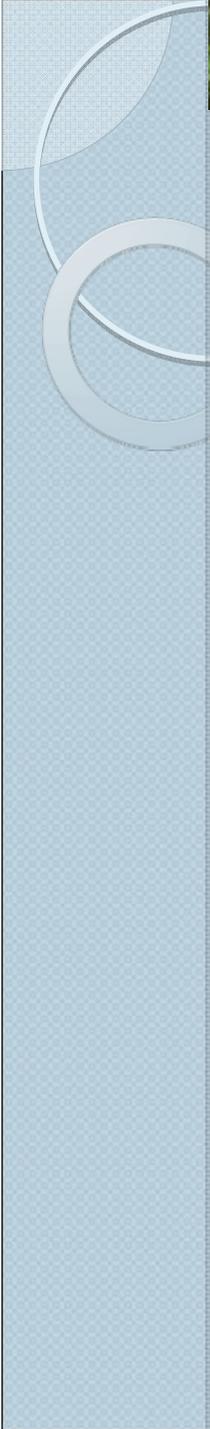


Erasing the Barriers of Distance:

How Telemedicine is Changing Rural Health Care.

**John Gardner CEO
Yuma District Hospital and Clinics
Yuma, Colorado**



Health Manpower Shortages

- The United States is in the midst of a physician shortage that is going to grow over the next ten years as the Baby Boomer physicians retire.
- In 2006 there were 1,647 job postings for rural practices, 211 of them were **filled** (3RNet Evaluation Membership Activities Report, 2007).

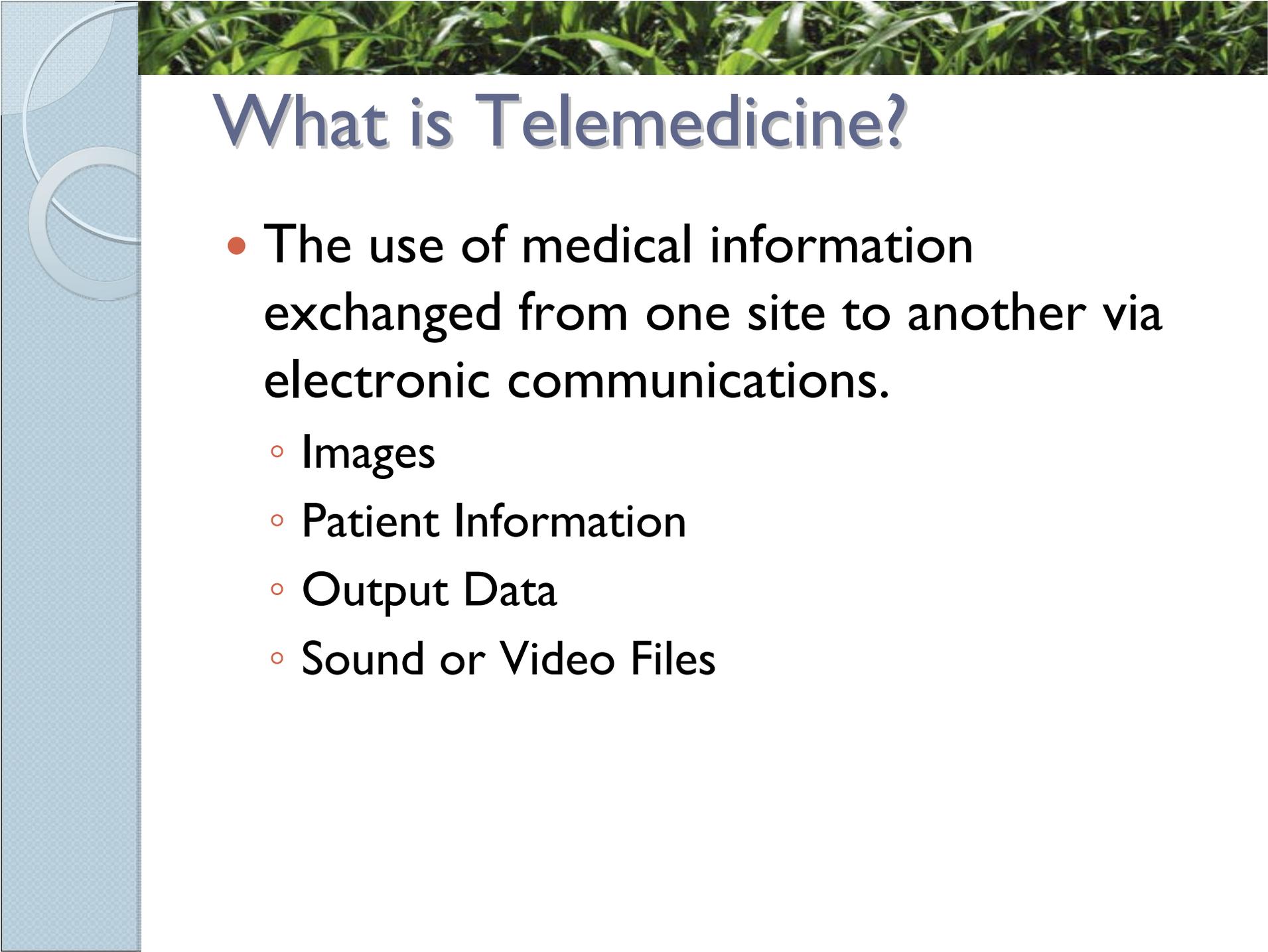


Demographics of Rural Populations

- The rural population is aging.
- With age comes chronic health conditions and increased need for health services.
- Travel is difficult and costly with rising energy prices.

