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Partnering Urban Academic Medical Centers And Rural Primary Care Clinicians To Provide Complex Chronic Disease Care

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Abstract

Many of the estimated thirty-two million Americans expected to gain coverage under the Affordable Care Act are likely to have high levels of unmet need for various chronic illnesses and to live in areas that are already underserved. In New Mexico an innovative new model of health care education and delivery known as Project ECHO (Extension for Community Healthcare Outcomes) provides high-quality primary and specialty care to a comparable population. Using state-of-the-art telehealth technology and case-based learning, Project ECHO enables specialists at the University of New Mexico Health Sciences Center to partner with primary care clinicians in underserved areas to deliver complex specialty care to patients with hepatitis C, asthma, diabetes, HIV/AIDS, pediatric obesity and mental illness. As of March 2011, 298 Project ECHO teams across New Mexico have delivered more than 10,000 specialty care consultations for hepatitis C and other chronic diseases.

Under the Affordable Care Act of 2010, an estimated thirty-two million Americans will gain health insurance coverage in 2014. Given what we know about the currently uninsured, we can expect that many of these newly insured people will have had little prior interaction with the health care system. Many are likely to have high levels of unmet need for chronic conditions such as diabetes and heart disease, and many live in areas that are already underserved.[1,2,3] Thus, providing them access to high-quality primary and specialty care will be a major challenge.

Fortunately, a number of strategies have been used successfully nationwide to increase access to primary care in underserved and rural areas. Much of this care is provided by federally qualified community health centers, which operate in more than 8,000 sites across the country and which provide primary care for an estimated twenty million Americans.[4]

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INNOVATION PROFILE

A Partnership Between Urban Academic Medical Centers And Rural Primary Care Clinicians To Provide Complex Chronic Disease Care

The Affordable Care Act contains a total of \$11 billion in new, dedicated funding over five years to greatly expand the reach of community health centers.

These community-based health centers and other local primary care providers can be the most culturally appropriate and accessible care sites for relatively low-income, uninsured patients. The centers often have established, ongoing relationships with their patients, and they can build on their long-term relationships with patients to improve patients' adherence to treatment regimens.

At the same time, however, providing primary care in rural and isolated areas is frequently a lonely business. Providers in these areas have little opportunity to interact with colleagues or continue their medical education. They frequently care for patient populations with high rates of illness, including complex, chronic illnesses that they may not be fully equipped to treat effectively. In fact, the lack of access to high-quality specialty care services is often a major problem, particularly for uninsured patients and those covered by Medicaid.[5]

An innovative new model of health care education and delivery in New Mexico known as Project ECHO (Extension for Community Healthcare Outcomes) is addressing these and other challenges. Established at the University of New Mexico Health Sciences Center, Project ECHO is developing capacity for safe and effective treatment of chronic, common, and complex diseases in rural and underserved areas while monitoring outcomes to ensure quality of care. Project ECHO serves as a model that other academic medical centers and primary care clinicians can build on to provide complex specialty medical care to underserved populations.

Using state-of-the-art telehealth technology and clinical management tools, ECHO trains and supports primary care providers in the community to develop knowledge and self-efficacy on a variety of diseases not usually considered within their scope of practice. As a result, these providers can deliver best-practice care for complex health conditions in federally qualified health centers and other community-based sites where this specialty care was previously unavailable. This article describes the Project ECHO model and discusses early results.

Background

The idea for Project ECHO grew out of New Mexico's severe hepatitis C problem. Prior to Project ECHO, fewer than 1,600 New Mexicans had received treatment for hepatitis C and chronic liver disease, although an estimated 34,000 residents had the disease.[6]

Hepatitis C

Hepatitis C is curable, but the treatment regimen is grueling and requires twelve to eighteen visits with a specialty provider over the course of a year. For patients who live great distances from academic medical centers or other major hospitals, or who lack transportation or face other access barriers, it can be difficult to see a specialist. For patients who are poor, uninsured, or underinsured, a number of other social, cultural, linguistic, and financial barriers may stand in the way of care.

