

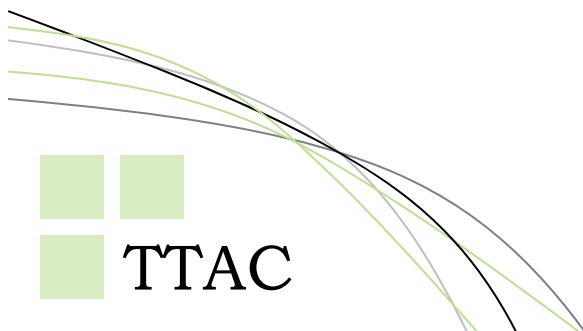
Selecting The Right Technology

For Your Telehealth Program

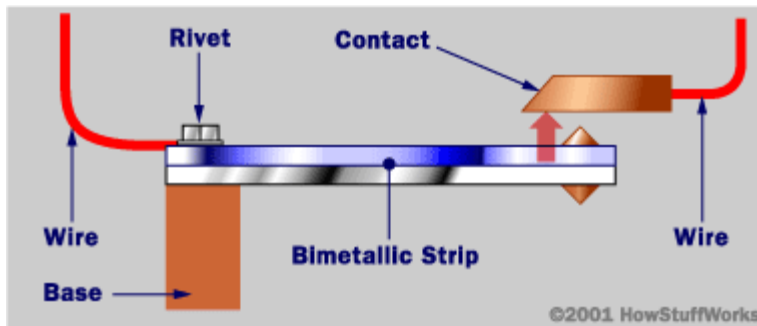


Kirt J Beck, Director

Telehealth Technology Assessment Center

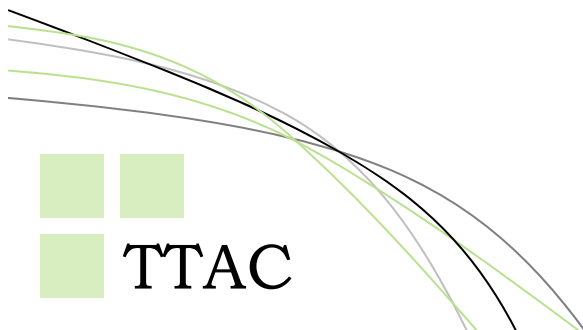


The Humble HVAC Controller

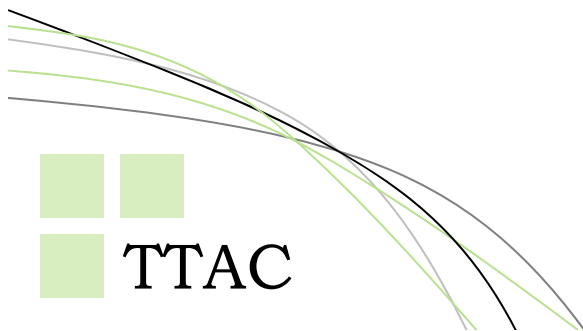


Technology and Quality

- ▶ Telehealth programs need technology to function
- ▶ Selecting the right technology is critical
- ▶ Not all technologies, not all services, and not all products are created equal

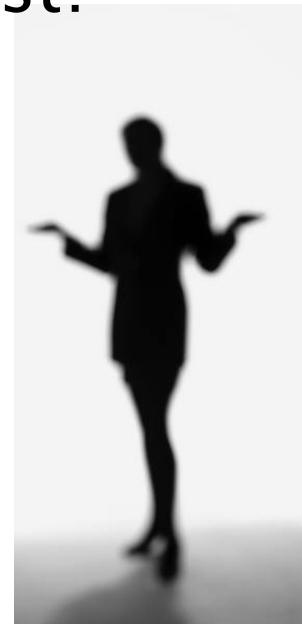
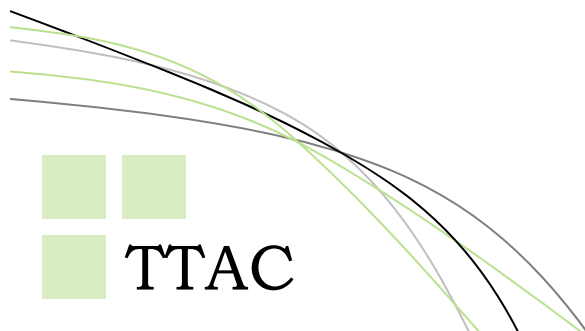


One size does not fit all.



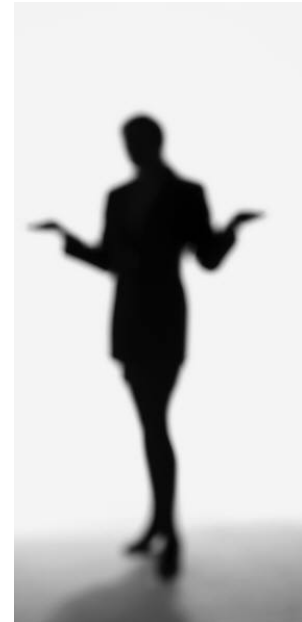
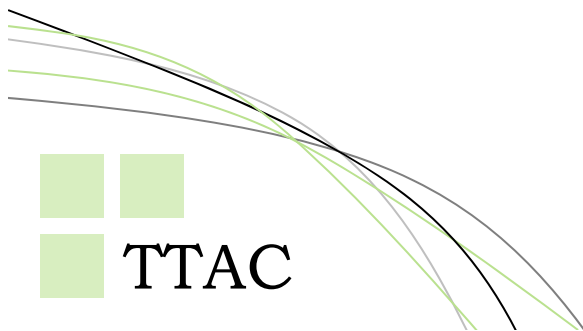
Why Should I Care About Assessment?

- ▶ Can't I just ask someone else who has already delivered these services?
- ▶ Aren't the devices pretty much all the same?
- ▶ Isn't the most expensive one the best?



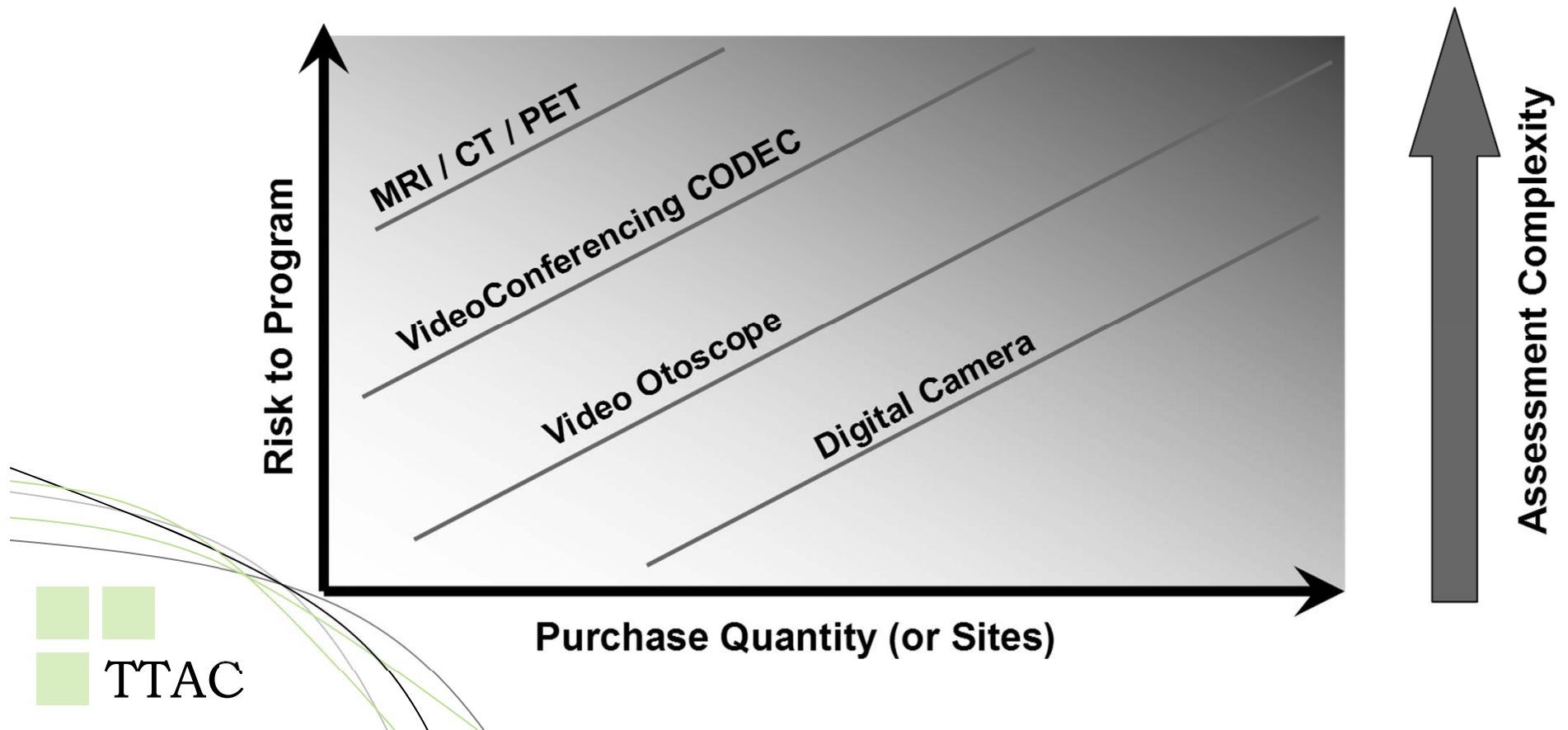
The Big Differences

- ▶ Organizations have different resources, strengths, and environments
- ▶ Equipment can change rapidly – what was good a year ago might not be best now
- ▶ Services are being delivered in increasingly diverse ways



