Mobile Health Clinics in the United States

Reducing Disparities

Improving care | Improving health | Controlling costs

Mobile Health Map

Report for the U.S. Department of Health and Human Services,
Office of Minority Health
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EXECUTIVE SUMMARY

Mobile clinics bring health services directly to those who need it most. There are 1,500-2,000 mobile clinics nationwide. The Health Resources and Services Administration funds more than 200 mobile clinics through its Community Health, Healthcare for the Homeless, Migrant Health and Public Housing programs. However, until recently, the sector has had limited capacity to evaluate its value. In September 2011, the U.S. Department of Health and Human Services’ Office of Minority Health supported Harvard Medical School and the Mobile Health Clinics Association to bring together mobile clinics across the U.S. through Mobile Health Map, a first of its kind collaborative research network. This project has been received with enthusiasm by mobile clinic providers and the media, as well as by federal, academic and other stakeholders. As of September 2012, there are more than 500 participating mobile clinics. Based on this collaboration, it is possible for the first time to describe the scope and impact of the mobile clinic sector in the U.S.

1. Mobile clinics improve access to health services in underserved communities across the country. There are 1,500-2,000 mobile clinics nationally receiving in total 5-6.5 million visits annually. Mobile clinics operate in every state across the country plus D.C and Puerto Rico. They serve communities that have the poorest access to health services in the U.S: rural communities as well as urban communities (15% of clinics serve rural clients, 42% serve urban and 44% serve both); the uninsured and lower-income individuals (57% of visits are by uninsured and 35% are by publically insured) and minorities (35% of visits are by individuals that identify as non-white, while 45% are by individuals identifying as Hispanic or Latino). Mobile clinics are able to reach males as well as females (46% visits by males and 54% visits by females). They reach all ages (of all visits, 41% are from individuals under 18, 50% from those aged 18-65 and 9% from those above 65).
3. **Mobile clinics improve health in underserved communities across the country.** They provide a wide range of services, tailored to communities’ specific needs. Overall, 41% of mobile clinics provide primary care, 38% provide prevention, 29% provide dental care and many also provide mammography, specialty and mental health services.

4. **Mobile clinics save money** through avoiding unnecessary and expensive emergency department visits and through delivering prevention activities. The first eleven mobile clinics that have used the online return on investment calculator have a staggering return of $20 for every dollar invested in them.

**Conclusion**

The mobile clinic sector is an underutilized resource for helping the nation reduce disparities and achieve the triple aim of improving care, improving health and saving health care costs. With the Office of Minority Health’s support, the Collaborative Research Network of Mobile Clinics has been launched and has successfully built the mobile clinic sector’s capacity to evaluate and demonstrate its impact.
The Collaborative Research Network began with an identified need to quantify, assess, and recognize the contributions of the mobile health sector, and developed into a nationwide collaboration. Following is a brief history of this process.

**The Imperative**

Priorities in our push to improve our nation’s health include reducing health disparities between populations while achieving three objectives: improving the health of populations, improving healthcare quality, and reducing per capita costs of health care. Mobile clinics travel to the heart of our communities and provide healthcare services directly to those who need them most but historically have accessed them least. They are designed to overcome barriers due to time, money and trust. The Health Resources and Services Administration funds more than 200 mobile clinics through its Community Health, Healthcare for the Homeless, Migrant Health and Public Housing programs. An estimated 1,500-2,000 mobile clinics operate nationwide, but until now their collective impact has not been assessed, nor has there been much recognition of mobile clinics as an important vector for healthcare delivery. This lack of assessment and recognition formed an imperative for action.

**Mobile Health Map**

In 2006 Harvard Medical School, the Mobile Health Clinics Association and a team of mobile health care providers and researchers joined forces to address this imperative through developing and launching MobileHealthMap.org. This online platform allows the mobile clinic community to aggregate its data in order to document the scope, geographic reach, and the value of the services provided. Funded by Ronald McDonald Charities, Harvard University, and The Boeing Company, the Mobile Health Map team published a prototype tool to
calculate the return on investment calculator for mobile clinics. One study using this calculator demonstrated that in one pilot program, for every dollar invested in preventative screenings, $30 was saved in health care costs by one pilot program. The study was an initial step in encouraging mobile clinics across the country to share data in order to capture the breadth and impact of the mobile clinic sector. Widely endorsed by the mobile clinic community, this study became the cornerstone for an emerging collaborative research network of mobile clinics.