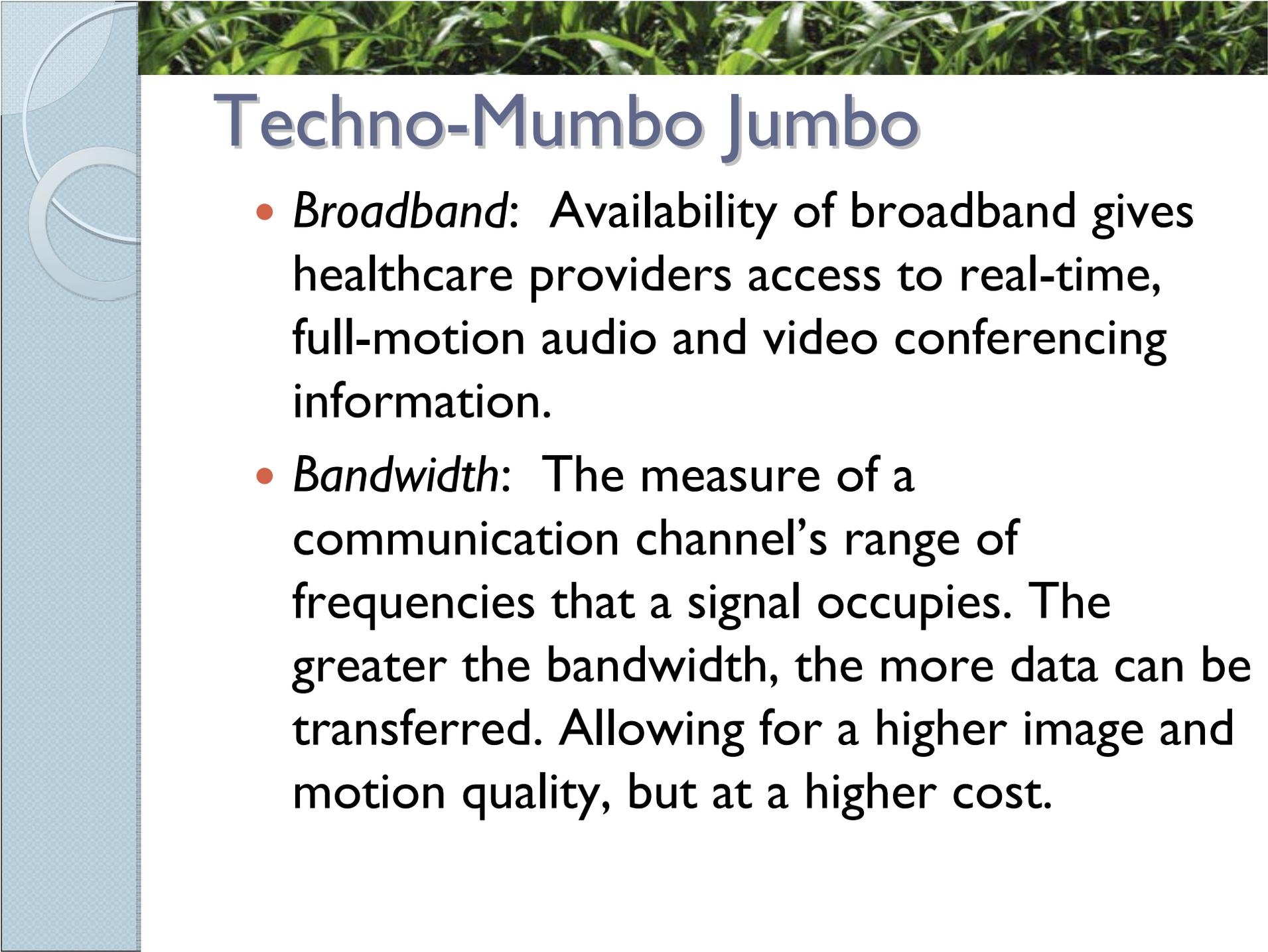


Telemedicine has the potential to be a vital tool in closing the gap between the supply of care givers and the growing demand for health services.



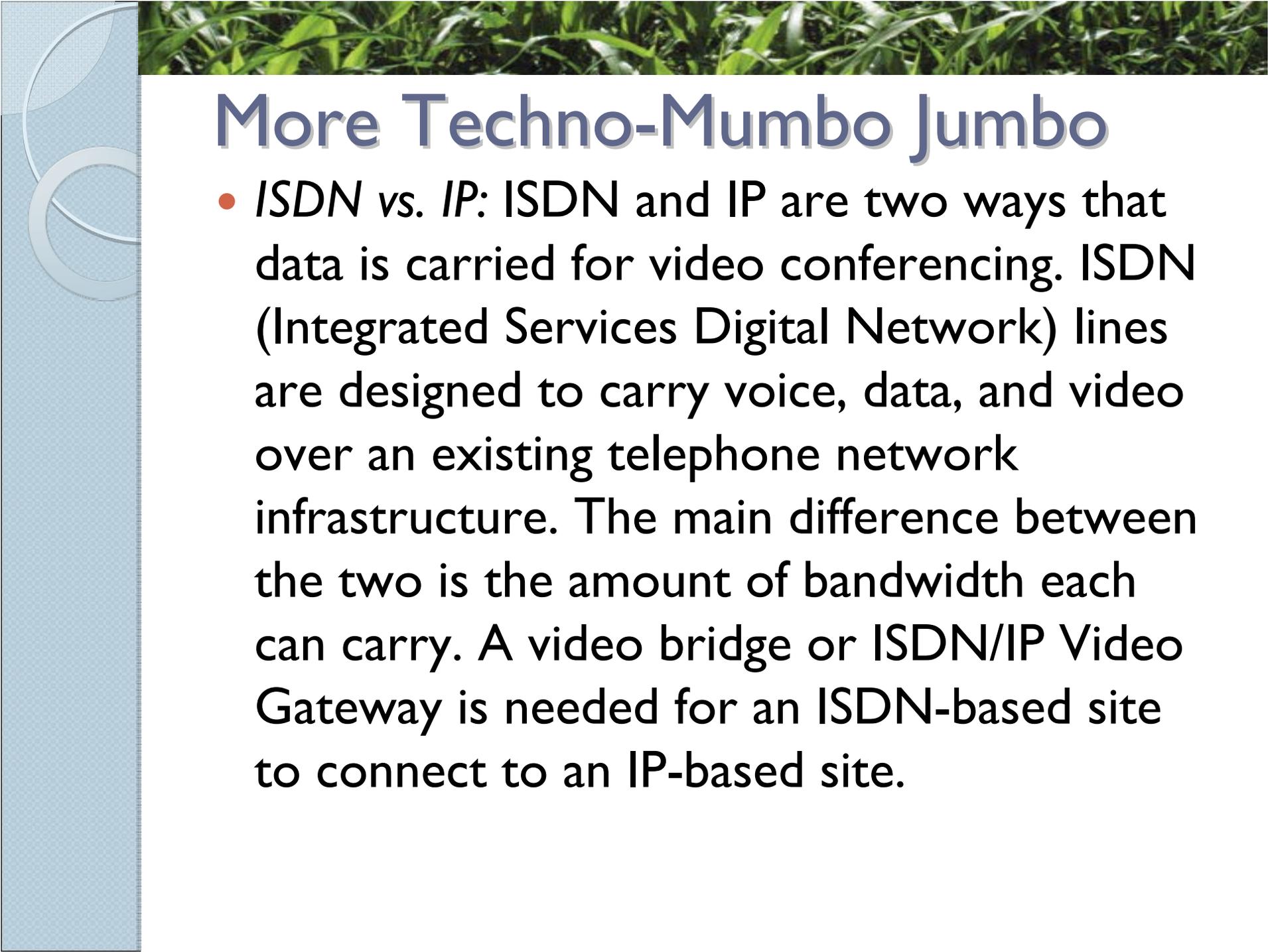
What is Telemedicine?

- The use of medical information exchanged from one site to another via electronic communications.
 - Images
 - Patient Information
 - Output Data
 - Sound or Video Files



Techno-Mumbo Jumbo

- *Broadband:* Availability of broadband gives healthcare providers access to real-time, full-motion audio and video conferencing information.
- *Bandwidth:* The measure of a communication channel's range of frequencies that a signal occupies. The greater the bandwidth, the more data can be transferred. Allowing for a higher image and motion quality, but at a higher cost.



