HIV/AIDS and Farmworkers in the US

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INTRODUCTION

HIV/AIDS takes an especially heavy toll on the most vulnerable and marginalized groups in US society. Poverty, low income, limited education, sub-standard housing, and limited access to health care are all factors that increase the rate of HIV/AIDS in a population. Farmworkers in the US contend with all these risk factors, plus others: limited English proficiency, mobile lifestyle, and social isolation, to mention but a few. This confluence of social and economic risk factors creates a situation in which a serious HIV/AIDS outbreak is a distinct possibility. (1) An outbreak would be particularly devastating for a population already vulnerable due to minimal physical and financial resources and poorer health status than the general population.(2)

At present, the seroprevalence rate of HIV/AIDS in farmworker communities is unknown. The vast majority of the epidemiological data on HIV incidence among farmworkers is based on small, local studies. A 1992 study of 310 farmworkers in Immokalee, FL, by the Centers for Disease Control and Prevention (CDC) found an HIV positive prevalence rate of 5%, almost 10 times that of the national rate of 0.6% at the time. (2) A few other small studies have reported rates ranging from 0.47% to 13%. (3,4,5,6)

In the absence of adequate population-based data on farmworkers, useful inferences may be drawn from statistics collected on migrant Latinos in the US, a group known to be disproportionately affected and infected by HIV. HIV/AIDS cases among Latinos are increasing in both incidence and prevalence. Latinos comprise approximately 13% of the US population, but account for 16% of all AIDS cases since the onset of the epidemic. Additionally, approximately 19% of all newly-diagnosed cases in the US are among Latinos (7).

This paper reviews the available research on HIV/AIDS in the farmworker community, supplemented with relevant findings from research with related populations, i.e., Latino, rural, migrant. The research reported in this paper focuses on behavioral, social and cultural, and structural risk factors that affect this community, as well as on ways that health care providers can help reduce HIV/AIDS risk within this highly vulnerable group.

BEHAVIORAL RISK FACTORS FOR HIV/AIDS

Inconsistent condom use

Condom use, or the lack thereof, has huge implications for the prevention of HIV in migrant farmworkers. For migrants, such use differs based on whether the person is the primary or occasional sex partner (1;8;9;9) With occasional sex partners, male migrant farmworkers used condoms slightly over half of the time. Condom use is also linked to whether they have a condom with them and how confident they feel in negotiating the use of protection. (9, 10) Carrying condoms and condom self-efficacy increase when they believe their friends also use condoms. (9)

The situation is very different when it comes to primary sex partners. Only about 20% of farmworkers use condoms with their primary sex partners and usage is dictated by social norms,

defined as whether family and friends condone condoms or how often a person recommends, criticizes, gives, or asks for condoms (9). Therefore, not only are farmworkers at an increased risk of HIV due to their infrequent condom use, but their wives and primary partners are also put at an elevated risk.

Lack of condom use with primary partners also increases rates of HIV in home countries (11). These risks are greater for married migrant men, due to the fact that they use condoms less than single men (10). Overall, Latino men's low condom use is one of the primary factors that increases the risk of HIV transmission (12).

Sexual risks: Men who have sex with men (MSM)

The primary exposure route for US Latino men living with HIV/AIDS is sexual contact with other men (55%). For most HIV-positive Latina women (69%), infections were through heterosexual contact with a man infected with HIV/AIDS (7). Farmworkers are likely to have a similar risk profile.

Men who have sex with men are at particularly high risk for contracting the HIV virus if they engage in unprotected anal sex with an infected partner. The likelihood of unprotected anal intercourse increases when men lack the knowledge, access, or self-efficacy to use condoms. Due to cultural beliefs and stigma, men do not always willingly admit to having sexual contact with other men and often lead separate lives where they have wives or girlfriends. By doing so, they may place the women with whom they have sexual relations at an increased risk of HIV infection (13, 14).

Use of commercial sex workers

Use of commercial sex workers is common within the migrant farmworker community. These farmworkers are young, male, and unaccompanied. The shortage of women in the rural work communities creates a social imbalance that drives some men to pay for sex (15). Only 5% of married men traveling with their wives use sex workers (8), whereas the frequency of use by single and unaccompanied married migrant and seasonal farmworkers is reported to be as high as 44% (10, 16). What is worrisome here is that sexual encounters with sex workers are often conducted without the use of condoms (11, 14, 15 17, 18, 19, 20, 21).

Migrant farmworkers have very inconsistent condom use, especially with commercial sex workers. Although on average they use condoms more than half of the time, consistent with the data on use of condoms with secondary partners, there are still about 15% that admit to never using condoms with commercial sex workers. Occasionally, migrant men will even pay commercial sex workers extra to have sex without condoms (14). As long as migrant men continue to travel unaccompanied by female partners, their high rate of unprotected sex with sex workers will remain a risk factor.