**The Collaborative Research Network**

In September 2011 the U.S. Department of Health and Human Services' Office for Minority Health provided a grant to expand the research piloted by the Mobile Health Map to create a Collaborative Research Network of Mobile Health Clinics (Table 1). Our mission is to build the foundation for a collaborative research network of mobile health clinics across the U.S., documenting key characteristics of the sector, including the populations served and details of the provider organizations. We then set out to share these findings with key stakeholders across academia, government and the mobile health clinic provider network to share the findings and launch, in 2012, a formal collaborative research network of mobile clinics.

**Text Box 1: Summary of the Collaborative Research Network’s vision, goals and objectives**

**VISION**

Mobile clinics are a highly effective vehicle for reducing health disparities and achieving the triple aims of improving care, improving health and controlling healthcare costs in the U.S.

**GOALS**

1. To improve the quality of care and the overall health of the nation by bringing healthcare interventions directly to the populations at highest risk.

2. To control rising increasing health care costs by increasing the use of innovative lower-cost models of care and encouraging the proper use of cost-effective prevention strategies.
**Key Partners**

Several key partners worked to lay this foundation for collaboration.

**Mobile Health Clinics Association**

The Mobile Health Clinics Association is a 501(c)(3) non-profit trade association and the trade association of mobile clinics with over 300 members. Its goal is to support the growth of and best practices for the sector. To these ends, MHCA undertakes a number of endeavors, such as a highly successful yearly course on how to start a mobile clinic: it hosts an annual meeting of mobile clinics, convenes special interest groups such as teen health programs or maternal health programs, helps organize regional meetings, and helps coordinate the mobile clinic community’s responses to disasters. Dr. Anthony Vavasis, Chair of the MHCA Board, is Co-Principal Investigator on this project. Darien DeLorenzo, CEO of the MHCA, is a Co-Investigator on this project.

**Harvard Medical School**

Harvard Medical School has supported mobile clinics for ten years through its support of The Family Van, a mobile clinic that was established in 1992 with a mission to reduce health disparities in Boston. Co-founded by the Dean of Students, it has been led by Jennifer Bennet since 2006. Caterina Hill, Research Associate at HMS, has focused on the research and evaluation effort for the mobile clinic since 2010. Dr. Nancy Oriol is Co-Principal Investigator for Mobile Health Map, Jennifer Bennet is Executive Director and Caterina Hill is Co-Investigator.

**Paul Cote**

Paul J. Cote, Jr. is an expert in health finance and policy. He led the development of the Return on Investment algorithm on MobileHealthMap.org. This algorithm calculates the impact on healthcare costs by mobile clinics based on two measures: the delivery of the Partnership for Prevention priority interventions and emergency department visits that were avoided. Since 1991,
he has served in various senior policymaking positions in the Commonwealth of Massachusetts, including deputy commissioner, acting commissioner, commissioner, assistant secretary and chief of staff at the departments of Mental Health, Social Services, Health Care Finance and Policy, Public Health, and Executive Office of Health and Human Services, respectively. In between these stints in government service, Mr. Cote has held a variety of senior management positions and worked as an independent consultant on health and human service issues for the states of Massachusetts, Iowa, Virginia, Nebraska, and Illinois. He continues as a consultant on these issues for multiple organizations.
Creating a community of mobile clinic providers who are engaged in building the evidence base for mobile clinics was our first objective. Until recently, many mobile clinic providers were even unaware of being part of the broader mobile clinic sector. Because some mobile clinics are part of health centers, some are part of universities, and some are independent organizations, they have tended to operate in isolation with limited resources for evaluation and dissemination. Building this research community not only makes possible the evaluation of the impact of the sector, but also builds a community of mobile clinic providers that can share best practices and build sector-wide tools to enhance its capacity for evaluation and dissemination.

Several steps were taken to engage mobile clinics across the country in this research collaboration.

**Building participation in the Mobile Health Map amongst mobile clinic providers**

The team worked with the U.S. Department of Health and Human Services’ Office of Minority Health (OMH) to create a public announcement about the partnership on October 24th 2011. This project was then presented at the Annual Mobile Health Clinics Association Conference in October 2011 in Palm Springs, California, attended by more than 200 mobile clinic providers. A research team followed up by contacting mobile clinics to spread awareness of the project and to encourage them to enter data into the Mobile Health Map dataset.