However, few rural practitioners are prepared to deal with treatment side effects, drug toxicities, treatment-induced depression, and co-occurring conditions. These can include mental health issues and substance abuse, both of which are common among hepatitis C patients. Optimal management of hepatitis C requires consultation with highly trained specialists from multiple areas, including gastroenterology, infectious disease, psychiatry, and addiction medicine.

Rural primary care providers who are treating patients in their home communities may want to consult with specialists, but they typically have limited access to such specialists or other difficulties in doing so. If they choose to refer their patients to specialists, the severe shortages of specialty providers in rural areas means that people with complex conditions such as hepatitis C often have to wait months to get treatment. Primary care physicians may then have few options but to refer patients to the closest academic medical center or other major hospital--which, as noted, may not be close at all. Not surprisingly, given the numerous barriers they may face, such patients often forgo treatment or wait until they have severe complications before seeking help.

Problems With Specialty Treatment

In New Mexico, barriers to specialty care treatment for hepatitis C are steep. New Mexico has a high proportion of residents who are poor (19.3 percent, versus 13.2 percent nationally) and uninsured (23.2 percent versus 15.4 percent across the nation).[7] Approximately two-third of the state's population lives in rural areas, but two-thirds of physicians are located in urban areas.[8] Patients frequently have to travel long distances to see university specialists.

Despite these barriers, Project ECHO presents an atypical example of a health care innovation in which the rural sector leads the way. Project ECHO affords an alternative model for meeting the needs of rural patients with complex diseases. The model was first piloted for treatment of hepatitis C in June 2003. Here is how the model works.

How The Model Works

When a new partner site--a primary care practice in a rural area, for example--joins the network, ECHO staff members first conduct a two-day, in-person orientation in Albuquerque. The orientation explains the hepatitis C treatment protocol as well as the communications technology and the case-based presentation format for the weekly two-hour telemedicine clinics. Next, primary care clinicians--including physicians, nurses, and physician assistants--are organized into disease-specific learning networks that meet weekly via videoconference to present cases. These "virtual grand rounds" or "teleclinics" are led by a team of University of New Mexico Health Sciences Center specialists who review and discuss cases with primary care providers.

The hepatitis C team from the University of New Mexico includes a hepatologist (liver specialist), a pharmacologist, a mental health specialist, and a nurse. These specialists do not assume the care of the patient; in fact, the team from the Health Sciences Center never even sees the patient. Instead, through a guided practice model, the primary care provider retains responsibility for managing the patient, operating with increasing independence as his or her skills and self-efficacy grow.

Web-based disease management tools facilitate consults, and specialists and primary care providers jointly manage complex chronic illness care for patients, who are treated right in their home communities. A secure, centralized database monitors patient outcomes.

The knowledge networks follow the familiar case-based learning strategies from postgraduate medical education, providing learning opportunities for primary care providers through three main routes.

First, in partnering with the university specialists to co-manage the care of patients, primary care providers benefit from case-based learning and have an opportunity to develop both content knowledge and self-efficacy. The model supports guided feedback from specialists

and ongoing learning, with the opportunity to discuss the patient many times during the course of the patient's care.

Second, community-based primary care providers have the opportunity to learn from each other through the network's provider interaction and shared decision making in case management. Through shared learning and increased expertise in hepatitis C management and treatment, they also rely on each other for expertise and support and develop a community of practice.

Third, community primary care providers also learn from brief didactic presentations that ECHO specialists make during teleclinics. These presentations are typically keyed to specific issues that arise during the teleclinics.

This multilevel "learning loop" allows primary care providers to learn by doing, to learn from each other, and to learn from specialists. It creates what one group of educators calls virtual "learning communities" that are "defined not by physical location or role within the community, but by common interests, concerns or affiliations." [9]

Collaborative partners in Project ECHO include providers from a variety of clinical sites, such as federally qualified health centers in rural and urban underserved areas of the state, rural hospitals, New Mexico Department of Health facilities, and prisons. More than 1,000 doctors, nurses, nurse practitioners, physician assistants, and community health workers have participated in Project ECHO's telehealth clinics and trainings. During calendar year 2009, ECHO specialists made 1,582 case consultations. These patients would have had to travel a combined total of more than 539,000 miles to have their specialty care needs met at the University of Mexico in Albuquerque.