More Techno-Mumbo Jumbo

- *ISDN vs. IP*: ISDN and IP are two ways that data is carried for video conferencing. ISDN (Integrated Services Digital Network) lines are designed to carry voice, data, and video over an existing telephone network infrastructure. The main difference between the two is the amount of bandwidth each can carry. A video bridge or ISDN/IP Video Gateway is needed for an ISDN-based site to connect to an IP-based site.



Applications



Peripheral Artery Disease Diagnosis

- Simple Internet transmission of Data.
- Team consisting of Cardiology, Cardiovascular Surgery and Interventional Radiology provide remote diagnosis.
- Greater reliability than ultrasound.



Picture Archiving Computer Systems (PACS)

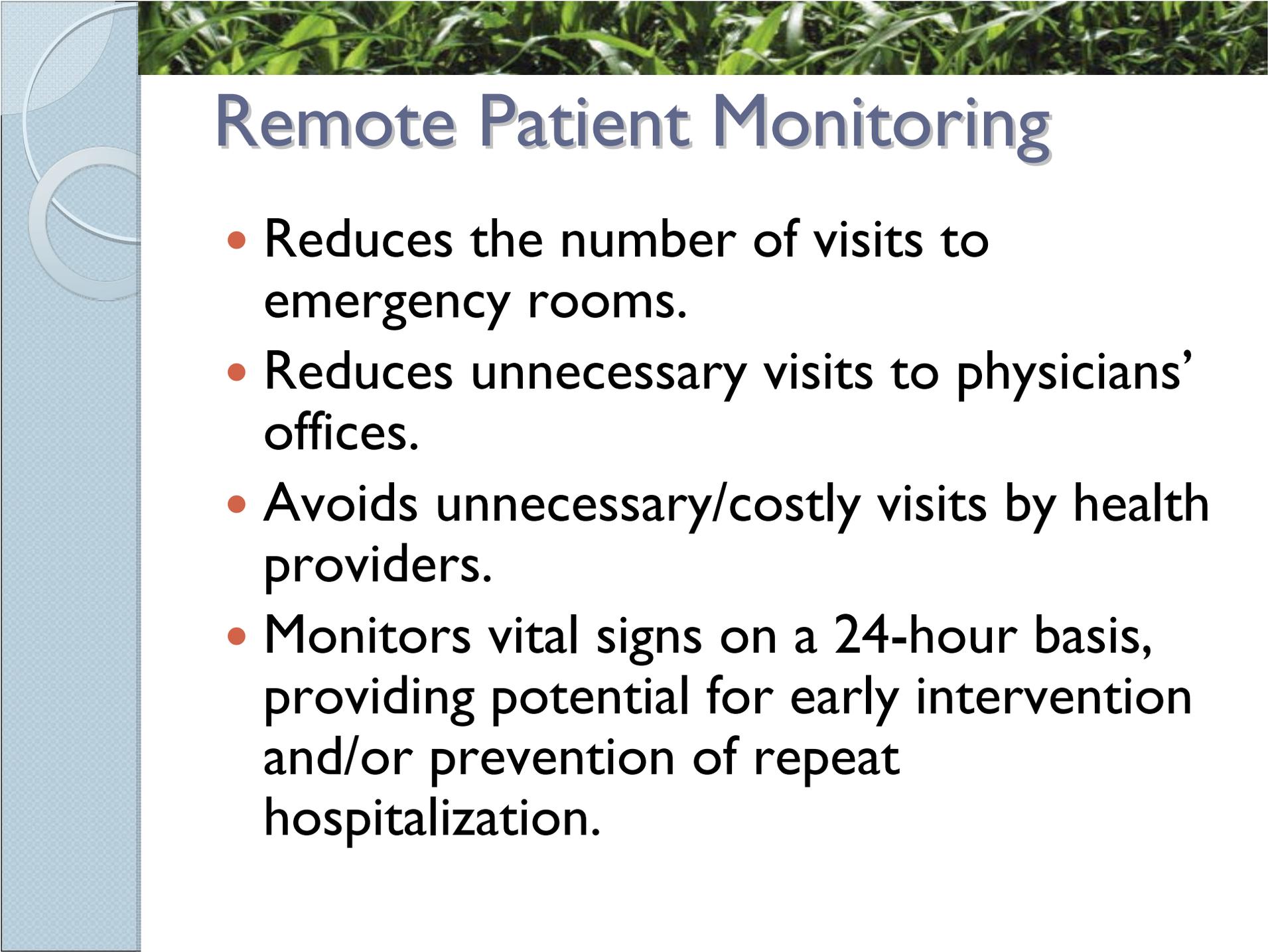
- With the conversion of x-ray images to digital format, images can be transmitted across the world for instant review and diagnosis by Radiologists.



Remote Patient Monitoring

- Automated Patient Monitoring Replaces Periodic Observations of the Patient.





