Mobile Health Units: Review of the Literature

Baltimore Healthy Start, Inc.
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Introduction

This review was commissioned by Baltimore City Healthy Start, which has expressed an interest in incorporating the use of a mobile health van to provide services for hard to reach members of its intended service population. The review examines (1) what is known about the need for mobile health units (MHUs) in general, (2) the types of services provided via mobile MHUs, (3) the intended service populations, (4) evaluation and feasibility studies, and (5) reports on the practical considerations that must be considered when planning to create and operate such a facility. As Healthy Start is most interested in how mobile units might be used to serve pregnant women and infants, the review highlights examples of programs with experience operating MHUs to address maternal and child health needs.

Overview

Mobile health units are not a new phenomenon. This venue for delivering health services is an accepted practice for reaching hard to reach populations. Frequently the impetus for the provision of services (educational or medical/clinical) through the use of mobile health units (MHUs) has a public health focus. Over the last four decades, MHUs have been used globally to fulfill many public health purposes (i.e., infectious disease control, vaccinations and health education) and have increased access to care for many underserved segments of the population (Hall, 1991; Vos, Borgdorff and Kachidza, 1990; Droste, 1989; Walsh and Warren, 1979; Grant, 1965). The units provide the flexibility that stationary sites do not, often operating in ways that address temporal, geographic and cultural barriers to health care utilization. The units may travel to locations that are convenient for the population in need, making services more accessible. Operating in rural communities, MHUs address the geographic barriers to accessibility (Alexy and Elnitsky, 1996; Wright, 1976; Bodenheimer, 1969). In urban communities, such portable facilities have been used to address cultural, temporal and other access barriers via community outreach to hard-to-reach populations such as low income families, new immigrants, the homeless and persons with mental illnesses or substance abuse problems, as well as vulnerable populations such as pregnant women and the elderly (Rosenblum, Nuttbrock, McQuistion, Magura, and Joseph, 2002; Reguero and Crane, 1994; McGee, Morgan, McNamee and Bartek, 1995; Rodriguez, Appelt, Young, Fox, 2007).

Types of Services

There are a variety of service delivery configurations utilized by organizations that operate mobile health units. Services range from comprehensive primary care to discrete selected services. For example, tertiary care facilities (hospitals) and stationary clinics may use MHUs to provide basic primary care services or specific screening services such as cancer screening (e.g., mobile mammography services), hypertension and diabetes screening, and to extend wellness services (e.g., provision of immunizations -- childhood, influenza and pneumonia) to vulnerable populations (children and the elderly) (Rodriguez, Appelt, Young, Fox, 2007; Postema, Breiman and National Vaccine Advisory Committee, 2000; Higgins, Walls, Fisher, Smith and Humphries 1991).
The lack of health insurance is frequently cited as the primary barrier to health care. However, a number of other social, cultural and environmental factors limit access to health care in the U.S especially for the growing minority population – transportation, discrimination, cultural values, lack of culturally appropriate services, language barriers, religious differences, and dissatisfaction with health provider in particular or distrust of health system in general. (Umar, 2003; Davis, 2000; Chapman 1999 and Meadows, 1999).

In a study examining the perceived barriers for early prenatal care among low income pregnant women, the women most frequently cited depression or unhappiness about pregnancy (44.3%), long waiting times at the clinic (35.1%), transportation (26.1%) and crowdedness of clinic (24.6%). The most difficult barriers that the women reported were embarrassment about being pregnant, poor image of the health facility, not wanting family and friends to know about the pregnancy, disliking previously received health care and distrusting the health care system. (Cook, Selig, Wedge, and Gohne-Baube, 1999).

Mobile Health Units often actively include strategies to address the social, cultural and personal barriers as expressed by these women. Vulnerable and hard-to-reach populations have been found to be more responsive to “alternative” health care delivery venues and methods. The non-traditional nature of such environments tends to foster an atmosphere that service recipients

<table>
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<tr>
<th>Types of Services Provided by Mobile Health Units</th>
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<tr>
<td>• Comprehensive primary care</td>
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<td>o Homeless populations</td>
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<td>o Rural populations</td>
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<td>o Pregnant women</td>
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<td>• Specific health services</td>
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<td>o Dental health care</td>
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<td>• Mammography</td>
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<td>• Colorectal, prostate, cervical</td>
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<td>o Mental illness screening/ outreach and crisis intervention</td>
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<td>o Health Education</td>
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<td>• Obesity – nutrition and physical activity counseling</td>
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<td>• Substance Abuse</td>
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<td>• HIV</td>
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<td>o HIV and STD testing, counseling and prevention education</td>
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<td>o Needle exchange</td>
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A Strategy to Reduce Access Barriers to Health Services

