

Ultra High-Speed Broadband Task Force

Health Care Panel

March 20, 2009



ULTRA HIGH-SPEED
BROADBAND TASK FORCE

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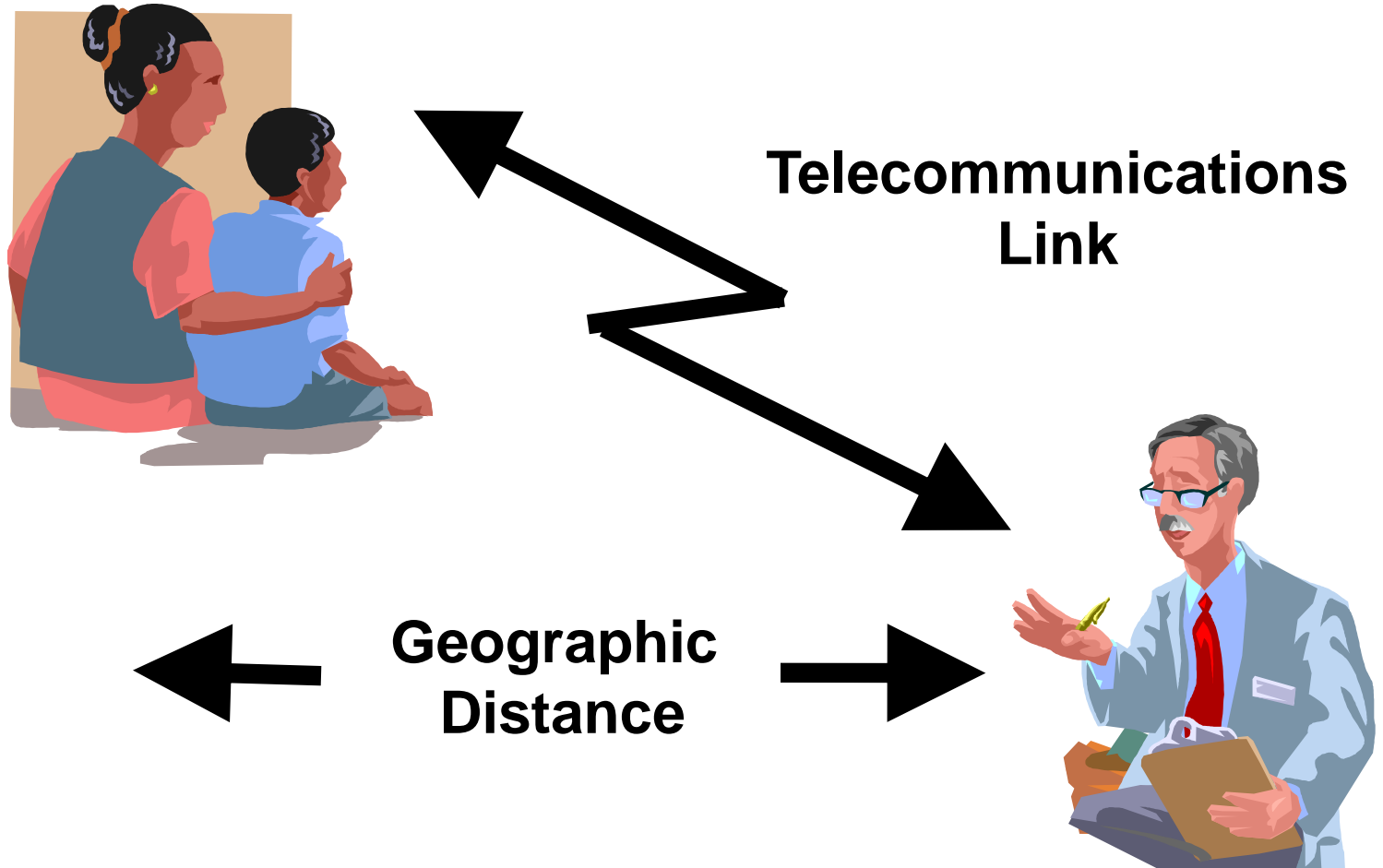
- Background on Broadband and Telehealth
- Real-Life Telehealth Applications
- The Return on Investment
- Barriers and Opportunities
- Questions

An Overview of Broadband Dependent Health Technologies: Telehealth and Electronic Health Records

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Institute for Health Informatics
University of Minnesota



The Basics of Telehealth



The Terms

Telehealth: delivery of health-related services and information via telecommunications technologies

Telemedicine: use of ...telecommunications technologies to provide and support health care when distance separates the participants (IOM)

Home telehealth (home monitoring): telemedicine that provides clinical services to a patient in his or her place of residency

Live, interactive: Telehealth where the provider and patient are interacting in real time (e.g. videoconferencing)

Store-and-forward: Clinical information is obtained from the patient and transmitted to the provider for review at a later time.