Substance use

<u>Alcohol</u>

Heavy alcohol use is linked to an increased risk of HIV and other sexually transmitted infections (22, 23, 24, 25, 26). People who drink consistently report a higher number of sex partners (26) and a lower rate of condom use (23, 26). Alcohol is a concern when it is consumed prior to sex with an occasional sex partner (23). Heavy alcohol consumption is identified as a problem in many migrant communities (1, 15, 17, 22, 27, 28). Drinking is not only part of a social routine or a way to relax , it is also linked to the idea of *machismo*, the sense of male pride

(14). With studies showing up to 52% of migrants drinking alcohol before or during sex, this is a risk factor that should not be ignored (17).

Drug Use

Drug use, although limited to certain groups, can be found in farmworker communities. Farmworkers use drugs as a way to unwind, offset the stress of working in the fields, and increase productivity (12, 14, 17, 27). In some camps, drugs are as readily obtainable as alcohol. As is common in the commercial sex work arena, crew leaders are often responsible for providing the drugs and may even encourage their use (29). In some locations, people enter the camps for the sole purpose of selling drugs to the farmworkers (14), most likely with the hope of getting them hooked. Methamphetamine, also know as *meth*, *crystal*, *tina*, or *ice*, is popular among farmworkers because of its stimulant effect and may increase in use (27, 30, 31). Other drugs found in farmworker communities include speed, crack and marijuana, which may be combined with alcohol consumption (27).

Although less common, injection drug use can be found in some farmworker communities. This carries an increased risk because of the potential for sharing unsterilized needles, an important route of HIV infection. Users of injection drugs may also engage in other high risk behaviors such as sex for pay as a way to pay for their habit. Many injection drug users share unsterilized needles and engage in high risk sexual activity, such as unprotected sex (1).

Lay Injections

Many Latino migrant farmworkers participate in lay injection practices (1, 19, 20, 21, 32, 33). Lay injection, which is distinct from the injection of recreational drugs, is the practice of injecting vitamins and antibiotics by members of the community who have no medical training (32). The injection of antibiotics and vitamins does not carry an inherent risk of HIV transmission; the injections become a health risk when needles are shared without being sterilized. Many Mexican farmworkers seek out these remedies, believing they are stronger than pills, but US doctors are at times unwilling to administer injections. If they are unable to obtain injections from health professionals, migrants will secure injections from community members (32). When there is a lack of syringes, lay injectors reuse needles and syringes, which are often not cleaned properly (21, 32). This inevitably increases the risk of transmitting HIV, along with other blood-borne pathogens.

SOCIAL AND CULTURAL RISK FACTORS FOR HIV/AIDS

Stigma and homophobia

Stigma and homophobia act as powerful barriers to HIV prevention, particularly in isolated, rural migrant Latino communities (34, 35). Stigma may keep farmworkers from accessing prevention services, obtaining testing, or discussing HIV. They fear that doing any of these activities would signify that they are infected, engage in risky behaviors, are unfaithful, or are homosexual (36, 37). Stigma may also impede safer sex discussions, exchanging status information, or negotiating condom use. People living with HIV/AIDS in the farmworker community fear that revelation of their status will lead to ostracism of themselves and their families (38). Additionally, the stigma that surrounds HIV and risk behaviors can make data collection difficult. Thus, getting an accurate picture of the depth of HIV prevalence in this community is challenging (13, 37, 39).

Latino MSM experience homophobia from both the broad US culture and the Latino community. This internalized homophobia may cause them to hide their sexual orientation, thus affecting their self-esteem and openness to discuss prevention methods and seroprevalence

status, and their willingness to get tested. (39, 40, 41). Latino MSM who are the insertive partners (penetrators, or "*activos*") often do not identify as homosexual because they are taking what they perceive to be the dominant sexual role (39). This may lead to a false sense of security (i.e., I am not homosexual and only homosexuals are at risk for HIV).

Traditional gender roles among Latinos

In many Latino marriages and sexual relationships, the expectations and rights of a partner are determined by traditional gender roles. In the farmworker community, these gender roles are often dictated by the twin doctrines of *machismo* and *marianismo*. *Machismo* implies strength and family protection (42), but also contributes to unequal power distribution in male/female relationships and in the workplace (43). *Machismo* may increase HIV risk by leading Latino men to feel a sense of justification in sexual promiscuity, resistance to condom use, and denial of MSM activity (44, 45). Reluctance to use condoms often stems from a sense of invulnerability, concern about lack of pleasure, or fear of erectile dysfunction. Thus, condoms are viewed as an assault on one's masculinity and manhood (46).

Similarly, Latina farmworkers may not feel they have the right to request condom use because of *marianismo*. In *marianismo*, a woman's gender identity is tied to the qualities of the Virgin Mary, including fertility and the importance of being perceived as a "good" or "decent" woman (44). Women who are traditional, submissive, and/or dependent may lack condom negotiation skills, or they may have partners who are unreceptive to condom use. Suggesting condom use may endanger the women's relationship with their partners or result in physical harm (46). In addition, some women prefer to ignore their HIV risk because it implies their partner's infidelity, or because they associate HIV with homosexuality, sex workers, and drug use (13, 46).