The lack of health insurance is frequently cited as the primary barrier to health care. However, a number of other social, cultural and environmental factors limit access to health care in the U.S especially for the growing minority population – transportation, discrimination, cultural values, lack of culturally appropriate services, language barriers, religious differences, and dissatisfaction with health provider in particular or distrust of health system in general. (Umar, 2003; Davis, 2000; Chapman 1999 and Meadows, 1999).
describe as non-judgmental and welcoming with recipients reporting that they have been treated with more respect and dignity and typically the mobile units employ community outreach staff members that reflect the population to be served (Daiski, 2005; Spanowwicz, Millsap, McNamee and Bartek, 1998; and Reguero & Crane 1994). The importance of how service recipients are treated as a potential access barrier is highlighted in the evaluation of the Health Bus, a mobile outreach health van, serving the urban poor in Toronto, Canada. Even in a community where financial access is assumed not to be a problem (universal health care in Canada), marginalized populations exist, whose ability to access to health care may be impeded by the lack of sensitivity of the health care staff and an unsupportive environment of the facility in which services are received (Daiski, 2005). It appears that the success of the MHU may be contingent upon the facility’s incorporation of culturally appropriate outreach strategies and adequate training in reaching the desired service population in need.

**Evaluation of Mobile Health Units**

The efficacy of mobile health units appears to be generally accepted though few reports of evaluation studies were found in the literature. However, when assessed the evaluation of mobile health units tend to be formative in nature. These evaluations provide descriptive reports on the population using mobile health units, the types of services provided by these units, and the outreach and service delivery strategies employed by these units for the “target” population, as well as report information on the perception of services received. However, such evaluations do not report on the outcome or impact of services. Formative evaluations of mobile health units have substantiated the assumption that providing educational and clinical services via a mobile health unit is a viable outreach method for accessing marginalized populations. Mobile units have been found to address the need for flexibility in service delivery that overcomes geographic, temporal, perceptual, cultural, personal and other barriers to access (Daiski, 2005; Cook, Selig, Wedge, and Gohne-Baube, 1999; Spanowwicz, Millsap, McNamee and Bartek, 1998). The Health Resources and Services Administration reports that outreach is critical to the success of Healthy Start programs, “Outreach workers – sometimes working out of mobile vans – often visit pregnant women at home, the best way to reach the most at-risk women and encourage them to get care” (HRSA, 2006).

Because of the diverse uses of MHUs for screening, immunizations and education there are various measures and intended outcomes that are specific to the purposes of each individual MHU program. Thus performance measures are developed for the particular health issue addressed: breast cancer screening, asthma, mental illness, substance abuse, HIV, STDs and obesity education. These measures are frequently in terms of numbers served as an indicator of “reach”. This differs from efforts to assess the outcome or impact of primary health care units. With the purpose of providing health care service, MHUs have objectives and performance measures that reflect increased access, appropriate utilization and improved health outcomes. An outcome evaluation was conducted on the mobile health van operated by Lucille Packard Children’s Hospital and recently reported in the literature. This and the review of other selected programs are described below.
Lucille Packard Children’s Hospital Women’s Health Van

The hospital at Stanford University Medical Center began operating the Women’s Health Van, a fully equipped mobile health clinic in 1999 to address barriers for undocumented immigrants and the uninsured population. The mobile van provides free gynecological and obstetrical care including STD screening, breast exams, and pregnancy testing on a walk-in basis or by appointment. The van has two exam rooms, an ultrasound machine and lab collection services and is staffed with a board certified physician and nurse practitioner who are both bilingual.

A retrospective study of 108 patients was conducted on women served over a 3 and a half-year period. The outcomes for these women were compared with outcomes of 127 women at other community sites. The study found that the women who initiated prenatal care on the van gained earlier access to prenatal care than the women who accessed services at other community sites, thus supporting the hypothesis that the mobile van can increase early access to prenatal care (Edgerley, El-Sayed, Druzin, Kiernan and Daniels, 2007).