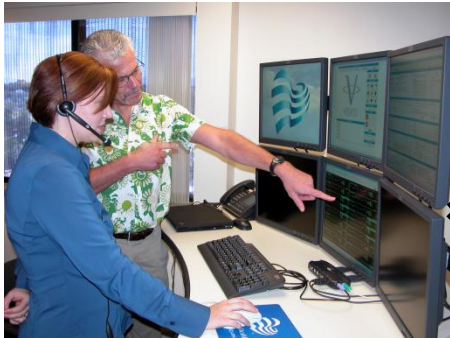
eHealth: providing consumer medical and health information

Tele-Mental Health

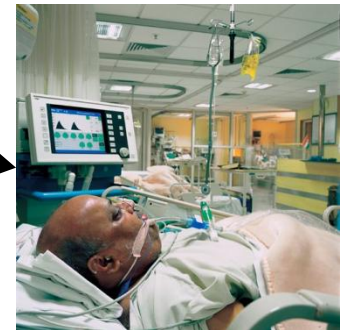


eICU

Central Monitoring Station



Hospital 1

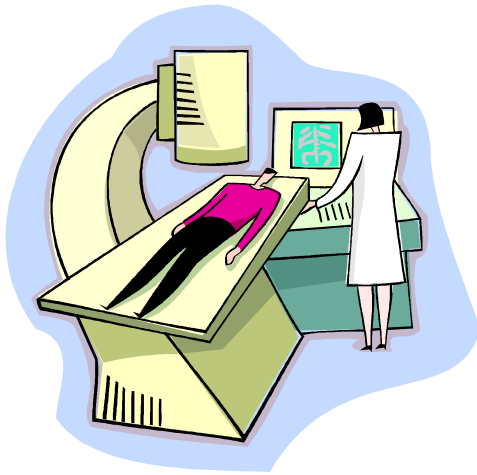


Hospital 2

Hospital 3



Teleradiology



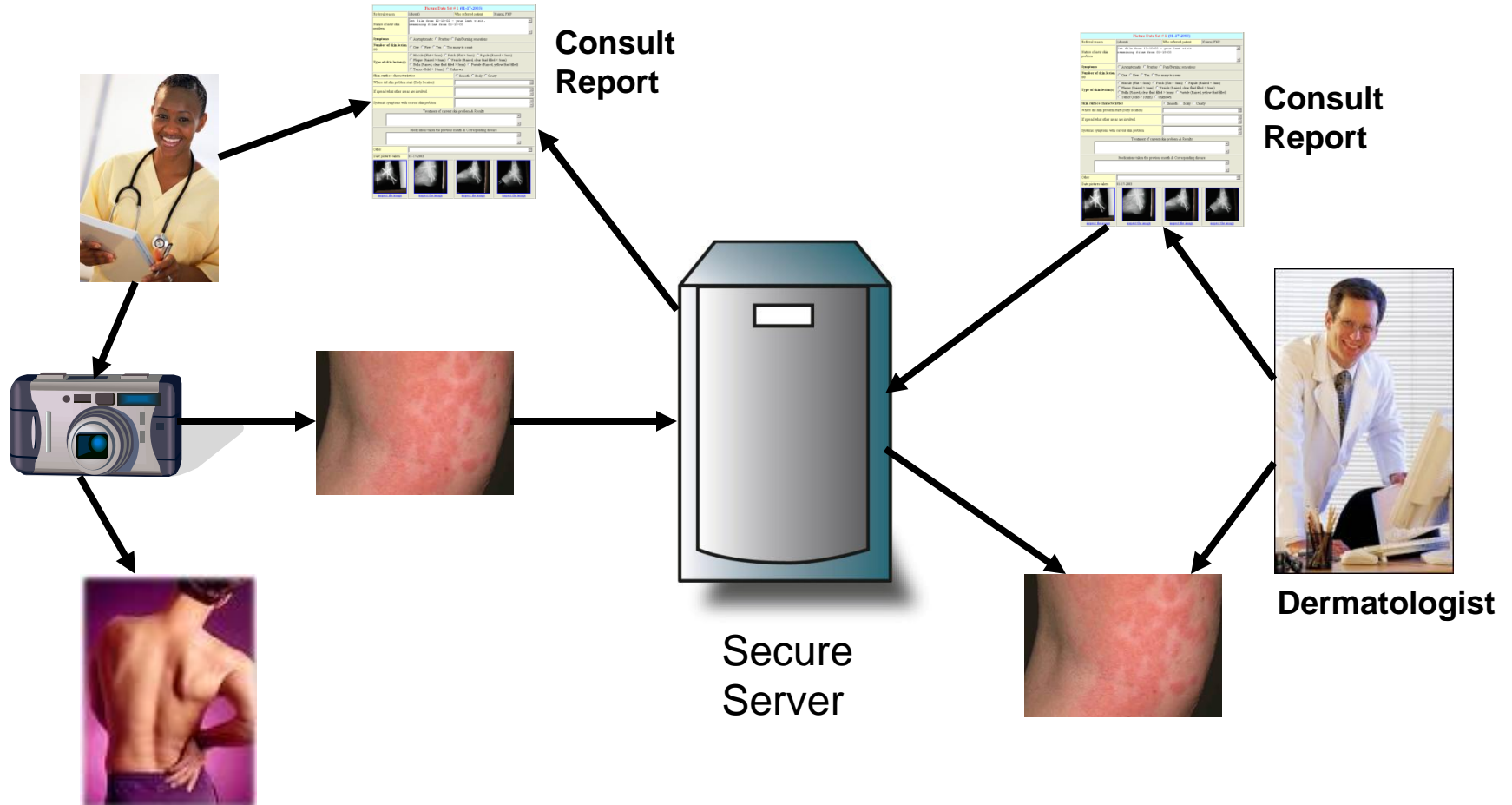
Rural Hospital
2am

Electronic image
transmission



24/7 radiology
Interpretation service
San Francisco

Store & Forward Teledermatology

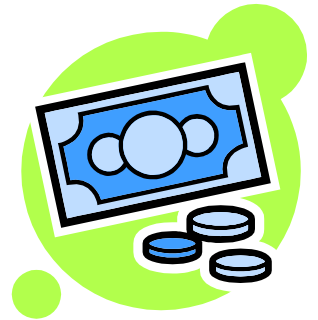


Home Telehealth

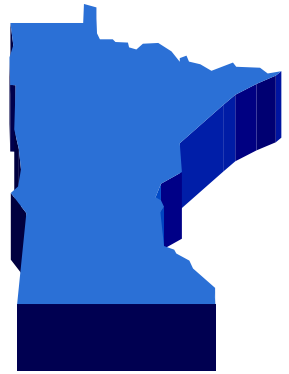


Medicare Reimbursement

- Must be live, interactive services
- Patient must receive service in an eligible rural site – hospital, clinic, etc.
- Provider payment is the same as for an in-person visit
- A facility fees is paid to remote sites



State-Level Coverage



- Medical Assistance (Medicaid)
 - duplicates and extends Medicare Coverage
 - Includes “store and forward” for dermatology
- Private Insurance Companies
 - All major companies in Minnesota provide reimbursement
 - Generally cover the same services as Medicare
 - Majority do not enforce the rural restriction on patient location

Telemedicine Benefits

- Improved clinical outcomes
 - eICU may reduce patient death rates
 - Home telehealth reduces emergency room visits and hospitalizations.
- Otherwise, where telemedicine is appropriate, clinical outcomes are the same as for in-person care.
- Patients are very satisfied with the care delivered.

Non-medical benefits

- Patient convenience and time-savings
- Employer reductions in lost work hours
- More efficient use of provider time
- Transport cost reductions
 - Example: Nursing home to hospital
 - Example: Corrections

Telemedicine Telecommunications Requirements

- Ubiquitous connectivity
- Seamless connectivity
- High capacity
- Secure
- Reliable

Electronic Health Records

- A secure, real-time, point-of-care, patient-centric information resource for clinicians. ...
- The EHR also supports the collection of data for uses other than direct clinical care, such as billing, quality management, outcomes reporting, resources planning and public health disease surveillance and reporting.



