Teleconsultation for Clinicians Who Provide Human Immunodeficiency Virus Care: Experience of the National HIV Telephone Consultation Service

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Abstract

Objective: *To examine the infrastructure, successes, and challenges of a teleconsultation service for human immunodeficiency virus (HIV) clinicians.* ***Materials and Methods:*** *The HIV Warmline is a telephone consultation service providing free, live HIV/AIDS management advice to U.S. clinicians. We present descriptive data about callers, patients, and consultation topics gathered by electronic query of the HIV Warmline database for 2009. Caller satisfaction survey results for 2009 are also presented.* ***Results:*** *The HIV Warmline has provided more than 37,000 consultations since its inception in 1992. The service provides consultations to clinicians from all 50 states, from a variety of professional backgrounds, and with a wide range of HIV experience levels. The majority of call topics concern antiretroviral therapy. Callers are generally pleased with the service, giving a mean Likert scale rating of 4.7 on satisfaction survey questions.* ***Conclusion:*** *The experience of the HIV Warmline can serve as a model for other programs planning to develop remote consultation systems. HIV teleconsultation has been relatively simple to implement and can be useful for many types of clinicians. HIV teleconsultation should continue to be evaluated as a way to improve HIV care, especially in areas without easy access to HIV expertise.*

Key words: *telemedicine, distance learning, telehealth*

Introduction

Distance-based clinician-to-clinician consultation (teleconsultation) is an area of increasing interest and research. Published reports describe successful teleconsultation systems using the telephone, Internet, and video in fields such as dermatology, radiology, and neurology.[1–4] Other fields of medicine might benefit from teleconsultation, especially those dealing with complex clinical problems in which access to local expertise is limited.[5–11]

Human immunodeficiency virus (HIV) medicine is one area in which teleconsultation might be useful. Since HIV is a rapidly changing field, clinicians can find it challenging to stay up to date and could benefit from efficient access to patient-focused HIV information and advice.[12,13] In addition, many clinicians, especially those providing care in rural or urban underserved areas, do not have easy access to HIV expert assistance and need to rely on consultation at a distance.[14,15]

A number of HIV teleconsultation programs have been created globally, mostly targeting providers in the developing world.[16–19] We describe here a teleconsultation program for HIV care in the United States that has provided more than 37,000 consultations over the past 18 years. This program, known as the HIV Warmline (1-800-933-3413), is a part of the National HIV/AIDS Clinicians' Consultation Center, a federally funded program located at San Francisco General Hospital (SFGH) at the University of California San Francisco (UCSF). This article details the history and operation of the HIV Warmline and provides descriptive data about HIV Warmline consultations to help inform future efforts in teleconsultation.

Materials and Methods

HISTORY

The HIV Warmline was created in San Francisco in 1992 with the goal of providing local HIV clinicians with rapid access to up-to-date HIV information and consultation. Within a year, the HIV Warmline expanded to become a national service with the acquisition of a federal grant from the Health Resources and Services Administration (HRSA). Housed at SFGH in the UCSF Department of Family and Community Medicine, the HIV Warmline has been in continuous operation since its inception and has since added two additional phone services: an occupational blood-borne pathogen exposure line (the PEPline; 1-888-448-4911) started in 1996 with supplementary funding from HRSA and the Centers for Disease Control and Prevention, and a national perinatal HIV consultation service (Perinatal HIV Hotline; 1-888-448-8765)[20] started in 2004. All three lines function together under the umbrella of the National HIV/AIDS Clinicians' Consultation Center (NCCC), which is a part of HRSA's AIDS Education and Training Centers (AETC) program.

CONSULTATION SERVICES OFFERED

The HIV Warmline provides clinical information and consultation to clinicians on all aspects of HIV/AIDS management via the telephone (1-800-933-3413). The service accepts calls from clinicians with any level of HIV-experience. It is available Monday to Friday from 8am to 8pm EST and is free of charge to all practicing clinicians in the United States. The service is not available to patients or the general public.