Acculturation

About 25% of farmworkers have been in the US for less than one year (47). Customs and behaviors common in the US are thus foreign and often confusing to them. Even when they have been in the US for a few years, isolation and separation from local communities lead to continued low acculturation. Low acculturation can directly and indirectly influence a number of HIV/AIDS-related risk factors. For many farmworkers, low acculturation is associated with lower use of testing and health services, less frequent condom use, discomfort in English-dominant environments, and increased depression, alcohol and substance abuse, as well as patronage of and employment in commercial sex work (1, 43, 44, 46, 48). Also, both married and unmarried Latino men with low levels of acculturation are more likely to have multiple sex partners, and less acculturated Latina women have the lowest rate of condom use (49).

STRUCTURAL RISK FACTORS FOR HIV

When looking at HIV/AIDS it is easy to blame individual-level risk factors like lack of HIV knowledge, lack of condom use, or lack of desire to practice safe sex, for the continued transmission of HIV. However, an individual's behavior is not the only factor putting them at risk; often there are structural/environmental factors at play that an individual has little control over. By looking at these structural risk factors, it is possible to examine the risky environments, particularly those exhibited in farmworker communities that also impact HIV transmission by limiting the power a person has in making safe decisions. Poverty and social discrimination can place people at risk for contracting HIV by creating risky environments that impact specific health outcomes. The prevention of HIV must take into account both structural and individual risk factors in order to curb the pattern of transmission.

Access to and utilization of health care is a serious problem for many farmworkers. Only about 18% of workers received services at the federally-funded migrant health centers in 2006. Overall, fewer than 20% have employer-provided health insurance. The majority of the remainder do not qualify for Medicaid or other government assistance and must pay for their health care out-of-pocket, often difficult to do on a farmworker's limited income (50). Farmworkers tend to forego health care unless they can pay for it, and are likely to prioritize work over health care if their clinic or service provider does not offer weekend or evening hours. Limited access to health care increase farmworkers' risk for HIV/AIDS because they may not receive important health education, timely HIV testing, and positive reinforcement for preventive behaviors such as using condoms, limiting the number of sex partners, and using clean needles.

Poverty and social discrimination can increase a person's powerlessness, which in turn can lead to a higher risk of HIV infection. Men who experience poverty, racism, and homophobia are more likely to engage in high risk behaviors, for example, having unprotected anal sex with non-monogamous partners (51). Financial hardship, defined as running out of money, having to borrow money for basic necessities, or having to look for work, has also been linked to an increased risk of HIV infection (1, 17, 51). Economic concerns increase stress and the need for survival strategies such as trading sex for money or other basic needs (1). They also increase the perception that HIV infection is inevitable and cannot be controlled (51). Stressors like poverty, poor housing conditions, being away from family, language barriers, racism and discrimination, and isolation make farmworkers more susceptible to mental health problems (12), all of which in turn put them at a higher risk for HIV infection.

CLINICAL IMPLICATIONS

As outlined above, HIV/AIDS is a concern for both male and female farmworkers, requiring positive action to promote prevention, assessment, and treatment services. Farmworkers are frequently unaware of their HIV risk and may not admit to partaking in risky behaviors. Language and cultural barriers play a role in all aspects of prevention, testing, and treatment, and should be taken into consideration throughout the process (12). Clinicians need to be aware of the risks that exist within the agricultural community and provide information and testing in a culturally appropriate manner.

When indentifying risk factors, it is important to realize that MSM activity is often stigmatized in the Latino culture, and many men do not admit to engaging in sexual relations with other men for fear of being ostracized by their family and community. However, it is a fact that men are engaging in sex with other men regardless of whether they consider themselves gay or straight.

Sex is not often discussed openly within the farmworker community, and many patients will be nervous or uncomfortable discussing these matters with a physician, especially a physician of the opposite sex. Care must be taken when broaching the topic of multiple sex partners, sex with sex workers, and condom use in order to offer assistance without offense. This is especially important with female patients. Within the Latino culture, women often do not discuss sex with their friends or family, and may be uncomfortable discussing such matters with a stranger. However, it is important to educate women that they are at risk for HIV, even if they are married, and to teach the importance of condom negotiation skills.

High alcohol consumption, which has been identified as a risk factor in the farmworker community, is a serious problem in a small but significant number of laborers. Many times it is

difficult to ascertain how much drinking is occurring because there is a tendency to drink a lot in one sitting, but not necessarily on a regular basis. Therefore, when assessing alcohol consumption it is important to not only ask how often a person drinks, but to also consider how much a person drinks at a time and how that varies by circumstances.