The Federal Commitment

“To improve the quality of our health care while lowering its cost, we will make the immediate investments necessary to ensure that within five years, all of America’s medical records are computerized.”

President Obama

ARRA Support

- \$34B over the next five years to encourage adoption of health information technology from CMS
- Directed to health care providers and organizations
- Requirements imposed
 - Certification of functionality including ePrescribing
 - Meaningful Use
 - Interoperability

Scope of EHR use

- Hospitals
- Provider offices
- Long term care facilities
- Community Health Centers
- Community Mental Health Centers
- Home care agencies
- Pharmacies
- Local public health departments
- Primary care clinics
- Specialty care clinics
- Laboratories
- Radiology centers
- Urgent care centers
- Dental clinics
- Behavioral health facilities
- Chiropractic clinics
- Ambulatory surgical centers
- Alternative medicine clinics
- Others

Requirement for Interoperability

MN e-Health Initiative Recommendation

- Interoperability of Electronic Health Records in Minnesota means the ability of two or more electronic health record (EHR) systems or components of EHR systems to exchange information electronically, securely, accurately and verifiably, when and where needed;

EHR Telecommunications Requirements

- Ubiquitous connectivity
- Seamless connectivity
- High capacity
- Secure
- Reliable



How does a telehealth consult work?

- Referrals go from local M.D./provider to the specialist
- Preparations occur on both ends
- Patient comes to local site
- Nurse shows patient to specialist/h.c. professional
- Consult/service performed

Wadena, MN Telehealth Outreach 2005 Statistics

Specialty Outreach Table Telemedicine

VIA TELEMEDICINE	VISITS	TOTAL VISITS
Orthopedics		278
Knee	30	
Shoulder	184	
Foot/Ankle	11	
Wrist/Hand	36	
Spine	3	
Dermatology		243
Psychiatry		110
TOTAL		631



Orthopedic Example

- Conservative Treatment for Medicare aged, knee pain and limited mobility
- Telemed visits weekly x 3
- Physical Therapy daily x 3 weeks
- CT Scan, x-rays
- ~~Surgery~~ → ~~Swing Bed~~ → ~~Home Care~~
PT
- Post-op telemed visits x 3 weeks

New Connections for Community Mental Health



Partners:
**Blue Cross & Blue Shield of
Minnesota**
United Behavioral Health
**Tele-Community
Development/DHS**

Home Telehealth





Cost to treat CHF in the hospital?

\$14,200



Congestive Heart Failure

- Home monitoring equipment user
- Weight gain over 2#
- Red flag for nurse monitoring 30 pts, 2x daily
- Patient contacted, Dr. contacted
- Water pill dose increased for 2 days
- Hospitalization & ER visit avoided

Patient Outcomes:

Admissions to a higher level of care

TeleHomeCare

17%



Control

42%



**Telehomemonitoring is a
lifeline to keep people with
fragile health at home longer.**



Service Growth Areas - Willmar

- Telehome – keeps patient at home longer, avoids LTC
- Jail health – avoids costly transports
- TeleDentistry – screening of worst cases (Head Start), prevention of decay
- TelePharmacy – economic development/small, rural towns
- TeleWound Care – advance practice nurse provided



Hutchinson Area
Health Care

The eICU Solution

Steve Mulder, MD



Hutchinson Area
Health Care

eICU

- A real world clinical application of broad band technology
- Keeping patients close to home and saving lives

The Leap Frog Group

Recommendation: All patients in an intensive care unit should be attended by a intensive care specialist

- Not practical in smaller, rural hospitals
- Not enough intensivists to go around

The eICU Solution

- One intensive care specialist caring for multiple patients from remote site
- First implemented in 2002
- Avera McKennan in Sioux Falls implemented in 2005
- Hutchinson Area Health Care joined Avera eICU network in 2008

eICU Workstation



Video Assessment



Image Acquisition



Remote Bedside Monitoring



Immediate Contact



Smart Alerts

Alarm Time	Site	Bed	Patient	HR Trend	Limit	O2 Trend	Cnat O
17:41	08/14	09G-VICU	201 Douglas,	[101] 124	117		Imp +10
17:38	08/14	09G-VICU	3 O'Hara, M	[91] 124			
17:38	08/14	09G-ICU	6 Basson, B	[91] 124		[91] 92	
17:33	08/14	09G-ICU	4 Ryan, K				+ 10
15:42	08/07	09G-ICU	3 Payer, S		[91] 99		
14:20	07/27	09G-GICU	343 Crawford, S	51 81		[91] 91	

