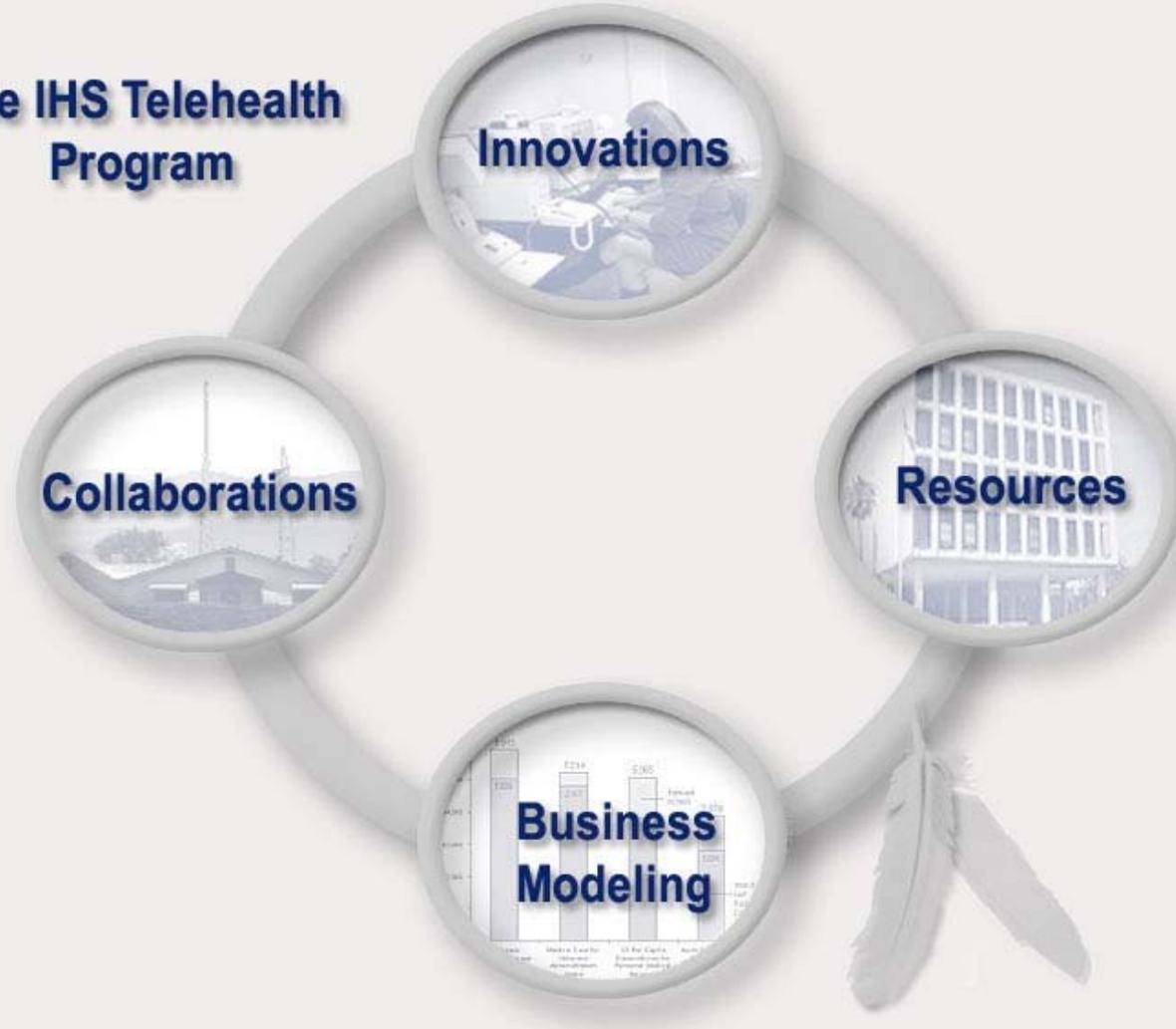




An Update on Telehealth: Innovation and ROI

Mark Carroll, MD

The IHS Telehealth Program







MORTALITY RATE DISPARITIES CONTINUE

American Indians and Alaska Natives in the IHS Service Area

2001-2003

(Age-adjusted mortality rates per 100,000 population)



	AI/AN Rate 2001- 2003	U.S. All Races Rate 2002	Ratio: AI/AN to U.S. All Races
ALL CAUSES	1042.2	845.3	1.2
Tuberculosis	1.8	0.3	6.0
Alcoholism	43.6	6.7	6.5
Diabetes	75.2	25.4	3.0
Motor vehicle crashes	51.1	15.7	3.3
Unintentional Injuries	93.8	36.9	2.5
Homicide	12.7	6.1	2.1
Suicide	17.1	10.9	1.6
Cervical cancer	4.4	2.6	1.7
Infant deaths ^{1/}	9.8	7.0	1.4
Cerebrovascular diseases	54.7	56.2	1.0

^{1/} Infant deaths per 1,000 live births

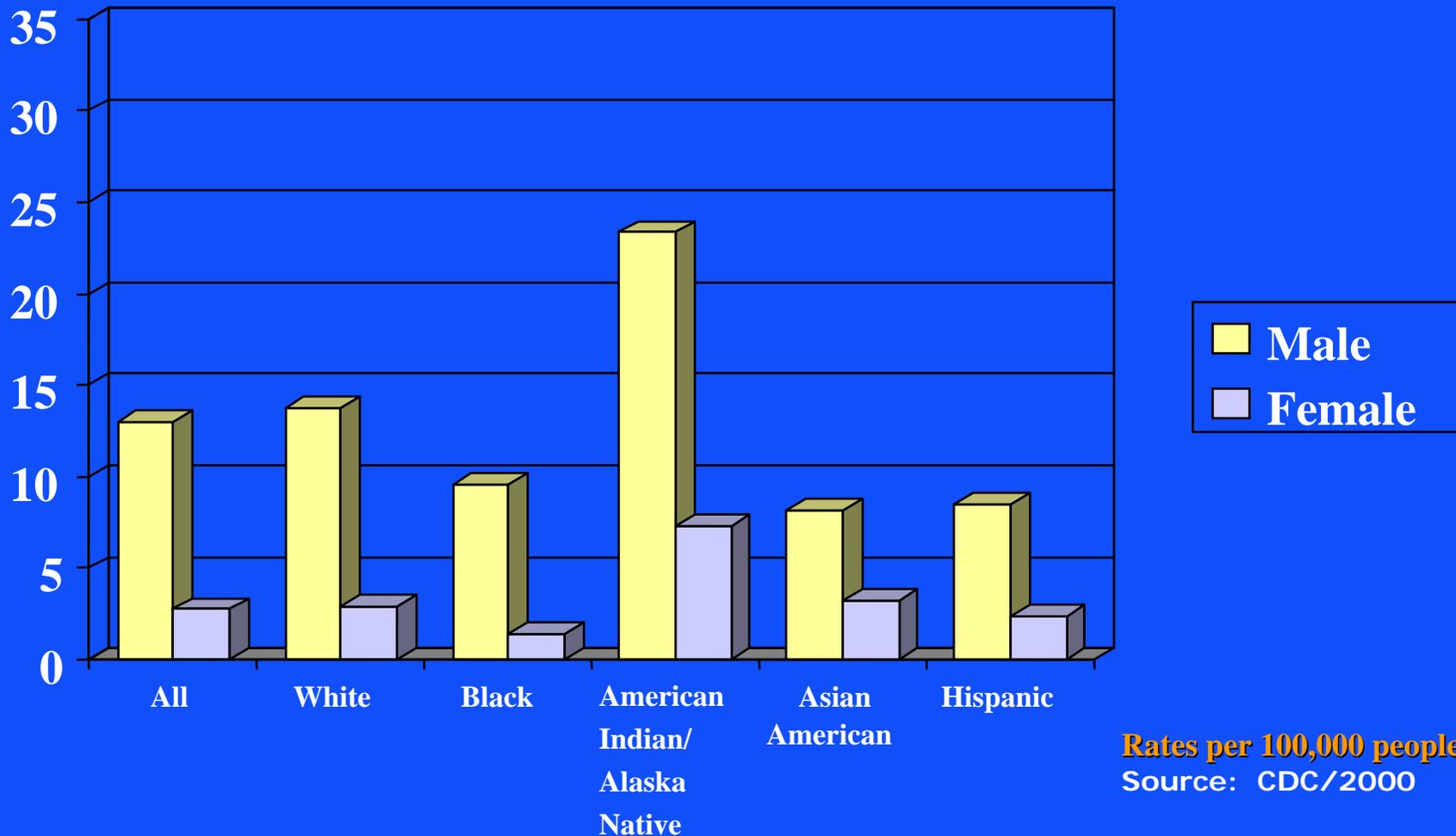
NOTE: American Indian and Alaska Native (AI/AN) rates were adjusted to compensate for misreporting of AI/AN race on state death certificates. AI/AN rates are based on 2000 census with bridged-race categories developed by the Census Bureau and the National Center for Health Statistics.