HIV testing should be incorporated into regular medical screenings (52). Physicians and health service providers are vital to early detection and should be offering testing at every opportunity. HIV is still stigmatized within the farmworker community, therefore getting an HIV test still has negative perceptions associated with it (52). By offering testing in routine medical screenings, the stigma surrounding HIV testing may dissipate. The use of rapid testing technology is especially appropriate for this population because it makes it possible to do the testing and counseling in the same visit. (53) Even though conventional testing is still needed to confirm the findings, studies have shown that individuals are more likely to return for the follow up visit after a rapid test than if only the conventional test is conducted. (54)

A positive result on an HIV test is only the beginning of a long and difficult process. HIV treatment needs to be continuous, and farmworkers who are HIV+ need to receive their medication on a regular basis no matter where they are or where they are going. Physicians should familiarize themselves with the treatment options available in their health center, their community, and other communities as well. Workers who migrate will need to find a new source of medications every time they move to a new location, even if only for a short time. They may also need assistance in affording the very expensive medications. The AIDS Drug Assistance Program (ADAP) is a government-funded program that provides medication assistance to low income individuals who are not covered by insurance or eligible for Medicaid (55). Eligibility for ADAP is not dependent upon residency or citizenship status, but income and other guidelines do vary by state (see "The Access Project" in *For More Information*, below).

RECOMMENDATIONS

- HIV testing should be included in routine health care, preferably point-of-service rapid testing
- Outreach staff should provide preventive education on HIV/AIDS
- Health care providers and outreach staff should encourage consistent condom use
- Migrant health centers and providers should identify a local network of treatment and service resources to which HIV+ farmworkers can be referred for follow up.

FOR MORE INFORMATION

Websites:

- Migrant Clinicians Network: HepTalk Project for information on how to address sensitive risk topics. http://www.migrantclinician.org/hepatitis.

- The HIV/AIDS Program: Ryan White Parts A-F: http://www.hab.hrsa.gov/aboutus.htm

- Farmworker Justice: HIV/AIDS and Migrant Workers: http://www.farmworkerjustice.org/Health&Safety/HIVAIDS.htm

- The Body Pro: HIV Resources for Professionals: http://www.thebodypro.com/index.html

- California HIV/AIDS Research Program: California-Mexico AIDS Initiative: http://chrp.ucop.edu/ResInitiatives/Cal_Mex.html

- California AIDS Prevention Studies: Current Research on Immigrants (several documents): http://www.caps.ucsf.edu/articles/article.php?kw=immigrantsmigrants

- The Access Project (http://www.atdn.org/access/index.html) provides links and phone numbers for HIV/AIDS patient assistance programs, including ADAP, for all 50 states plus Washington DC, Puerto Rico, and the Virgin Islands.

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Acknowledgements:

This publication is a joint project of Farmworker Justice and Migrant Clinicians Network, supported by the Health Resources and Services Administration's Bureau of Primary Health Care.

The contents of this publication are solely the responsibility of Farmworker Justice and Migrant Clinicians Network and do not necessarily reflect the official views of the Bureau of Primary Health Care or the Health Resources and Services Administration.

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ENVIRONMENTAL OCCUPATIONAL HEALTH SECTION

U.S. EPA Honors The Migrant Clinicians Network!

The U.S. Environmental Protection Agency's Office of Children's Health Protection and Environmental Education recognized **the Migrant Clinicians Network (MCN)** as one of 12 honorees to receive a 2008 Children's Environmental Health Champion Award for outstanding commitment to protecting children from environmental health risks.

A special awards ceremony and reception was held on October 22, 2008 at the Churchill Hotel in Washington D.C. to honor the Children's Environmental Health Champion Award winners.

MCN received an Champion Award for its accomplishments minimizing the number of migrant workers and their children that are exposed to environmental hazards, increasing the knowledge of migrant workers and their families of environmental hazards, increasing knowledge of migrant clinicians, head start personnel, and outreach workers of various environmental hazards, and creating sustainability in VA by developing relationships and products that are now in place to continue educating the migrant community in VA Eastern Shore and throughout the Region.

"Protecting children from environmental health risks is fundamental to EPA's mission to protect human health and the environment. While EPA takes actions to ensure that children have clean air to breathe, clean water to drink and safe food to eat, we recognize the important role that others have to protect children from environmental threats. The Children's Environmental Health

Champion Awards recognize individuals, communities and organizations for their leadership in making our environment healthier for our children. This year's 12 Champions demonstrate strong commitment to children's environmental health, and EPA is proud to be recognizing them for their dedication and leadership," said Ruth McCully, Director, Office of Children's Health Protection and Environmental Education.

Add your own quote: "MCN strongly believes in the link between children's health and their environment," said Edward Zuroweste, MD, MCN's Chief Medical Officer. "MCN is raising awareness about the importance of protecting children in our community from environmental risks and our example illustrates that taking action is the most effective means to keeping our children healthy."