Real Results

- Avera McKennan
 - 50% reduction in mortality compared to predicted
- Hutchinson Area Health Care – First Six Months
 - 32% increase in ICU census (keeping more patients)
 - 8.5% increase in CMI (keeping sicker patients)

Greater MN Telehealth Broadband Initiative

- FCC Rural Health Care Pilot Program/USAC
- 2007 authorized funding: \$417 million over three years for 69 statewide or regional telehealth networks in 42 states
- Support construction and operating costs of broadband networks to support health care
- Unlike traditional USAC Rural Health Care program, allows urban eligible facilities to participate and connect with rural providers
- 85% TCom reimbursement/15% HCP match

Greater MN Telehealth Broadband Initiative

- \$5.4 million in potential reimbursements
- A consortium of six health care networks:
 - SISU Medical Systems, Duluth (Lead): 16 hospital IT consortium
 - Minnesota Telehealth Network- 38 MN sites
 - North Region Health Alliance – 21 MN/9 ND sites
 - Medi-sota, Inc. – SW MN 31 hospital consortium
 - MN Assn of Community Mental Health Programs – 78 facilities statewide

GMTBI: potential barriers to full utilization of \$5.4 funds and network deployment

- Regional project, yet funded through individual facility reimbursements
- Lack of organization structure, coordination and management
- No reimbursements for program administration and management
- FCC/USAC program administration

For more information

Karen Welle

Office of Rural Health and Primary Care

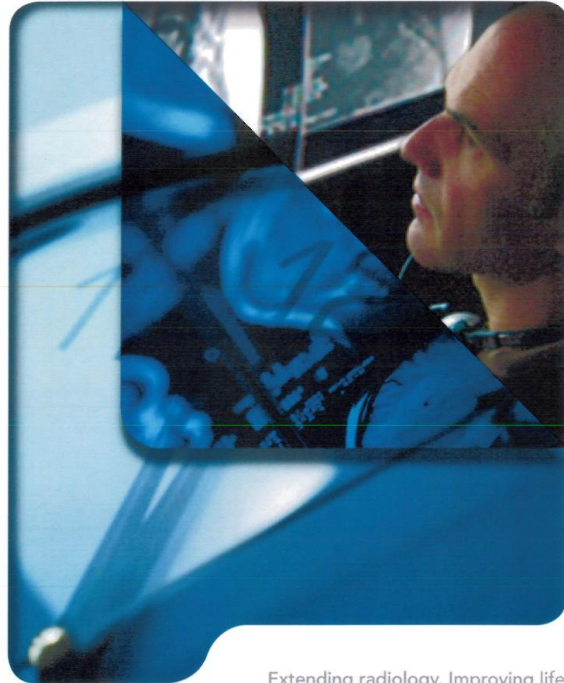
MN Dept of Health

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VIRTUAL RADIOLOGIC™



Extending radiology. Improving life.™

Eduard Michel, MD

Teleradiology – A Paradigm Shift in Radiology

Old Paradigm:



1890's

Analog



1970's

Analog



1980's

Centralized
Analog



1990's

Centralized
Digital

Radiologists Travel to Images

New Paradigm:



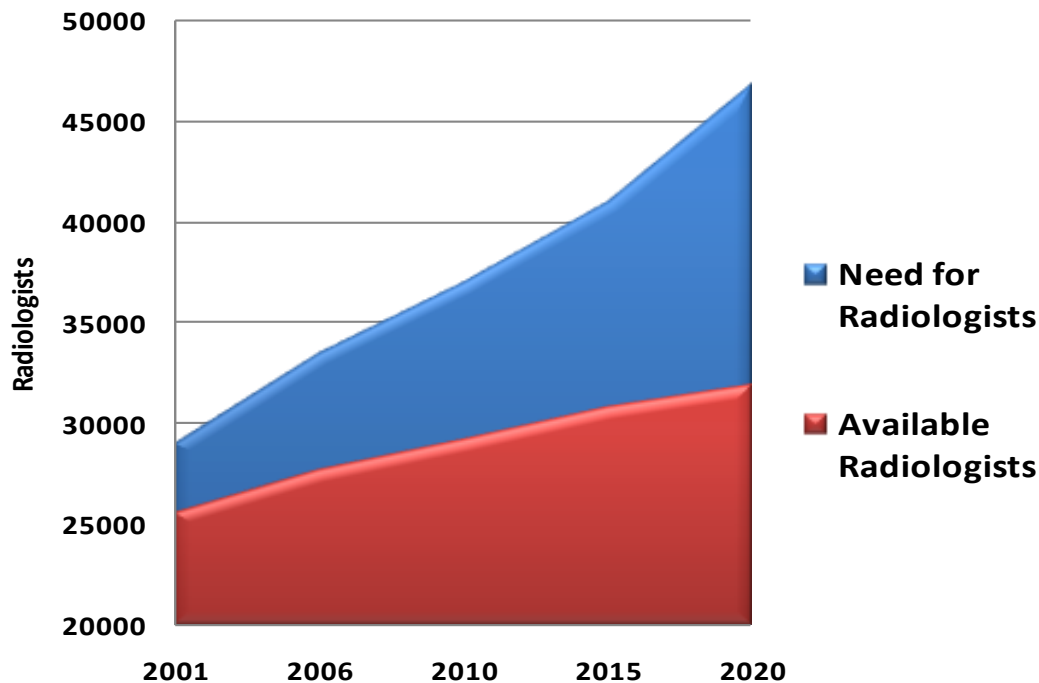
2000 & Beyond

Distributed
Digital

**Images Travel to
Radiologists**

Nationwide Radiologist Staffing Crisis

Projected Shortage of Radiologists



Source: American Journal of Roentgenology

- **Shortage of 15,000 radiologists by 2020**
Note: signs the shortage may be easing
- **Even more of a crisis in rural areas where the average age of radiologists is 62.5**

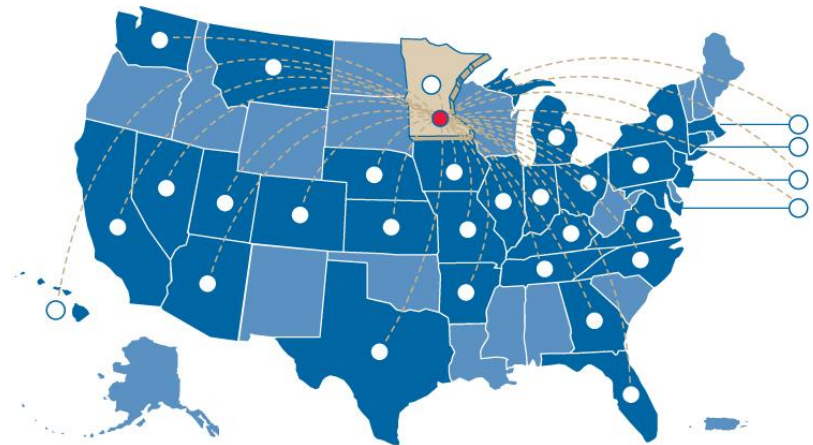
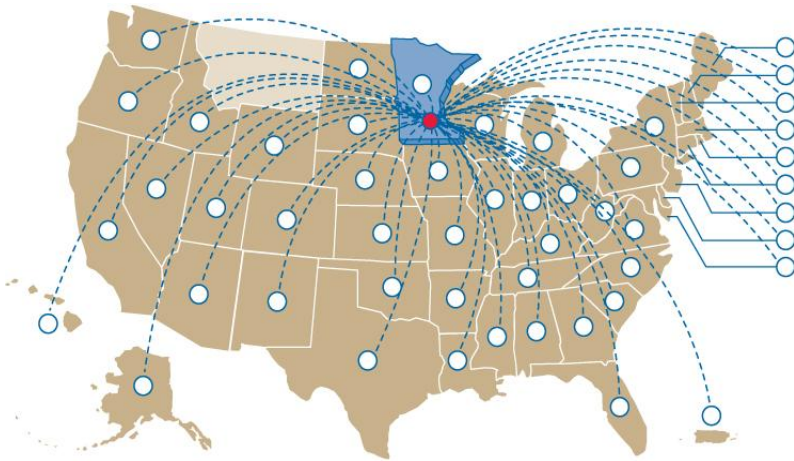
Teleradiology Provides Critical Service to Communities