Jan. 2007



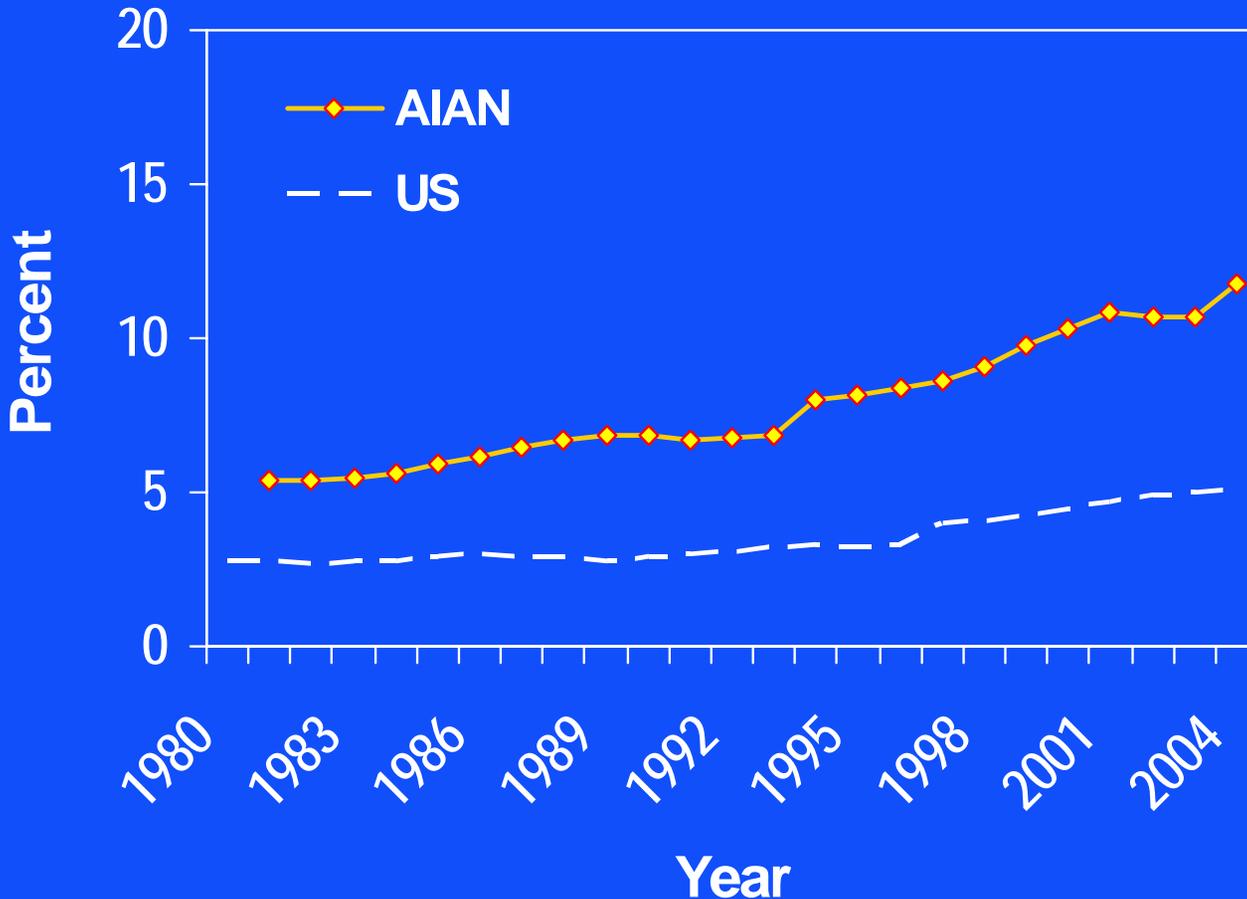
Suicide Rates

Ages 15-19, by Race and Gender



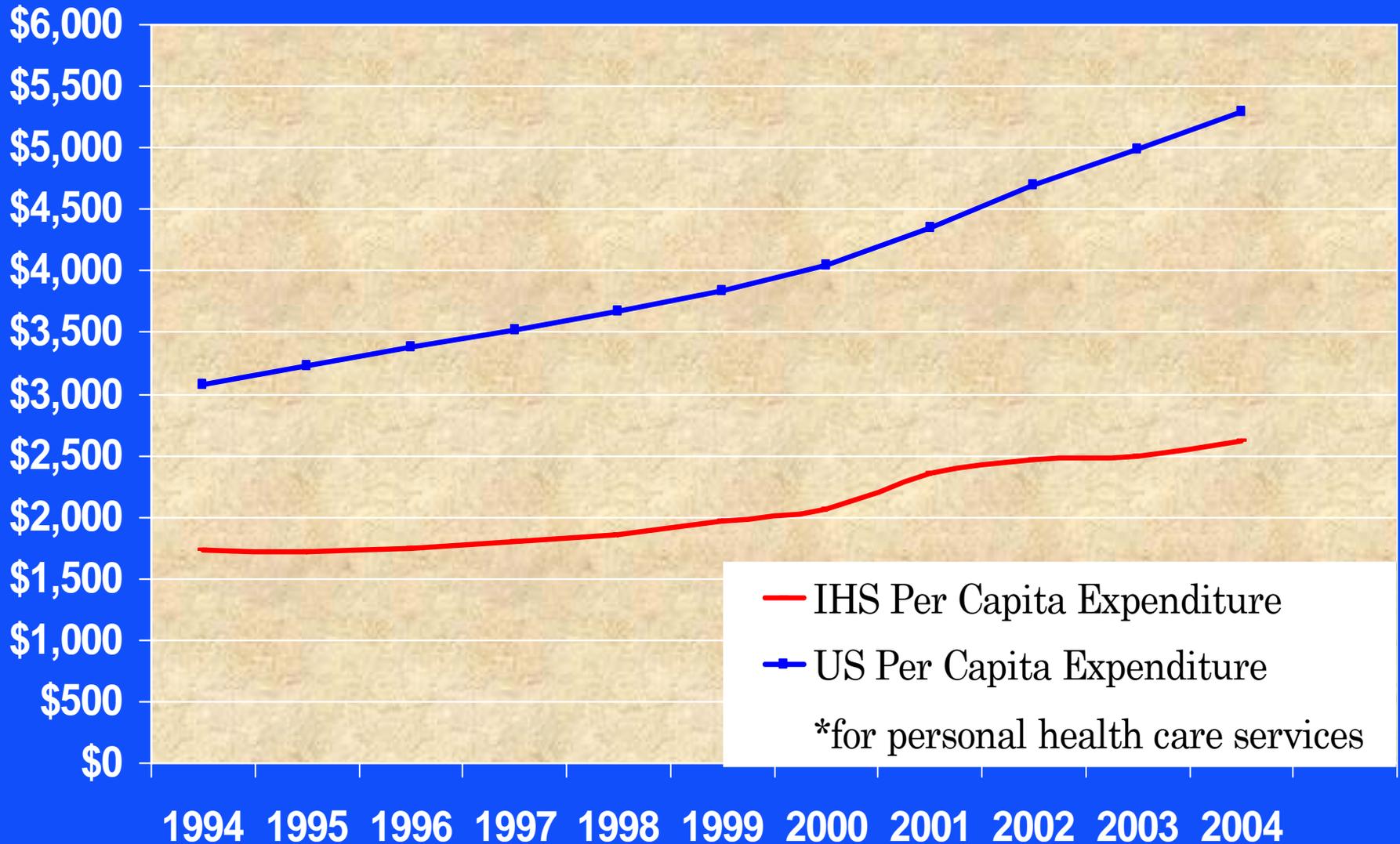
Prevalence of Diagnosed Diabetes: AI/ANs Compared to U.S. Population

1980- 2004





Per Capita Expenditures Trend: IHS Compared to US Average





Telehealth as a Business Tool

- **To improve service delivery in the face of:**
 - **Increasing service population/need**
 - **Disparities in:**
 - **Mortality data**
 - **Funding**
 - **Staffing**
 - **Facilities**



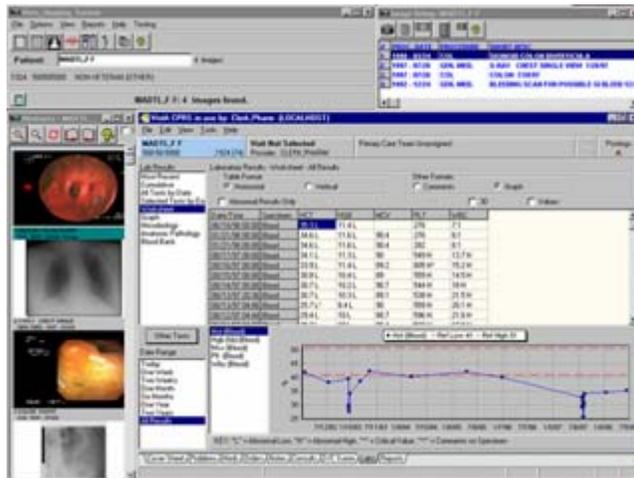
Key Questions

- **What are the opportunities for shared/collaborative service delivery?**
 - To help improve ROI

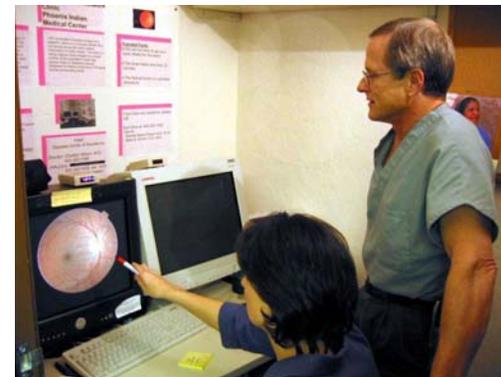
- **What is the opportunity specific to chronic care?**
 - To improve access to care, system efficiencies, and quality of service delivery

IHS Telehealth Program: Leveraging Investments

- Build on existing successes



AFHCAN
Access Without Limits





IHS Joslin Vision Network

- Retinal screening for patients with diabetes
- 57 sites nationally in 15 states
- Single reading center at Phoenix Indian Medical Center
- Over 21,000 interpretations projected to date by end of CY 07



INS/JVN Teleophthalmology Program

2000 - 2006

- Phoenix, AZ
- Sells, AZ
- Tuba City, AZ
- Parker, AZ
- Hopi, AZ
- San Carlos, AZ
- Salt River, AZ
- Peach Springs, AZ
- Ft Belknap, ND
- Pine Ridge, SD
- Rosebud, SD
- Shiprock, NM
- Santa Fe, NM
- Crown Point, NM
- Fairbanks, AK
- Cass Lake, MN
- Winnebago, NE
- Crow Agency, MT
- Livingston, TX
- Clinton, OK
- Wewoka, OK
- Lawton, OK
- Eufaula, OK
- Okmulgee, OK
- Oklahoma City, OK
- Lawrence, KS
- Warm Springs, OR
- Nespelem, WA
- Yakama, WA
- Wellpinit, WA
- Tacoma, WA
- Fort Hall, ID
- Lapwai, ID
- Plummer, ID
- Elko, NV
- Reno Sparks, NV
- Schurz, NV
- Washoe, NV
- McDermitt, NV
- Fallon, NV
- Rock Hill, SC
- Pawnee, OK
- Ft. Yuma, AZ
- Albuquerque, NM
- Mescalero, NM
- McLaughlin, SD
- Ft. Defiance, AZ
- Tucson, AZ
- Pascua Yaqui Tribe
- San Xavier

- Tanlequah, OK
- Jicarilla, NM
- **Kayenta, AZ**
- **Inscription House, AZ**
- **Montezuma Creek, UT**
- **Blanding, UT**
- **Monument Valley, UT**
- **Navajo Mountain, AZ**
- **Salem, OR**

~ 100 Deployments within 24 months



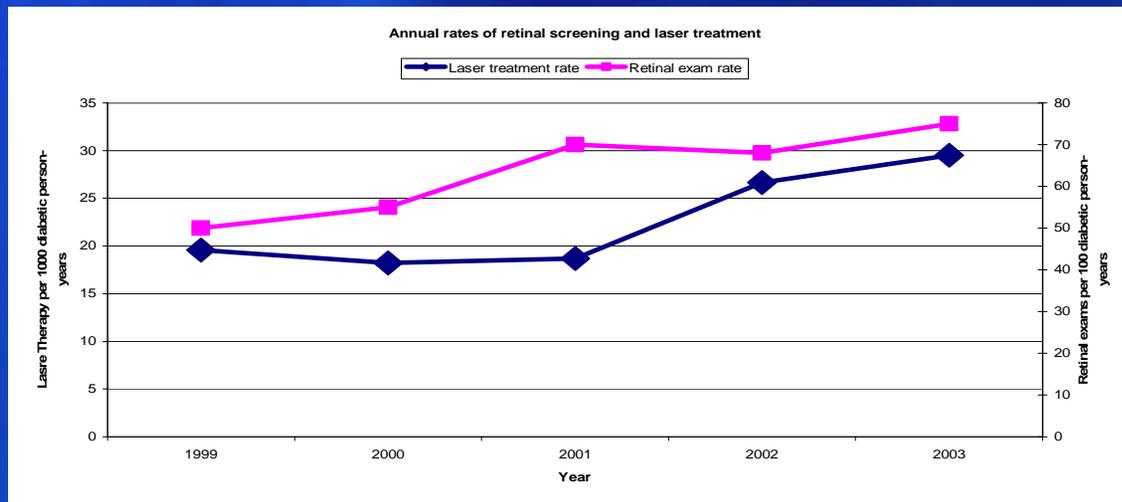
“Mobile Joslin Vision Network”