Health Quest Mobile Van

The Health Quest mobile van travels through six rural counties in northeast Indiana to reach those who have no easy access to health care (Garrett, 1995). The self contained unit offered preventive, primary and protective health care services to a variety of rural populations in counties designated by the Indiana Department of Rural Health as rural, a Medically Underserved Area (MUA) and or as having a Primary Care Health Professional Shortage. After two years of operating, an evaluation of the services provided by the van reported improved accessibility for the rural population in the service areas. Based on initial survey results more than 250 people had received primary health care from the mobile unit, 86 % have been women. One hundred and four (104) women (41.6%) from six county service area were asked, “During your last pregnancy, when did you first visit the doctor?” Of the respondents, 84.6 % indicated in the first trimester, 11.5% the second trimester and 3.8% the third trimester. Of those receiving care, 12.4% indicated having no physician and 6.4% of those seen would use an emergency department to treat minor illnesses. When asked, what keeps you from going to a doctor? 35.6% cited no Medicaid benefits, 6.4% reported distance to a provider as a problem, 21.6% reported no insurance, 12.4 % said care was too expensive and 3.6% had no transportation. Specific wants that focused on meeting the needs of women, infants and children yielded the following results:

- 1% received family care
- 4% of the women received prenatal care
- 99% received Women, Infant and Children (WIC) services
- 77% reported being satisfied and would come back
- 38% reported the ease of access to Health Quest was what attracted them to the mobile unit
Project Mother Care: A Model Program to Reduce Infant Mortality

Project MotherCare is a hospital’s response to the high perinatal death rate in New Haven, Connecticut. The Hospital of Saint Raphael implemented a mobile health unit to bring prenatal care to underserved neighborhoods of New Haven and to identify the substance abusing pregnant women and deliver a continuum of services including prenatal care, counseling, social services, and referral to a drug treatment program (Reguero & Crane 1994). Initially the van traveled to seven or eight impoverished neighborhoods in New Haven each week on a regular schedule. These neighborhoods were located in the census tract areas in which most of the infant deaths had been occurring and in which more than one fifth of the pregnant women had either no prenatal care or had begun care after the first trimester. Today the van’s bi-lingual staff provides prenatal care, pediatric services, and primary care for men and women, immunizations, screening of blood samples, nutrition and psychosocial counseling, traveling to four community locations. Clients are seen on a walk-in basis. Clients are screened on initial intake visit. All persons who visited the van are eligible for services regardless of their ability to pay. The program has reportedly been met with great acceptance in the community. The van provides over 3,000 patient visits and over 10,000 services each year and has reported serving over 52,000 persons since its creation (http://www.srhs.org/services/comm_projmothecare.asp)

The Governor’s Wellmobile: Maryland’s Mobile Primary Care Clinic

The School of Nursing at the University of Maryland operates the Governor’s Wellmobile Program (Heller and Goldwater, 2004). There are four Wellmobiles, two on Maryland’s Eastern Shore, one in Central Maryland and one in Western Maryland. Each of the mobile units is equipped with two exam rooms, a CLIA waiver-approved laboratory and an area used for both intake and health education sessions. Traveling to various sites each day, the mobile health units are staffed with nurse practitioner faculty, registered nurses, bilingual outreach workers and professional drivers. Operating with a holistic view of health care, the Wellness Mobile Program provides case management services, assisting those in need with housing, food, medication and any specialty care needs. The most recent statistics report that the program serves 6000 underserved Maryland residents annually. The Governor’s Wellmobile Program also provides service-learning opportunities for students in the undergraduate, graduate and doctoral programs at the School of Nursing. Students conduct community needs assessments, offer health education services, provide direct health care, as well as participate in community-based research as part of their clinical practicum. The program has been lauded for its significant role as a safety net provider for the uninsured and underinsured in the State of Maryland, increasing access to health care to these populations. The Wellmobiles have traveled to the Gulf Coast, providing services to the victims of Hurricane Katrina.

Design and Operational Concerns for Running a Mobile Health Unit

By the early 2000’s the literature reflected a focus on addressing feasibility and cost issues. Published articles were directed at the planning and management of such health units. As with planning any health service, the feasibility of a new service must match and balance the needs of the community with the provider organization’s goals, resources and capacity. Whether to pursue the use of mobile health unit is driven by many considerations. Factors that should be considered in the planning process were culled from the literature (Moulavi, Bushy, Peterson and
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Stullenbarger, 1999 and 2000) and posed as questions which when answered could serve as guidelines for planning mobile health service program. The guiding questions include the following:

- What potential options are there which might achieve provider and community goals/needs, along with benefits, costs and outcomes?
- What factors make mobile health units appropriate for the population to be served?
- Can multiple services be combined in one vehicle or must it be a single service unit?
- Is a MHU more or at least as cost effective as other delivery options? What are the existing resources for funding and maintaining the MHU over the next 2 – 5 years?
- What are the vehicular requirements for the planned unit? How and who can best determine the options?
- What are the staffing needs to operate the unit compared with a fixed or freestanding facility? This includes clinical personnel, qualified drivers, outreach workers and security.
- How can volunteer services be integrated?
- For what types of services/programs have MHUs been successful and unsuccessful? How does the project/venture meet provider’s goals versus needs and expectations of the community?
- What products are available on the market in your geographical region and how are these maintained?

