EXPANDING TELEAUDIOLOGY IN RURAL ALASKA: AN EHDI PILOT PROGRAM

Annette Callies

Women's Children's and Family Health
Department of Health and Social Services

Anchorage, AK

Samantha Kleindienst Robler, AuD, PhD

Norton Sound Health Corporation

Nome, AK

18th Annual EHDI Meeting, Chicago, IL

March 3, 2019

Annette Callies
No conflicts of interest

Samantha Kleindienst Robler
No conflicts of interest

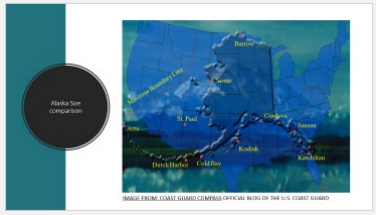
CONFLICT OF INTEREST

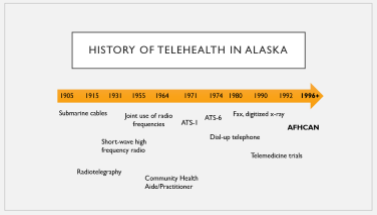
AUDIENCE

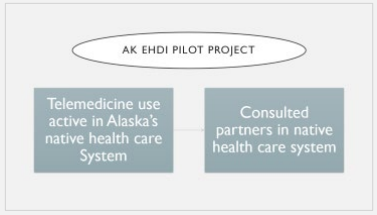
- Name
- Location
- Specialty
- Goal for attending session

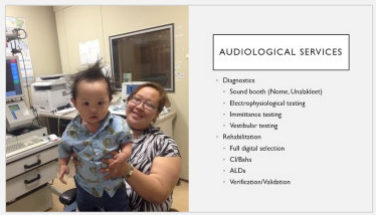
OVERVIEW

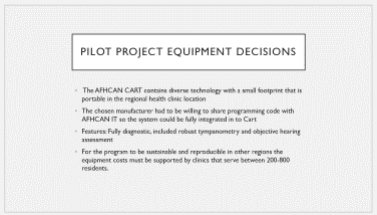
- ❑ State of Alaska
- ❑ Development of solutions to address needs in Alaska (telemedicine/CHAP)
- ❑ Alaska EDHI program
- ❑ Alaska EHDI Pilot Project
- ❑ Norton Sound Health Corporation (NSHC)
- ❑ NSHC Audiology Services/models of care
- ❑ Pilot Project Equipment Selection and implementation
- ❑ Tips and Take Aways
- ❑ Demonstration