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TECHNICAL INFRASTRUCTURE

The infrastructure of the HIV Warmline is based on a telephone system and a computer network. The Warmline is equipped with digital group telephones connected to the SFGH trunk lines. A 1-800 number connects clinicians throughout the United States directly to Warmline consultants. Overflow calls are transferred to the SFGH voice mail mechanism and are returned by a Warmline consultant at the earliest opportunity, usually within the hour. After-hours calls are answered on the next business day. Telephone consultations are sometimes supplemented with written materials via email or fax.

The Warmline has a secure network of computers and servers managed by the UCSF/SFGH Information Technology department. Consultants at each workstation use direct input software to record caller demographic information, de-identified patient information (consistent with HIPAA guidelines), and consultation notes that serve as an electronic medical record. The database of caller, patient, and consultation topic information can be searched for reporting, continuous quality improvement, and research purposes.

The HIV Warmline Web site is a part of the larger NCCC Web site (www.nccc.ucsf.edu) that includes the PEPline and Perinatal HIV Hotline Web sites. The site contains information about the NCCC telephone consultation services and provides access to clinical resources created by the NCCC, along with links to outside training and technical assistance resources, educational resources, and guidelines.

CONSULTANTS

The HIV Warmline is staffed by a multidisciplinary team of approximately 15 UCSF clinical consultants, including family physicians, internists, infectious disease specialists, obstetrician/gynecologists, and clinical pharmacists. New consultants are selected after a comprehensive review process and undergo supervised training before working as principal consultants. In addition to extensive clinical experience and academic proficiency, consultants should have excellent communication and teaching skills. Consultants vary in the amount of time they spend answering telephone calls at the HIV Warmline, varying from 10% to 70% effort. Most consultants also maintain active HIV clinical practices or engage in HIV-related research or other academic activities.

CONSULTATION METHODOLOGY

During business hours, between two and five consultants are usually available to answer calls. Consultants work together onsite at the Warmline call center to facilitate multidisciplinary collaborative discussions of complex cases and to encourage ongoing peer review of consultations. Consultants use the information contained in federal HIV practice guidelines (Department of Health and Human Services Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents at http://aidsinfo.nih.gov) as the basis for clinical recommendations. Clinical questions relating to emerging issues or clinical "grey areas" that are not adequately described in the federal guidelines are addressed using research findings and/or expert opinion. Complex cases are generally discussed impromptu among a group of HIV Warmline consultants before management options are presented to the caller. Cases involving HIV drug resistance may also be discussed at a monthly resistance panel, staffed by HIV Warmline consultants and other UCSF HIV resistance experts. Recommendations from the resistance panels are presented to the caller and posted for public viewing on the NCCC Web site. When clinical questions arise that require the input of sub-specialists, such as oncologists, nephrologists, or neurologists, HIV experts on the UCSF faculty from the respective specialty departments are consulted.

QUALITY ASSURANCE

Maintaining state-of-the-art expertise in HIV care requires frequent updates, ongoing dialog with experts, and review of articles, guidelines, and conference findings. HIV Warmline consultants are expected to participate in monthly peer-led internal training sessions and resistance panel discussions. Individual level HIV-specific continuing medical education is also expected, including attendance at HIV conferences and ongoing review of the HIV literature.

The quality of consultations is continuously monitored. Formal peer-review occurs quarterly with each consultant being assigned to review a set of randomly chosen and de-identified consultations from their colleagues. In addition, informal quality control occurs spontaneously as consultants discuss cases with each other and receive input and feedback from colleagues in real time.

Customer satisfaction surveys are mailed quarterly to a random sample of callers from that quarter. Results are shared with clinicians, and feedback is integrated into quality improvement sessions.

OUTREACH AND PROMOTION

The HIV Warmline's outreach plan includes promotion through conference attendance, materials distribution, and targeted mailings. The HIV Warmline staffs a booth with outreach materials in the exhibitor area at an average of eight conferences a year, especially those attended by clinicians caring for large numbers of underserved and minority patients. In addition, many regional and national organizations list the HIV Warmline as a resource for clinicians. A large number of callers hear about the HIV Warmline from colleagues who have used the service.

LEGAL

As a UCSF program, the university accepts legal responsibility for all NCCC consultations.