Project ECHO is not a traditional telehealth model that facilitates a one-to-one connection between a doctor and a patient using technology. Rather, Project ECHO builds altogether new and permanent capacities by developing specialist expertise where it previously did not exist. It is not one to one, but one to many. Instead of a single university-affiliated specialist in Albuquerque treating seventy patients a year, a cadre of health professionals trained in hepatitis C care is delivering specialty-level care to thousands of patients across the state. To date, Project ECHO has provided more than 10,000 specialty consultations across disease areas to patients throughout New Mexico. This "force multiplier effect" holds dramatic promise for reforming health care delivery nationally.

In addition to improving access to specialty care in rural and remote locations, Project ECHO connects isolated providers with colleagues, including specialists at academic medical centers. It delivers continuing education and improves primary care providers' satisfaction and retention in areas where it is often hardest to keep them. What's more, participating providers can earn continuing education credits at no cost, as well as certification in treating diseases such as hepatitis C. They also gain access to specialty consultation in a range of areas relevant to their practice that they did not have before.

An example of how Project ECHO model can disseminate best practices and innovations almost immediately is a relatively new protocol involving the administration of vitamin D to vitamin-deficient patients with hepatitis C. A small, randomized controlled trial led by Saif Abu-Mouch of Hillel Yaffe Medical Center in Hadera, Israel, found that the addition of a vitamin D supplement improved the virologic response rate of antiviral therapy in hepatitis C patients. [10] Upon learning of these results, Project ECHO checked vitamin D levels among its hepatitis C patients across the state and found that approximately 85 percent were deficient. The clinician leadership rapidly instituted a protocol adding vitamin D to antiviral

therapy and deployed it among the project's participating providers. The team will track patient outcomes from this intervention.

Expansion Of The Model To Other Chronic Illnesses

Project ECHO started with hepatitis C but has expanded to address asthma, chronic pain, diabetes and cardiovascular risk reduction, high-risk pregnancy, HIV/AIDS, pediatric obesity, rheumatology, substance abuse disorders, and mental illness. As of March 2011, 298 ECHO teams across New Mexico were delivering specialty care for these various conditions.

Chronic disease can be difficult to manage, especially for a primary care provider working alone. An example is rheumatoid arthritis--a complex, chronic, inflammatory disorder that may affect many different tissues and organs. Untreated, it can lead to severe joint deformity and disability. There is no cure, but disease-modifying medications can reduce joint inflammation to relieve pain and prevent or slow joint damage, and occupational and physical therapy can teach patients how to protect their joints. Long-term management typically is performed by a rheumatologist.

Approximately 1 percent of the population of New Mexico has rheumatoid arthritis.[11] However, many primary care physicians don't know how to manage the condition, and they often have difficulty differentiating rheumatoid arthritis from more benign forms of arthritis, such as osteoarthritis. As a result, many more patients are referred to specialists than necessary, and patients with serious disease face long delays as they compete for specialist clinic spots with patients who have more benign illnesses. These patients could be treated by a primary care provider, but the primary care providers in their communities might not feel comfortable treating rheumatoid arthritis because they lack expertise in this area. The result: long delays for specialty care and greater expense as a result of more referrals.

Project ECHO's rheumatology clinics have established an effective triage system to help participating primary care providers determine when a patient needs to see a specialist. And through training and co-management with rheumatologists, primary care providers can treat patients with rheumatoid arthritis effectively--at the appropriate level of care--in their own communities. That means that specialists are more available to treat patients with even more serious diseases, such as lupus or polyarteritis nodosa.

Applying The Model To Public Health In An Epidemic

The Project ECHO model has important implications for public health emergencies such as the H1N1 outbreak, as a result of the rapid-response capacity of the clinician network. During the height of the H1N1 outbreak in the fall of 2009, the number of pneumonia patients hospitalized in New Mexico for ventilator support increased dramatically. Unlike seasonal flu strains, H1N1 attacks the lower respiratory system, sometimes causing a virulent form of pneumonia. Patients with pneumonia from H1N1 often require several weeks of ventilator support in the intensive care unit, where they are monitored closely.