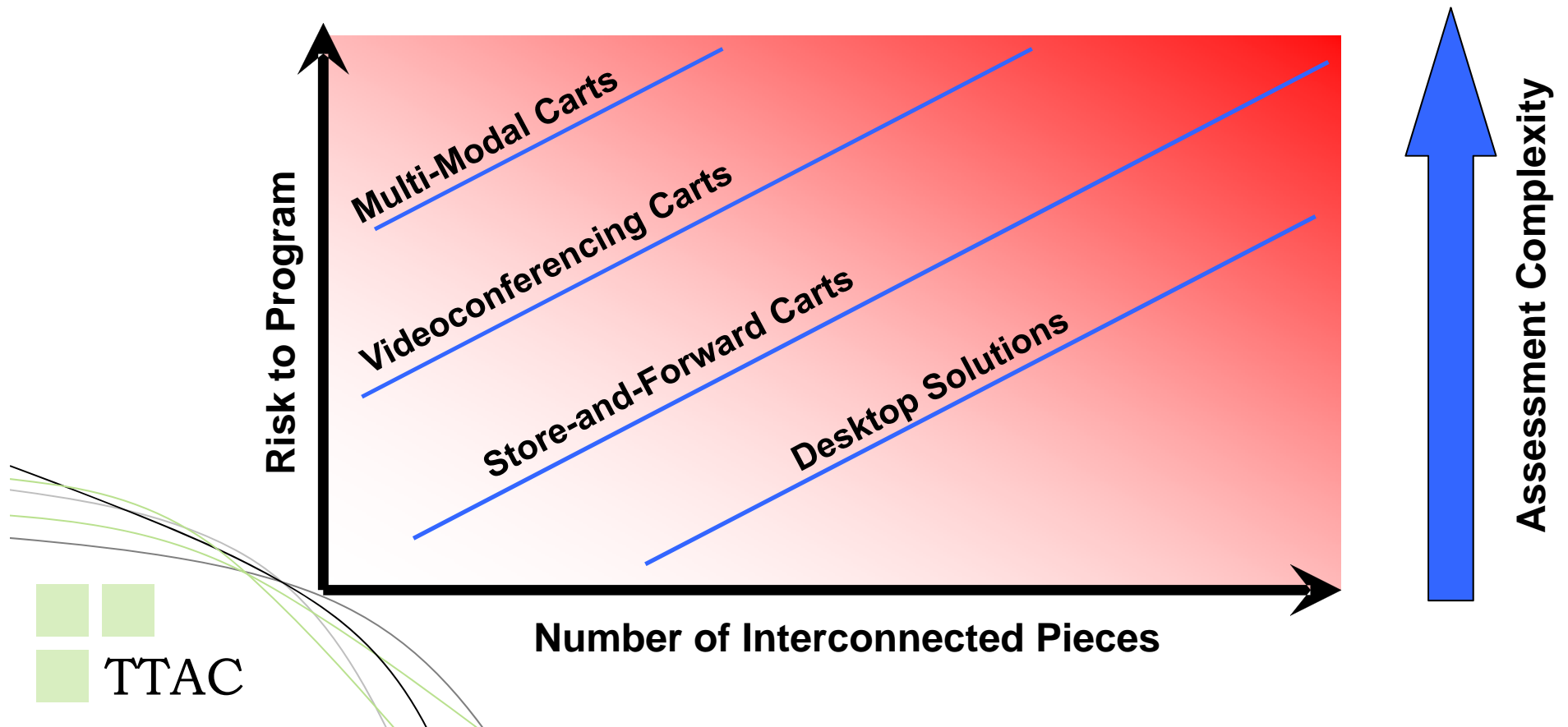
Equipment Complexity

- ▶ Implementing technology can be risky
- ▶ Structured technology assessment can reduce risk



Solution Complexity

- ▶ The risk gets even greater the more complex the solutions become



The 1-10-100 Rule

The cost of finding a defect in planning.

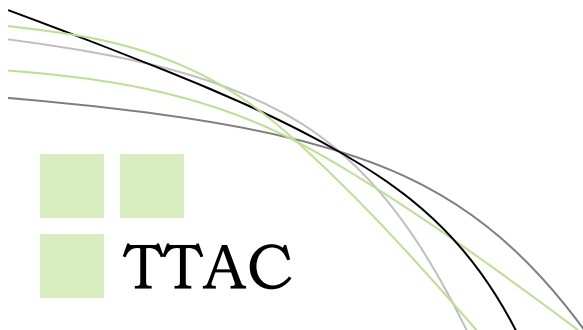
1

The cost of finding a defect in development.

10

The cost of finding a defect in quality assurance.

100



The 1-10-100 Rule

The cost of finding a defect in planning.

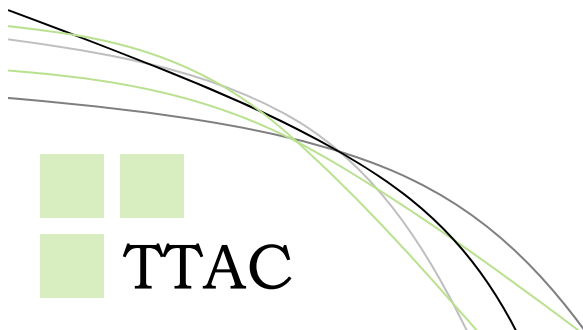
The cost of finding a defect before testing.

The cost of finding a defect after testing.

1

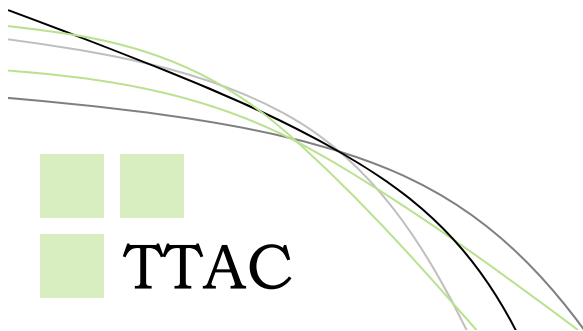
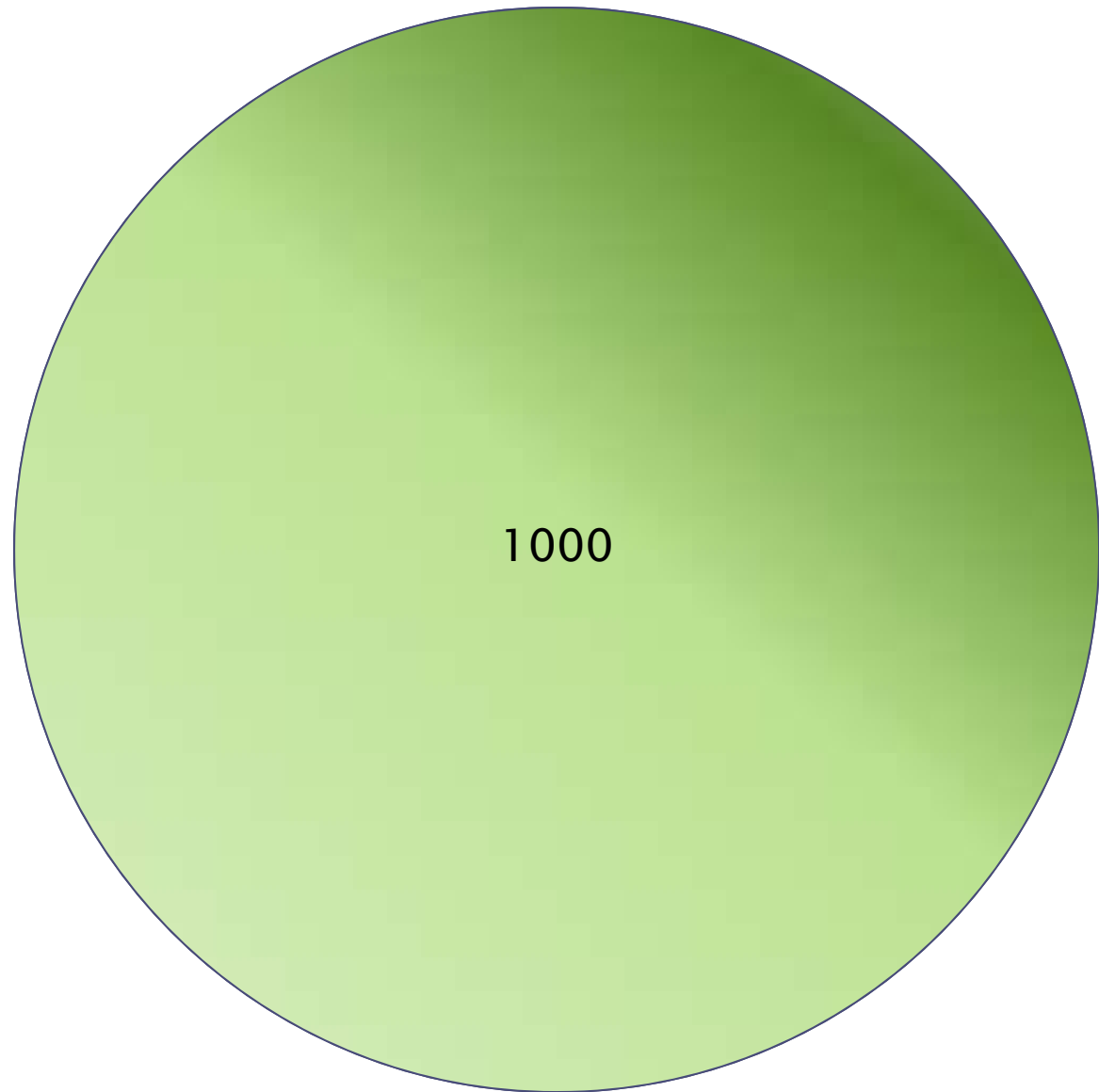
10