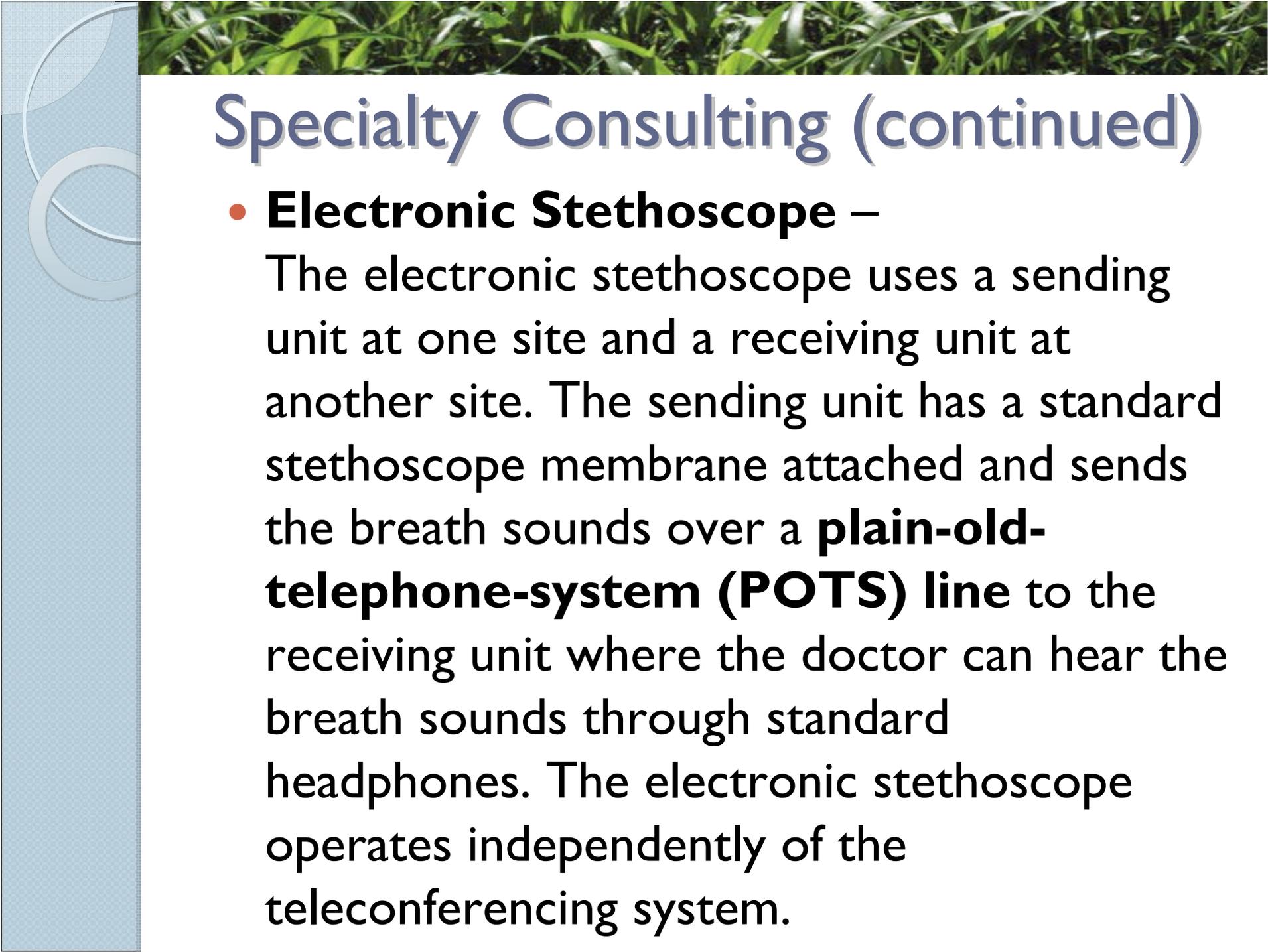
Remote Patient Monitoring

- Reduces the number of visits to emergency rooms.
- Reduces unnecessary visits to physicians' offices.
- Avoids unnecessary/costly visits by health providers.
- Monitors vital signs on a 24-hour basis, providing potential for early intervention and/or prevention of repeat hospitalization.

Specialty Consulting

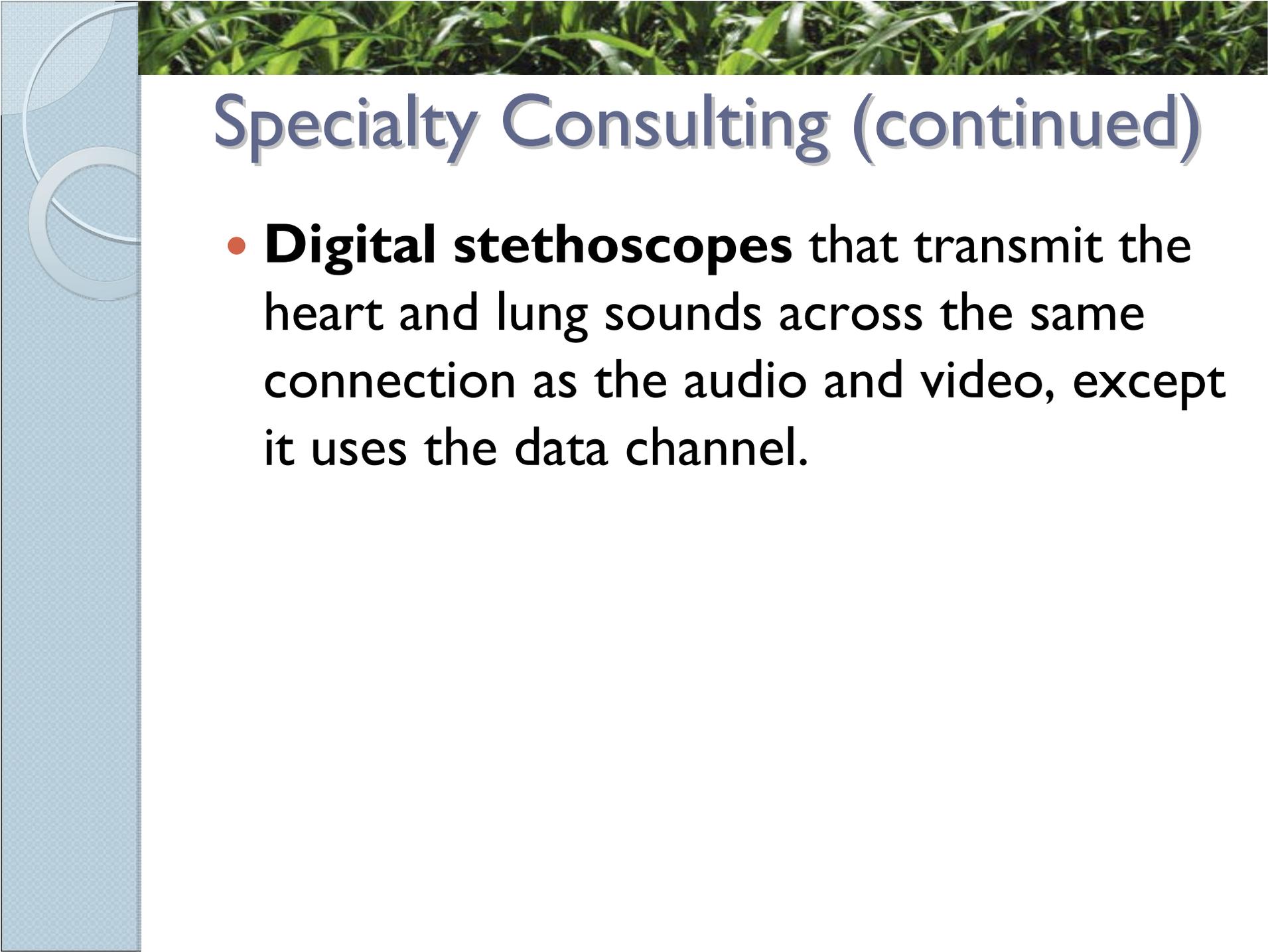
- Video cameras capture the image of both the physician and patient, transmit images over dedicated telephone lines or the internet, and reproduce live audio and video images on a television monitor located at each end of the communication.





Specialty Consulting (continued)

- **Electronic Stethoscope –**
The electronic stethoscope uses a sending unit at one site and a receiving unit at another site. The sending unit has a standard stethoscope membrane attached and sends the breath sounds over a **plain-old-telephone-system (POTS) line** to the receiving unit where the doctor can hear the breath sounds through standard headphones. The electronic stethoscope operates independently of the teleconferencing system.