- Proof-of-concept to the Arctic Circle

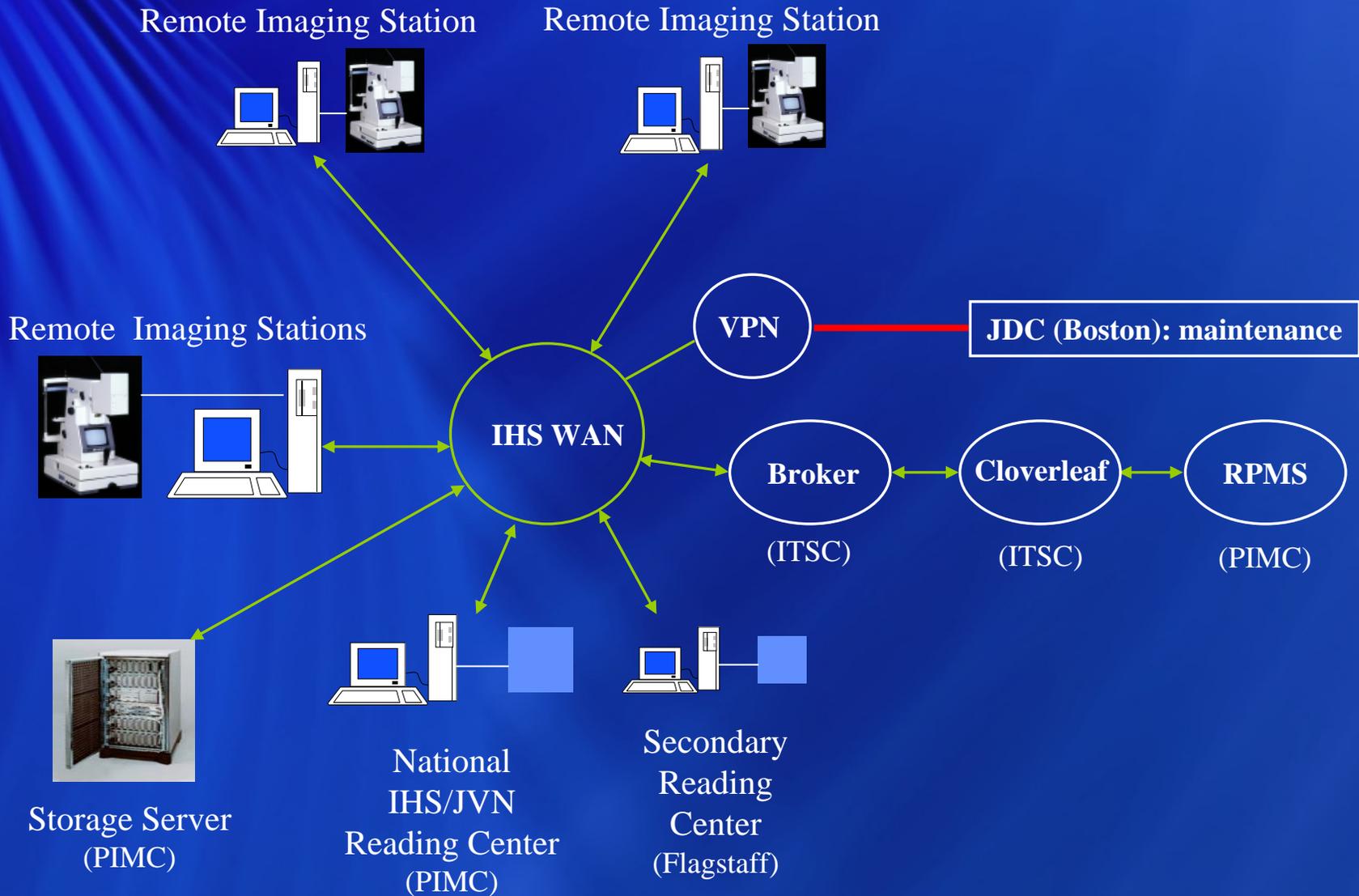


IHS/JVN Teleophthalmology

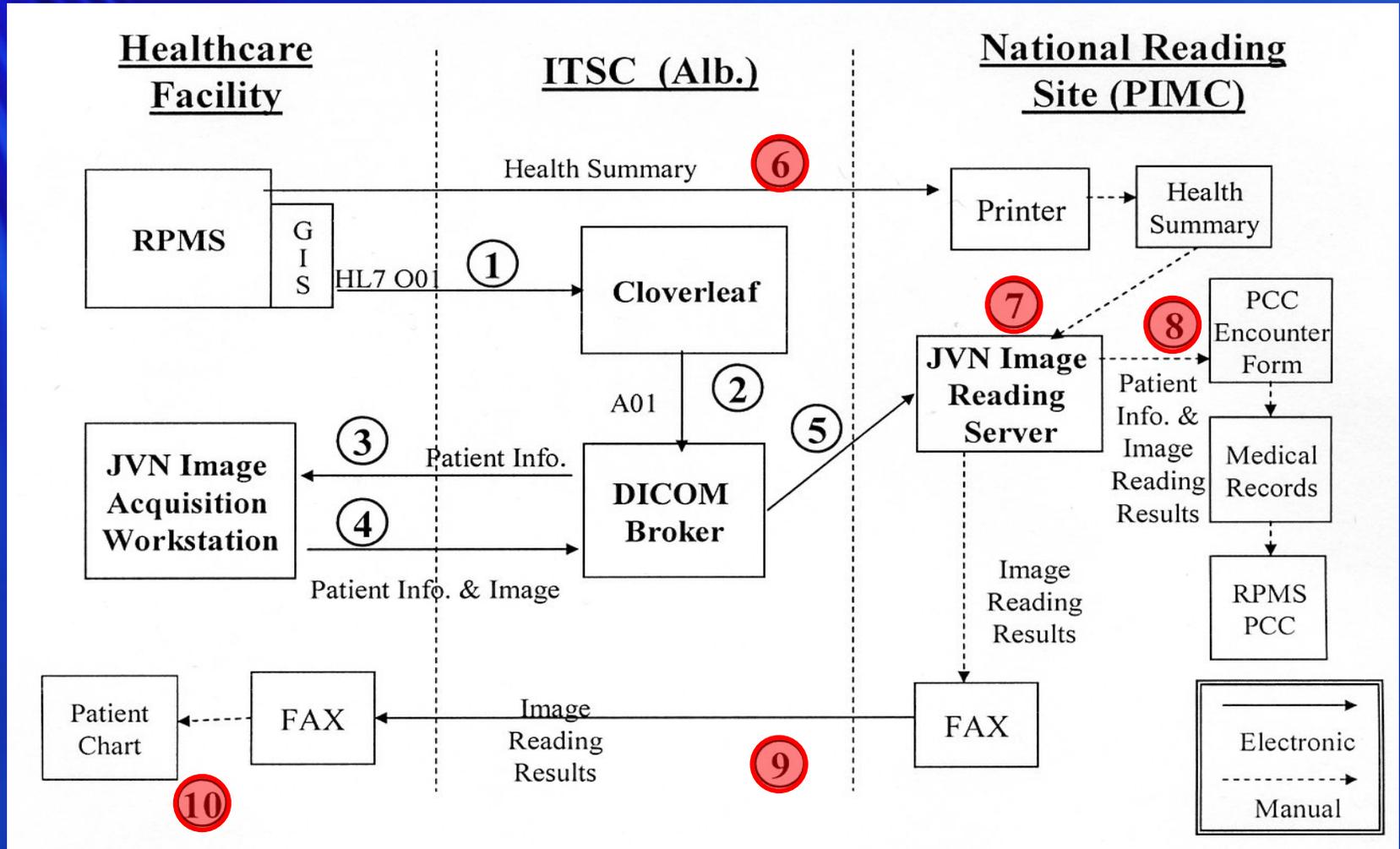
- Validated better than live eye exam for diagnosis of DR
- Able to increase compliance with standards of care for DR in AI/AN's



IHS/JVN Teleophthalmology Program Architecture



IHS/JVN₃ CONOPS Summary



● - Manual Steps

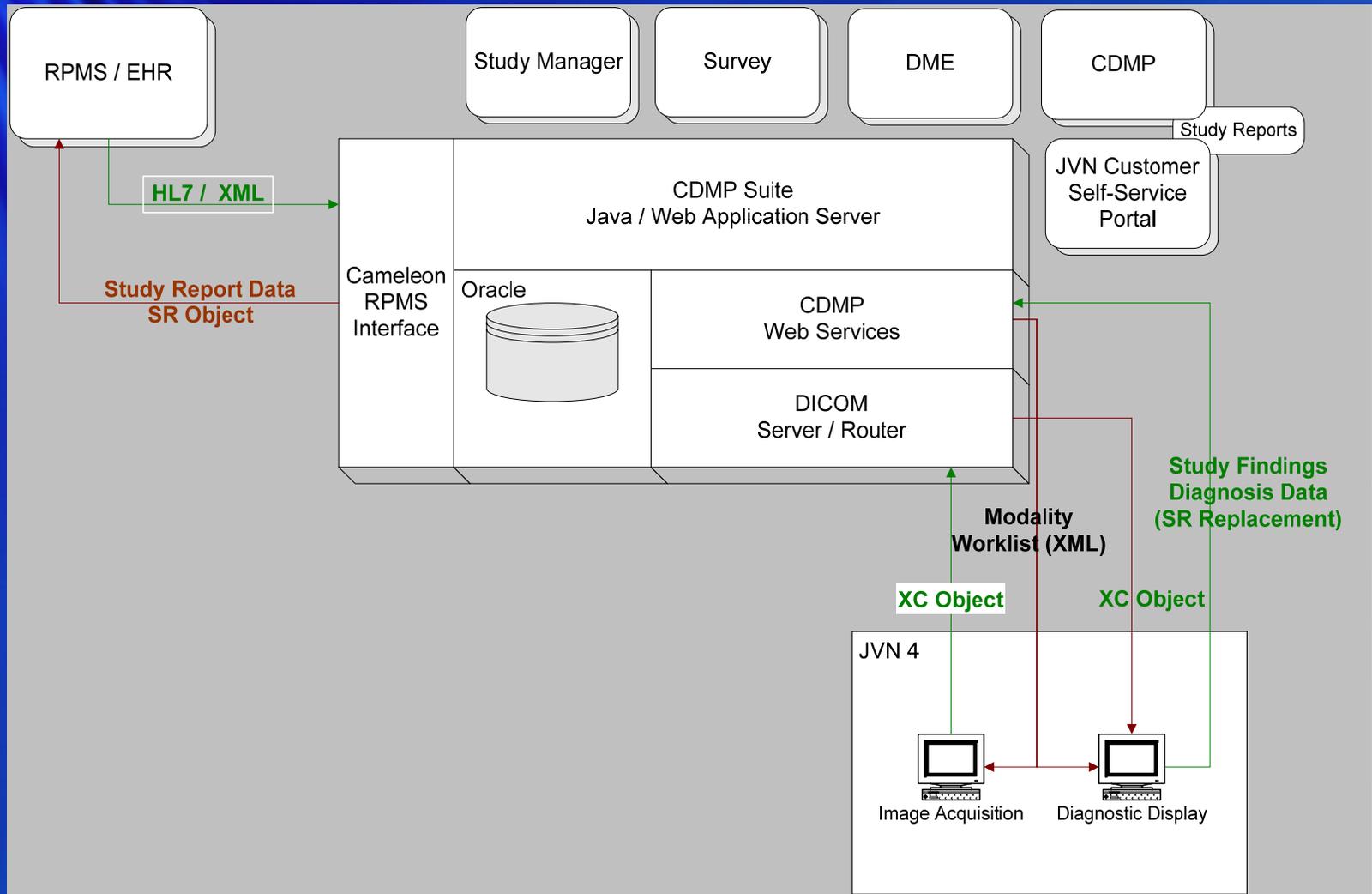
Needed Enhancement

- **Eliminate need for AGFA Broker and Basix Storage Server**
- **Eliminate manual steps in work flow**
- **Enhanced communication with RPMS**
- **Enhanced reporting**
- **Image and other evidence display in EHR**