Having tracked complications of H1N1 influenza rates, Project ECHO immediately convened a teleclinic for providers across New Mexico to share newly identified best practices for ventilator treatment of hospitalized patients with H1N1 and pneumonia. The ECHO asthma team that organized teleclinics on ventilator treatment reached out successfully to a new audience: respiratory therapists at community hospitals. A separate teleclinic addressed antibiotic coverage of children with H1N1 and pneumonia. The experience demonstrated the flexibility of the ECHO model to mobilize the health care workforce in a public health crisis and disseminate best practices.

What Project ECHO Has Accomplished To Date

We have data to illustrate the achievements of Project ECHO, including observations of the weekly hepatitis C clinics, databases of ECHO clinic participation, and patient presentations by clinical providers. In addition, a study of the ECHO program incorporates annual survey data and routine surveys of community providers about workplace learning, personal and professional experiences, systems and environmental factors associated with professional practice, self-efficacy, and facilitators and barriers to ECHO.[6]

To date, Project ECHO has performed more 1,000 telehealth clinics through its knowledge networks and more than 10,000 patient consultations for hepatitis C and other chronic diseases via the video conferencing clinics. This number includes clinical evaluations and screenings to ensure that patients are ready to begin treatment (many patients with hepatitis C need to terminate substance use, lose weight, improve their nutritional intake, or make other health improvements prior to starting treatment), with periodic review of cases that are not treatment-ready to ensure appropriate linkage to other services. Most consultations serve patients from ethnic/racial minority groups. For example, 69 percent of patients from rural health centers and prisons in the hepatitis C clinic were minorities.

The ECHO videoconferencing clinics have participating agencies across New Mexico that accept referrals from other clinicians in the community for chronic complex diseases. They include 298 teams of primary care clinicians at federally qualified health centers, rural hospitals, New Mexico Department of Health offices, Indian Health Service facilities, seven prison sites, and private practice physicians who serve low-income communities.

More than 20,000 hours of Continuing Medical Education and Nursing Continuing Education Units have been issued to community-based primary care providers at no cost to the providers. Project staff have provided more than 500 hours of training at rural sites, including staff and provider training, as well as grand-rounds presentations.

Initial survey data published in 2010 show a statistically significant improvement in providers' knowledge, self-efficacy, and professional satisfaction through participation in ECHO hepatitis C clinics. Clinicians reported a moderate-to-major benefit from participation.[6]

Primary care providers who participated in Project ECHO's hepatitis C clinics reported increased competence in their ability to assess, treat, and manage patients with hepatitis C. At the time they joined the ECHO clinics, they self-reported having little knowledge or skill in hepatitis C; after participating in ECHO for twelve months or more, they described themselves as competent or very competent. Providers also reported that participating in ECHO greatly reduced their sense of professional isolation, increased their professional satisfaction, and benefited their clinics.[6]

After participating in Project ECHO for twelve months in the co-management and care of patients with hepatitis C, thirty-four community providers responded to a survey with ten Likert-scale statements asking them about their perception about their future role in the management, treatment, and care of patients with hepatitis C. Each statement was rated from 1 (not important) to 4 (essential). Eighty-eight percent of the providers agreed that it is very important or essential for them to become well-trained providers of local care for hepatitis C patients; 91 percent agreed that it is very important or essential for them to manage and treat hepatitis C patients with support of the teleconference network. In addition, 58 percent agreed that it is very important or essential for them to become the local expert on hepatitis C, while 73 percent reported that it is very important or essential for them in their future role to provide consultation to other primary care providers in the care of hepatitis C patients.

(See Exhibit 1 for full results.) The hepatitis C community providers largely endorsed the goals of ECHO model after participating in Project ECHO for one year and treating between one and more than ten patients during the year.

In 2010 Project ECHO held a one-day annual meeting that included professional education and updates for specific clinical endeavors. Project ECHO partners were asked to complete an anonymous survey at the conclusion of the annual meeting; partners included physicians, nurses, pharmacists, nurse practitioners and physician assistants, health educators, and community health workers. The survey included Likert-scale statements that participants rated from 1 (strongly disagree) to 5 (strongly agree). Each statement included a “do not know/not applicable” response as well. Ninety-four participants rated seven statements included in Exhibit 2; where fewer are reported, these participants selected “not applicable” or “do not know.” Participants’ mean ratings associated with the benefits from Project ECHO range from 3.66 to 4.73, with the mean for six statements at 4.3 or higher.