FUNDING

The HIV Warmline is funded entirely by the HRSA AETC program. The HIV Warmline and its faculty members accept no funding from the industry, avoiding any appearance of commercial bias.

DATA REVIEWED FOR THIS STUDY

This study reviews information available from database query and caller satisfaction surveys for the year 2009. A one-time evaluation of time spent on the telephone per consultation, performed by an independent observer during May and June of 2006, is also presented.

Results

The HIV Warmline has answered 37,061 calls since its inception in 1992. In 2009, there were 1,863 calls from 721 unique callers. Over the past 10 years, call volume has remained relatively stable with an average of 2,114 calls per year (range 1,796 to 2,549 calls). Calls come from all 50 states as well as certain U.S. territories such as Puerto Rico, Guam, Trinidad, and Tobago. States with the highest volume of calls in 2009 included California (591), New York (121), Texas (98), and Florida (88). Washington D.C. contributed 94 calls.

CALL TIMES

Of the calls in 2009 with response time available, 96.3% (1,788 of 1,857) were answered live, 3.6% (66) were transferred to voicemail and answered on the same day or the next business day, and 0.2% (3) were answered in more than one business day. Time spent on the telephone ranged from 2 minutes to 44 minutes with an average time of 11.4 minutes per call.

CALLERS

There were 721 unique callers in 2009. The majority of callers were physicians (424, 58.8%), with family physicians being more common than internal medicine physicians or infectious diseases specialists (*Table 1*). Mid-level providers, including physician assistants and nurse practitioners, were also well represented. Callers had a range of HIV-experience levels, with about half of the callers caring for more than 25 patients with HIV. The majority of callers practiced in outpatient settings (502, 69.6%). There were 76 callers practicing in correctional facilities.

A total of 280 callers used the service more than once. Repeat callers averaged 5.1 calls each, with a range of 2–57 calls. There were 25 clinicians who used the service 10 or more times in 2009. Compared with the general population of callers shown in *Table 1*, these callers were more likely to be physicians (80.0% vs. 58.8%), infectious diseases specialists (40.0% vs. 28.1%), and clinicians caring for more than 25 patients (92.0% vs.50.2%).

Table 1. Caller Demographics for 2009

CALLER PROFESSION	CALLERS	%
Physician	424	58.8
Family medicine	150	35.4
Infectious diseases	119	28.1
Internal medicine	118	27.8
Other specialty	37	8.7
Nurse practitioner/ physician assistant	134	18.6
Nurse	39	5.4
Pharmacist	59	8.2
Other	65	9.0
Total	721	100.00
NUMBER OF HIV+ PATIENTS IN CALLER'S CARE	**CALLERS**	**%**
0 patients	102	16.9
1–5 patients	84	13.9
6–25 patients	114	18.9
>25 patients	303	50.2
Total	603[a]	100.00

[a]Information on HIV patient load not available for all callers.
HIV, human immunodeficiency virus.

PATIENTS

Almost three quarters of patient management calls were in reference to male patients, and most patients were either White or African American. The most frequent risk factors for HIV acquisition were sexual (either men who have sex with men, or high-risk heterosexual sex) (*Table 2*).

CONSULTATION TOPICS

The majority of calls involved discussions of antiretroviral therapy including indications for therapy, choice of regimen, management strategies for adherence, adverse drug reactions, and issues of antiretroviral resistance (*Table 3*). A review of a random subset of 100 antiretroviral calls showed that 58.0% dealt with antiretroviral resistance, including interpretation of resistance tests and choice of second- or third-line antiretroviral regimens. The next most common topic was management of clinical problems, such as opportunistic infections and coinfections (e.g., viral hepatitis).

CALLER SATISFACTION

Composite results of caller satisfaction surveys for the year 2009 are shown in *Table 4*. Response rate for surveys was 46.7%. Questions were scored on a 5-point Likert scale (1 = low, 5 = high) with a mean response for all questions of 4.7 points.