100



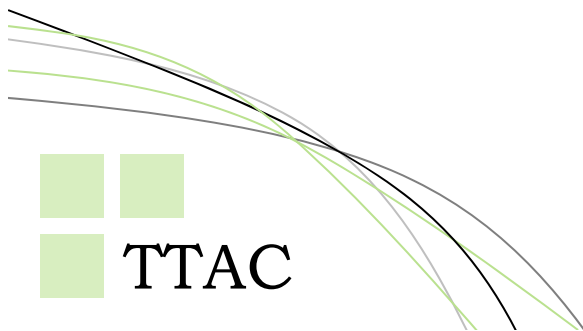
The 1-10-100-1000 Rule

The cost of finding a defect after deployment.



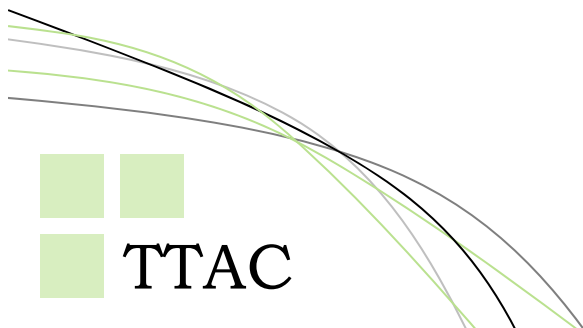
The Cost of 1000

- Planning and Deployment
- Equipment Purchases
- Staff and Training
- Doing it Again
- Lost Confidence



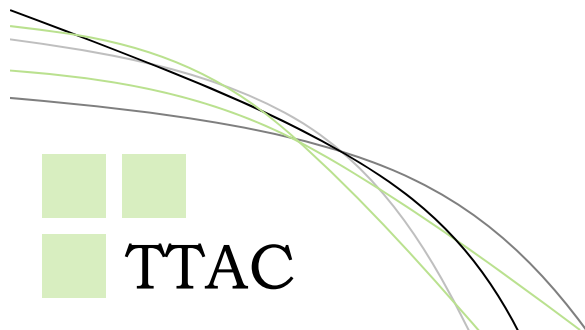
Intangible Costs

- ▶ Providers lose faith in the technology
- ▶ Technology is seen as an obstacle to providing care
- ▶ Future projects may have reduced buy-in



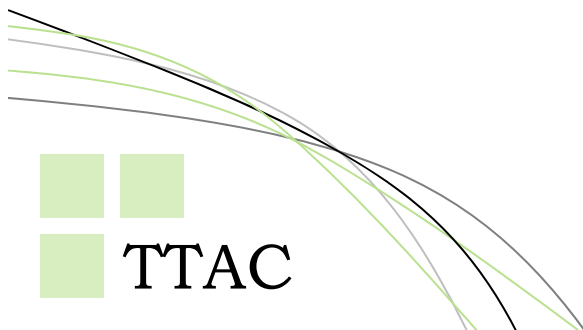
What About the Champions?

- ▶ They are your advocates and supporters
 - Don't make their job harder
 - Even they have limits
 - Select equipment that non-champions can use



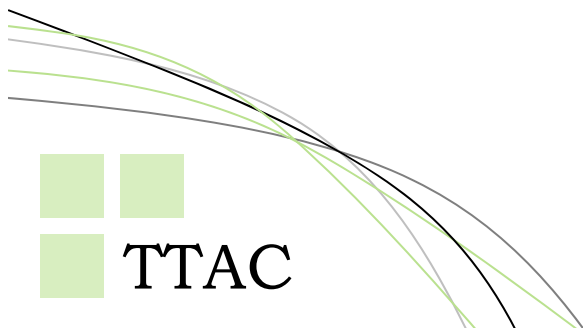
People. Perceptions. Processes.

- ▶ A Process Overview:
 - Establish Requirements
 - Review the Market
 - Procure the Devices
 - Plan the Tests
 - Test the Plan
 - Select a Device
 - Deploy and Support



People. Perceptions. Processes.

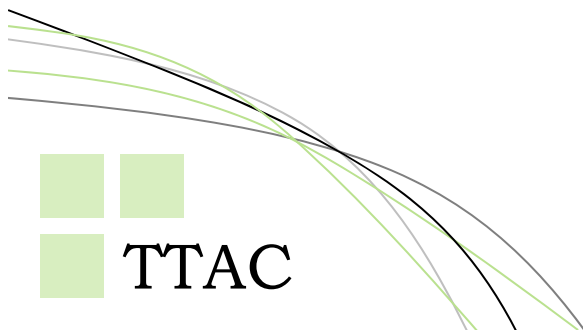
- ▶ Establish Requirements:
 - Gather as many points of view as possible
 - Create shared meaning around the requirements
 - Think through a variety of requirement types:
 - Functionality
 - Portability
 - Interoperability
 - Usability
 - Data Integrity



People. Perceptions. Processes.

▶ Review the Market:

- Use online resources – Google, Bing, Amazon, etc
- Phone a friend – TRCs, OAT Grantees, TTAC
- Talk to organizations that have existing programs
- Contact the manufacturers and vendors



People. Perceptions. Processes.

▶ Procure the Devices:

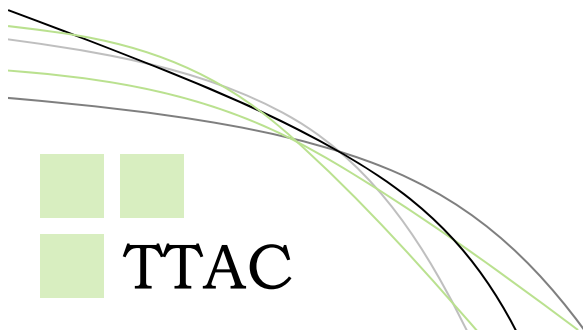
- Manufacturer and vendors can be incredibly useful
 - Loaners are great!
- Buy and borrow what you need
- Keep it all organized
- Try to get the devices in at the same time



People. Perceptions. Processes.

► Plan the Test:

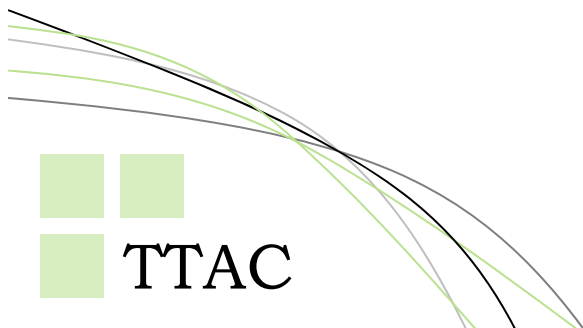
- Quantify your requirements
- Develop methods to test against the requirements
- Planning and testing can be iterative



People. Perceptions. Processes.

▶ Test the Plan:

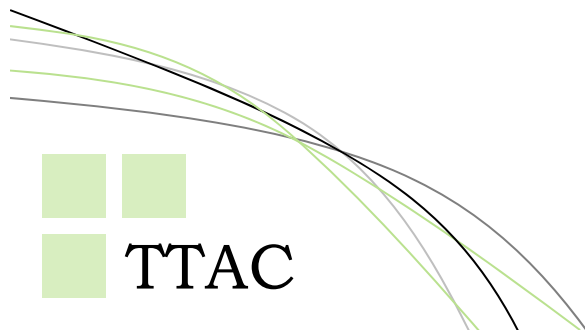
- Test independently or together
 - Independent tests can prevent “group think”
 - Collaboration can foster discussions
- Document EVERYTHING
- Be consistent
- Update test if needed



People. Perceptions. Processes.