The result of this outreach has been extremely exciting. Participation on the Mobile Health Map has increased continuously throughout the grant period (Figure 1). The number of mobile clinics on the map has increased by 50%, the number that has entered service type data has increased 2-fold and the number
that has entered demographic data has increased more than 3-fold. All initial grant targets were far surpassed (Figure 2).

**Figure 1. Number of mobile clinics participating on MobileHealthMap.org, September 2011-August 2012**

**Figure 2. Mobile Clinic engagement with Mobile Health Map: baseline, targets and achievements, September 2011-August 2012**
**Building regional coalitions of mobile clinic providers**

For the first time, regional coalition meetings were held in New Orleans, New York City, Northern California, North Carolina, Southern California and Texas. These meetings aimed to encourage local collaboration between mobile clinic providers to share best practices and address regional needs. They also encouraged regional research efforts through the Mobile Health Map project. As examples of this effort coming to fruition, the North Carolina and New York City coalitions are building an analysis of the Mobile Health Map data to estimate the impact of mobile clinics in their regions to present to local government officials.

**Building a repository of resources for mobile clinics**

Mobile clinics need tools to promote awareness among local community stakeholders about the benefits and impact of mobile clinics. To this end, an online media kit was developed and placed online for participating mobile clinics to not only promote local understanding, but also to publicize the collaborative research network. This kit proved very valuable and was widely used.

Additionally, growing evidence of the impact of mobile clinics has been collated into an open access research database, which includes 90 articles retrievable by key word functionality. Articles are available online at: http://www.mobilehealthmap.org/roi.php.

**Developing research leaders**

Sharing of research has been further advanced through a request for Abstracts for evidence-based programs was put out for programs to be showcased at the federal convening and in publications (see SECTION 4 below). This fostered new collaboration between seven mobile clinics with more advanced research programs.
This summary is based on the Mobile Health Map data as of September 2012. As with all live databases, MobileHealthMap data is constantly growing. Highlighted case studies are mobile clinics that were selected to be presented through the Mobile Health Map Request for Abstracts mentioned above. A small sample of relevant published studies is also included.

1. Reaching Underserved Communities Across the Country

There are an estimated 1,500-2,000 mobile clinics nationally, of which more than 1 in 4 participate on the Mobile Health Map. Mobile clinics operate in every state across the country plus D.C. and Puerto Rico (Figure 3). It is estimated that mobile clinics each receive over 3,000 visits annually, which is an estimated 5-6.5 million visits annually as a sector as a whole (Figure 4).
Mobile clinics serve millions annually. On average, there are 3,301 visits to each mobile health clinic per year and there are 2,000 mobile clinics across the U.S., with the sector as a whole providing an estimated 6.6 million visits annually (Figure 5).

Figure 3. Mobile Clinics operating in the U.S., as mapped by MobileHealthMap.org (n=546, September 2012)
Figure 4. Estimated numbers of visits to mobile clinics in the U.S. annually*

<table>
<thead>
<tr>
<th>Average number of visits annually</th>
<th>Total number of MHCs</th>
<th>Total visits to MHCs across US</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,301</td>
<td>1,500-2,000</td>
<td>5-6.5 Million</td>
</tr>
</tbody>
</table>

*Average number of annual visits based on reports from 243 mobile clinics that reported this data. Estimate of total number of mobile clinic based on triangulation of methods (see Text Box 2).

Text Box 2: Estimating the size of the mobile clinic sector

The size of the mobile health clinic sector is based on a triangulation of data sources:

1. The Mobile Health Clinics Association estimates that there are 2,000 mobile health clinics nationwide based on extensive outreach and research among healthcare providers nationwide during an eight-year period (2005-2012).

2. The capture recapture method. A list of mobile clinics supported by HRSA was used to estimate the proportion of mobile clinics that had already been identified on Mobile Health Map. On this list of 306, 221 were confirmed to be functioning mobile clinics, following verification by the Mobile Health Map research team. Sixty-five were found not to be mobile clinics, and there were 20 for whom it was not possible to verify whether they were functioning mobile clinics or not. Of the confirmed 221 functioning mobile clinics, 36% (80) were among the 546 already on the Mobile Health Map. It was therefore inferred that the sample of 546 mobile clinics on the Mobile Health Map represented 36% of the whole sector. The estimate for the whole sector from this list is therefore 1,508 vehicles. Because Health Resources and Services Administration are likely to fund mobile clinics that are part of larger health centers, this estimate is likely to underestimates the number of smaller mobile clinics and therefore the size of the sector overall.
Reaching populations at high risk for preventable disease, and with poor access to healthcare, is something that mobile clinics are especially effective at doing. Data from the Mobile Health Map confirms this.