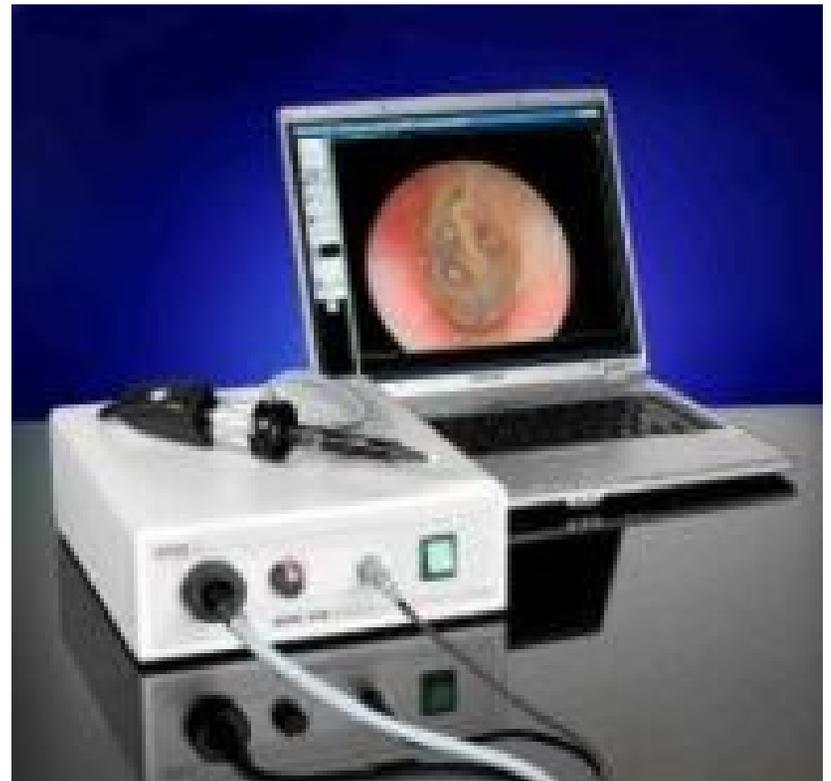


Specialty Consulting (continued)

- **Digital stethoscopes** that transmit the heart and lung sounds across the same connection as the audio and video, except it uses the data channel.

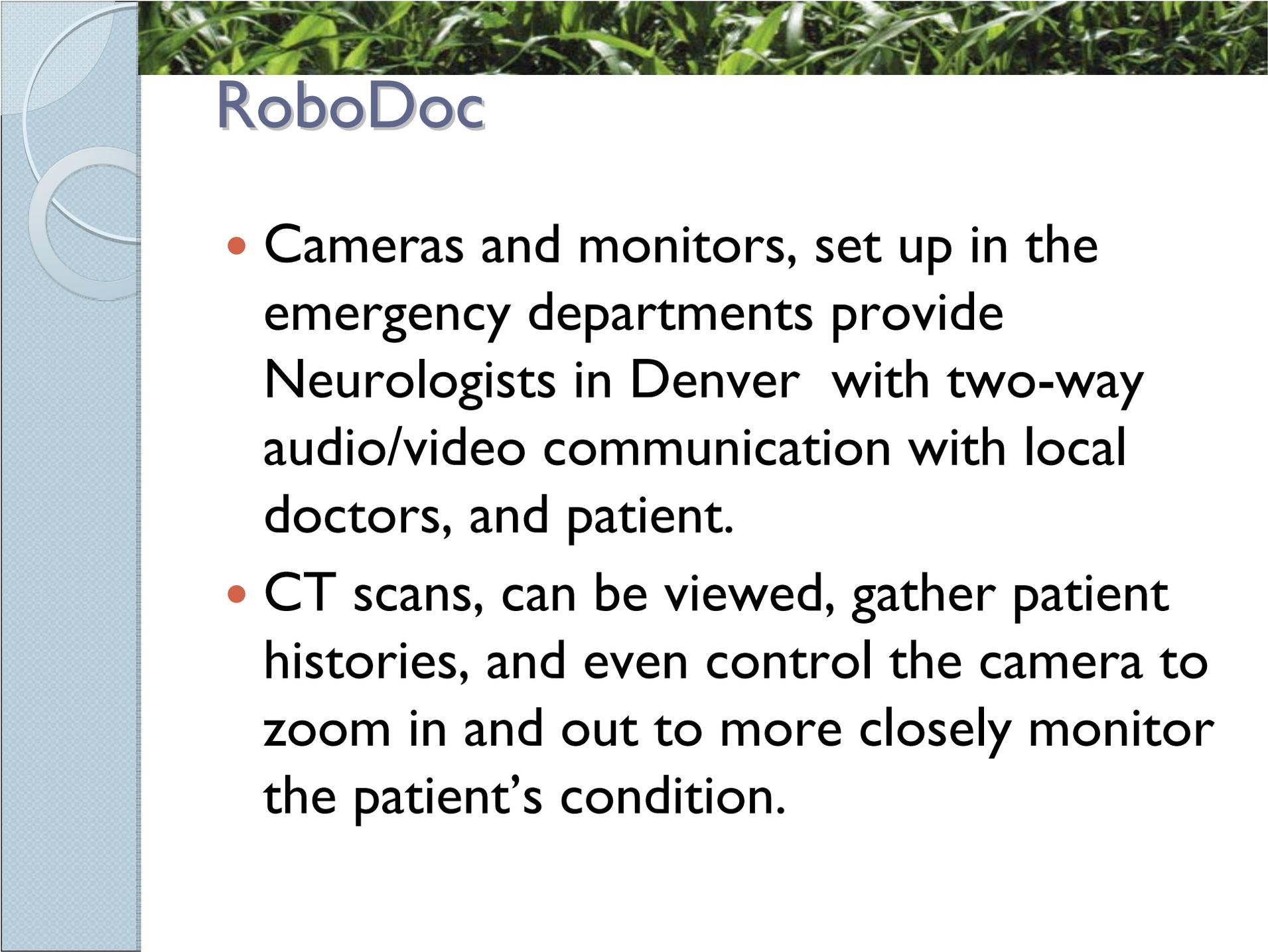
Specialty Consulting (continued)

- Otoscopes similar to a clinical otoscope, allowing the doctor to see inside a patient's ear, nose or throat.