MCN has partnered with Region 3 since 2004 providing education to health care providers, outreach workers, migrant farm workers and the community about children's environmental health and how to minimize potential environmental exposures; and building capacity to address children's environmental health for migrant farmworkers in Virginia. In their most recent project called Mi Casa Es Su Casa, funded by Region 3, MCN partnered with a local migrant head start program to recruit and train 6 promotores de salud on children's environmental health issues. These promotores then educated approximately 400 farmworker parents about four environmental topics – lead, pesticides, indoor air quality/asthma triggers and water/sanitation. MCN developed an in-home needs assessment and trained the promotores to conduct these assessments. About 76 in-home needs assessments were conducted and education and training were provided as appropriate. The most notable accomplishments thru the needs assessment was the gained knowledge and changed practices from the analysis of pre/post test – 63% reported change in bathing practices and taking off their shoes before entering homes thus minimizing exposures to their children. MCN developed a short video and radio dramas on the subjects: pesticide safety, pest control in the home, water and sanitation, and indoor air quality/asthma triggers. The radio novellas are available on the MCN website http://www.migrantclinician.org/excellence/environmental .

In two years, MCN reached more than 600 migrant farmworkers and their family members on Virginia's Eastern Shore. This project provided Region 3 with its first baseline information on some of the environmental health issues facing children in the migrant community. MCN's efforts resulted in significant gains in knowledge and behavioral changes on the part of migrant farmworker families.

The Migrant and Community Health Center that participated in these trainings will partner with MCN in 2008-2009 in its Saving Lives by Changing Practices program, with a focus on perinatal care and environmental health. *Saving Lives by Changing Practices* is a cooperative agreement with the Office of Pesticide Programs. The program works to change clinical practices regarding the recognition and management of environmental exposures and injuries through in depth partnerships with Migrant and Community Health Centers throughout the United States.

This will be the fourth year for the Office of Children's Health Protection and Environmental Education (OCHPEE) to hold the Children's Environmental Health Champion Award program. EPA established the Children's Health Program in May 1997 to make the protection of

children's health a fundamental goal of public health and environmental protection in the United States. OCHPEE supports and facilitates Agency efforts to protect children's health from environmental threats. The awards program recognizes individuals and organizations for their activities that protect children from environmental health risks.

For more information about the Children's Environmental Health Champion Award, visit EPA at www.epa.gov/children.

New Resource from MCN!

Poco Veneno...¿No Mata?

MCN together with the Center for Environmental Resource Management in El Paso, Texas is pleased to share our newest pesticide comic book, *Poco Veneno...¿No Mata?* The comic book features a story about a family with a child who was poisoned in the home by pesticides. Through the family's encounter with a local clinic and an in-home visit from the neighborhood *promotora de salud*, the comic book offers information on what pesticides are, why one should be concerned about pesticide exposurse, how to minimize pesticide exposures and how to respond to a pesticide poisoning. It is written in simple Spanish with cartoon drawings.

This resource was designed as part of MCN's Pesticide Education Project, funded by the Paso del Norte Health Foundation. MCN provided technical assistance to six organizations implemented community-based pesticide education interventions in El Paso County, Texas, Doña Ana County, New Mexico and Cd. Juárez, Mexico. The organizations asked MCN to create a pesticide educational resource that addressed the urban and peri-urban realities of pesticide use and safety in the Paso del Norte region. This includes the use of *polvo de avion*, a methyl parathion based powder that, although banned, is commonly used in Cd. Juárez.

We welcome your visit to the MCN website www.migrantclinician.org, where you can download this resource and give us feed back.

Editor's Note: The following is excerpted testimony from former MCN Board Member, Matthew King, M.D. to the House Committee on Ways and Means about his experience with VISTA, an Open-Source Electronic Medical Record.

Testimony Before the Subcommittee on Health of the House Committee on Ways and Means

Statement of Matthew King, M.D., Chief Medical Officer, Clinica Adelante, Inc, Surprise, Arizoza

July 24, 2008

Background

Clinica Adelante, Inc (CAI) is a Community Health Center located in the Phoenix, Arizona area. We have seven sites that serve both urban and rural populations and a mobile clinic that serves remote areas of Maricopa County. The clinic has 26 providers, including family practice, pediatricians, internists, OB/Gyn, mid-levels, and dentists. We see about 32,000 individual patients annually and about 90,000 encounters. 50% of our patients are uninsured, 40% Medicaid, 3% Medicare and the rest commercial insurance. We provide sliding fee services to those at 200% FPL or below.

In 2000, I took over as Chief Medical Officer for the clinic. CAI was engaged in National Chronic Disease Collaboratives sponsored by HRSA. We used Wagoner's Chronic Disease Management Model[1] to improve care for some of our diabetics and asthmatics, which has been successful in showing dramatic improvements in chronic disease outcomes. The model utilizes patient education, nationally recognized treatment guidelines, a rapid process change model known as PDSA cycles and a chronic disease registry. The registry is a critical piece of the model because it can be used to track the population and also provide a means for outreach. However, it is not designed to be used in the exam room with the patient, so the patient data needs to be entered manually into the registry later. This double entry of data--once in the exam room and once in to the registry--is error prone, time consuming and costly.