JVN_{4.x}

- Latest version upgrade of JVN uses JVN Server based on the CDMP telemedicine platform
- Release Q1 CY07
- Must have RPMS interface to install and use JVN_{4.x}

IHS/JVN_{4.x} Architecture



IHS/JVN_{4.x} Distributed Reading

JVN Imager



JVN Server

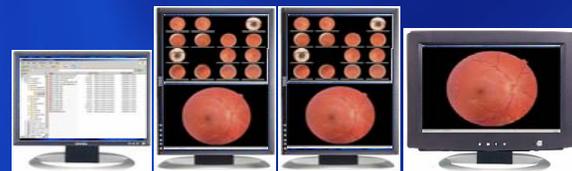


DICOM MWL Query

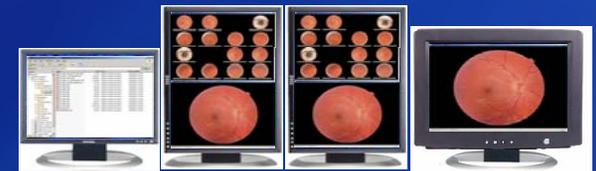
DICOM Storage

Reports

Customers



National Reading Center
(Phoenix)



Peripheral Reading Site
(Flagstaff)

Benefits JVN_{4.x}/CDMP

- **Costs Savings**
 - Elimination of AGFA and Cloverleaf
 - Single site location of server
- **Communication enhancement**
 - Bidirectional RPMS interface
 - Vista Imaging ready
- **Cost effective distribution of reading services**
- **Platform for home telehealth data**

AFHCAN Telehealth



- ◆ 8 years operational history
- ◆ R&D Telehealth System
- ◆ 10,000 cases / year
- ◆ Manufacturing of Medical Devices
- ◆ Whole Product Solution
 - Design → Installation → Training → Support → Marketing
- ◆ Installed Customer base includes:
 - 248 sites, 44 organizations
 - 37 Tribal organizations
 - US Army sites (6)
 - US Air Force bases (3)
 - State of Alaska Public Health Nursing (26)
 - US Coast Guard clinics (5)
 - US Coast Guard cutters and ice breakers (6)



Start

Patient:

Case #:

User: Carroll, Mark

Log Out

What do you want to do today?

Create a New Case

Click here if you want to create a new case.

Cases To Review

Click here to view cases on your plate (cases on hold, your cases, your group cases.)
You have 4 cases.

Cases You Sent

Click here to view cases you have sent that are still open (not yet archived.)

Search Archives

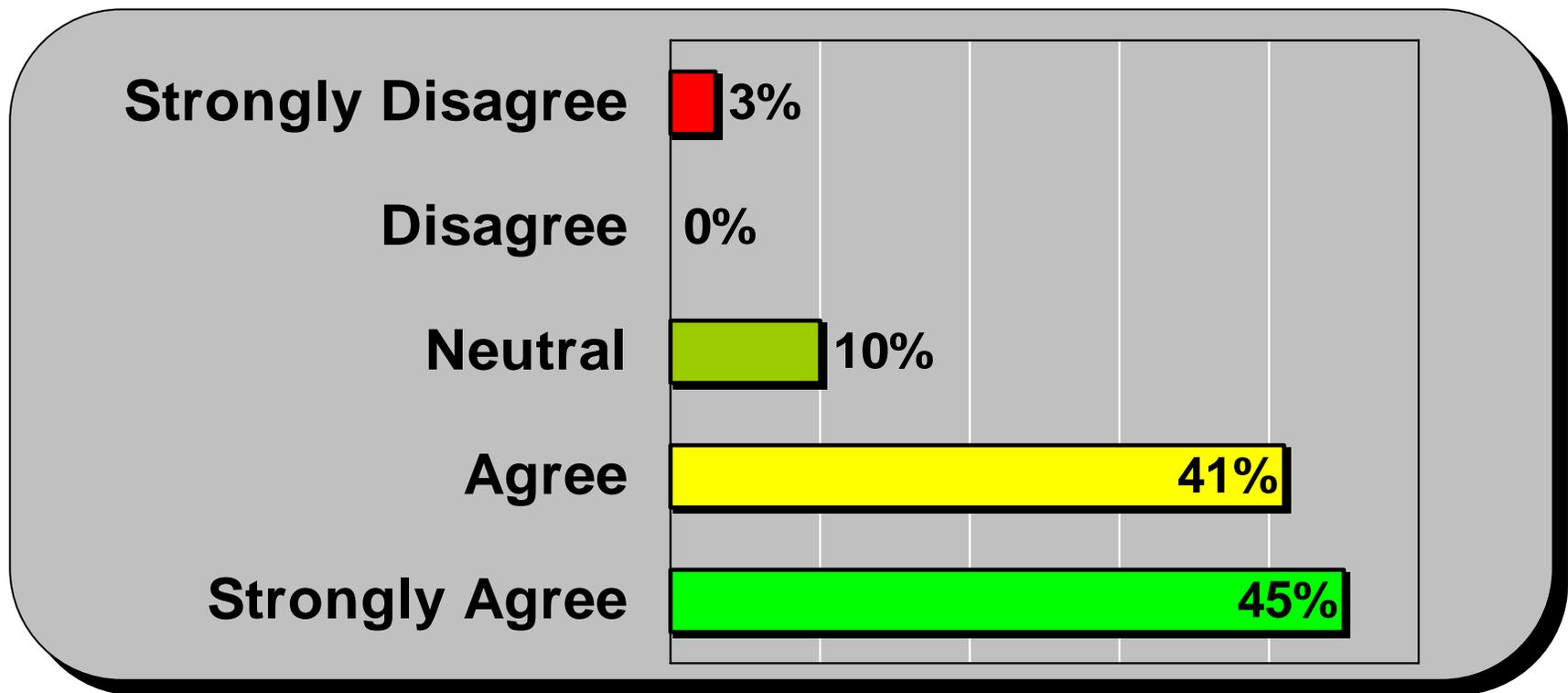
Click here to search the archived cases.

My Settings



For this case, rate the following statement:

**Telemedicine will improve the
QUALITY OF CARE for this
patient. (n=1,681)**





Product Evaluation



AFHCAN
Access Without Limits

Study 7. Burn, Hand on Blue Cloth, Quality:High, Distance: , Flash:On (10 images)

AFHCAN File Edit View Animation Image Color Preferences Window

A) Canon A640 (High... B) Casio EX-Z1000 (7... C) Fuji E550 (12M, Fi... D) Fuji E900 (9M, Fin... E) Fuji Z3 (5M, Fine) ... F) Kodak C875 (High... H) Nikon L1 (Highest ... I) Nikon L5 (5M High... J) Nikon S7c (7M High... K) Panasonic DMC-FX...

[B] Casio EX-Z1000 (7M, Fine) 4.0 MB 3648x2736 3648x2736 pixels 24 BPP 100% 9.52 Megapixel

Zoom: Relative 100 Zoom=100 Re-Load

Resize: 800 x 600 1024 x 768 1280 x 1024 1472 x 1104

Select Study: Previous

start [Taskbar icons] Type to search 49% 9:42 AM

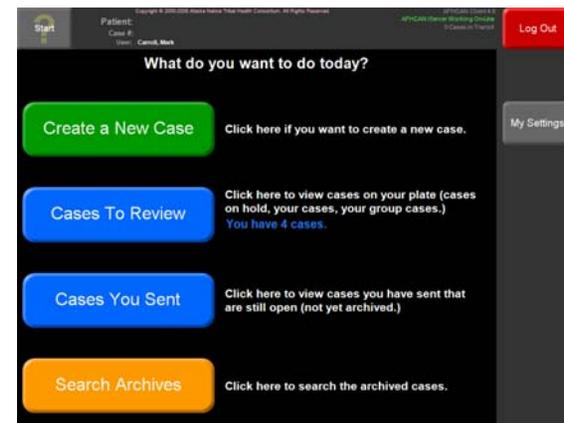


IHS-AFHCAN Collaboration

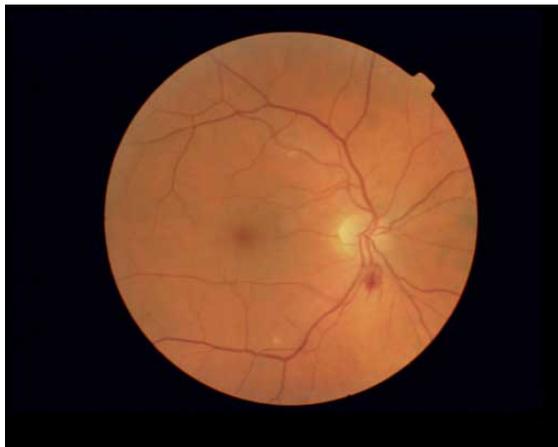
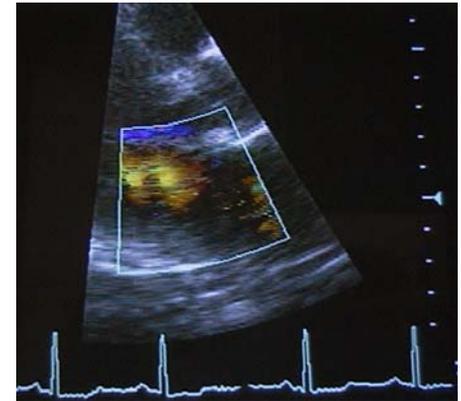
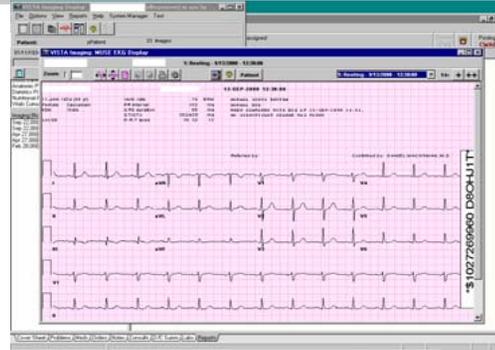
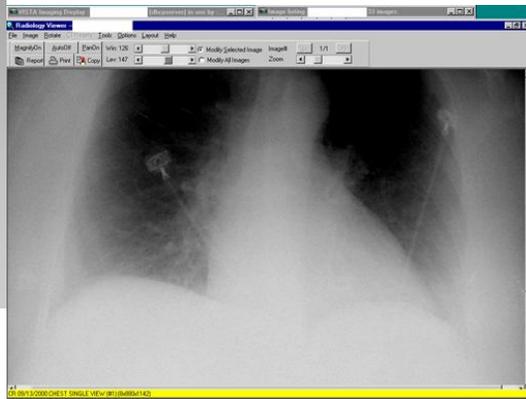
- **National Telehealth Infrastructure in Indian Health**
 - Offer a secure enterprise solution for store-and-forward telemedicine across Indian health