▶ Select a Device:

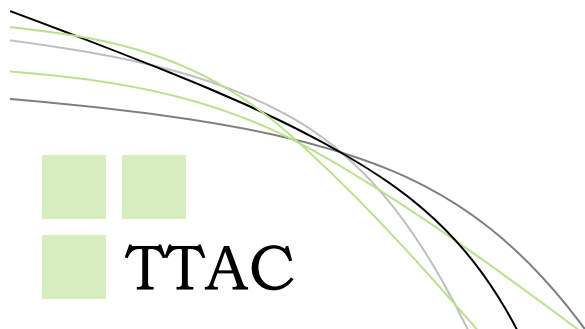
- Get the reviewers together
- Discuss the scores – clarify discrepancies
- Consider bringing in the initial requirements team
- Be prepared for a second review of top performers
- Make a decision and share your results



People. Perceptions. Processes.

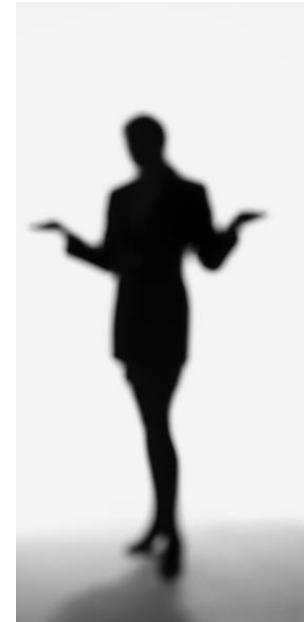
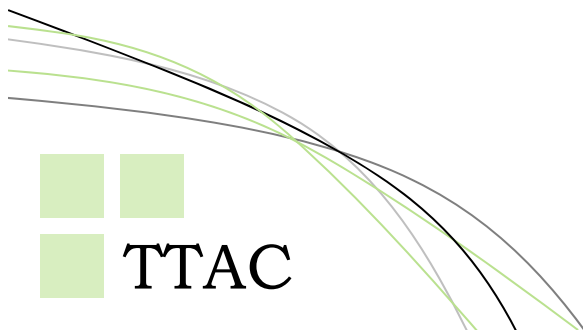
▶ Deploy and Support:

- Device Staging
- Configurations
- Spares
- Warranties
- Customer Support
- Troubleshooting
- Training
- Replacing Equipment



What Have We Done?!

- ▶ We have looked at a lot of equipment
 - Digital Cameras
 - Video Otoscopes
 - Patient Exam Cameras
 - Electronic Stethoscopes
 - Desktop Videoconferencing Software
 - Home Health
 - ... and a whole lot more!



Digital Cameras

▶ The Market

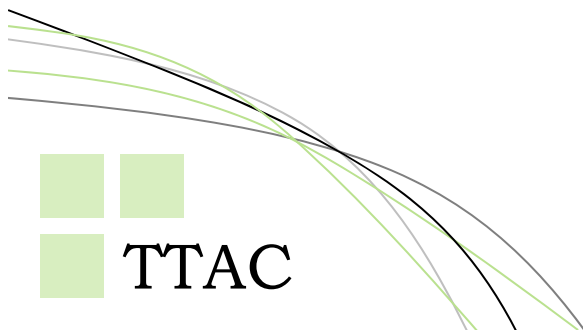
- Almost 100 new cameras are released each year
- Prices can range from < \$50 to > \$1000
- We focused on point-and-shoot cameras that were over \$200 but less than \$400
- Cameras have a short product lifespan



Digital Cameras

▶ What We Thought

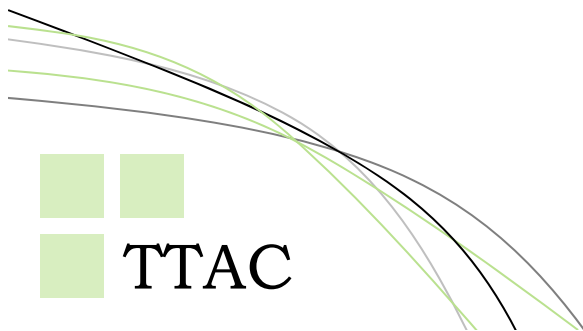
- Macro and flash would be features of high importance
- There would be a handful of winners and a pile of less-desired devices



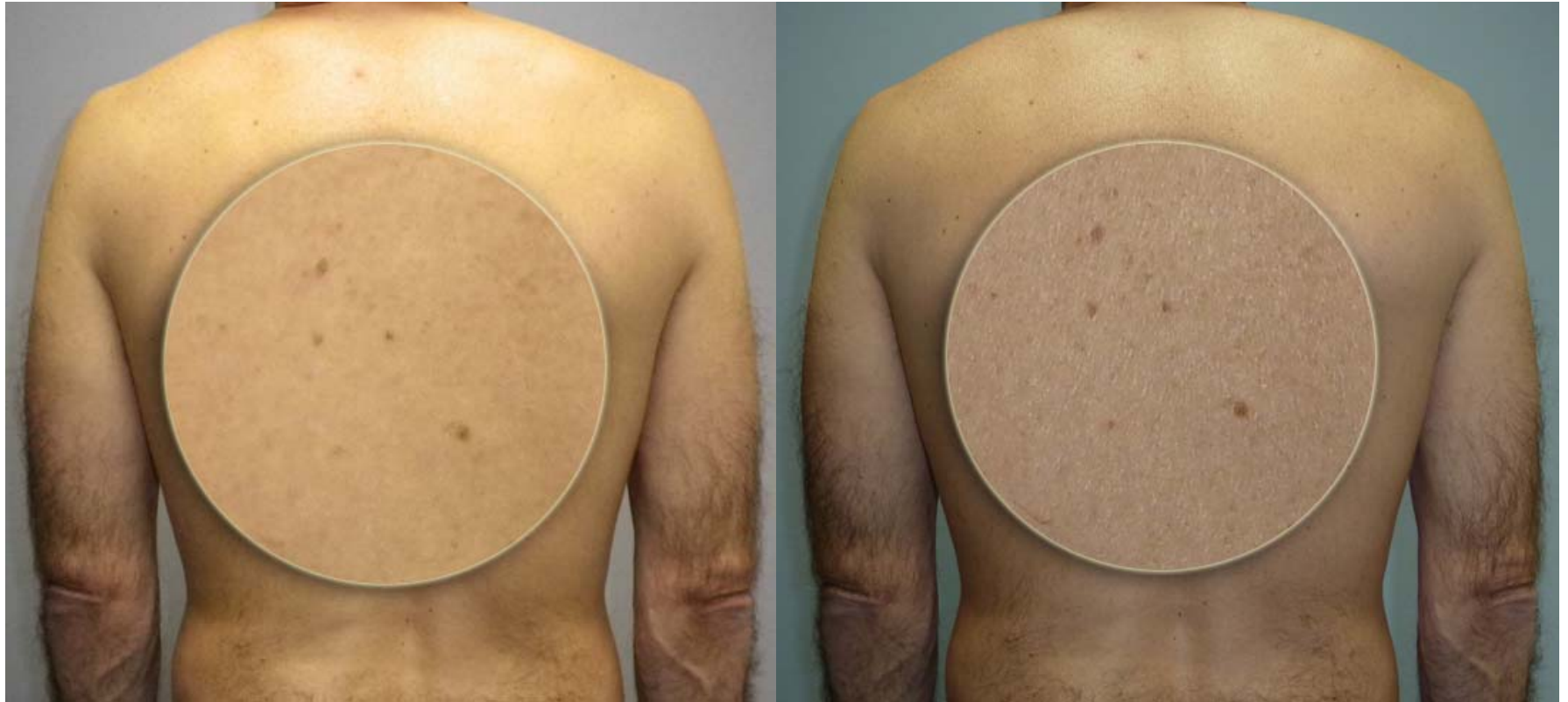
Digital Cameras

▶ What We Learned

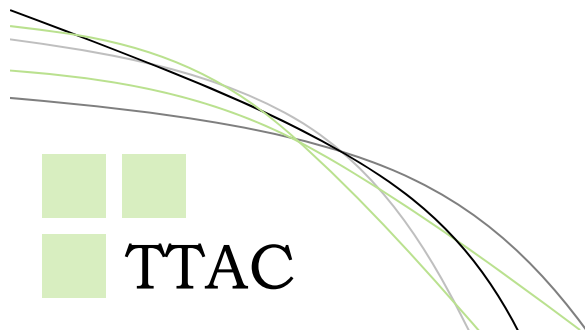
- Automacro!
- The same top cameras have been shuffling between the top ranks each year