Exhibit 3 reports an additional five statements collected in the 2010 annual meeting survey from ECHO partners. Sixty to seventy-two participants rated five Likert statements (from 1, strongly disagree, to 5m strongly agree) about the patient benefits associated with their participation in Project ECHO. Participants agreed or strongly agreed with these statements; their mean ratings ranged from 4.19 to 4.45.

We conclude that ECHO expands access to best-practice care for underserved populations, builds communities of practice to enhance professional development and satisfaction of primary care clinicians, and expands sustainable capacity for care by building local centers of excellence.

Scaling Up Project ECHO

The Project ECHO model is suited for addressing a range of health care delivery challenges that many communities already face. We can only expect these challenges to intensify after the implementation of the Affordable Care Act, when an estimated thirty-two million newly insured people enter the US health care system. The challenges include ensuring access to high-quality specialty care in rural and underserved areas; improving workforce retention among rural primary care providers; gaining control over a burgeoning chronic disease burden through primary and secondary prevention; reducing variations in care and reducing costs; and deploying cost-effective best practices and health care delivery innovations quickly.

As we have shown, the Project ECHO model holds great potential for meeting these challenges. It is being replicated at a second academic health center at the University of Washington, focusing initially on hepatitis C, for providers serving Native American populations, and then growing to include rural sites, such as migrant health worker clinics and family health centers. The University of Chicago also has launched an ECHO program to manage heart disease among African American men. The ECHO model is gaining international attention as well, notably in India, where a program modeled on Project ECHO is training pediatricians on early detection of autism and educating schoolteachers in best-practice management of autistic children. In addition, a project to improve access to HIV treatment has been launched in collaboration with Maulana Azad Medical College in Delhi.

Despite the benefits of the ECHO model, there are barriers to national or even international replication. Most important is sustainability. In New Mexico, Project ECHO has received several grants, including a three-year, \$1.45 million grant awarded by the federal Agency for Healthcare Research and Quality in 2004 for the hepatitis C pilot, and an additional grant

from that agency of \$1.5 million under the Minority Research Infrastructure Support Program to support pilot research for four more health conditions.

In 2008 Project ECHO received an award of \$5 million from the Robert Wood Johnson Foundation to replicate the model in six other disease areas and at the University of Washington. In 2009, ECHO received an additional \$1.2 million grant from the Agency for Healthcare Research and Quality to enhance the project's web-based disease management tool. Since 2008 Project ECHO has also received more than \$900,000 per year from the New Mexico legislature, based on its ability to make best-practice care for hepatitis C and other chronic diseases available statewide.

Clearly, it is unlikely that funders will support Project ECHO indefinitely. Nor is it likely that the model can be replicated on a large scale without a structure for sustainability. To make a substantial impact on how health care is delivered across the United States, the model needs to be incorporated into the health care system so that reimbursement mechanisms are created to pay for the various services it provides.

The Affordable Care Act creates opportunities for such reimbursement mechanisms through provisions that strengthen financial incentives for providing high-quality care at the lowest possible care. Most notable, perhaps is the establishment of accountable care organizations. Under the Affordable Care Act, an accountable care organization would receive a fixed budget to provide health care for a defined population over a set period of time, with responsibility for demonstrating the health outcomes of the targeted population. Such a system, which essentially "bundles" health care services so that the financial incentives focus on the quality of patient outcomes rather than the number of services provided, would be well suited to adopting the ECHO model.

Sustainability will also require the active engagement of academic medical centers, which must embrace the ECHO model and its underlying goals and core concepts as part of their missions. Project ECHO offers academic medical centers an opportunity to develop new and expanded leadership roles in teaching and training the health care workforce, providing health care to Americans most in need, disseminating evidence-based best practices, and protecting the nation in a public health crisis. And by helping to solve serious community health problems, academic health centers can strengthen their ties with community leaders and health care providers. Large integrated delivery systems may apply the ECHO model in much the same way.