Discussion

Since 1992, the HIV Warmline has provided more than 37,000 telephone consultations to thousands of U.S. clinicians. Clinicians who call the HIV Warmline include physicians, nurse practitioners/physician assistants, nurses, pharmacists, and others. Among physicians, infectious disease specialists represent about 30% of callers, and primary care clinicians represent almost 60% of callers. This can be compared with the estimated distribution of HIV care providers in the national work force (42% infectious disease/58% generalist).[12] Clinicians who use the HIV Warmline have a variety of HIV experience levels, ranging from very inexperienced clinicians calling about

Table 2. Patient Demographics for 2009

PATIENT RACE/ETHNICITY	CALLS	%
White	561	38.2
African American/Black	538	36.7
Latino/Hispanic	242	16.5
Asian/Pacific Islander	68	4.6
Native American	43	2.9
Other	15	1.0
Total	1,467[a]	100.0
PATIENT HIV RISK FACTOR	**CALLS**	**%**
Men who have sex with men	582	43.4
Injection drug use	2	16.2
High-risk heterosexual	458	34.1
Maternal-child and other	85	6.3
Total	1,713[a]	100.0

[a]Information on patient demographics not available for all calls.

Table 4. Summary of Caller Satisfaction Surveys for 2009

QUALITY OF CONSULTATION	MEAN
The clinician with whom I spoke was knowledgeable about the topic discussed.	4.8
The information I received was presented clearly and concisely.	4.8
All of my questions were answered thoroughly.	4.7
Overall, I was pleased with the quality of my consultation with the HIV Warmline.	4.8
QUALITY OF CLINICAL INFORMATION	**MEAN**
The information I received was up to date.	4.8
The information I received was useful in managing the case I called about.	4.8
FUTURE SERVICES	**MEAN**
I would use this service again.	4.9
I am likely to recommend this service to my colleagues.	4.9

their first HIV patient, to HIV specialists requesting a second opinion about a complex case.

Patient demographics are generally reflective of the U.S. HIV epidemic with a preponderance of calls about male patients and those with sexual risk behavior. However, compared with the U.S. epidemic, the HIV Warmline receives more calls about White patients and fewer about African American or Latino patients (38% vs. 35%, 37% vs. 45%, and 16% vs. 18% respectively, $p < 0.0001$).[21] The lower number of calls about minority patients could be attributed to uneven marketing efforts on the part of the HIV Warmline, or insufficient local consultation services in high-need areas. Unfortunately, it may also reflect the fact that minority patients may be less likely to be enrolled in care.[22,23]

Table 3. Consultation Topics for 2009

TOPIC	CALLS	%
Antiretroviral therapy	1,198	56.0
Management of clinical problems	622	29.1
HIV testing and prevention of transmission	126	5.9
Healthcare maintenance	72	3.4
Nonclinical general information	28	1.1
Other	93	4.3
Total	2,139[a]	100.0

[a]Multiple topics may be discussed during each call.

Consultation topics are generally concentrated on antiretroviral therapy with a majority of calls focusing on HIV drug resistance, an esoteric yet critical topic with rapidly changing clinical information. Clinical decision making in this area can be based largely on clinician reports and laboratory findings without physical examination of the patient, which makes teleconsultation especially appealing. Over time, the HIV Warmline has been receiving fewer questions about opportunistic infections and increasing numbers of questions about antiretroviral drugs, as would be expected given the changes in the HIV epidemic over the last 15 years (data not shown).

The HIV Warmline has been popular with clinicians, as evidenced by the steady number of calls over the years and the results of caller satisfaction surveys. Callers who return the surveys generally give very high marks for the quality and usefulness of consultations. When negative comments are received, they are taken seriously and are used to inform quality improvement measures.