Digital Cameras



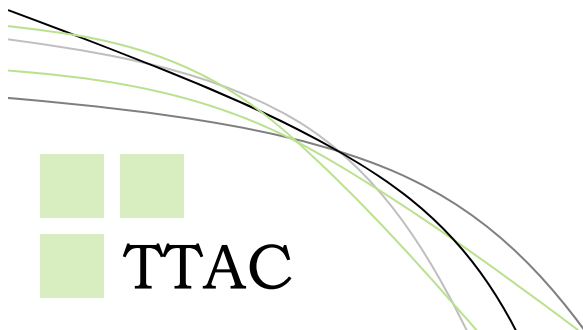
Digital Cameras



Video Otoscopes

▶ The Market

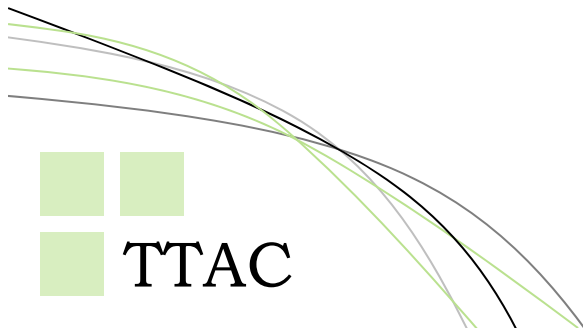
- 10 Manufacturers producing 16 devices
- Price range from <\$400 to >\$8,000
- Video output options include S-Video, Composite, HDMI, DVI, and USB
- Form factor varies widely across the market



Video Otoscopes

▶ What We Thought

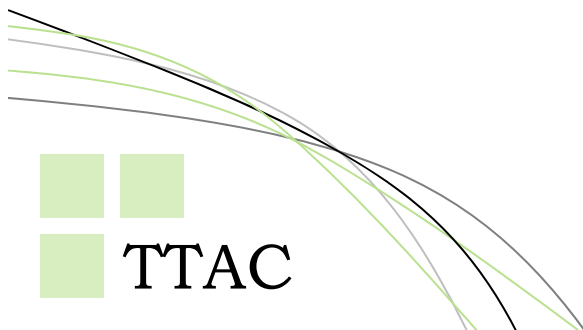
- “Technical” images would help in evaluating the equipment
- Portable USB models would be generally unusable for diagnosis

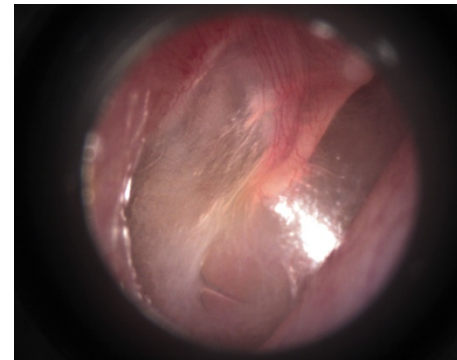
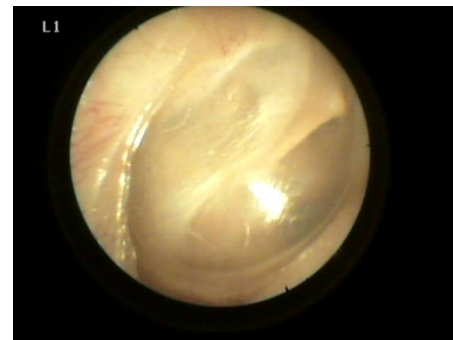
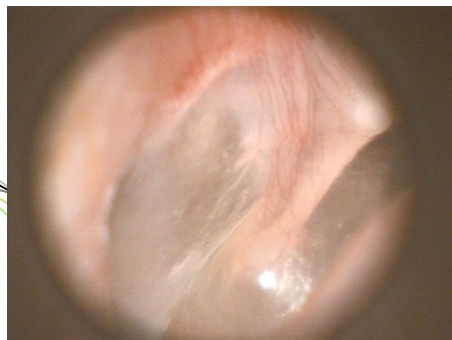
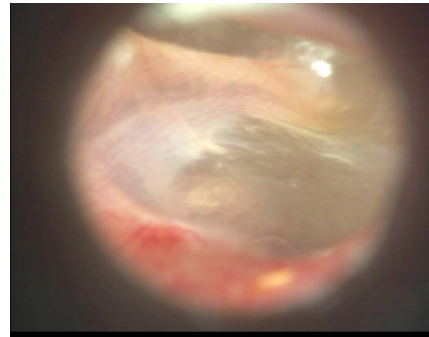
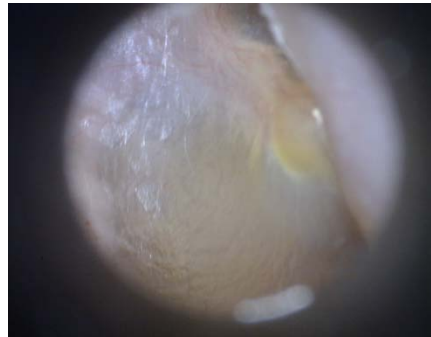
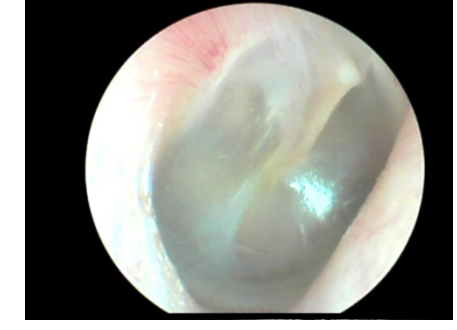
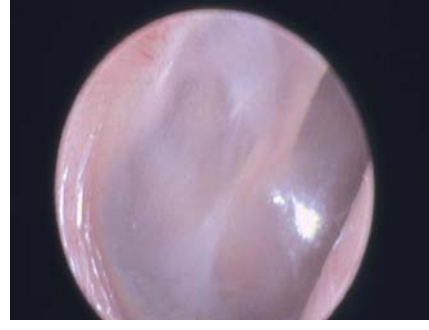
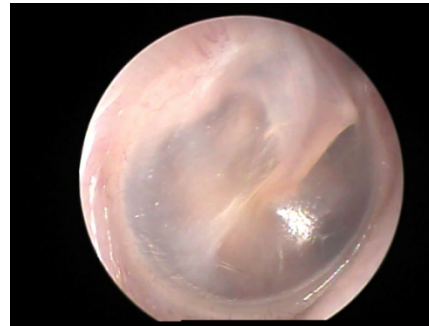
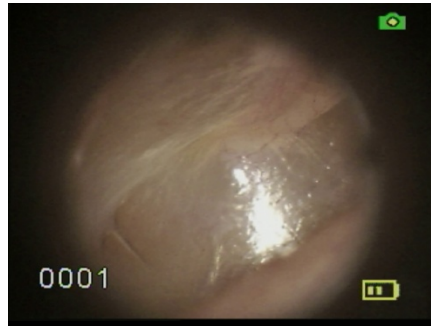
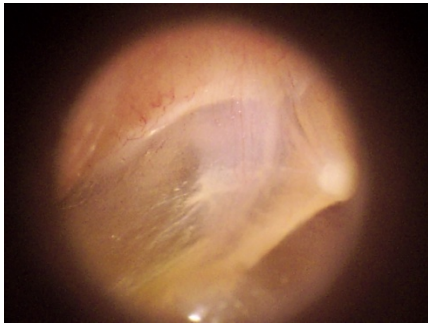


Video Otoscopes

▶ What We Learned

- 8 ENT doctors will have 8 different opinions
- Portable models are capturing better images than they were last time we looked
- There is still a wide range of quality issues in many of the products
- “Technical” imaging is not as useful as we thought it would be



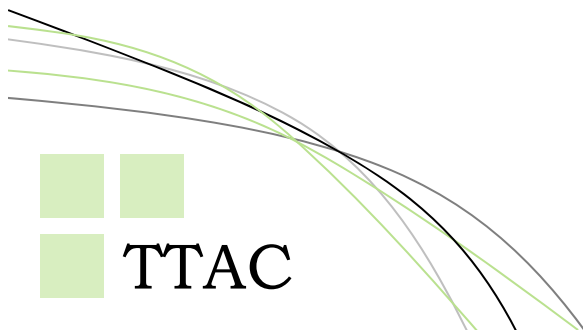



TTAC

Electronic Stethoscopes

▶ The Market

- 12 manufacturers creating 13 products
- Most of the market is providing amplifying steths
- Two “digitizing” stethoscopes on the market
- A rise in devices that talk to a computer



Electronic Stethoscopes

▶ What We Thought

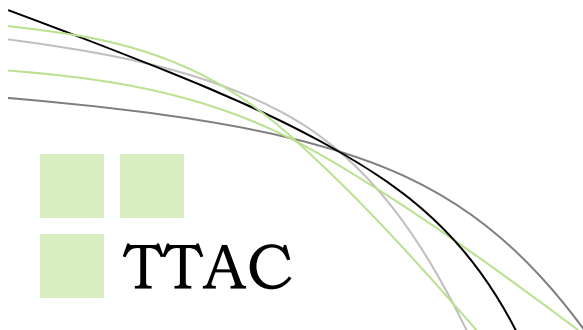
- Precise testing would be especially useful
 - Planned to have a tone generator, frequency response measurement tools, expensive monitors, artificial skin
- Some features felt a little gimmicky