- **Increases Quality of Patient Care**
 - Reduces the time to diagnose and treat patients
- **Increases Access of Healthcare**
 - Provides communities immediate access to radiologists
 - Expanded expertise: Specialized radiologists enhance patient care (neuroradiologists, cardiac, pediatrics, etc.)
 - High degree of reliance on teleradiology in the U.S.
 - Virtual Radiologic provides services for 1,100+ medical facilities
 - 17% of U.S. hospitals served by Virtual Radiologic
 - 32% of vRad's patient exams volume comes from rural facilities

Virtual Radiologic's Distributed Network

- Geographically Diverse Client Base
- Time Zone Optimized
- Improved Service Reliability

- Proprietary platform on low cost hardware
- Encrypted connections over internet
- Load balancing among radiologists



Possible Image-Transmission Bottlenecks

Affecting TAT

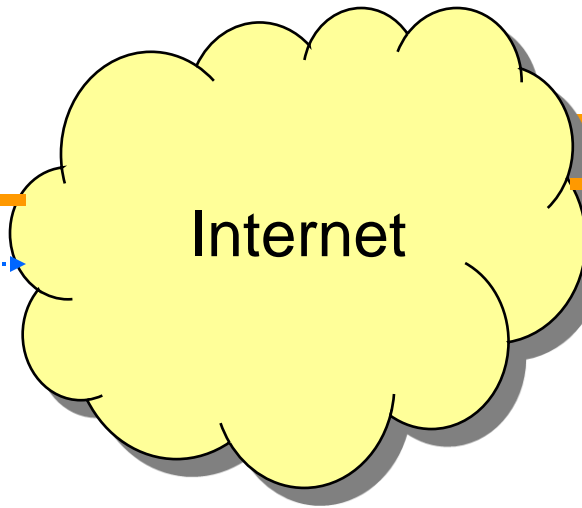
Possible Bottlenecks

Hospital



Images

ISP

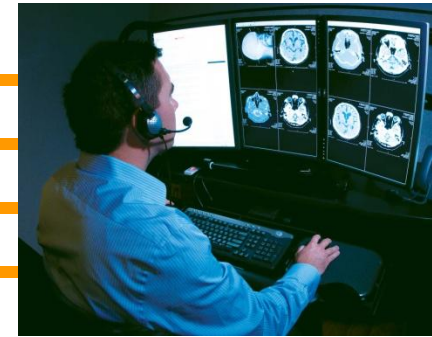


ISP

ISP

ISP

ISP



Teleradiologist

Internet Service Provider (ISP)

- DSL
- T1 Line
- 3MB Cable
- T3 / DS3 Line

- 4 ISPs
- 100 Mbps each

Trauma Outcomes Are Sometimes a Matter of Minutes or Seconds



Begin triage



Transport



Scanning
Patient



Teleradiologist
Interprets Patient
Exam



Treatment

Typical Transmission Times*

Study	DSE (.76 Mbps)	T1 (1.5 Mbps)	3Mb Cable (3.0 Mbps)	T3 Line (45 Mbps)**
CT Brain 100 images	8.65 min	4.43 min	2.22 min	1.33 min
CT Body 250 images	21.6 min	11.1 min	5.55 min	3.33 min

- Virtual Radiologic read 500,000 STAT Emergent exams in 2008
- 2 million patient exams read in 2008
- Around 400 GB of data crosses Virtual Radiologic's network in 24 hours

*Other factors that may impact transmission time: latency, location, compression factors, # of studies

**5 Mbps DICOM limitation

Teleradiology Summary

- Teleradiology has become a national necessity
 - Access to radiology in rural areas is especially acute
- Patient care is expedited in ED through teleradiology
 - ED volumes are likely to increase with the rising number of uninsured
- Care can be compromised without access to ultra high speed internet



Rice Memorial Hospital

RETURN ON INVESTMENT

Presented by

Maureen Ideker, RN

Associate Administrator – Chief Nursing Officer

Rice Memorial Hospital - Willmar, MN

March 20, 2009



- **Cost of interactive video equipment**
 - **Under \$10,000**

- **Cost of homemonitoring equipment per patient**
 - **\$3,000**



Win-Win Situation for Rural and Urban Sites

- Facility Fee
- X-rays, scans
- Labs
- Rehab PT/OT
- Home Health Care
- Swing Beds
- Specialist fees paid same as face-to-face



Rural Revenue Example #1

Sandy is a 38 year old female who injured her left shoulder at work.