AFHCAN
Access Without Limits



Multi-Modality "Store&Forward" T-Health

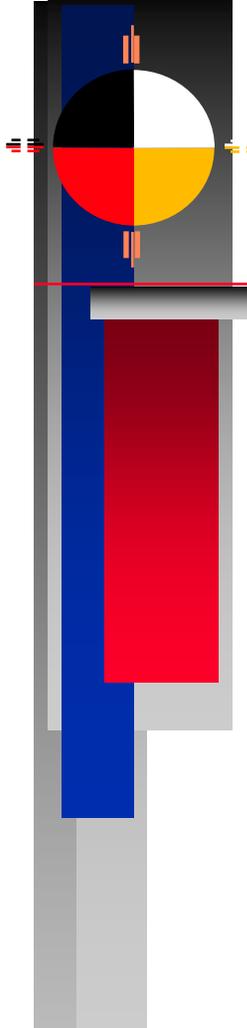




AFHCAN Status Report - #1

■ Server infrastructure

- IHS core network in place
 - Includes capability for outside, non-IHS consultants/specialists
- Multiple Areas with AFHCAN servers
 - Nashville, Phoenix, Portland
- Other Area capacity expanding
 - Some via planned expansion of tele-consultation support for IHS AIDS-HIV telemedicine project



AFHCAN Status Report - #2

■ Carts not required



- Lots of telemedicine possible via free software + local PCs + peripherals (e.g. digital camera)

■ AFHCAN-RPMS interface

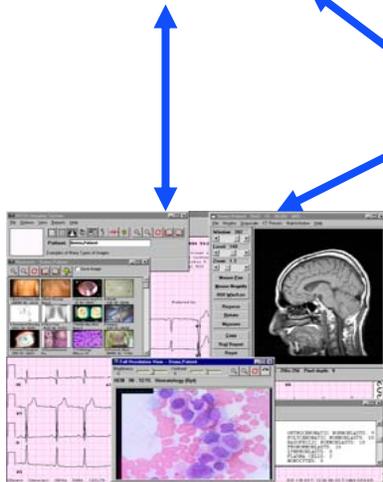
- 1st phase being completed

■ Service models developing for multiple sites from different Areas

- Note: Tremendous opportunity for quality, value, and system efficiencies

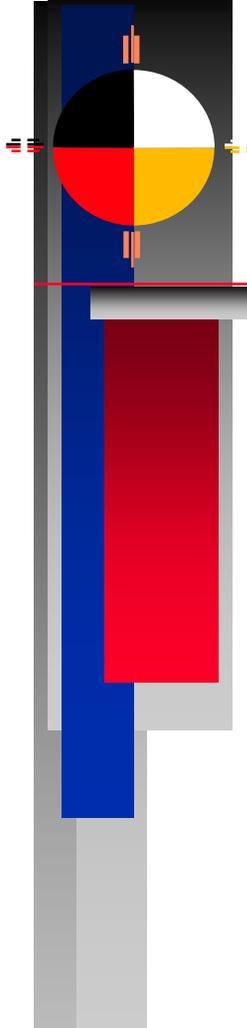


Integrated Systems of Care



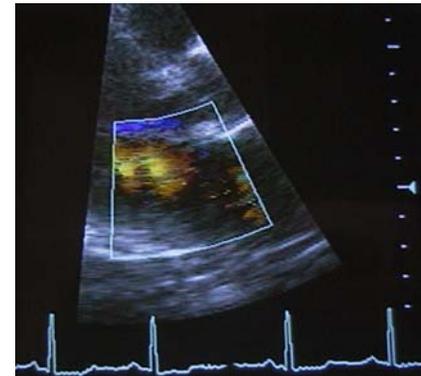
AFHCAN
Access Without Limits

- Focus on standards and information systems integration
 - AFHCAN to be integrated with -
 - The IHS Electronic Health Record
 - And VistaA Imaging



New Service Models Possible For:

- Radiology
- Retinopathy screening
- Mental health
- Dermatology
- ENT
- Cardiology
- Pharmacy
- AIDS-HIV care
- Neurology
- Nutrition/Dietetics



Emerging Capability

- **“High Tech”**
 - Broad application
 - Tele-pharmacy
 - Focused application
 - Electronic ICU
 - “Robotic surgery”
 - Training

- **“Low Tech”**
 - Broad application
 - Home telehealth
 - Medical nutrition Rx
 - Focused application
 - Pediatric specialists



ENT Tele-Consultation Center



- **Specialists at Alaska Native Medical Center**
 - Statewide experience via the AFHCAN network
- **Extended in 2006 to patients at the Yakima Indian Health facility in eastern Washington**
- **Further extension in 2007 to other Indian health facilities outside Alaska**
 - “Expert triage” model



Tele-Pharmacy

- **Aberdeen Area**
 - **Pilot project began last summer**
 - **Supporting the Pine Ridge Service unit and surrounding clinics**

- **Based on work done at ANMC and outside Indian health**



Access to “Best Practices” Specialists

■ National Jewish Medical Center

- Leader in Asthma Care

■ University of California, San Francisco

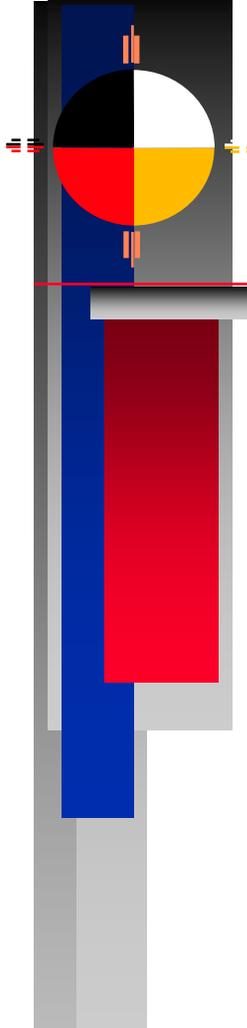
- Consultation for patients with HIV/AIDS



Telehealth Service “Menu”

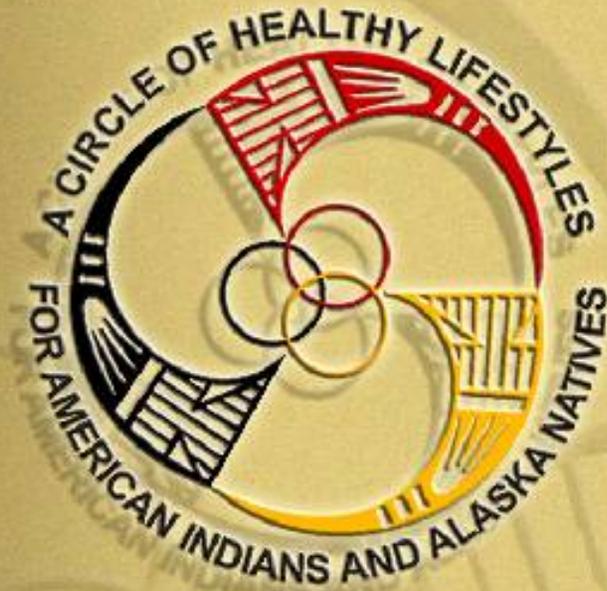
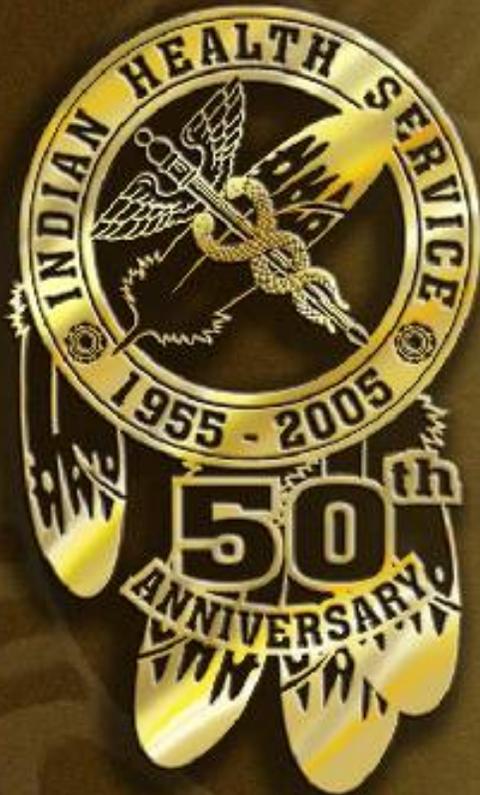
	Real-Time	Store&Forward	Home
Clinical	Mental Health	JVN	Heart Failure Care
	Cardiology	Cardiology	Diabetes Care
	Rheumatology	Rheumatology	
	Nutrition Services	Dermatology	
	Pain Management	Radiology	
		AIDS/HIV Care	
		ENT	
Educational	CME/Rounds	Streaming Media	
	Pathways into Health		
Programmatic	Tele-Public Health		

**Draft – Phoenix Area IHS* 2006*



Phoenix Area IHS: 2007 Telehealth Services Available

Clinical Service	Brief Description of Service
Tele-Retinal Surveillance	Diagnosis and management of diabetic eye disease via the IHS Joslin Vision Network (JVN) program
Tele-Cardiology Consultation	Consultation to primary teams from the Native American Cardiology Program for cardiovascular conditions
Tele-Nutrition Care	Real-time videoconferencing between patients, families, and a certified dietician regarding nutrition services for chronic conditions
Tele-Nephrology Consultation	Consultation to primary care teams from Phoenix Area IHS adult and child nephrologists regarding kidney disorders
Home Telehealth for Heart Failure Care	Home-based care management from the Native American Cardiology Program for patients with heart failure
Tele-Geriatric Consultation	Consultation to primary care teams from the IHS Geriatrics consultant regarding medical care for elders
Tele-Dermatology Consultation	Consultation to primary care teams from the Arizona Telemedicine Program dermatologist regarding skin conditions