**Reaching rural communities**

About one in five Americans lives in a nonmetropolitan area. Rural communities have poorer access to health care than urban communities. Rural communities have a high rate of shortages of primary care health professionals. Individuals in rural communities are less likely to have had a physical or checked their cholesterol in the last 5 years. They report longer travel times to their usual source of care and greater difficulty accessing after hours care. People in rural areas are less likely to receive preventative services such as mammograms, pap smears and colorectal screenings. Overall, 60% of rural counties are dental shortage areas. Mobile clinics can travel to remote communities to provide regular services to rural communities that have poor access to care. According to the Mobile Health Map, 15% of mobile clinics serve rural clients, 44% serve both rural and urban communities, and 42% serve only urban areas (n=89).

**Text Box 3: Case Study -- Rural Mobile Clinics**

**Health Hut in Rural Louisiana**

Health Hut was set up to address the needs of rural communities in Lincoln County, Louisiana. It accepts patients who were discharged from hospitals as a way to prevent re-hospitalization related to lack of follow-up care. This mobile clinic travels to rural communities on a regular basis to provide primary care to help the uninsured and those with poor access to primary care to manage and control their chronic disease. Evaluation of this innovative approach will be available in 2013.
**Reaching low-income and minority men, women and children**

In 2009, 14% of the U.S. population had incomes below the poverty line.\textsuperscript{14} In general, poor populations have reduced access to high-quality care and poorer health. This is partly, but not completely, due to lack of insurance.\textsuperscript{15} Mobile Health Map does not collect income data. However, insurance status is used as a proxy for income. Overall, 57% of visits are by uninsured patients and 35% are by publically insured patients (n=60). In 2010, 14% of Whites, 36% of Blacks, 35% of Hispanics, and 23% of other races lived in poverty.\textsuperscript{16} Even adjusting for poverty and insurance status, minorities have poorer access to health and healthcare.\textsuperscript{17} Overall, 35% of visits to mobile clinics are by individuals that identify as non-white (n=35), and 45% are by individuals identifying as Hispanic or Latino (n=60).

Mobile clinics are able to reach males as well as females (46% visits by males and 54% visits by females, n=66), which is notable as men have poorer access to health care than women do.\textsuperscript{18} They reach all ages (of all visits, 41% were from individuals under 18, 50% from those aged 18-65, 9% from those aged above 65, n=66).

Assuming a lower estimate of 5 million visits to mobile clinics annually, this represents an estimated 2.8 million visits by uninsured, 1.7 million visits by publically insured, 2.2 million visits by individuals identifying as Latinos, 1.7 million visits by clients who identify as non-White, 2.3 million visits by males and 2 million visits by children (Figure 5).
Figure 5. Estimated visits to 1,500 mobile clinics nationally by insurance status and demographic group

**Reaching underserved low-income minority communities: How do we do it**

Mobile health clinics park in the heart of the community and offer a convenient service, often at no charge. This removes logistical constraints, such as transportation issues, difficulties making appointments, long waiting times, complex administrative processes, and financial barriers to accessing services, including the need for health insurance and copayments. However, there is evidence that mobile clinics also overcome subtler barriers including lack of trust in the healthcare system at large. Many successful mobile clinics cite their ability to foster trusting relationships. Qualitative research in such mobile clinics has found that patients value the informal, familial environment in a convenient location with staff who are easy to talk to; the staff’s marriage of professional and personal discourses provides patients the space to disclose information themselves. A communications academic argued that mobile clinics’ unique use of location and space is important in facilitating trusting relationships. Mobile clinics are often parked in community spaces such as
shopping centers; additionally, the limited space inside the vehicle becomes both a social space and a space for delivering health care. Mobile clinics often embody several recommendations from the Institute of Medicine’s Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care, including (1) community health workers, (2) patient-centered care focusing on patient education and empowerment, (3) cultural competence training for staff, (4) stability and consistency of service provision within communities, and (5) staff diversity. Each of these elements has been shown to overcome barriers resulting from poor patient-provider communication, mistrust, and disempowerment in minority communities and therefore helps mobile clinics reach low-income minority urban populations.