Electronic Stethoscopes

▶ What We Learned

- Soundproof boxes made out of foam are not actually soundproof
- There is still a wide range of differences in quality
- Southeast Asian companies are bringing products to market
- Sometimes the best test is to give a product to a doctor and ask them to try it out



Desktop Videoconferencing

▶ The Market

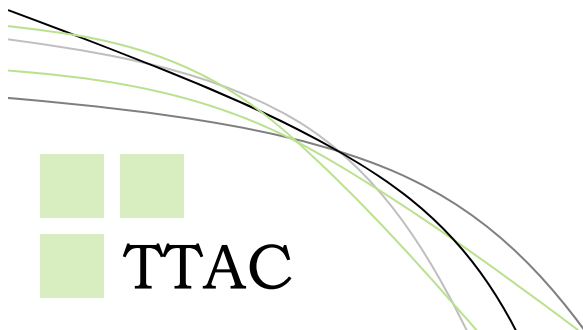
- Two main classes of product
 - Consumer-Grade
 - Standards-Based
- Broadly split between target populations



Desktop Videoconferencing

- ▶ What We Thought

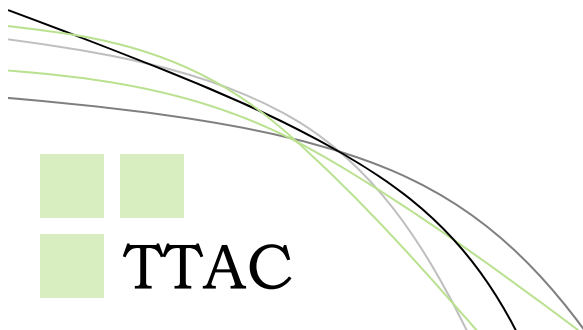
- Few thoughts, as we were learning this market



Desktop Videoconferencing

▶ What We Learned

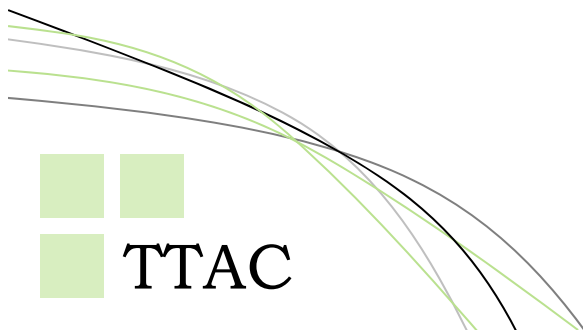
- The products do not often play well together
- Video and audio quality was generally good, if the bandwidth was there to support it
- Some features will be a problem for clinical uses of these products
- Everyone just wants to know if Skype will work



Patient Exam Cameras

▶ The Market

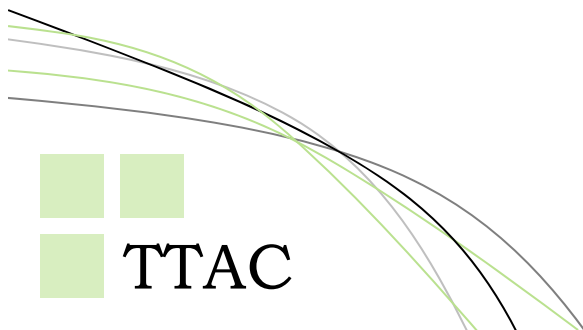
- Small official market (two products)
- Large unofficial market (camcorders, digital cameras, etc)



Patient Exam Cameras

▶ What We Thought

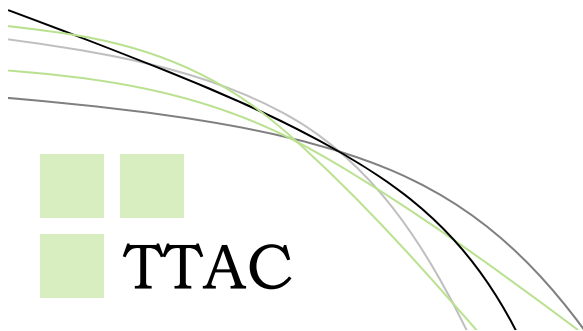
- Usability would be an issue with consumer products
- A lot of interest in how consumer products would stack up against the telehealth products



Patient Exam Cameras

▶ What We Learned

- Digital cameras and camcorders did rather well in some tests
- Usability was a bit of an issue, but not just for the consumer products
- The basics of imaging still apply – good light, good technique, good equipment