Our desire was to extend the model to everyone that walked into the door so that each patient could have their own personal health plan based upon their age, sex, risk factors and disease states. However, we faced two main challenges. First, because the registries required double entry, we estimated that we would need to hire 24 more data entry specialists; however, we did not have the funds to do so. Second, the time required to do the preventive health would have a negative impact on our revenue. We knew that we needed to find an EHR solution that was relatively inexpensive and could support data entry into a registry without double entry; because it could be used at the point of care.

The Search for an EHR Solution

We started a search for an EHR. The search was disappointing: The products were very expensive, between $200,000 to $500,000, and they really didn't perform chronic disease

management out of the box well without expensive customization; and they were deployed in a consumer unfriendly environment that included consumer hostile contracts, vendor lock, poor interoperability, and a licensing and support structure that negated the natural leverage of collaborative networks. Because of my prior exposure to Linux and other open source products, I wondered if there were open source solutions that would address the clinic's needs.

I would like to stop for a moment to discuss what Open Source means in the context of Health Information Technology (HIT). Open Source software allows one to see the source code and is freely available. The Open Source license used by organizations such as WorldVistA guarantees that not only is the code available to be examined, it is also available to be enhanced by the community and the enhancements cannot be lost or trapped in a proprietary product for the sole benefit of one vendor and its customers. Improvements must be donated back to the community of users. Enhancements to the code can come from volunteers, vendors, funded projects, IHS, VA, etc. These enhancements are checked by experts and only released after review. The important points here are that innovations can come from many sources, collaborative development compounds the value and effectiveness of investments, and the processes are transparent, organized and safe.

The following is a list of what we perceive through our direct experience to be some of the key benefits of the open source model in healthcare:

1) Software quality and standardization accelerated by transparency - The transparency of the code assures better software quality and conformance to coding standards and security. Security flaws are more likely to be found and quickly addressed, often within hours of discovery. Non-conformance with open standards is not tolerated by both developers and users.

2) Rapid innovation and improvement -The improvement cycle needed to keep the software current in response to the dynamically changing healthcare environment is much more rapid than in proprietary business models.

3) Improvement driven by user needs - Enhancements and fixes are directly driven by what users need, not by marketing, shareholder or other non-healthcare related priorities. Community Health Centers, for instance, can drive changes to update their UDS reporting, while a proprietary vendor might not have the business case to make the code changes.

4) Lower total cost of ownership - No licensing fees mean less upfront and lower total recurring costs.

5) Competition focused on service excellence - Flexible support fees mean greater chances to leverage technology. For instance, if support fees are fixed by number of servers, not providers, every provider assigned to that server will spread the costs over more and more users. In the traditional model, every provider added to the system will cost another license and more support fees.

6) Collaborative leveraging of resources to improve “products” - Open source means quality management tools, clinical tools, interfaces, training and deployment materials are all shared. Going forward, the costs to participate are less and less.

7) The ultimate competitive free market economy - Vendor competition in open source is not distorted by the effect of vendor lock in. Open source prevents vendors from actively and purposefully using closed code to maintain their advantage over clients. Vendor competition encourages fair support pricing, great customer service and innovation. It also provides the consumer with a way out if the vendor goes out of business or is not responsive. Open source is a simple survival of the fittest business ecosystem which is driven and focused by evidence based improvement of both health quality and costs.

Taken in aggregate, these advantages create strong financial and quality incentives to join cooperative networks and collaborate. This in turn accelerates improvement of safety and quality through best practice sharing and reducing isolated islands of healthcare data.

Our search for an appropriate EHR led us to VistA in 2000, while researching open source alternatives. Unfortunately, at the time it was nowhere near ready for easy deployment outside the Veterans Administration (VA) so we continued to search for a solid EHR in the usual ways, but found the process disappointing. The process is not unlike being detailed by a pharmaceutical representative, so I started wondering what I could learn by comparing the two. Most physicians don't prescribe medicine based upon what the drug representatives tell them. Instead they use an evidence-based approach. This is now an expectation and considered a standard of care in medicine, because evidence-based medicine saves lives. According to the Institute for Healthcare Improvement, nearly one third of all medical errors could be prevented by applying appropriate technology[2]. So applying technology can save as many lives as prescribing aspirin after a heart attack! I began to wonder, is there an aspirin of electronic health records? What does the evidence based literature say about EHR and impact on quality? Is there one in particular that stands out? Shouldn't applying the medical evidence to the choice of HIT be the standard of care since it, like aspirin, can potentially save so many lives? What I found in the literature shocked me.