### Text Box 4: Common barriers to health services in low-income minority communities and methods mobile clinics use to overcome them

<table>
<thead>
<tr>
<th>Common Barriers</th>
<th>Typical Mobile Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistical</td>
<td>Travel to the community</td>
</tr>
<tr>
<td>Transport/Distance</td>
<td>No appointments needed</td>
</tr>
<tr>
<td>Difficulties getting an appointment</td>
<td>‘Navigator’ support provided</td>
</tr>
<tr>
<td>Financial</td>
<td>Serve individuals without insurance</td>
</tr>
<tr>
<td>Insurance required</td>
<td>No copayments</td>
</tr>
<tr>
<td>Copayments necessary</td>
<td>In community space</td>
</tr>
<tr>
<td>Trust</td>
<td>Often run by people from community and community health workers</td>
</tr>
<tr>
<td>Poor patient-provider communication</td>
<td>Culturally and linguistically appropriate services</td>
</tr>
<tr>
<td>Low linguistic and cultural competence</td>
<td></td>
</tr>
</tbody>
</table>

### Reaching extremely vulnerable groups

Mobile clinics’ flexibility and non-traditional format make them an attractive source of care for extremely vulnerable groups such as sex workers and homeless individuals. The Health Resources and Services Administration funds 131 mobile clinics through its Healthcare for the Homeless program.
Text Box 5: Case Study -- Mental Health Mobile Clinic

The SAMSHA funded Wellness in Motion mobile clinic in NYC targets inner-city minority substance abusers, particularly injecting drug users, young men of color who have sex with men, sex workers, and those with trauma and or mental health issues. The service provides trauma-informed, care substance abuse and mental health treatment, HIV prevention and testing, and brief medical screenings. An evaluation of 312 clients who were followed up over 6-months using four assessment tools (the GPRA, the CAGE, the MMMS, and the PTSD Checklist) found there was a significant reduction in unprotected sexual contacts; a significant decrease in mental health (i.e. depression) symptoms; and a significant decrease in PTSD symptoms.

(Barbara Hoffmann, PhD, MSW, CASAC, Lower Eastside Service Center, New York City, Washington, DC, June 26, 2012)

Reaching communities in public health emergencies

Mobile clinics can respond rapidly to emerging health needs. Mobile clinics have provided a rapid response to emergencies ranging from Hurricane Katrina, to floods in Missouri and fires in Southern Californian. For example, after Hurricane Katrina, countless numbers of Mississippi residents faced increased challenges in accessing basic needs and services; infrastructure issues such as disabled public and private transit only exacerbated such efforts, particularly among the most vulnerable communities. Mobile clinic outreach efforts in the undertaking known as Operation Assist in the Mississippi Gulf allowed medical professionals to successfully directly serve isolated populations and those most in need by concentrating much of their efforts in resource-poor settings. Operation Assist’s mobile unit was successful in serving as a long-term healthcare option (in many cases, the only option) in affected regions until permanent clinics were able to once again resume services.
Text Box 6: Case study -- Vulnerable and Homeless Children Mobile Clinic

Children’s Health Fund’s National Network, comprised of 25 health care programs, brings vital medical, dental and mental health services to more 80,000 vulnerable children and family members each year by going directly to their homeless shelters and schools.

When emergencies occur, Children’s Health Fund is ready to react with its fleet of 50 mobile medical clinics in 17 states and the District of Columbia. It has provided critical support to cut-off areas in emergencies including most recently, Hurricane Sandy.

2. Improving health in underserved communities

Mobile clinics are flexible in the services they provide and can be tailored to the needs of the communities they serve. Overall, 41% of mobile clinics provide primary care, 38% provide prevention, 29% provide dental and many also provide mammography, specialty and mental health services (Figure 6).

Figure 6. Proportion of mobile clinics that provide particular services
Focus on Prevention and Screening

There has been considerable national focus on the need for safety net programs to provide community-based prevention and screening, particularly for low-income, minority and rural communities. There is a consistent body of peer reviewed articles demonstrating that mobile clinics are successful at identifying high rates of chronic and infectious disease through screening. Some studies have found that mobile clinics facilitate earlier diagnosis of life-threatening diseases, thereby potentially prolonging life and improving quality of life. For example, one study showed that individuals found to be HIV positive through mobile clinics had higher CD4 counts than those screened in a clinic, indicating that infected patients were identified earlier and therefore could begin treatment earlier. Another study found that women accessing prenatal care via a mobile clinic accessed services in a more timely manner than those who accessed care in a traditional clinic. Moreover,
mothers utilizing the mobile clinics reported significantly lower rates of pre-term births and a notably lower rate of low-birth-weight infants (4.4% vs. 8.8%). 59

Mobile clinics are also a source of ongoing prevention and chronic disease management support.