Director's 2005 Initiatives

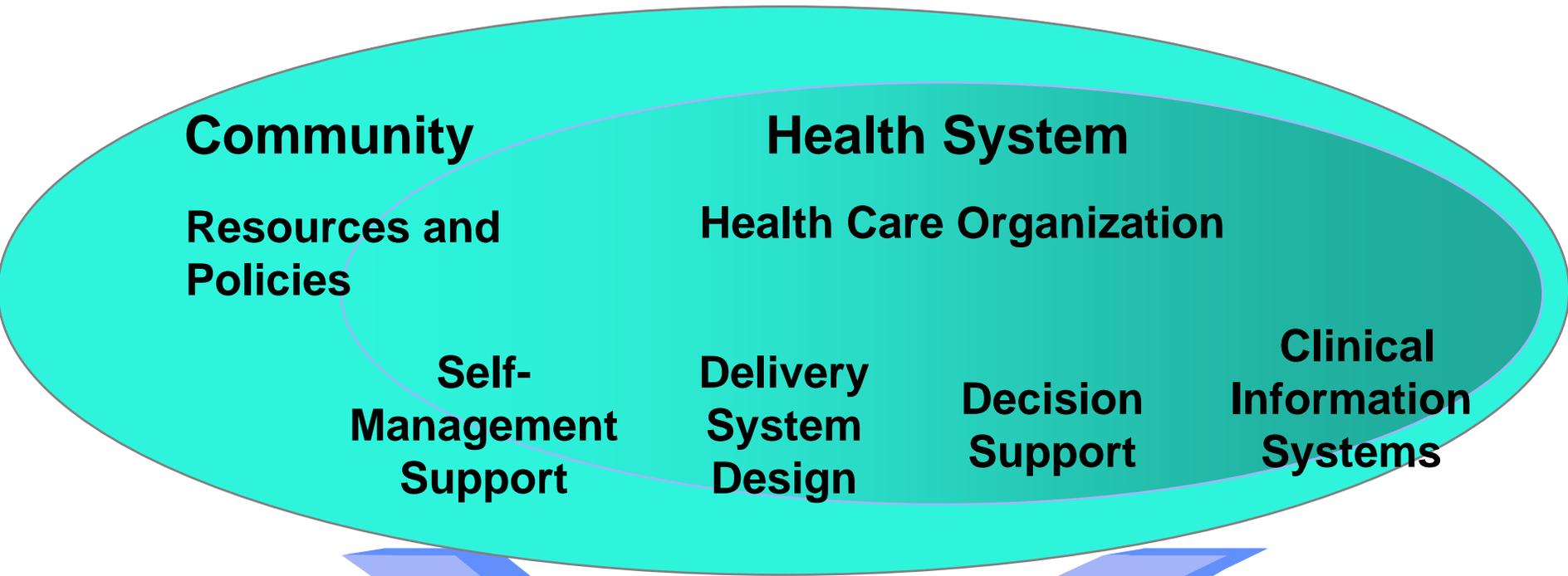
- BEHAVIORAL HEALTH
- CHRONIC DISEASE
- HEALTH PROMOTION
DISEASE PREVENTION

Tele-Behavioral Health

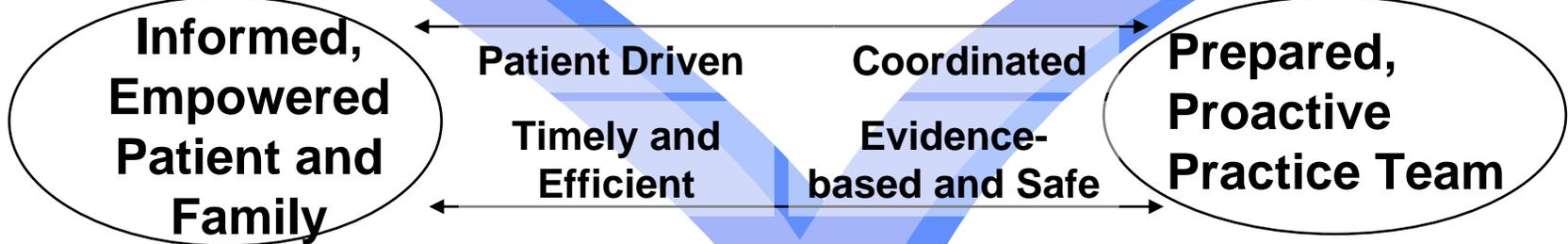
- Behavioral health service is an ideal target for telehealth
 - Growing experience already within Indian health
 - Service delivery models ready to go
- Other 'real-time' telehealth is maturing
 - Cardiology, Rheumatology, Nutrition services
 - Reimbursement models improving



Care Model



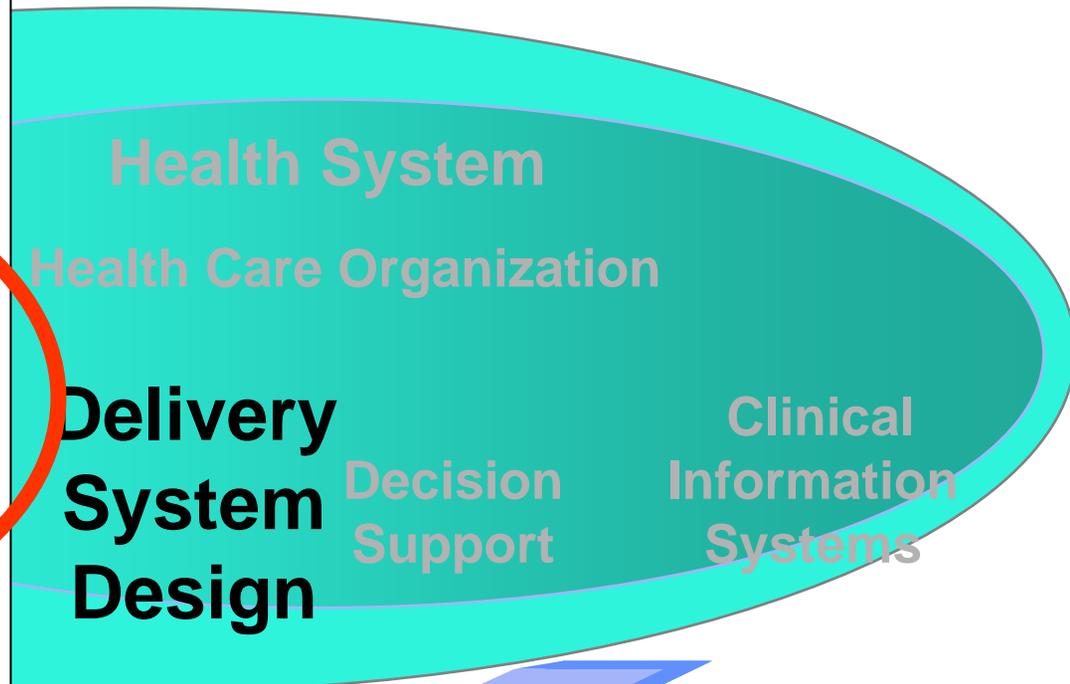
Productive Interactions through effective asset based partnering over time



Improved achievement of patient and community goals

1. Develop a multidisciplinary team that optimizes the role of each member in clinic & community
2. Optimize the Care Team: each member performs at the highest level of their licensure.
3. Focus on access, efficiencies and flow
4. Provide clinical case management services for complex patients
5. Give care that patients understand and that fits with cultural background
6. Think about alternative approaches to traditional 1:1 face to face care: telehealth, group visits, etc.
7. Integrate traditional medicine

re Model

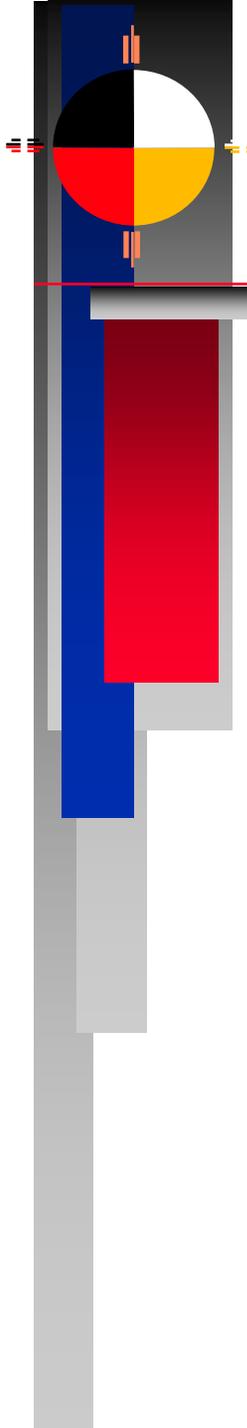


effective asset based partnering over time

en
d
Coordinated
Evidence-based and Safe

**Prepared,
Proactive
Practice Team**

of patient and community goals



Home Telehealth/Remote Monitoring

- Improving literature and experience
 - Chumbler et al, 2005: 455 VA patients
 - 50% reduction in hospitalization
 - 11% reduction in ED visits
 - Improved health-related quality of life
 - Noel et al, 2004: 104 elderly “high use” VA pts
 - Decreased hospital bed days, ED visits
 - Decreased Hgb A1C
 - Improved cognitive scores
 - Decreased resource needs, increased treatment compliance



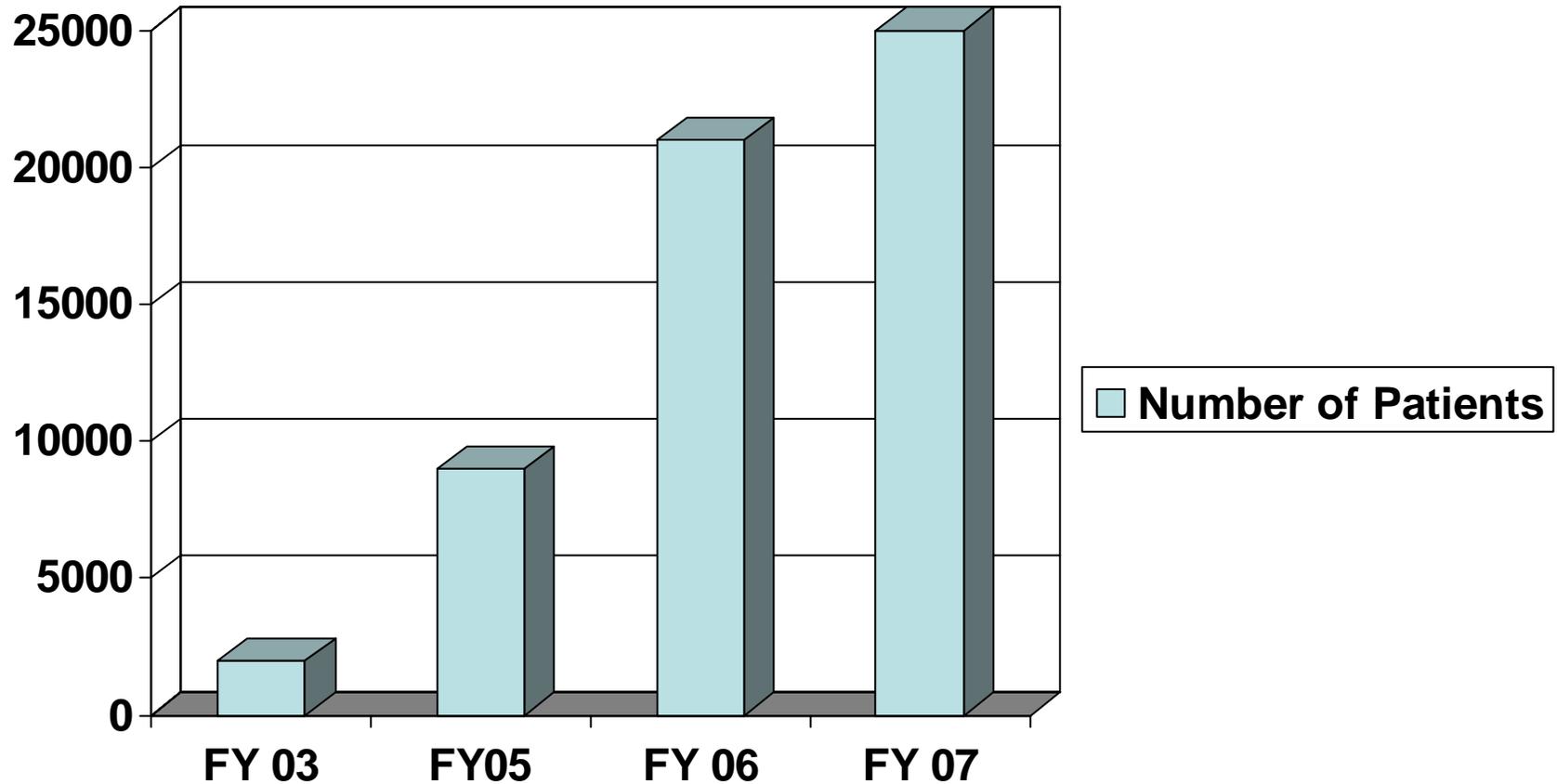
VA Home Telehealth

- 25,000 patients currently enrolled across the VA health system
- For a range of services:
 - Mental health
 - Heart Failure, HTN
 - Diabetes care
 - Other chronic conditions