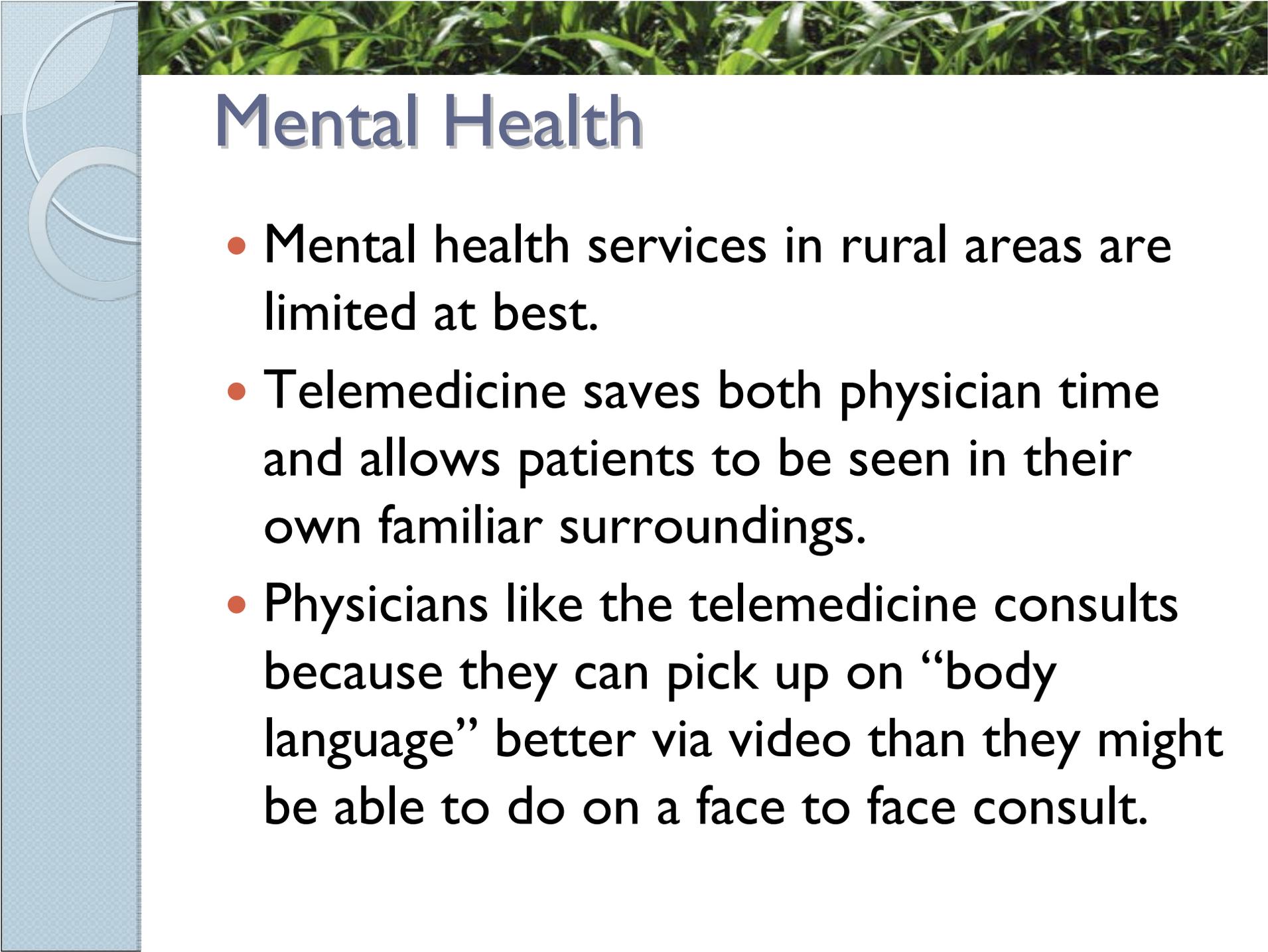
RoboDoc





RoboDoc

- Cameras and monitors, set up in the emergency departments provide Neurologists in Denver with two-way audio/video communication with local doctors, and patient.
- CT scans, can be viewed, gather patient histories, and even control the camera to zoom in and out to more closely monitor the patient's condition.



Mental Health

- Mental health services in rural areas are limited at best.
- Telemedicine saves both physician time and allows patients to be seen in their own familiar surroundings.
- Physicians like the telemedicine consults because they can pick up on “body language” better via video than they might be able to do on a face to face consult.

Teletrauma

- Camera placed in small Critical Access Hospital linked to emergency room in Trauma Center.
- Trauma team can advise local physician on treatment.
- Allows trauma center to better mobilize resources before patient arrives.



**Good Samaritan Hospital
Trauma Center
Kearney, Nebraska**

Remote Intensive Care Units

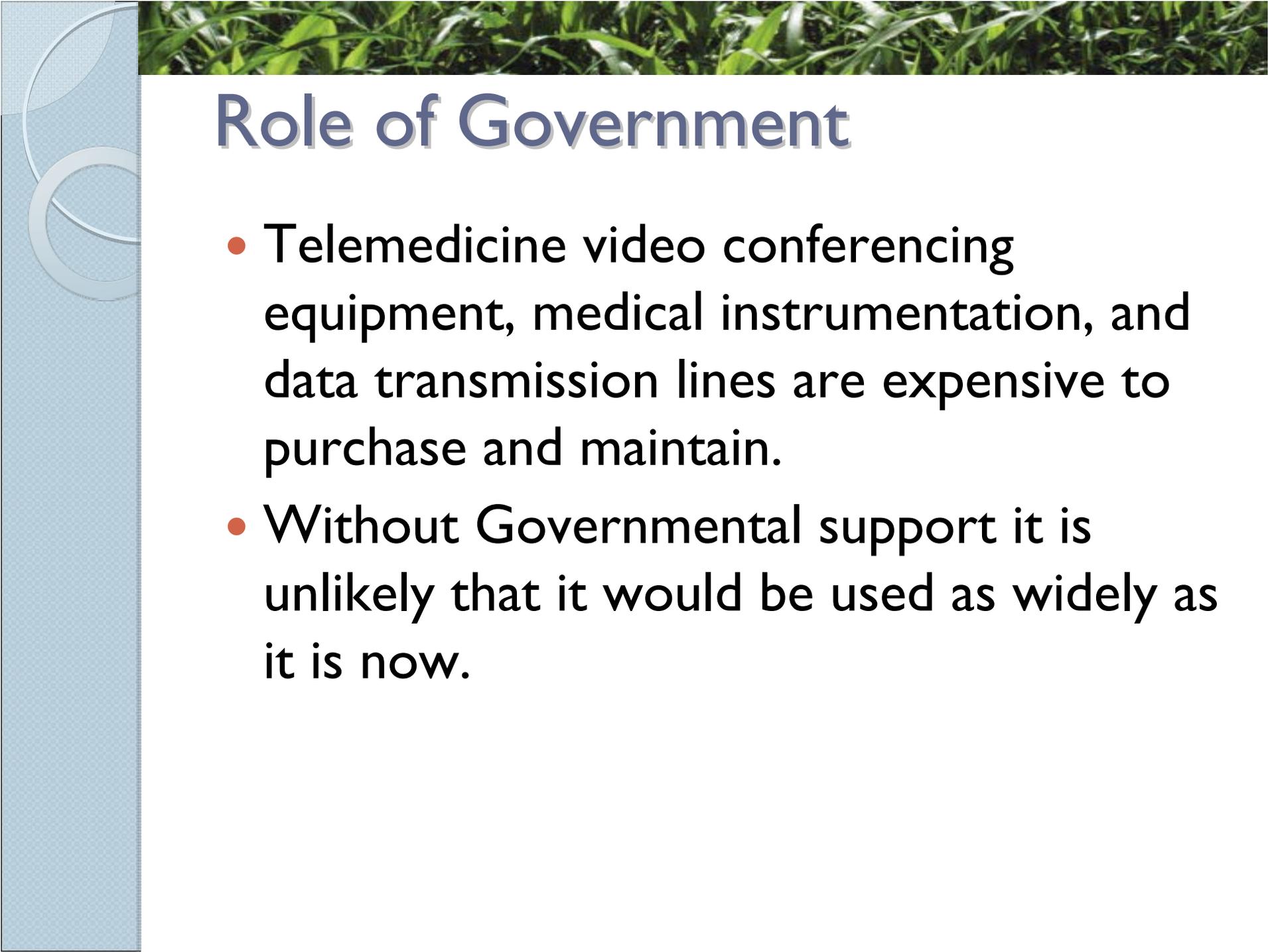
- Remote bedside monitoring.
- Automated monitoring system to detect potential patient problems.
- Improves patient outcomes.
 - Mortality rate ↓ 27%
 - Length of stay in ICU ↓ 16%
- Improves the use of scarce highly skilled nurses and physicians.