**Text Box 7: Case Study -- Chronic disease management**

The Family Van is a mobile clinic providing prevention and screening services in underserved communities in Boston using a model staffed by community health workers, nutritionists and HIV counselors. Many visits are by regular clients who come to monitor their health and receive health coaching and support. Patients who presented with high blood pressure during their initial visit, who then visited again, experienced average reductions of 10.7 and 6.2 mmHg in systolic and diastolic blood pressure, respectively, (p<0.001) during their follow-up visits. This was estimated to be associated with 32 percent and 45 percent reductions in the relative risk of myocardial infarction and stroke respectively. 60 Although hypertension is theoretically very manageable, nationally only one in two individuals diagnosed with the condition has it under control. This is not simply due to lack of insurance, as 80% of those with uncontrolled blood pressure are in fact insured. 61 The challenge with hypertension management is sustaining adherence to medication and lifestyle changes. The evidence from the Family Van suggests mobile clinics help patients in addressing these challenges.

3. **Mobile clinics’ impact on healthcare costs**

Controlling healthcare spending is a national priority. There are several areas where mobile clinics can be used to increase efficiencies:

**Increasing quality life years saved**

The National Partnership for Prevention has identified the top 25 most cost-effective prevention interventions. Many of these interventions are commonly carried out in mobile clinics. By converting the Quality Adjusted Life Years
Saved from these interventions into dollars saved, it is possible to calculate the value of these prevention activities. Mobile Health Map includes an online Return on Investment calculator devised by Paul Cote that calculates the return on investment based on QALYS and emergency department visits avoided.62 The converted QALYS compiled for eleven mobile clinic programs to date has been estimated to be $77 million.63

**Text Box 7: Case Study: Saving money through oral health prevention**

St David’s Foundation provides dental services to children through their schools. They have calculated the cost savings of their prevention work:

- Sealant = $47
- Cavity Filling = $163
- Surgical Extraction = $250
- Emergency Department Visit = $667

(Dental Procedure Costs based on the National Dental Association (NDA) published fees for our region and city size. ED based on article: Hospital Based Emergency Department Visits Attributed To Dental Caries in the United States in 2006)

**Reducing unnecessary Emergency Department visits**

There is a clear opportunity for cost-savings by reducing unnecessary emergency department visits nationally.64,65 Massachusetts can be viewed as a bellwether of what happens to demand for emergency departments when healthcare insurance coverage becomes more universal.66 In Massachusetts, during FY2010, there were 1,178,068 million preventable/avoidable ED visits accounting for 49% of the total ED volume and representing a 6.3% increase on 2006.67 In FY2010, the average cost per preventable/avoidable visits was $474 and in total these visits cost $448,089,302, a 35.4% increase from 2006. Rates of preventable/avoidable ED visits are high among Medicaid and Commonwealth Care recipients, the uninsured, minorities, young and working-aged individuals.68 This is related to ongoing barriers to primary care services post-Massachusetts healthcare reform including waiting times, copayments, complexities of
navigating the system and feelings of intimidation. 69, 70, 71, 72, 73, 74, 75, 76. By providing care that is less expensive than emergency department visits, mobile clinics can potentially help reduce healthcare costs.

The first eleven mobile clinics that have calculated their return on investment have saved an estimated $4 million in avoided emergency department visits. 77

**Return on investment based on Quality Life Years Saved and avoided Emergency Department Visits**

The first eleven mobile clinics are the first to have entered their program data into the return on investment online calculator show a staggering return of $20 for every dollar invested in them (Figure 7).

Figure 7: Return on investment of eleven mobile clinics

<table>
<thead>
<tr>
<th>Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20:$1</td>
</tr>
<tr>
<td>Total Savings*: Total Costs</td>
</tr>
<tr>
<td>$81 Million: $4 Million</td>
</tr>
</tbody>
</table>

*Savings

Avoided Emergency Department Visits: $4 Million

Quality Adjusted Life Years Saved: $77 Million

**Reducing Hospital Readmission**

About 18% to 20% of Medicare beneficiaries who are discharged from a hospital are readmitted within 30 days. U.S. health care spending associated with potentially preventable readmissions has been estimated at $12 billion to $17.4 billion. 78 As part of the Affordable Care Act, Medicare and government efforts have imposed penalties for readmitted visits as an effort to decrease associated
costs. Research is underway as to whether mobile clinics can play a role in reducing these readmissions.