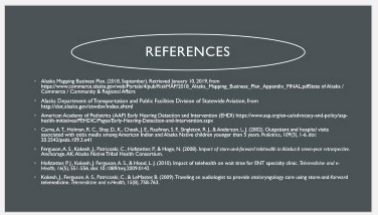












Alaska Size comparison

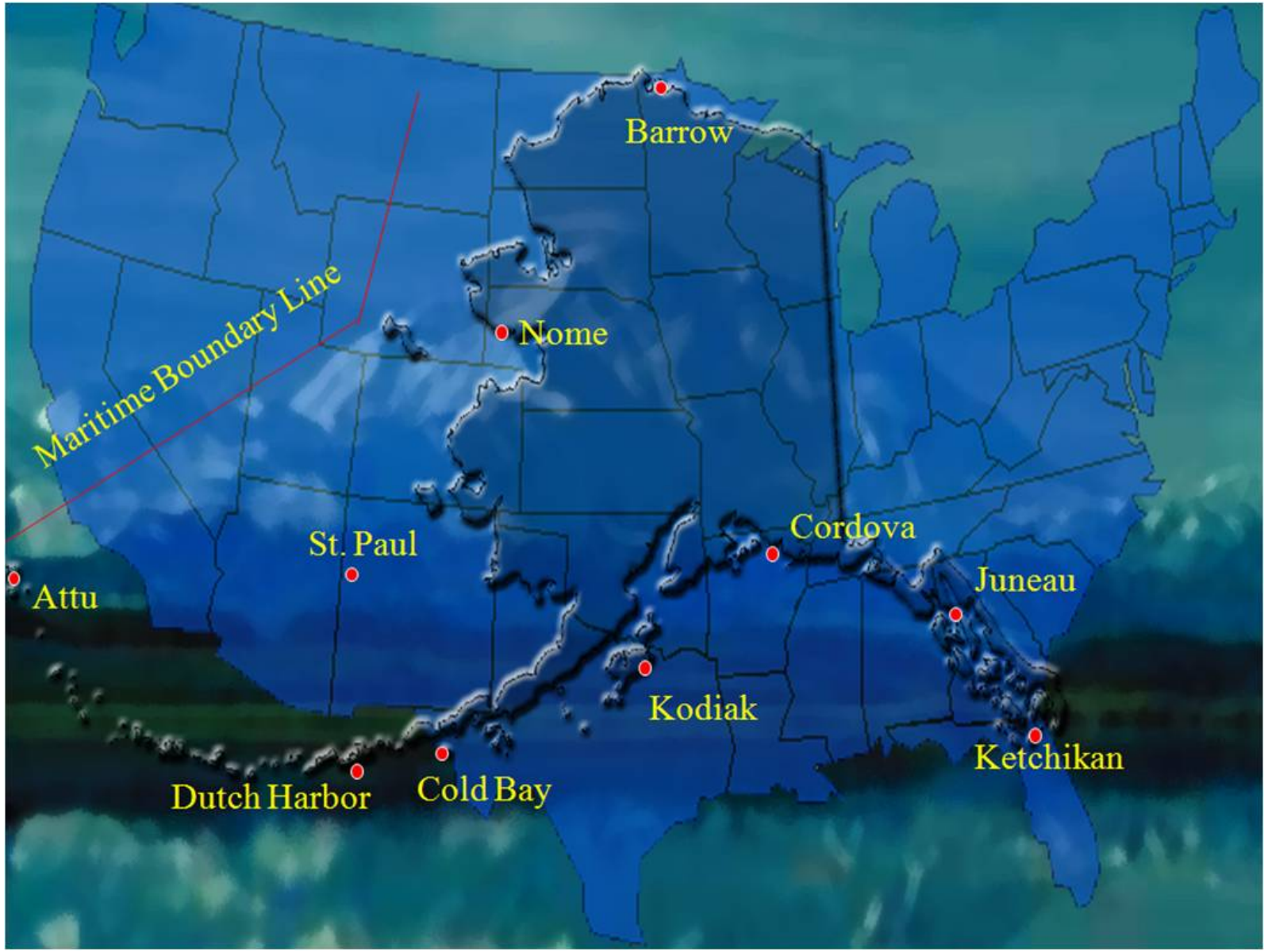


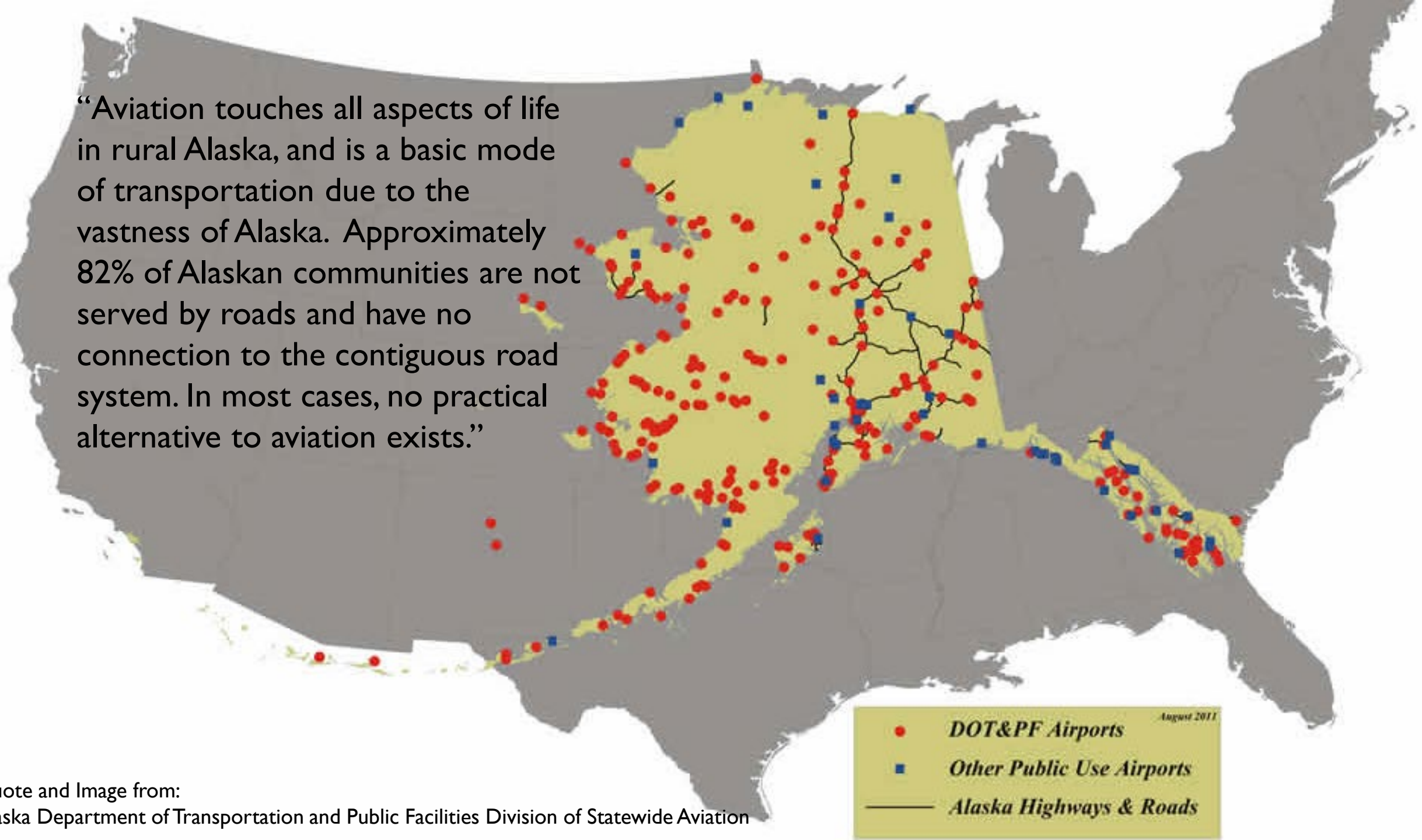
IMAGE FROM: COAST GUARD COMPASS OFFICIAL BLOG OF THE U.S. COAST GUARD

"The difference between rural Alaska and "any other rural area" is that in other states, people can drive to the nearest large town to obtain services. Commuting is generally not an option for the people of rural Alaska; there are fewer miles of road in Alaska than in any other state."

Quote from
https://www.commerce.alaska.gov/web/Portals/4/pub/RiskMAP/2018_Alaska_Mapping_Business_Plan_Appendix_FINAL.pdf

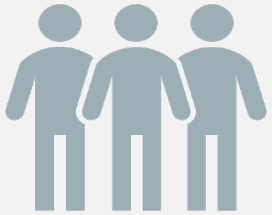
Image taken from:
http://www.travelalaska.com/getting%20around/travel%20within%20alaska/by%20car%20rv%20motorhome.aspx

"Aviation touches all aspects of life in rural Alaska, and is a basic mode of transportation due to the vastness of Alaska. Approximately 82% of Alaskan communities are not served by roads and have no connection to the contiguous road system. In most cases, no practical alternative to aviation exists."