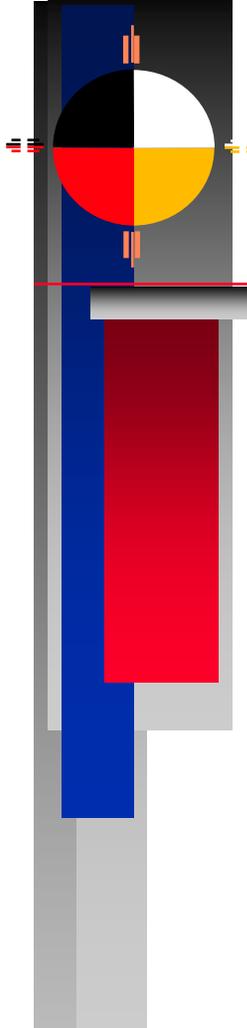
VISN 19 Home Telehealth Data - 2004

	Inpatient				Outpatient				Inpatient + Outpatient				N	Total Avoidance
	Pre	Post	Avoidance	%	Pre	Post	Avoidance	%	Pre	Post	Avoidance	%		
Mental Health Pgms														
Bipolar Disorder	\$2,574	\$637	\$1,937	75%	\$8,815	\$5,465	\$3,351	38%	\$11,390	\$6,102	\$5,288	46%	29	\$153,351
Depression	\$11,418	\$3,502	\$7,916	69%	\$10,432	\$4,901	\$5,531	53%	\$21,850	\$8,403	\$13,447	62%	38	\$510,986
PTSD	\$2,566	\$3,210	-\$644	-25%	\$6,591	\$3,323	\$3,268	50%	\$9,157	\$6,533	\$2,624	29%	73	\$191,552
Substance Abuse	\$22,421	\$3,877	\$18,544	83%	\$5,251	\$9,148	-\$3,897	-74%	\$27,672	\$13,025	\$14,647	53%	20	\$292,940
Schizophrenia	\$54,025	\$12,748	\$41,277	76%	\$5,456	\$4,362	\$1,094	20%	\$59,481	\$17,110	\$42,371	71%	2	\$84,742
				56%				17%				52%	162	\$1,233,571
Medical Pgms														
COPD	\$2,574	\$637	\$1,937	75%	\$8,815	\$5,465	\$3,350	38%	\$11,389	\$6,102	\$5,287	46%	65	\$343,655
CHF	\$15,644	\$12,249	\$3,395	22%	\$6,368	\$5,591	\$777	12%	\$22,012	\$17,840	\$4,172	19%	111	\$463,092
Diabetes	\$6,905	\$4,935	\$1,970	29%	\$2,849	\$1,029	\$1,820	64%	\$9,754	\$5,964	\$3,790	39%	30	\$113,700
Med Compliance	\$10,413	\$4,336	\$6,077	58%	\$18,171	\$3,761	\$14,410	79%	\$28,584	\$8,097	\$20,487	72%	99	\$2,028,213
HTN/CHF	\$7,696	\$8,146	-\$450	-6%	\$3,369	\$3,621	-\$252	-7%	\$11,065	\$11,767	-\$702	-6%	53	-\$37,206
Anticoagulation	\$3,637	\$2,245	\$1,392	38%	\$4,757	\$6,510	-\$1,753	-37%	\$8,394	\$8,755	-\$361	-4%	46	-\$16,606
				36%				25%				28%	404	\$2,894,848

VHA CCHT Patient Numbers



As of 3/30/07 → 25,000 pts



Home Telehealth in IHS

■ Development Continues

● Pros

- Improves patient access to care
- Improves chronic care
- Extends health care team more efficiently
- Decreases inappropriate hospital utilization
- Promotes guideline-driven care

● Cons

- Reimbursement policy only beginning to take shape



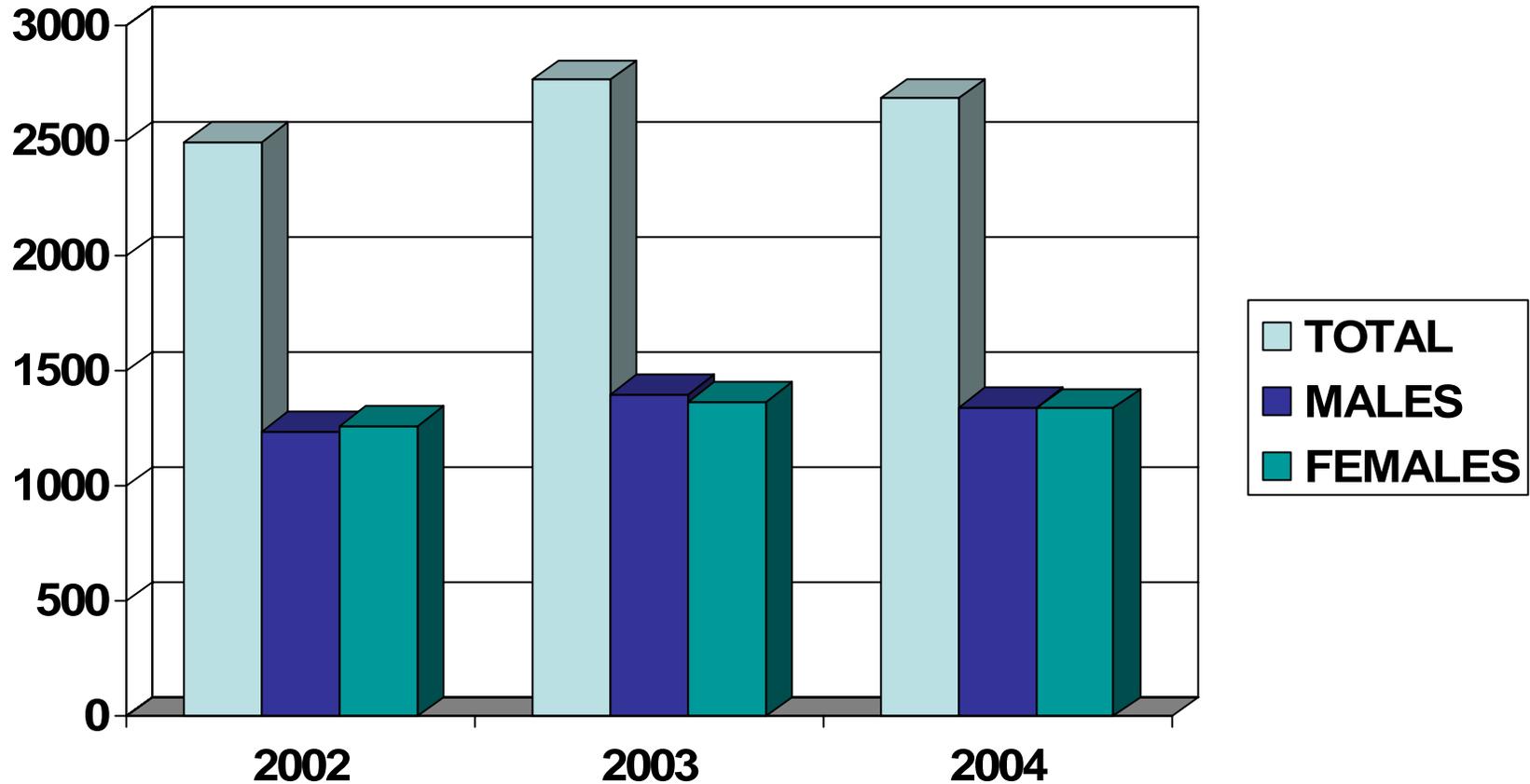
HOME TELEHEALTH FOR HEART FAILURE

HEART

Health Enhancement for American
Indians & Alaska Natives Through
Residential Telemedicine

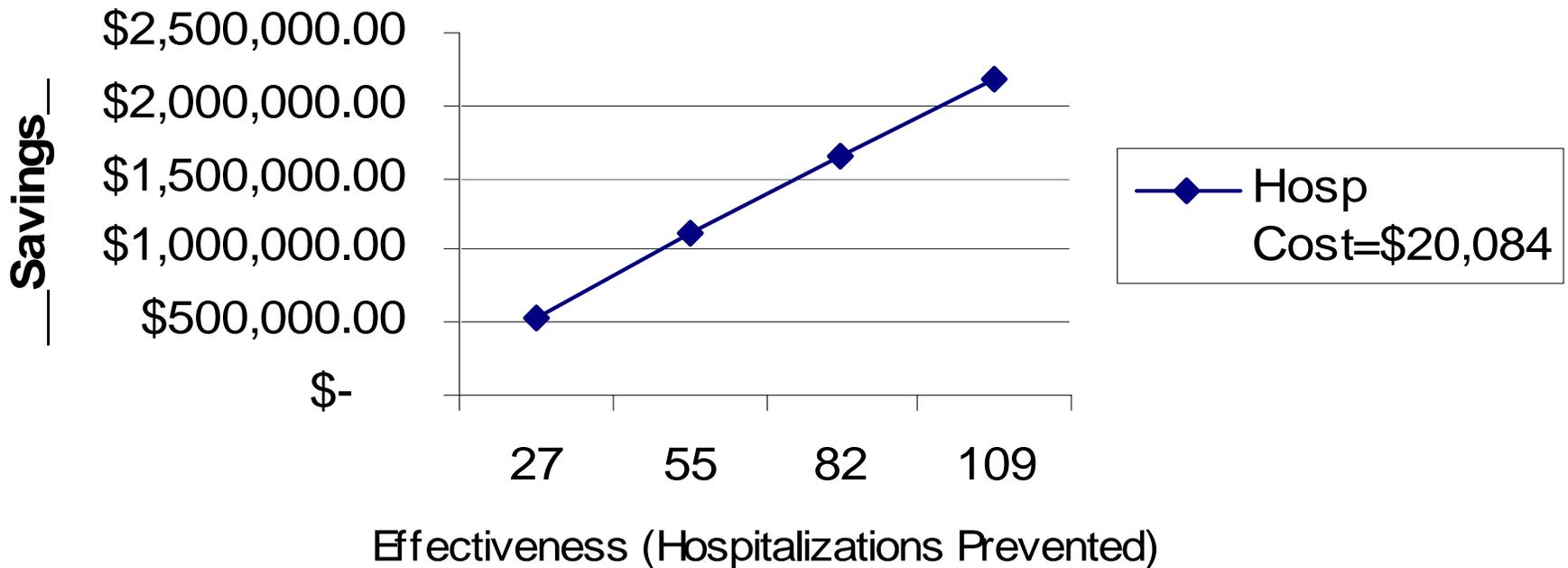
‘Success with Failure’

Patients with Heart Failure: 12 IHS Areas

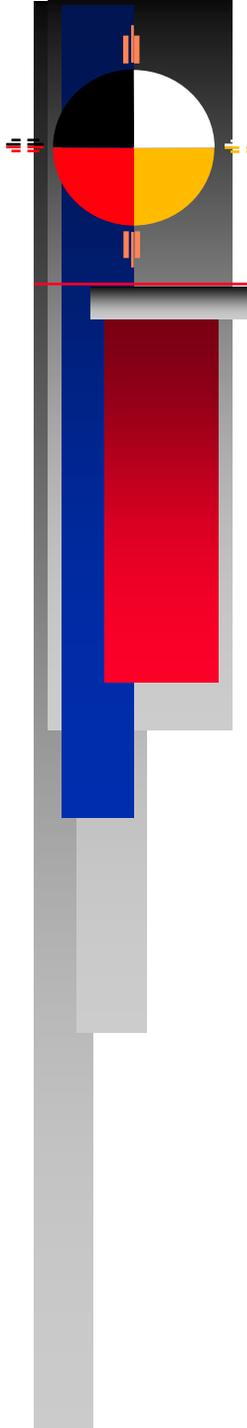


POTENTIAL SAVINGS

**Savings in Hospitalization Costs by Effectiveness,
75 Patients Enrolled, 109 expected hospitalizations.**

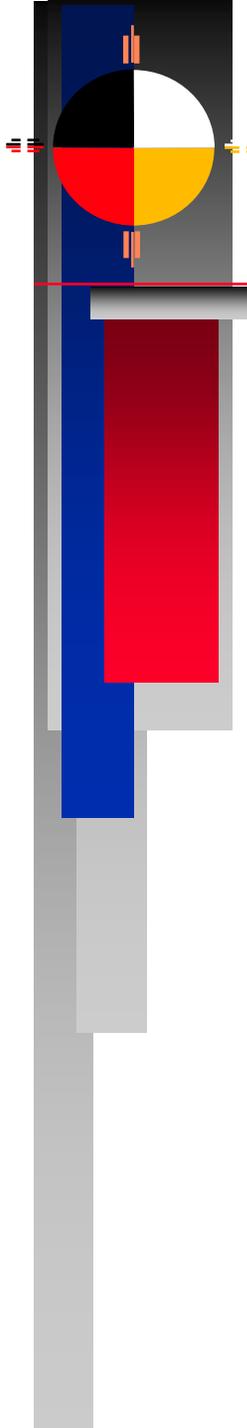


Note: Cost/Hospitalization from Dasta (2005) AHA 6th Scientific Forum on Quality of Care and Outcomes Research in Cardiovascular Disease & Stroke