There are aspects of the planning process that are best left to consulting experts to assist with identifying the type of vehicle needed (i.e., towed trailer versus self-contained vehicle) and vehicular requirements (electrical system, external and internal design) to sustain the specific activities of the MHU as well as purchase and maintenance options (Moulavi, Bushy, Peterson and Stullenbarger, 1999 and 2000; and Murphy, Klinghoffer, Fernandez-Wilson, and Rosenberg 2000).

**Conclusions**

There are ample studies found in the literature, reporting on the evaluation of prenatal care and maternal and child health programs. However, this review was limited to specifically look at mobile health units and determine if there is evidence that the presence of such programs has been found to contribute to positive health outcomes in general and specifically to the positive outcomes for programs similar to Healthy Start. Thus, attempts were made to locate evaluation reports and studies on the outcomes for MHUs for this literature review. However, limited reports were found in the literature. This does not mean that such services are not evaluated by their organizational sponsors but may represent more the frequently acknowledged
gap between practice and research. The dissemination of internal evaluations and management reports outside of the organization are not a priority for health care organizations. Clinical care delivery methods once adopted and accepted as appropriate practice are not likely to be the subject of research in academic peer reviewed journals but more likely to be seen as part of internal management reports to be used for strategic and operational planning and technical reports to be shared with funding organizations as well as with similar health services providers. Thus it is likely that there are many reports on the outcomes of mobile health units that have been prepared by the organizations operating such mobile facilities.

A number of Healthy Start programs around the country operate mobile vans as a means of increasing access to cultural competent prenatal health care and support services in their respective communities such as Oakland Healthy Start, DC Healthy Start, Healthy Start of the Heart in Louisiana and Healthy Start Laredo. All Healthy Start programs regularly collect and report performance indicators, which include both process, and outcome measures. However, Healthy Start program evaluation data remains in the realm of internal program reports. Thus, the challenges, benefits and impact that mobile units have on meeting Healthy Start goals appears to go unpublished. Efforts should be made to gather, assess and disseminating the wealth of information from Healthy Start organizations around the country that operate mobile health units to help other organizations understand how mobile prenatal services might be best implemented in their communities. Through the National Healthy Start Association and the Mobile Health Clinics Network, a comprehensive list of programs operating mobile health units might be compiled for the purposes of surveying organizations on the usage of their mobile units as well as any findings from the evaluation of their programs. Additionally, these two national provider associations and the Health Resources and Services Administration (HRSA, a federal funder of health care) might be queried about the availability of technical reports on the performance of mobile health, expanding the scope of available and relevant literature for review.

In spite of the paucity of published literature on the efficacy of mobile health units, the available literature provides sufficient information to conclude that such service delivery models are beneficial. Advantages of MHUs include:

1. The potential to increase the availability of services to underserved populations where access to care is perceived to be one reason for under use of available services. Mobile vans appear to be a valuable tool for effective community outreach.
2. The opportunity to increase and broaden the educational experiences of students training in a health professions program enhancing cultural competence and contributing to a greater sense of social responsibility among health care providers.

Organizations interested in adding mobile health units to their service delivery venues, must plan with full consideration of the initial expenses and on-going operation expenses including maintenance, security, insurance and staffing. The pertinent city and state agencies should be contacted to ascertain what is needed to conform to health, safety, and transportation guidelines. Planners would benefit by hiring experienced consultants to help them fully comprehend the issues involved. The Mobile Health Clinics Network is an excellent resource for obtaining list-qualified consultants. The International Mobile Health Association also provides technical assistance to organizations wishing to establish a model health program.
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Selected Resources

International Mobile Health Association
http://www.internationalmobilehealthassociation.org/default.htm

Mobile Health Clinics Network is dedicated to advocacy that advances access to healthcare through the use of mobile health clinics. http://www.mobilehealthclinicsnetwork.org/index.html

ADI is the builder and designer of Winnebago mobile medical and dental vans. We are a dental company first and foremost combining the expertise of Winnebago Commercial Vehicles to produce your mobile unit. Visit our Web site: www.adi-dentalvans.com

Farber’s Specialty Vehicles. Farber’s seasoned professionals design, build and service mobile medical and specialty vehicles in state-of-the-art facilities. Styles include Commercial Motor Home Shell, Cab and Chassis, Commercial Step Van, Farber Custom Coach, and MCI or Prevost Coach. http://www.farberspecialty.com/

LifeLine owners provide a whole range of community outreach programs. Just some of the uses are: mobile medical clinics, mobile dental clinics, mobile mammography, mobile laboratories, mobile dental units, health testing, telemedicine, and occupational health. http://www.lifelinemobile.com/

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