Conclusion

In the aftermath of passage of the Affordable Care Act, Project ECHO has the potential to radically transform how health care is provided in the United States and to bring best-practice care to patients with chronic health conditions, wherever they are. As an estimated thirty-two million newly insured people enter the health care system in 2014--bringing with them a host of health-related problems--cost-effective care models are needed.

Project ECHO is just such a model. It creates partnerships between primary care providers in rural and underserved areas and specialty care providers at academic medical centers that allow for the sharing of new knowledge in real time. These partnerships exponentially boost the health care system's ability to deliver specialty care to people who otherwise would lack access. Thus, Project ECHO uses technology and existing resources to magnify the capacities of the health care workforce, build a bridge across health care settings, and truly provide health care without walls.

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NOTES

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Exhibit 1

Community Providers' Perception About Future Role In Management, Treatment, And Care Of Patients With Hepatitis C

My future role as a primary care provider	Not important (%)	Somewhat important (%)	Very important (%)	Essential (%)	Not applicable (%)
To become a well-trained provider of local care for hepatitis C patients (n = 34)	3	3	56	32	6
Diagnosis of HCV patients (n = 32)	6	6	31	50	6
To screen and refer hepatitis C patients to specialists for treatment (n = 34)	29	26	9	27	9
To manage and treat hepatitis C patients with the support of the teleconference network (n = 34)	3	0	53	38	6
Treatment of HCV patients with antiviral therapy (n = 34)	6	6	47	35	6
Monitoring and follow-up of HCV patients (n = 34)	3	3	38	50	6
Referral for all hepatitis C management (n = 34)	41	21	18	6	15
Referral for consultation and co-management of hepatitis C (n = 33)	24	36	18	12	39
To become the local expert in HCV in my community (n = 34)	9	26	29	29	6
To provide consultation to other primary care providers in the care of HCV patients (n = 34)	3	18	47	26	6

SOURCE Authors' analysis of data collected under Project ECHO.

Exhibit 2
 Project ECHO Benefits: Views Of Participating Providers, Health Workers, And Educators

Project ECHO benefits	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Do not know/not applicable (%)	Mean (SD)
Through the Project ECHO telehealth clinics I am learning best practice care in chronic disease (n = 89)	0	1	3	20	70	5	4.68 (0.59)
I am connected with peers in the ECHO telehealth clinic whose opinion I respect for professional advice and consultation (n = 90)	0	3	4	24	63	5	4.55 (0.73)
I learn with guidance from Project ECHO academic specialists in chronic disease management whose knowledge and skills I respect (n = 88)	0	0	1	22	69	7	4.73 (0.46)
I am connected to and respected by the academic specialists in the ECHO telehealth clinic in which I participate (n = 80)	0	3	5	31	46	14	4.4 (0.77)
As I become more and more expert in disease management, I need to present fewer and fewer patients in Project ECHO telehealth clinics (n = 59)	1	10	16	19	17	37	3.66 (1.09)
I am developing my clinical expertise through participation in Project ECHO (n = 84)	0	1	5	32	51	12	4.48 (0.66)
After gaining expertise in the clinical diseases addressed in Project ECHO, I am comfortable teaching others what I have learned (n = 80)	0	0	9	36	39	15	4.33 (0.71)

SOURCE Authors' analysis of data collected under Project ECHO.

Exhibit 3

Project ECHO Participants' Views Of Patient Benefits

Patient benefits	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Do not know/not applicable (%)	Mean (SD)
My participation in Project ECHO benefits patients under my care who I co-manage with ECHO specialists (n = 60)	0	0	8	21	38	33	4.45 (0.69)
The patients under my care whom I co- manage with ECHO specialists receive best practice care (n = 58)	0	0	7	23	34	36	4.43 (0.67)
My participation in Project ECHO benefits the patients under my care whom I do not co-manage with ECHO specialists (n = 62)	0	1	10	35	24	30	4.19 (0.75)
I apply what I have learned about best practices through Project ECHO to all my patients with similar chronic diseases (n = 72)	0	0	6	32	42	20	4.45 (0.62)
I feel comfortable applying the principles I learned from Project ECHO to other patients in my practice with similar chronic disease, independently, without presenting them on the network (n = 71)	0	0	11	38	30	21	4.23 (0.68)

SOURCE: Authors' analysis of data collected under Project ECHO.