**Reducing unnecessary ED visits and hospitalizations**

An asthma-oriented mobile van intervention\textsuperscript{79} providing free services to underserved children demonstrated an overall improvement in symptom-free days (average SFD of 199 at baseline and average improvement of 44 SFDs post-intervention), resulting in cost-savings of $79.43 per day gained for children aged 5-11 in terms of reduced ED visits and hospitalizations. Overall, in this particular context medical costs saved outweighed operational costs. Another study amongst elderly hospital discharges showed that at the very least mobile health utilization does not result in higher rates of readmission compared to traditional clinics.\textsuperscript{80}
Unfortunately, many stakeholders do not recognize mobile clinics as a distinct and unique sector within the healthcare system. This project has aimed to evaluate the scope of the sector and also to build awareness both internally and externally. The following is a record of key communication events.

**Communication with Federal partners**

Federal Convening Office of Minority Health in Washington D.C., June 2012. This event included partners from:

- The Office of Behavioral Health Equity (Substance Abuse and Mental Health Services Administration)
- Administration for Children and Families (U.S. Dept of Health and Human Services)
- Center for Faith Based and Neighborhood Partnerships (U.S. Dept of Health and Human Services)
- DCHAP/HIV/AIDS/HAB (U.S. Dept of Health and Human Services)
- Health Resources and Services Administration (U.S. Dept of Health and Human Services)
- Office of Assistant Secretary for Health (U.S. Dept of Health and Human Services)
- Office of Consumer eHealth (U.S. Dept of Health and Human Services)
- Office of the National Coordinator for Health IT (U.S. Dept of Health and Human Services)
- Office of Disease Prevention and Health Promotion (U.S. Dept of Health and Human Services)
- Office of HIV/AIDS and Infectious Disease Policy (U.S. Dept of Health and Human Services)
- Office of Minority Health (U.S. Dept of Health and Human Services)
• Office of Rural Health Policy (Health Resources and Services Administration, U.S. Dept of Health and Human Services)
• Office of the Secretary (U.S. Dept of Health and Human Services)
• National Vaccine Program Office (U.S. Dept of Health and Human Services)
• Roundtable on the Promotion of Health Equity and the Elimination of Health Disparities (Institute of Medicine)

Other strategic partners including March of Dimes and the Institute for Strategy and Competitiveness (Harvard Business School) were also included.

**Communication with Providers**

- The Mobile Health Clinics Association Annual Forum (October 2011, October 2012, Oral Presentation)

Mobile clinic providers were provided a summary of the findings to date from this project in an interactive session that allowed two-way dialogue.

**Communication with Academia**

*The Health and Human Services National Health Promotion Summit in Washington D.C.* (April 2012, Oral Presentation). Mobile clinics were represented on a panel showcasing the role of community health-workers in the U.S. The panel was led by James M. Galloway, MD, FACP, FACC, FAHA Chair, Federal Executive Committee, Chicago, Assistant U.S. Surgeon General, USPHS, Regional Health Administrator, U.S. Department of Health and Human Services, Region V

*American Public Health Association in San Francisco, CA* (October 2012, Oral Presentation). Mobile clinics were represented on a panel opened by the
Assistant Secretary for Health on the role of Public Health Quality for improving the health of populations.

**Medicine 2.0 Conference, Harvard Medical School Boston, MA** (September 2012, Oral Presentation) We have presented the key results at Harvard Medical School through the Medicine 2.0 Conference (September 2012, Oral Presentation). This presentation included a description of the process of building a virtual community as well as a summary of key outcomes.

**Communication with Media**
Mobile Health Map convened and participated on a panel called ‘from the bedside to the curbside’ in Boston MA with senior health journalists from across the country. Other panel participants included leaders of Beth Israel Deaconess Medical Center and Dimock Neighborhood Health Center.

We conducted a special project with a group of twenty leading junior health journalists participating in a summer Kaiser Medical Fellowship. Initially, Dean Nancy Oriol, of Harvard Medical School and Dr. Matthew Levy gave a presentation; then the journalists were tasked to spend time visiting mobile clinics near the newsroom where they were placed for the summer.