There are other factors not captured by the data that may help explain the successes and challenges of the HIV Warmline. Our subjective experience, along with feedback from thousands of callers,

has led us to consider the following points that would benefit from further investigation:

Reasons for the success of the HIV Warmline may be attributed to the following:

- Operational simplicity: At its core, the HIV Warmline relies on very basic infrastructure: office space and telephones. Although daily operations are made easier by use of a computer system to record consultations and collect data, this is not absolutely necessary. The simplicity of the infrastructure makes this model easily exportable and adaptable to a variety of settings including those with limited resources. Given the availability of cellular telephones in most parts of the world, this type of telemedicine may be more realistic to implement than those that depend on video or the Internet. Further, although there are many new telecommunications modalities available for use, the HIV Warmline has continued to rely primarily on the telephone. This is based on positive feedback from users about the convenience of the telephone for most consultations. Increasingly, however, clinicians are asking to communicate via email, and these types of consultations will be offered soon. There have been no requests to communicate via instant messaging, video conference, or other electronic devices.
- Synchronous ("live") consultations: The availability of "live" consultants makes the service fast, direct, and individualized. Synchronous communication with an expert ideally allows clinicians to make management adjustments in real time, often while the patient is still in the clinic or office. This may have both practical and financial advantages over formal referral to outside specialists, or even asynchronous remote consultation modalities, such as email. Additionally, the ability to talk to callers by telephone allows consultants to use conversational cues to better assess an individual caller's consultation needs and adapt the consultation appropriately. Responding to callers in a warm and inviting manner encourages them to use the service again and fosters ongoing collegial relationships between callers and consultants.
- Free for the caller: There is no charge for callers at any time. The federal government funds the project in its entirety.

The HIV Warmline experience has also identified some specific challenges in teleconsultation.

- Time intensive for consultants: Although the time spent on the telephone with the caller is usually moderate, the time spent by the consultant researching an answer, contacting subspecialists for advice, and documenting the consultation can be significant. Therefore, to accommodate callers in a mostly synchronous manner, multiple consultants need to be available to answer the phones during all business hours.
- The need for office space: The HIV Warmline operates out of a call center where consultants work together onsite. Although this may be more expensive and logistically complex compared with having consultants work remotely, it enhances the ability of consultants to collaborate on cases, learn from each other, and contributes to professional satisfaction.
- Funding issues: Although funding for the HIV Warmline has been stable throughout, the project has grown faster than funding has allowed in recent years. The technical aspects of the service (telephones, computers, and office space) have been maintained but funding is limited for personnel, making it hard to fund the additional Warmline consultants that are needed for the increasing volume of calls. Other payment options, such as fee-for-service, might need to be explored in the future, but this would surely limit the number of clinicians who would use the service. An unfortunate consequence could be a decrease in the overall quality of care for patients infected with HIV, as many HIV Warmline users have no other ready source of HIV consultation.
- Legal matters: A common concern of telemedicine programs is the medicolegal implications of practicing medicine at a distance and across state lines.[24] The HIV Warmline has never been named in any legal proceedings, and there are no reports in the literature of legal actions in teleconsultation. However, the risk of liability is a real concern and is addressed by the HIV Warmline in several ways. First, consultants take special care to document each consultation in a permanent record. Second, consultants inform callers that the HIV Warmline's role is to educate and to present the caller with a range of clinical management options; the ultimate responsibility for the medical decision making rests with the callers themselves, a fact that seems to be understood and accepted by callers.

This examination of the HIV Warmline has some weaknesses. Data from this study were garnered from the consultation database, which is kept as a permanent clinical record of consultations but was not primarily designed for research purposes. Therefore, certain data points may be missing (e.g., demographic data may not be fully gathered from busy callers). Survey data come from routine customer satisfaction surveys, which in 2009 were sent to postal mail addresses. These surveys have a moderate response rate, and, therefore, the answers may not accurately reflect the overall opinion of the HIV Warmline by all users. Currently, these surveys are being performed by e-mail (Survey Monkey) and have a higher return rate.

RELEVANCE AND POLICY IMPLICATIONS

The experience of the HIV Warmline can serve as a model for other programs wishing to develop remote consultation systems. HIV teleconsultation has been relatively simple to put into practice and can be useful to providers from variety of clinical backgrounds and with a wide range of HIV experience levels. In coming years, the HIV Warmline will begin to explore the use of other telecommunications modalities, primarily e-mail, to enhance the usefulness of its service for clinicians. The authors believe that HIV teleconsultation should continue to be evaluated as a way to improve HIV care, especially in areas without easy access to HIV expertise.

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