

RETINAL SCREENING IN NEW MEXICO AND SOUTH TEXAS: Investigating Three Different Delivery Models

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Purpose

Objective

- VisionQuest Biomedical, CommuniCare Health Centers, Project ECHO, Retina Institute of South Texas (RIST) and Project HOPE, formed a team to provide a retinal evaluation service.
- This service is designed to eliminate barriers to retinal screening for underserved populations of Hispanics and Native Americans in urban and rural areas of New Mexico (NM) and South Texas (TX).
- Implementation of retinal screening within several unique medical environments resulted in the comparison of three different delivery models.

Background

- Diabetic retinopathy (DR) is the leading cause of blindness in the United States among adults aged 20 -74.
- Early detection and treatment can decrease the risk of severe vision loss by >90%.¹ Therefore it is recommended that individuals with diabetes undergo yearly retinal examination to prevent blindness.²
- Patients and physicians agree access to care is one barrier to compliance.³
- Recent advances in telecommunication services have enabled retinal telehealth and telemedicine services to be delivered to those without access.⁴
- Three different models for delivering retinal telehealth services were evaluated for availability, quality, and cost-effectiveness.

Methods

- A retinal screening protocol that uses a Canon CR-1 Mark II digital retinal camera to acquire two 45-degree non-mydratric (no dilation) images of each retina (Figure 1):

- optic disc - centered
- macula - centered

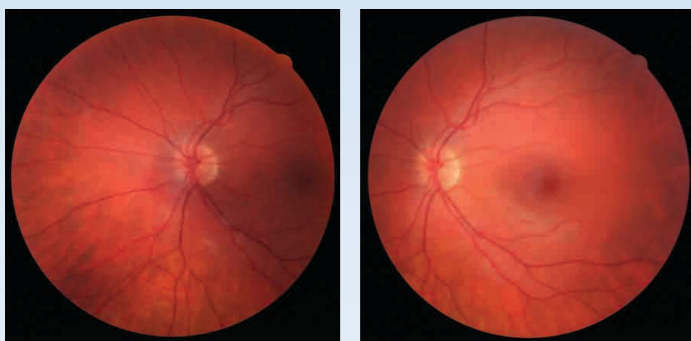


Figure 1. Optic disc - centered image (Field 1) of left eye (L) and macula-centered image (Field 2) of left eye (R).

Methods

- Cases were uploaded to a Web-based, HIPAA compliant, FDA cleared picture archival communication system (PACS).
- A network of licensed optometrists and ophthalmologists graded the images for pathology using a surveillance template built into the PACs (Fig. 2).
- Patient recruitment and communication of retinal screening results varied depending on the delivery model.

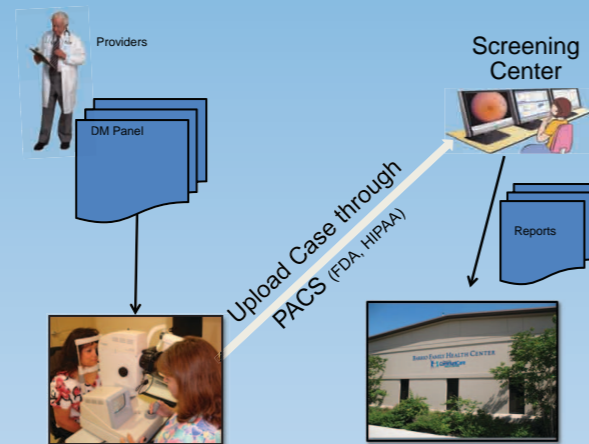


Figure 2. Diagram of Eye Disease Screening System.

Delivery Model 1 – Project HOPE

- Self-contained mobile clinic offers health education to both local residents and health care professionals, for improved chronic disease prevention and management (Figure 3)
- Health workers performed retinal screening
- Provided retinal screening to anyone over the age of 18 at healthcare events hosted throughout rural areas of New Mexico
- Results were communicated through parcel service within one week



Figure 3– Project Hope HABITS for Life HOPE mobile (top); Interior of mobile clinic performing retinal screening (bottom).

Methods

Delivery Model 2 – CommuniCare

- Health clinic located in an underserved area in southern San Antonio, Texas
- In-clinic and community health education, including counseling, health screenings, and awareness campaigns
- Primary care physicians (PCP) referred patients for a retinal screening
- Medical assistants performed retinal screening
- Results were communicated to the patient through the PCP and clinic (Figure 2) within one week

Delivery Model 3 – Project ECHO

- Network of community health clinics throughout rural New Mexico (Figure 4)
- Two retinal cameras were rotated through 8 clinics
- Community health workers (CHW) and diabetic care managers performed retinal screening
- Patients were recruited by CHW
- Results were communicated through the community health worker or diabetic case manager within one week



Figure 4. Project ECHO satellite site, Pecos Valley Medical Center (L), in Northern New Mexico and telemedicine room (R) in Albuquerque.

Results

Table 1 – Breakdown of cases collected per retinal screening model.

	Project HOPE	CommuniCare	Project ECHO
Normal*	1,625 (45.3%)	378 (46.6%)	508 (56.0%)
Abnormals**	1,001 (28.4%)	408 (50.3%)	258 (28.5%)
Inadequates***	934 (26.0%)	28 (3.%)	140 (15.5%)
Total Cases Collected	3,582	812	906

* Normals were determined to be adequate enough so the grader could determine no illness is present
 ** A case determined to have any sort of pathology was classified as abnormal
 ***If the grader could not determine the presence, or absence, of pathology due to poor photography or small pupils, the case was determined inadequate

Table 2 – Number of patients with pathology per retinal screening model.

	Project HOPE	CommuniCare	Project ECHO
Diabetic Retinopathy	138 (3.9%)	194 (24.0%)	64 (7.1%)
Hypertensive Retinopathy	179 (3.9%)	110 (13.6%)	26 (2.9%)
Cataract(s)	21 (2.0%)	107 (12.7%)	26 (2.2%)
Glaucoma	167 (5.0%)	4 (5.8%)	29 (3.2%)
Drusen	146 (4.1%)	15 (1.9%)	25 (2.8%)

- Over 5,000 retinal screens were performed
- Screening in NM covered the entire state and screening in San Antonio focused on underserved areas
- Out of the total screened, 33% had diabetes. There have been 108 urgent referrals to date

Results

- Model 1 – Project HOPE
 - Screened the largest population
 - Lowest DR and pathology incidence rates most likely due to non-exclusion criteria
 - 60 urgent referrals including papilledema, cholesteral embolus; advanced DR
- Model 2 – CommuniCare
 - Highest DR incidence rate
 - Highest incidence rate of other pathologies, specifically hypertensive retinopathy
 - Lowest inadequate rate
 - 29 urgent referrals
- Model 3 – Project ECHO
 - DR incidence rate higher than Model 1
 - Medial inadequate rate
 - 19 urgent referrals including a case of DR requiring immediate laser therapy

Conclusions

- Using PCPs and/or CHWs to refer patients:
 - Better care of at-risk individuals
 - Detection of disease in early stages
 - Effective result communication
- Settings affect case quality: lighting and venue
- No unique model currently exists to bring retinal screening to places in NM
- Technology can reduce access barrier, however, does not solve the entire need by itself

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