The following newspapers participated:

- Boston Globe
- The Charlotte Observer
- KQED Public Radio
- KTVU TV
- LA Times
- Milwaukee Journal Sentinel
- NPR DC
- The Oregonian
This opportunity for journalists to develop an understanding of mobile service delivery resulted in stories across the country; for example:

- Minneapolis Star Tribune ~ June 19 - Vans deliver access to health care - *Mobile clinics are bringing care to the uninsured and those who live in remote places* By Daniela Hernandez
- Los Angeles Times ~ July 16 - *Mobile Clinic Project benefits both sides of the clipboard* - By Erin Loury
- KQED/The California Report ~ August 1- *Mobile Health Vans Care for Alameda’s Homeless* - By Alvin Tran

The key data is also available online at [MobileHealthMap.org](http://MobileHealthMap.org)
Enhancing our capacity for research and evaluation is a priority as the mobile clinic sector works to build an evidence base and demonstrate its value. Key limitations are outlined below.

**Barriers to participation**
While mobile clinic participation in the Mobile Health Map has increased dramatically over the grant period, the number of clinics able to provide data on client demographics was relatively low. In order to find out more about barriers to participation, individuals who attended regional coalition meetings were asked whether they had added demographic information to Mobile Health Map. Of 43 who reported barriers to participation, 33% reported that they were just starting out so they didn’t have a full year’s data, 23% said they do not collect the data in the format requested, 16% did not have the resources to collect data, 12% said they did not have the time to enter the data, and 16% reported other reasons. A survey conducted in 2010 at the Mobile Health Clinics Association national conference with 87 respondents found that only 56% of mobile clinics used electronic data collection mechanisms. This data is corroborated from qualitative information collected by our outreach team when contacting clinics by phone. For smaller programs, there is often limited capacity to collect accurate data.

**Evaluation of clinical effectiveness**
It is relatively challenging to carry out community-based evaluations of clinical effectiveness, due to lack of resources and lack of control groups. While a handful of studies have succeeded, many mobile clinics are not yet at the stage where they can demonstrate effectiveness.
Use of the Return on Investment Calculator
The Return on Investment calculator is an excellent tool to measure costs saved in terms of Estimated Quality Life Years Saved and avoided emergency department visits. However, the Return on Investment algorithm requires particularly high quality budget and service delivery information that most mobile clinics do not have. For example, for mobile clinics that are part of larger organizations like health centers it is often difficult to separate the costs specific to the mobile clinic specific program costs and the services it delivers from those associated with the rest of the health care system. In addition, the Return on Investment calculator does not yet include some services such as dental, for which ROI data is not yet available.

Opportunities
The mobile health community has a clear need to develop its research community. There is a scope and need for developing the research community. The first step is to enhance the capacity of the mobile clinic sector to evaluate its impact through:

- Adding the ability for mobile clinics to carry out needs assessments of their local areas using the Mobile Health Map.
- Providing support to individual and regional programs to develop evaluation capacity at a regional and individual program level through online resources, one-on-one support and workshops.
- Using existing data on health disparities data, mobile clinics could be strategically deployed in communities that have the greatest need but which and lack other healthcare options.
- Analyzing why the mobile clinic model attracts high risk populations such as men and minorities.

Several opportunities for research studies could fill gaps in evidence, with the most pressing need being a systematic analysis of the cost savings in various areas; for example, an analysis of savings through hospitalization readmissions reduction.
Mobile clinics serve a unique role for the underserved populations in our society. They deliver care to the full spectrum of at-risk populations, from medically complex patients who may not be able to navigate the health care system and who rely on emergency departments for care, to the homeless and uninsured, to people living in rural environments who may lack access to any care. Mobile clinics are often the provider of last resort in places where the mainstream health care system has not provided a point of access. As policymakers look for effective ways to control health care spending while increasing access to care, they should consider mobile health clinics as a potentially cost-effective and clinically beneficial model of health care delivery.

The mobile clinic sector is an untapped resource for helping the nation reduce health disparities while improving care, improving health and saving healthcare costs. With the Office of Minority Health’s support, the Collaborative Research Network of Mobile Clinics has been launched and has successfully developed the mobile clinic sector’s capacity to demonstrate its impact. "This project has great potential to help us make better use of a frequently overlooked resource in the health care system, one that can help us reach populations that often do not have a regular source of primary care," said Dr. Garth Graham, Deputy Assistant Secretary for Minority Health and Director of the HHS Office of Minority Health. "Mobile clinics provide us with another set of tools for helping to serve racial and ethnic minority populations and others affected by health disparities."
Sincere thanks to the community of mobile clinic providers who are participating in this project, to the clients who continue to use mobile clinic services to improve their health and to our funders, particularly the Office of Minority Health.

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