Initial Diagnosis: Rotator Cuff Sprain

Evaluation and treatment of diagnosis initiated by family practice physician:

Charges were generated from:

- 01-06-06 – MRI
- 01-24-06 to 06-27-06 – Telemed Consult x 4
- 02-02-06 – PT Eval
- 02-02-06 to 03-16-06 – PT Therapy x 15
- 06-09-06 – Pre-op H&P
- 06-09-06 – EKG and labs
- 06-16-06 – Surgery with Dr. Freehill @ University
- 06-27-06 – PT Eval
- 06-27-06 to 08-02-06 – PT Therapy x 5
- 07-12-06 to 08-01-06 – Telemed Consult x 2

Total Generated Revenue Ortho: \$3,576.00



Rural Revenue Example #2

Cathy is a 17 year old with a diagnosis of acne vulgaris. Evaluation and treatment of diagnosis initiated by local medical doctor:

- 04-05-05 to 12-20-05 – Telemed Consult x 5

Failed at conventional treatments. Referred to local medical doctor for initiation of Accutane

- 01-27-06 – Local medical doctor visit
- 03-09-06 to 07-14-06 – Accutane Required Labs x 6
- 04-04-06 to 06-06-06 – Telemed Consult x 2

Total Generated Revenue Derm: \$2,606.00



Rural Revenue Example #3

Mike is a 13 year old with a diagnosis of Autistic Disorder and ADHD.

Recently moved to the area. He sees the psychiatrist for medication management.

- 12-22-04 to 05-24-06 – Telemed Consult x 10
- 04-27-05 – EKG for baseline
- 05-02-05 – Repeat EKG
- 05-02-05 – Evaluate for med toxicity

Total Generated Revenue Psych: \$550.00



- Telehome monitoring CHF Example
 - Daily recording of
 - Weight
 - Blood pressure
 - Pulse
 - Oxygen saturation



- **Maintaining CHF fragile elderly at home saves:**
 - LTC placement at \$4,500 month
 - Medical Assistance coverage statewide is at 2/3 of all LTC residents.



- **Avoided CHF hospitalizations at \$14,200 each**



- **Patient Satisfaction – 99%**



For more information:

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Minnesota Broadband in Healthcare

Opportunities and Barriers

March 20, 2009

Overview of SISU

- Non-profit consortium of 16 hospitals, primarily rural, for the purpose of sharing I.T. technology and staffing
- Also support several clinics and other healthcare entities

What We Have Accomplished With Broadband Communications

- Allows us to share the cost of operating a high availability data center
- Allows us to share a wide array of other technologies such as:
 - E-mail / Internet Access
 - Network Security
 - Video Network
 - Digital Dictation

Initial Barrier – Broadband Costs

When SISU was formed in 1998,

- Our sites required the speed and growth potential offered by T1 service, yet we only needed a fraction of T1 bandwidth to start
- T1 service to several SISU sites was **\$2,200 or more per month** (these facilities would not have participated in SISU at that price)
- SISU members were very fortunate that the FCC Universal Service Fund was offered at that time to help mitigate the costs

SISU is a good example of collaboration and what can be accomplished in terms of rural healthcare information technology when affordable broadband access is readily available.

Our early goal was to expand our collaborative services to the point where the T1 bandwidth would be fully utilized. Over half of our member sites now have expanded well beyond a single T1 circuit!

Now we are looking toward future opportunities and overcoming the barriers.

Current / Future Broadband Opportunities

- Remotely hosted advanced clinical applications (e.g. e-Medication Admin Record, patient care plans and documentation, bedside medication verification)
- Remote patient monitoring (ICU, ER, etc.) – allows patients to stay local which is easier on patient and family
- Tele-video / tele-health applications (e.g. mental health evaluations, dermatologist consults)

NOTE: Unlike the initial applications we offered in the late 1990s, the applications above require very high availability.

New Barrier – Broadband Resiliency Recurring Barrier – Cost

- Most rural towns have very limited capabilities in terms of resilient data circuits
- Cost again comes into play when trying to build resiliency into a wide area network (e.g. circuit charges and WAN management)



If we build or enhance rural broadband communications without regards for resiliency, we are missing the target!

Questions?