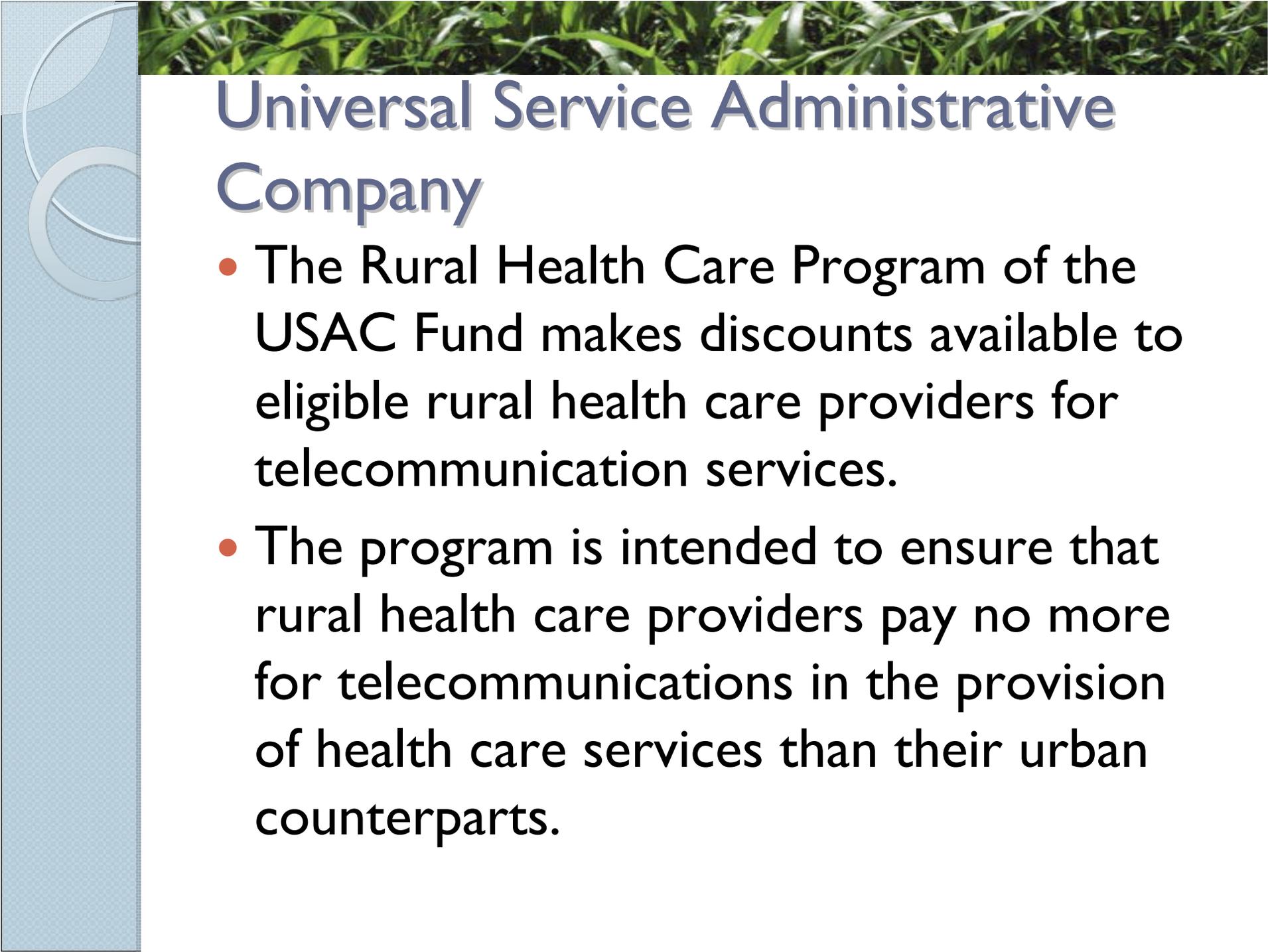
EICU





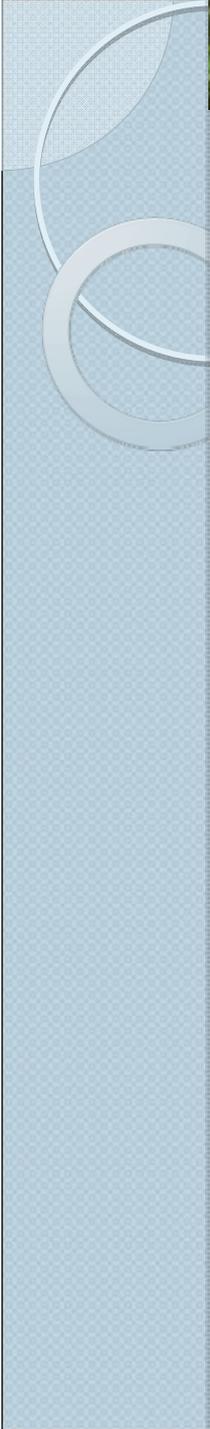
Role of Government

- Telemedicine video conferencing equipment, medical instrumentation, and data transmission lines are expensive to purchase and maintain.
- Without Governmental support it is unlikely that it would be used as widely as it is now.