It turns out that a search of the peer reviewed medical literature shows that the VA VistA EHR system is one of the only EHR systems that has been associated with improved outcomes. By contrast, the literature says almost nothing about proprietary systems and outcomes. Moreover, VA’s costs only went up 0.8% between 1995 and 2004, while Medicare costs increased by over 40%[3].

Once we understood the role of VistA in the VA's transformation and performance our search was over. In addition we also became aware of the CMS VistA Office EHR initiative, the WorldVistA not-for-profit and the efforts to adapt VistA for use outside the VA. This work would ultimately lead to WorldVistA providing a CCHIT version (WorldVistA EHR) licensed under an open source software license. The only open source EHR to achieve CCHIT certification is WorldVistA.... Suddenly the advantages of the open source model would be available using a CCHIT certified VistA clone!

Clinica Adelante's WorldVistA EHR Implementation Strategy

So after applying evidence-based studies and recognizing the importance of an open source model in healthcare, we chose WorldVistA to do a demonstration project. We developed a relationship with WorldVistA and became a development site during the CMS project. A key contribution our site made was to pilot a full open source platform which included the open source operating system Linux, and the open source database GT.M to further cut licensing costs.

We leveraged and made use of the extensive resources and documentation which the VA makes available through a number of public web sites such as the VistA University training materials. Other examples of leveraging the open source model include:

- modifying an installation checklist found on the VA documentation website for our use to direct our installation efforts
- developing an open source interface to our practice management system (PMS) for registration and scheduling
- integrating test ordering and results reporting with our external reference lab; our providers order labs in WorldVistA EHR and the results return as discrete data directly into WorldVistA EHR
- development of chronic disease registries that allow data to be entered at point of care and reported in many forms including a HIPAA-stripped form for uploading to state and national chronic disease databases
- implementation of real time drug order checks, automated clinical reminders and automated provider alerts
- development of pediatric templates, including state approved EPSDT forms

We formed 4 teams, using our staff and external consultants to help with the work and build buy in, including our key stakeholders early in the process. We hired a clinician to a training role and hired trainers to train him. The preparation phase took 8 months and we went live August 10, 2007 in Surprise, AZ at our busiest clinic.

Outcomes and Costs

Initially, as with any intervention of this magnitude productivity declined... in our case to 50% of our usual level in the first week, but it recovered to 85-90% in six weeks. We are now at 100% productivity at our first site. Our referrals department can now do 10- 15 referrals per hour, compared to only 6 per hour before implementation. We don't lose medical records any more and they are always available for the patient visit when we need them. We lost no staff or providers as a result of the project. Staff immediately loved the system, but the providers only tolerated it at first. Now, no provider desires to return to the old way or to paper charts.

Our registry functions also appear to be very successful. We now have two registries—one for diabetes and another for asthma--configured. Now 100% of qualified patients are selected

automatically for entry by the computer. This will allow planned care to be scaleable to 100% of our patients without hiring extra data entry specialists. We will be able to provide outreach and improved chronic disease management to a much larger population of patients. For instance, when we used the registry that required double entry, we were only able to use Wagoner's model on about 800 diabetics. Now we can use it on all of our patients with Diabetes. That is over 3000 diabetic patients. We will also be able to extend the Chronic Disease Model to other types of chronic disease, like depression, coronary artery disease and hypertension. Eventually, we hope to give every patient their own personal health plan, using the VistA registry technology.

We were very cost conscious with the first implementation. We had no special grants. Our development costs were approximately $19,000 dollars, plus hardware costs. This does not include the salary of the trainer. Nor does it include lost revenue from staff meetings and lowered productivity, or my time as project leader. To achieve this, I spent most of my administrative time, evening and weekends working on the project. It is doubtful that others can expect to achieve what we did with the same budget, nor should it be so difficult to do the "right thing" by patients.

Since the demonstration project, we have also implemented our EHR at another site and also with the (mobile) rural health team. We are developing a 16 week implementation cycle that can be staggered to allow two implementations in different phases. We have started a network with two other community health centers and a small safety net non-federally qualified clinic. Although the demonstration project allowed us to show clinical success and estimate reduced costs compared to proprietary systems, the project has stalled without more funding. Our analysis of sustainable costs show a savings of 30 to 50% over proprietary systems, perhaps more as the network grows larger. Even so, this cost remains out of reach for most offices. Ultimately, we view the EHR as a tool to reduce medical errors, improve patient care and stabilize the costs of healthcare. Developing these strategies is possible with systems like WorldVistA EHR, but are unlikely to co-evolve on their own. Proper planning, adequate funding and well designed incentives are all necessary to drive projects like these forward. In fact, without more funding, we will not be able implement WorldVistA EHR across all our network sites. This network represents a quarter of a million patient visits a year—that is a lot of patients who we *could* be reaching and whose care we *could* be improving with health IT but which we cannot, because of lack of funding.