Mouth – Patient Exam Camera



Mouth – Old Camcorder



Mouth – Point-and-Shoot



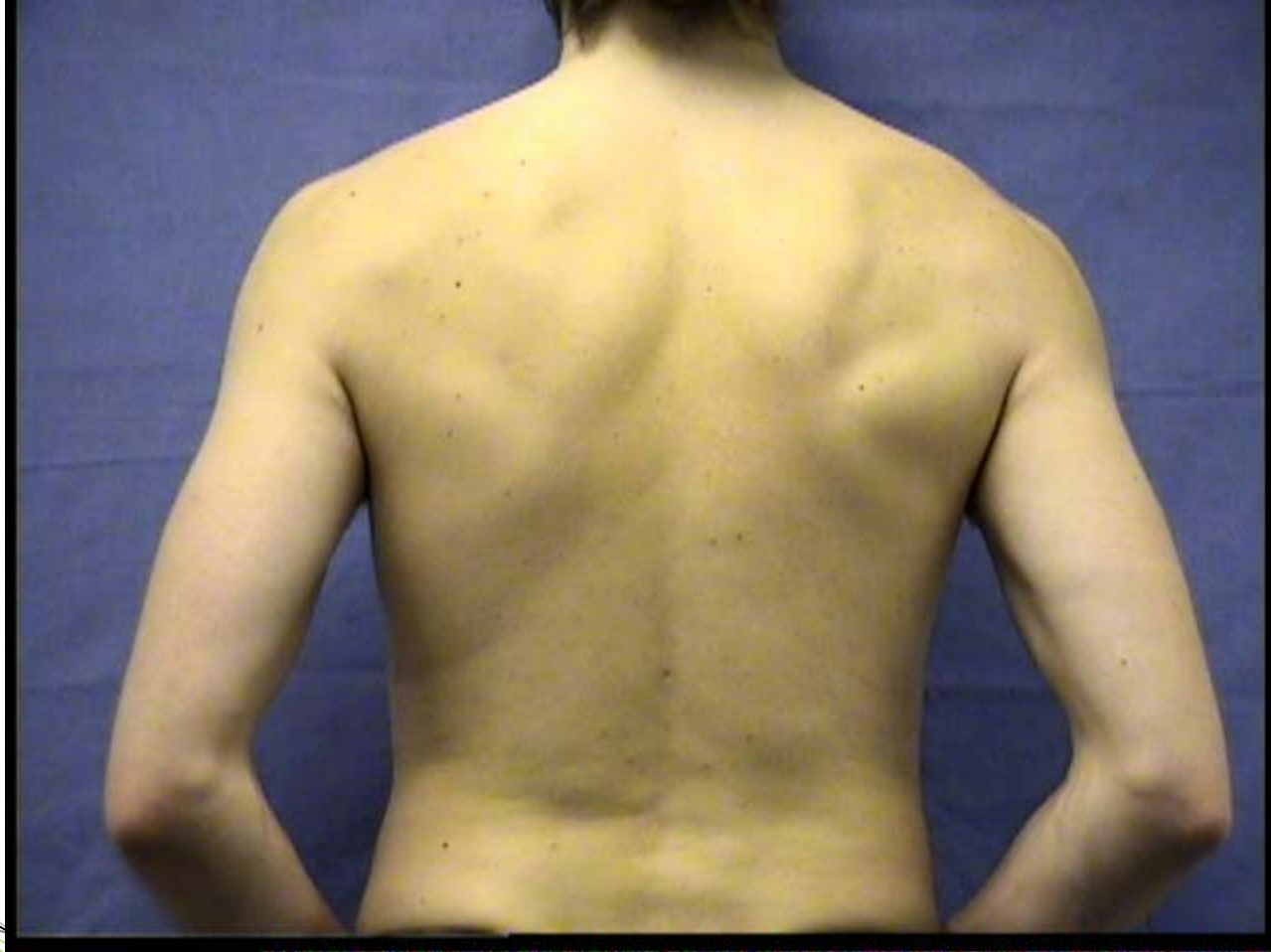
Mouth – New Camcorder



Mouth – New Camcorder, no light



Back – Patient Exam Camera



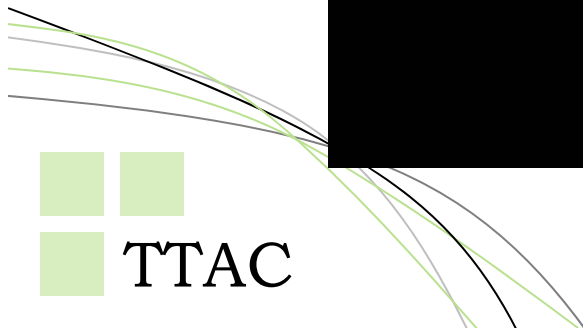
Back – Patient Exam Camera



Back- Point-and-Shoot

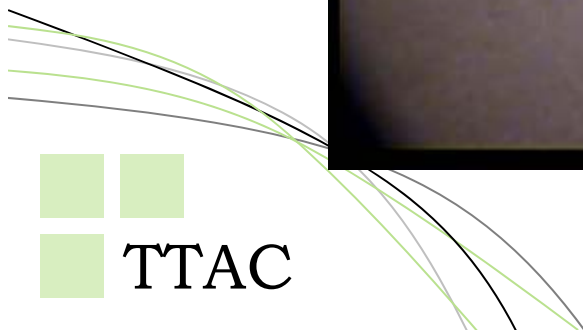


Back – New Camcorder



TTAC

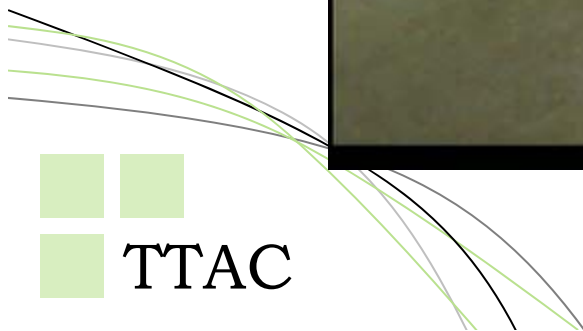
Vitiligo – Patient Exam Camera



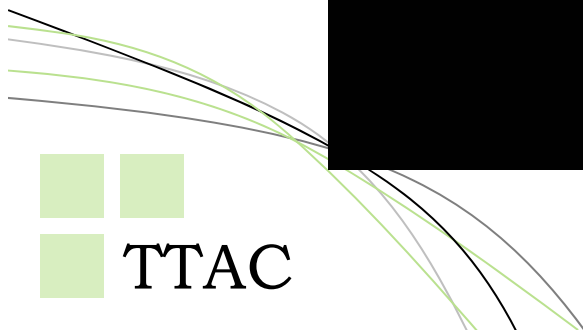
Vitiligo – Patient Exam Camera



Vitiligo - Old Camcorder



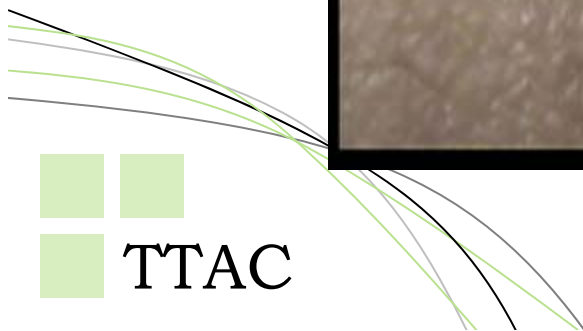
Vitiligo – New Camcorder



The Benefit of Image Recording – Patient Exam Camera



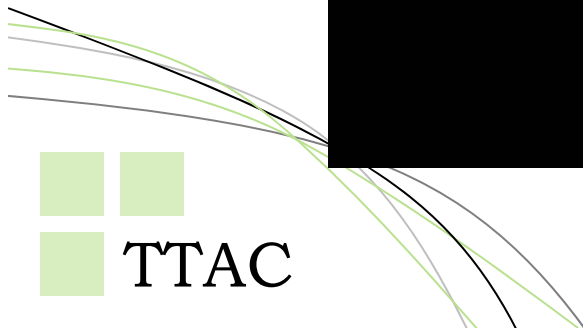
The Benefit of Image Recording – Patient Exam Camera



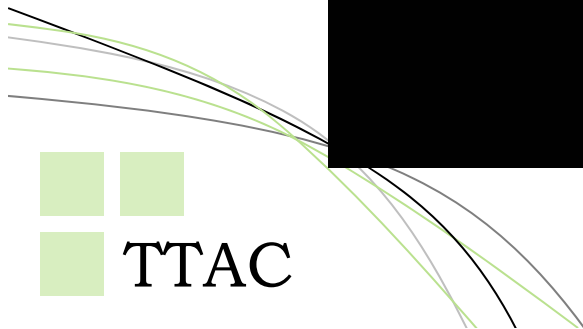
The Benefit of Image Recording – Patient Exam Camera



The Benefit of Image Recording – Camcorder Playback



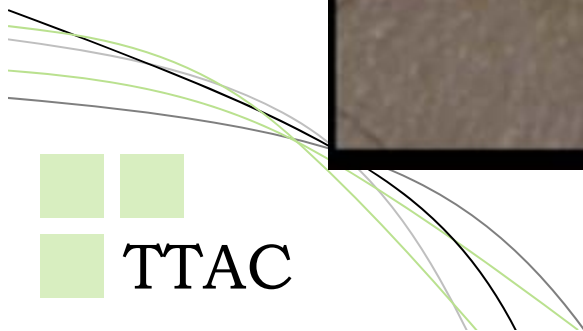
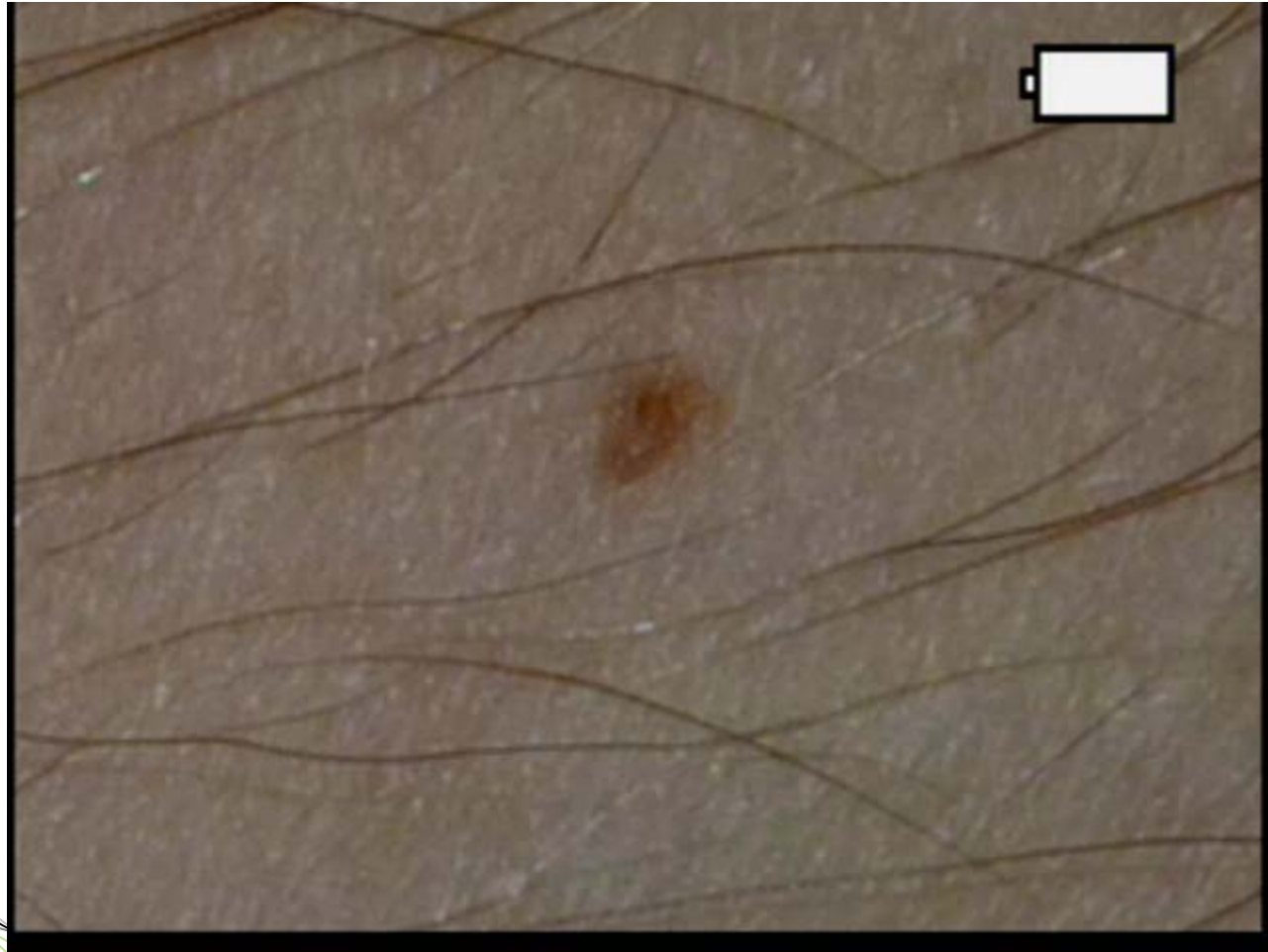
The Benefit of Image Recording - Camcorder Playback (Zoomed In)