Economics of Home Telehealth

- Annualized cost per patient ~ **\$2,500**
 - Includes cost of equipment and shared staff (new) to oversee day-to-day program
- Annualized savings per patient ~ **\$30,000**
 - Assumes prevention of roughly 1.5 hospitalizations per year for patients with heart failure as primary diagnosis



Home T-Health Reimbursement

- **System savings don't equal individual facility budget savings**
 - Savings to 3rd party insurers vs. individual facility CHS budget
- **Reimbursement policy in home telehealth is still evolving**
- **And some incentives are “malaligned”**
 - E.g. Decreased hospitalizations are not advantageous to some referral facility operating budgets



Telehealth Reimbursement

- Medicare reimburses for real-time telehealth
- A growing # of Medicaid programs also reimburse for real-time telehealth services
- More Medicaid programs reimburse for some store-and-forward telehealth services
 - E.g. AZ Medicaid is especially proactive

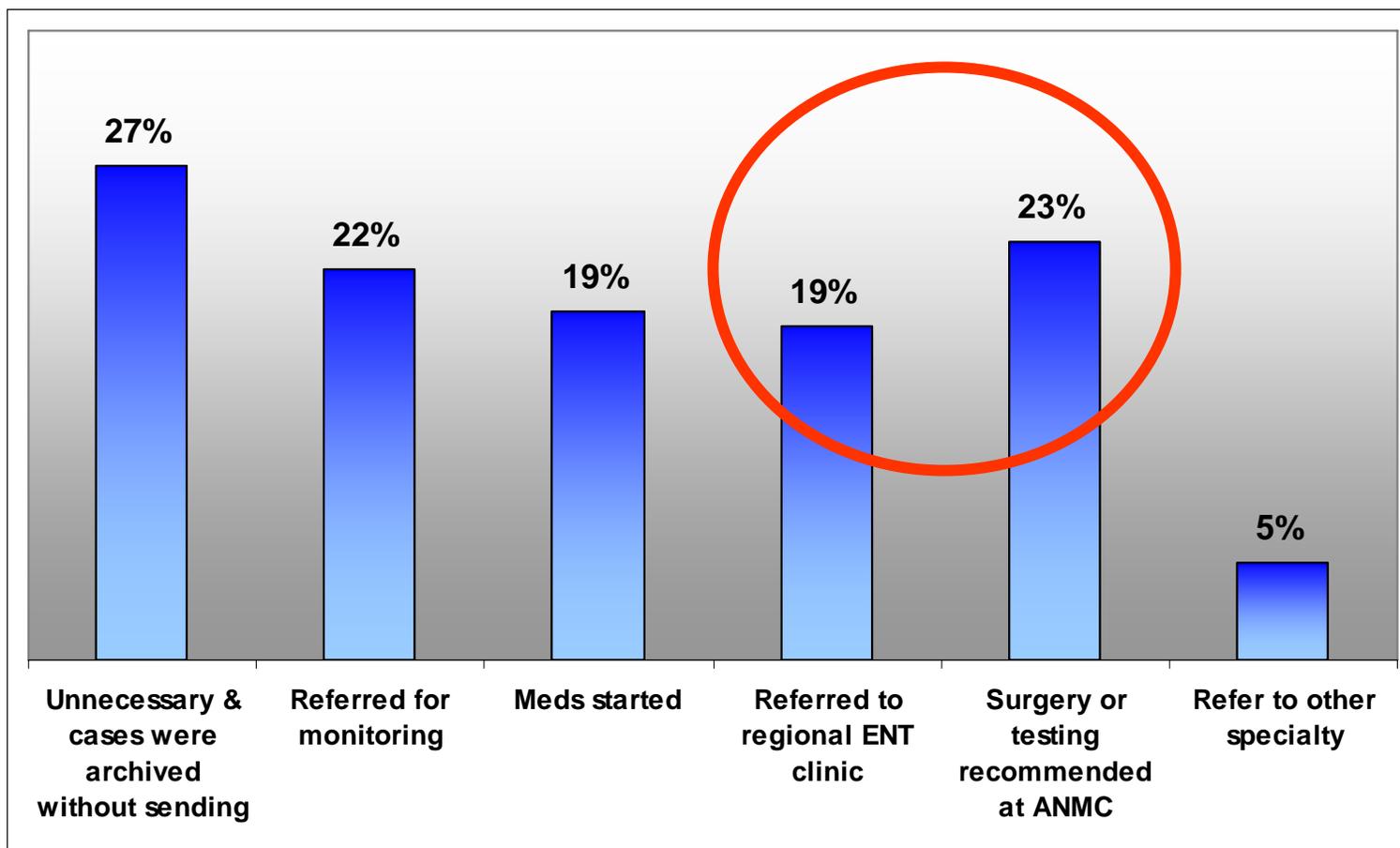


T-Health Business Models

- **Lapsed salaries**
 - Use T-health for unfilled vacancies
- **Reimbursement**
 - Relies on 3rd party payer policy and rates
- **Cost Avoidance**
 - Eg. For contract health budgets
- **Agreements/contracts**
 - Shared costs among facilities/communities for specialist FTEs/services



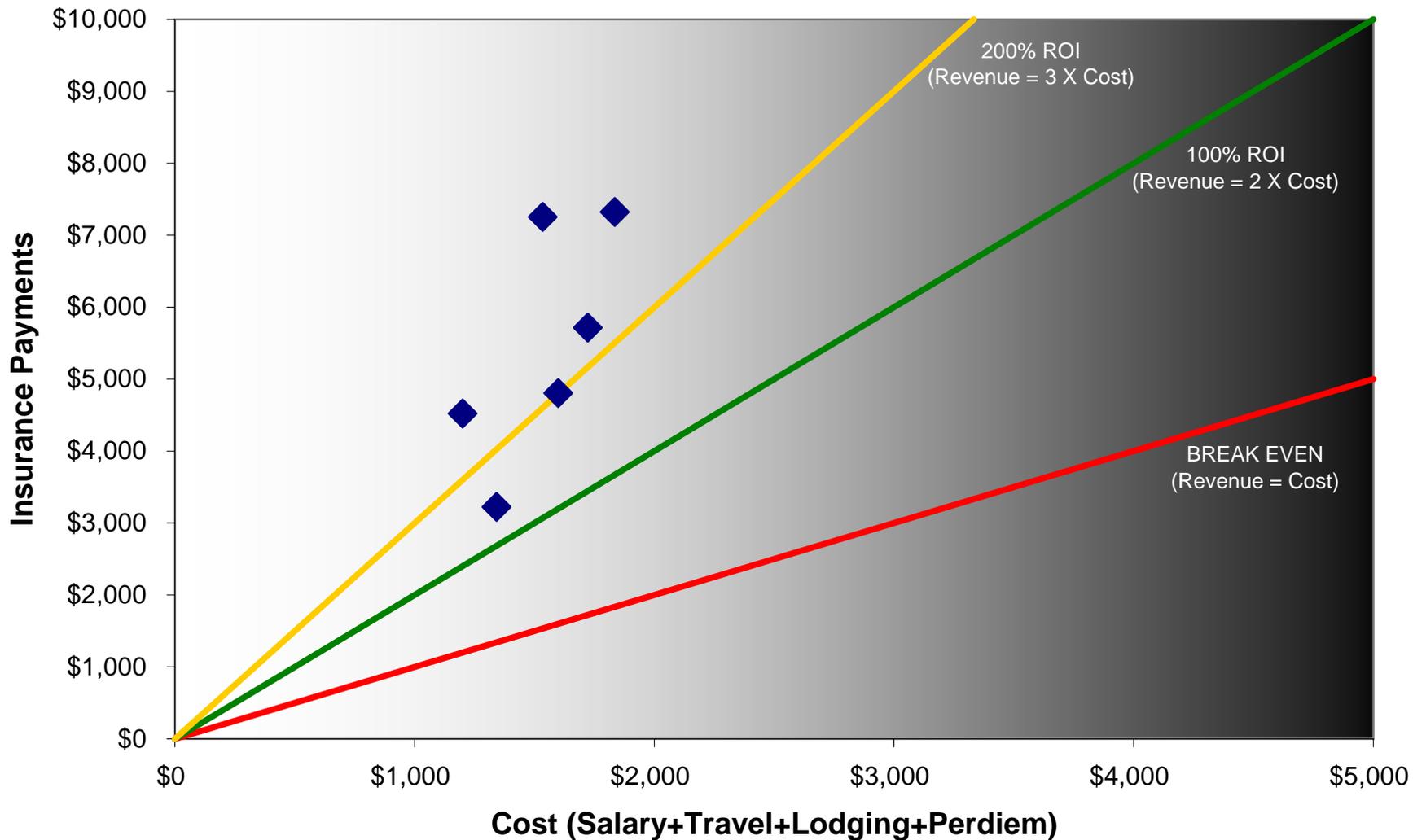
Alaska ENT Outcomes (n=897)



About 73% of the patients seen needed something done (meds, surgery, ongoing monitoring) and 27% needed to be screened out.

Note: Percentages may not add to 100% due to multiple outcomes per case.

Insurance Payments vs Cost for 6 Audiology Clinics

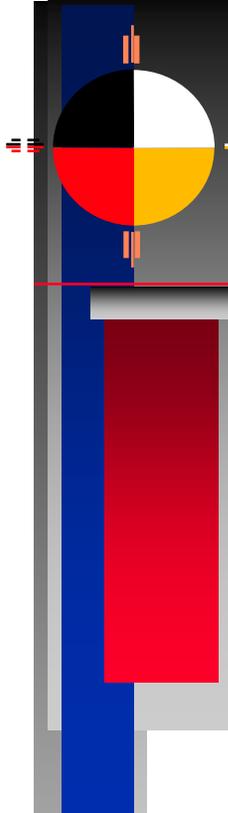




Next Steps

- **Regional telehealth service “menus”**
- **Continued modeling, with business planning**
- **Important opportunities for emerging tools to complement/shape new service delivery models**
 - **Chronic Care**





Collaborations are Key

- **Within Indian health**
 - Southwest Telehealth Consortium
 - Alaska Federal Health Care Access Network (AFHCAN)
 - Inter-Area “corporate” projects
- **With other federal agencies**
 - Veterans Health Administration
- **With universities, states, and other organizations**



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Thank You