Based on our practical experience, our view is that VistA is hands down the best system available, is the only solution backed by solid scientific evidence to prove it, and costs 50-70% of the costs of comparable proprietary systems. The fact that it is open source and was developed by with taxpayers' money makes it a logical and very affordable choice for a large segment of the US health system.

Health Improvement through health IT and the need for incentives

Health improvement through health information technology is a tough sell to providers in general because it temporarily affects productivity as providers learn how the use the system. Moreover, any cost savings (like less ER visits because of better control of asthma) are realized downstream from the user and tend to accrue largely to the patient and the health care purchaser.

Incentives are a very powerful tool to effect change that successful businesses use all the time. In this context, it is the fastest way to increase the rate of provider adoption for health IT.

Incentives certainly could increase the rate of adoption, but just giving incentives for EHR acquisition will not improve quality. Incentives must be tied to quality improvement or reporting clinical measures to have the desired effect. Connecting offices through networks tasked with quality improvement would work. The most innovative approach would be to move completely away from volume based reimbursement to value based pay. Pay for performance is a step in the right direction, but still relies on volume.

However, it is important to note that quality incentives need an adequate HIT infrastructure with enough connectivity and sufficient granularity to report clinical measures at the provider level. This is why as a first step, I believe it is important that provider incentives be tied to the adoption of EHR systems. I believe further that EHR systems should support these important clinical and quality reporting functions.

In addition, a provider might need time and support to get used to the system and learn to use it effectively. This is why I believe provider incentives should encourage network membership. Networks are better prepared than small offices—much less solo practitioners working on their own—to evaluate EHRs for the necessary functions, have the capital to customize them as needed and the expertise to deploy them, secure them and support them. Networks can also better connect with existing HIE, Medicaid transformation grant projects, labs and other ancillary services, etc. Provider support and clinical improvement will be greater with network formation and will also achieve the goals of better connectivity and improved quality.

Myths about VistA and open source applications

Before I conclude, I want to dispel the many myths floating out there about the VistA system and open source applications in general.

Myth #1: the M coding language is too old to be used in a modern healthcare system. This is false and most large proprietary healthcare vendors, Epic for example, use it. There are many innovations taking place outside the VA right now that show the robust and flexible nature of the M based code.

Myth #2: Open source is unfair in a competitive market. Open source stimulates competition unlike proprietary systems whose goal is to lock in users and monopolize the market. Proprietary systems are only in a competitive market until the client signs on the contract line. Then the relationship becomes very lopsided. I have been to many Health Information Conferences and have listened to the best speakers. They always say deciding on a healthcare vendor is like getting married, because it will be a long-term relationship. It is very difficult to change vendors because of vendor lock. Then they talk in the remaining hour about all the “pre-nuptials” you must get because you can't trust any of the vendors. Open source has competition at multiple levels, but primarily on support services and training which are the most important factors in successful and sustainable adoption of a solution. In the case of WorldVistA EHR both large and small companies can compete against each other with the same a high quality, CCHIT system.

Large companies are definitely interested, too. For instance, a major US systems integrator has just won the contract to provide all of Jordan's public health system (46 hospitals, 500 clinics) with the WorldVistA EHR. With open source vendor competition, you reduce price, eliminate vendor lock and improve customer service. Open source is a true free market.

Myth #3: The VA code is too expensive to maintain. VistA, under the open source model has flourished. Clinica Adelante was able to fund an extraordinary amount of customization for a moderate amount of money. Moreover, these enhancements are available for other offices for the price of configuration and support. Some of the code done by WorldVistA has found its way back into the VA system. There is an extraordinary opportunity for governmental agencies like the VA and Indian Health Service to work with private businesses and not for profits to further their missions.

Myth #4: Open source applications are more vulnerable to security breaches. Because open source code is transparent, there is a myth that it is insecure. This has not proved true at all. Breaches are often a result of poor coding practices. The transparency of the code demands that peers code to the highest levels. Moreover, it is scrutinized by expert before it is released. The result is clear: Nobody runs anti-viral software on (open source) Linux, nor do they need to. Everybody runs anti-viral on Windows (closed code) and they would be crazy not to. Moreover, with so many eyes looking at the code, more security flaws are found before breach and more quickly corrected, often within hours.

VistA is the aspirin of EHRs

VistA is the aspirin of EHRs and if it was a drug, every provider would prescribe it. But just like generic aspirin, there are no “drug representatives” or lobbyists to sell it. Its effectiveness is clearly supported in the literature, but administrators don't have time to read the literature. So they listen to the sales pitch and the lobbyists. In the healthcare industry, that could cost lives. In healthcare, when lives are at stake, I believe we should hold ourselves to the same standard we hold our physicians and use the evidence whenever possible to evaluate and select technology solutions...not advertising or marketing hype. And that is why Clinica Adelante chose VistA EHR.

[1] Rothman AA, Wagner EH. Chronic illness management: what is the role of primary care. *Ann Intern Med* 2003;138: 256-61

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