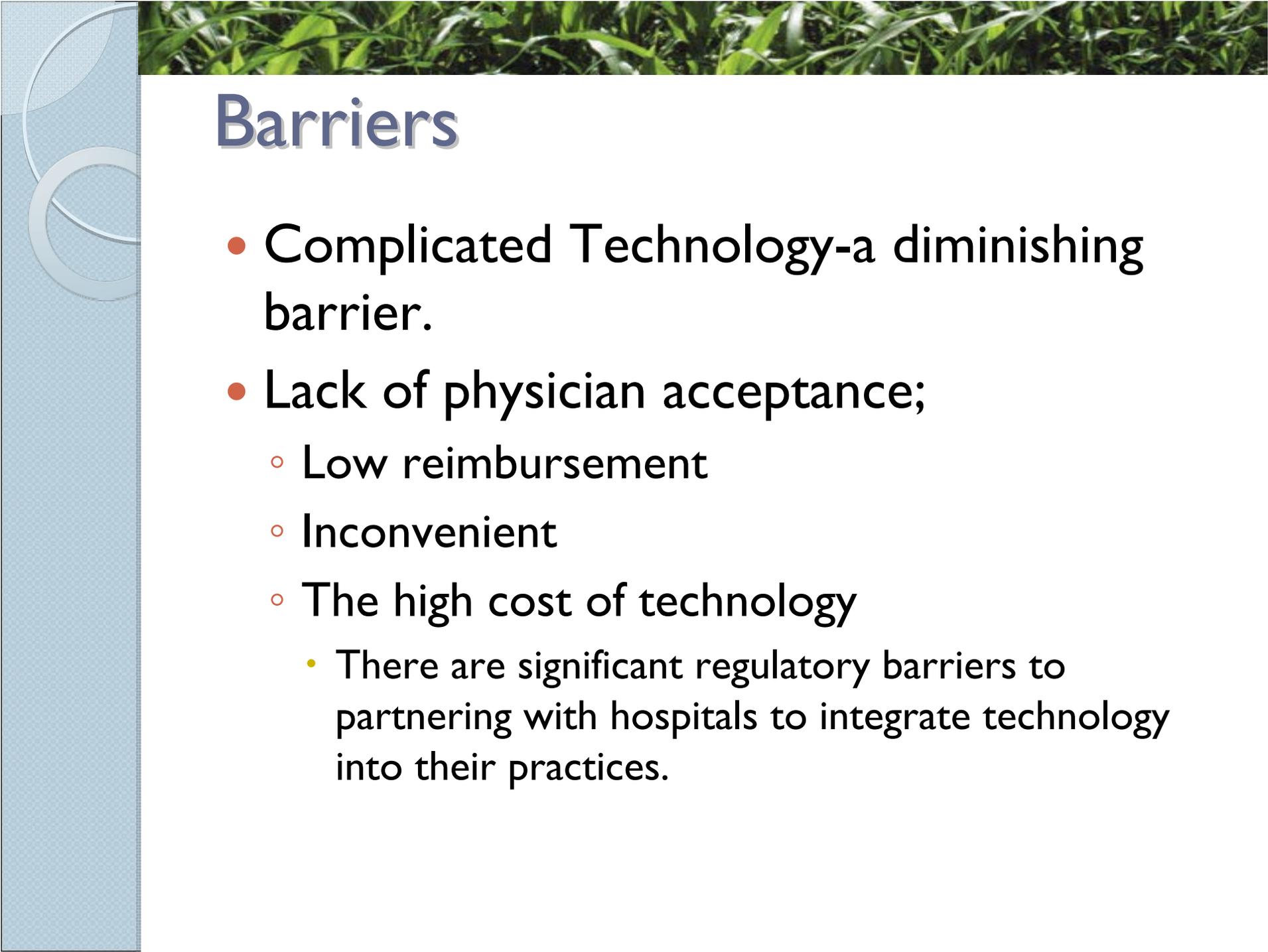
Universal Service Administrative Company

- The Rural Health Care Program of the USAC Fund makes discounts available to eligible rural health care providers for telecommunication services.
- The program is intended to ensure that rural health care providers pay no more for telecommunications in the provision of health care services than their urban counterparts.



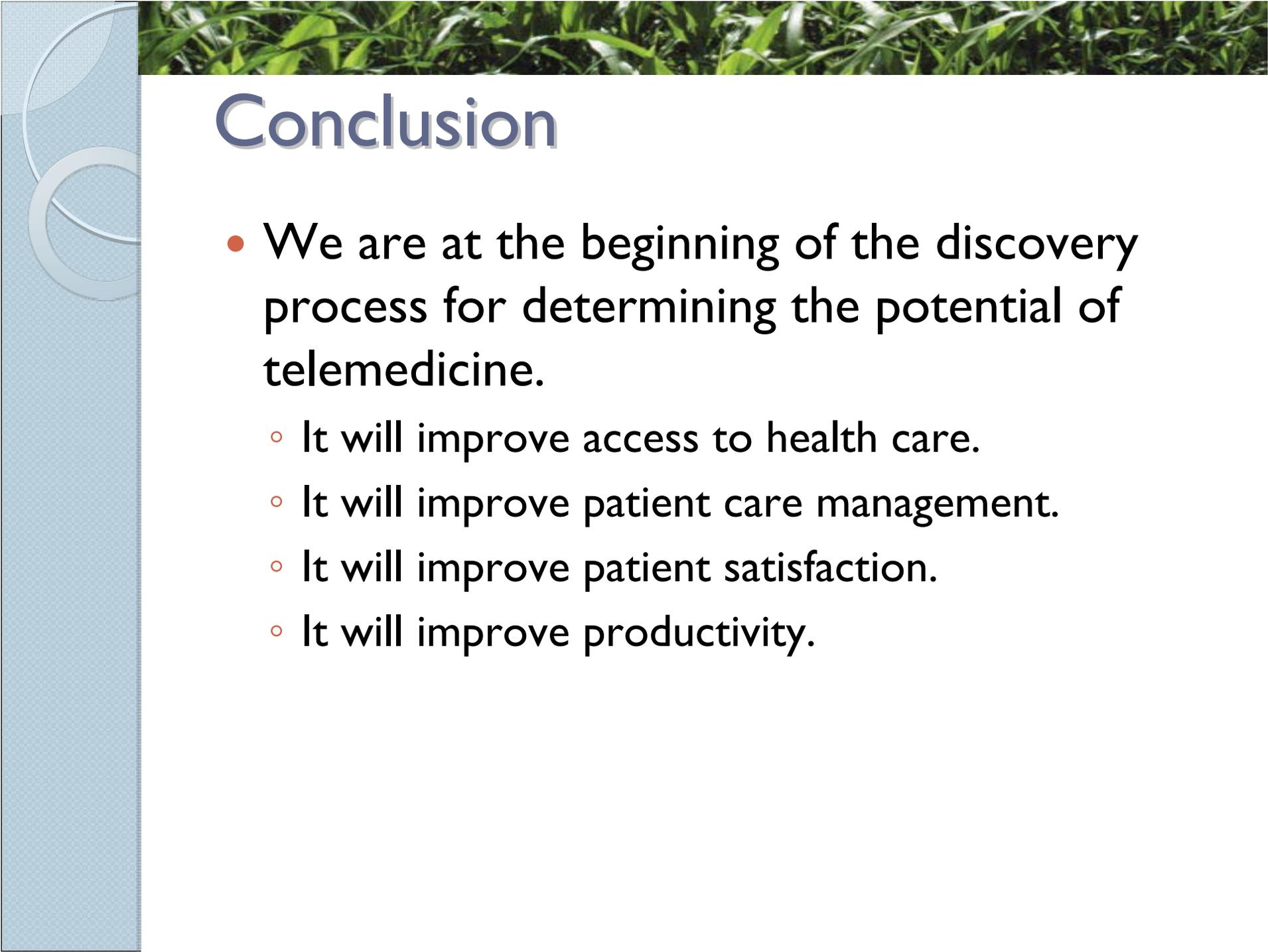
USDA

- The Community Connect program serves rural communities where broadband service is least likely to be available.
- Funding is provided for equipment and development of Broadband connectivity.



Barriers

- **Complicated Technology**-a diminishing barrier.
- **Lack of physician acceptance;**
 - Low reimbursement
 - Inconvenient
 - **The high cost of technology**
 - There are significant regulatory barriers to partnering with hospitals to integrate technology into their practices.



Conclusion

- We are at the beginning of the discovery process for determining the potential of telemedicine.
 - It will improve access to health care.
 - It will improve patient care management.
 - It will improve patient satisfaction.
 - It will improve productivity.