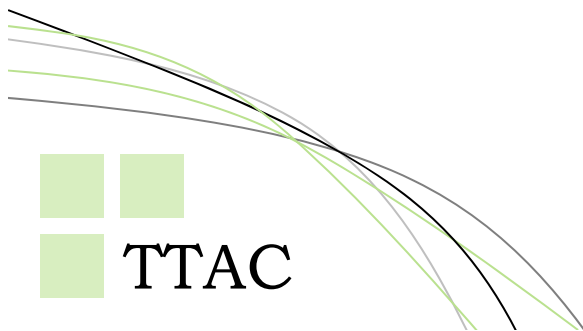
The Benefit of Image Recording – Digital Camera Playback



The Benefit of Image Recording – Digital Camera Playback (Zoomed In)

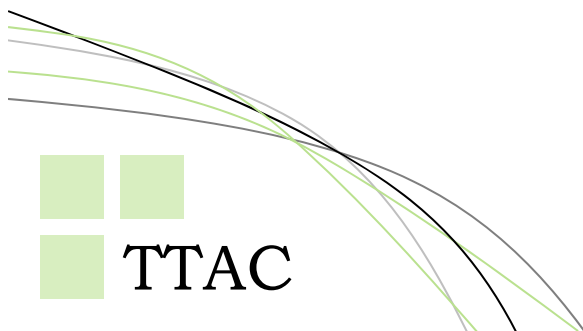


Got Help?



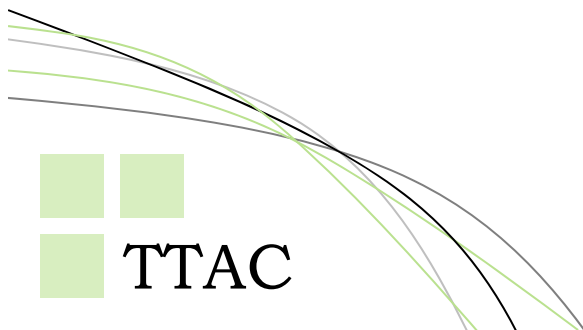
More Questions Than Answers?

- ▶ Many of you may just want to know what devices to use without having to go through an assessment process
- ▶ Remember, one size does not fit all ...
 - ... but sometimes one size can get pretty close



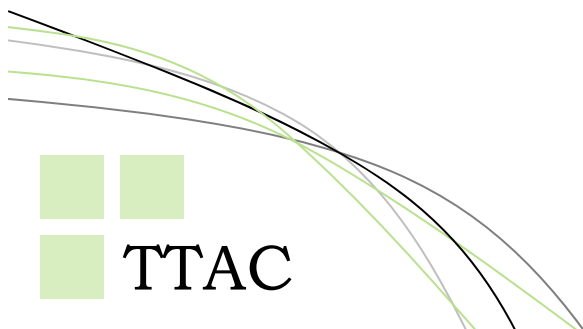
Use Available Resources

- ▶ Take advantage of others experiences and knowledge
 - OAT Listserv
 - Telehealth Resource Centers
 - Telehealth Technology Assessment Center
 - American Telemedicine Association
 - Other Organizations



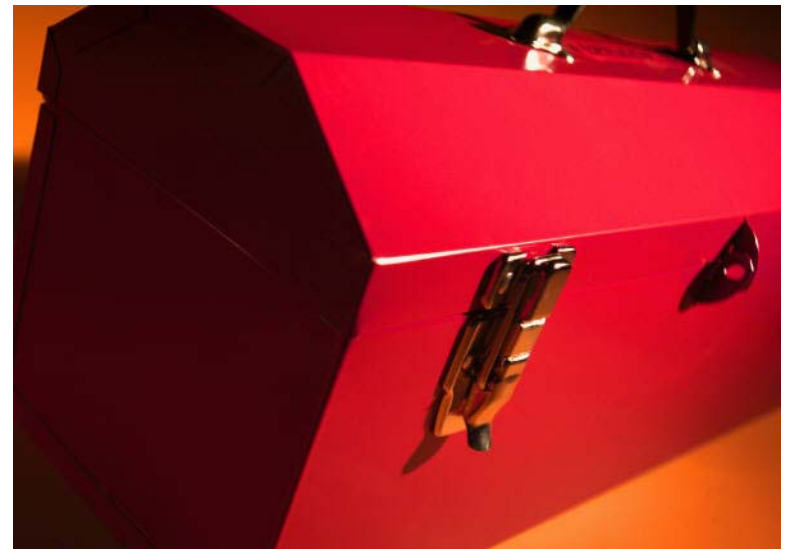
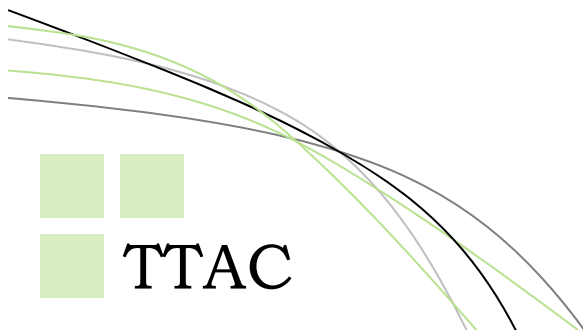
TTAC

- ▶ Telehealth Technology Assessment Center
 - Supports the work of the TRCs
 - Focuses specifically on technology issues
 - Creates toolkits on technology assessment
 - Produces webinars on technology-related topics
 - Here to support the OAT grantees



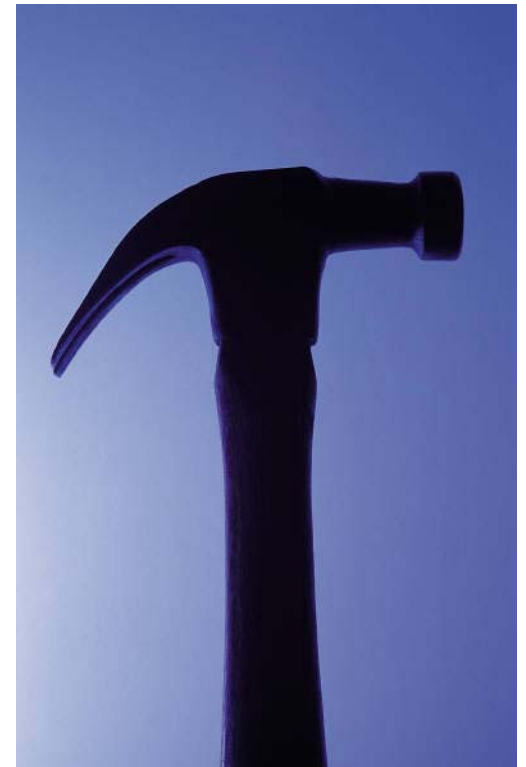
Toolkits

- ▶ Educational content on the TTAC website
 - How the technology works
 - Market reviews
 - Sample images and data
 - Feature comparisons
 - Description of how we test the devices



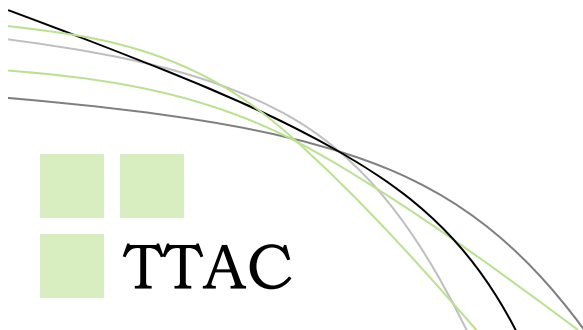
Toolkits

- ▶ Educational content on the TTAC website
 - Point-and-Shoot Digital Cameras
 - Desktop Videoconferencing Software
 - Patient Exam Cameras
 - Electronic Stethoscopes
 - Technology Assessment 101
 - Video Otoscopes
 - Home Health
 - Videoconferencing Endpoints
 - Videoconferencing Bridges
 - Digital SLR Cameras (2012)
 - mHealth (2012)
 - Portable Ultrasound (2012)



Conclusion

- ▶ Technology assessment is incredibly important
- ▶ Technology assessment is a process and a skill
- ▶ There are plenty of people here who can help



For additional information, please visit our website at www.TelehealthTAC.org or email info@TelehealthTAC.org

Additional resources for telehealth program development can be found at www.telehealthresourcecenters.org

Kirt J Beck

kjbeck@TelehealthTAC.org

(907) 729-2282



Jenevra Foisy RN, BSN

jmfoisy@TelehealthTAC.org

(907) 729-4721

