number here. (3 mins)
   _____

2. Turn on your **Wireless LAN** and go to the website www.yahoo.com. (5 mins)
   Note: Remember to turn it off after use. Wireless access consumes a lot of battery power.

3. Click into the **JNC VII** Blood Pressure tool. Go to the Treatment (**Tx**) section. Look into 'Initial Drug Choices for Hypertension' with **Compelling Indications**. Please note below the treatment options for hypertension with **Heart Failure**. (5 mins)

   _____

4. Fill in the blanks below with information from the Obesity tool (**OEI**) (5 mins)

   "A reasonable time to achieve a _____ % reduction in body weight is _____ months of therapy."

   Hint: Once you click into the OEI tool, go into the 'info' section → Goals of therapy → Rate of weight loss.

5. Open Notepad and take down my contact information: (3 mins)
   Raj Adusumilli

   212-382-0699
   cme@cdnetwork.org

6. What is the website to download free PDA tools? (1 min)

   _____

7. Remaining 3 minutes?
   How about a game of Solitaire?
   Go to Start→ Programs → Games → Solitaire and have fun!!

Please return this activity sheet to one of the eClinician staff in the room. Thank You.