Quote and Image from:
Alaska Department of Transportation and Public Facilities Division of Statewide Aviation

COMMUNITY SIZE



Over half (55%) of municipalities are extremely small with populations less than 500 residents

13% are less than 100 residents

Only six municipalities (4%) contain 30,000 residents or more including the:

Juneau, Fairbanks, Kenai Peninsula, Mat-Su, and Anchorage

https://www.commerce.alaska.gov/web/Portals/4/pub/RiskMAP/2018_Alaska_Mapping_Business_Plan_Appendix_FINAL.pdf

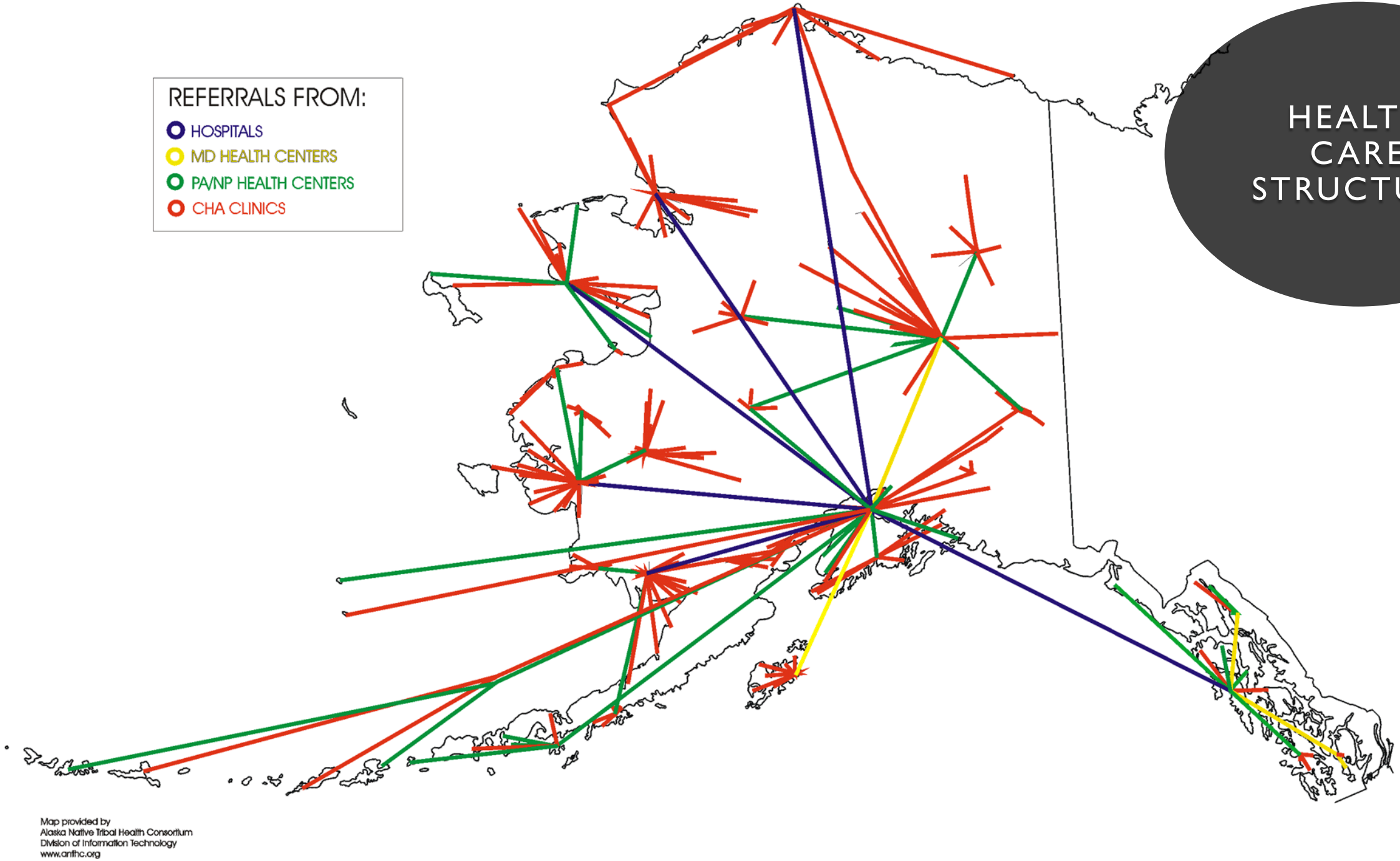
AIR TRAVEL TO REMOTE SITES IN ALASKA

Alaska Statute 02.35.110 Emergency Rations & Equipment requires that an airman may not make a flight inside the state with an aircraft unless emergency equipment is carried as follows:

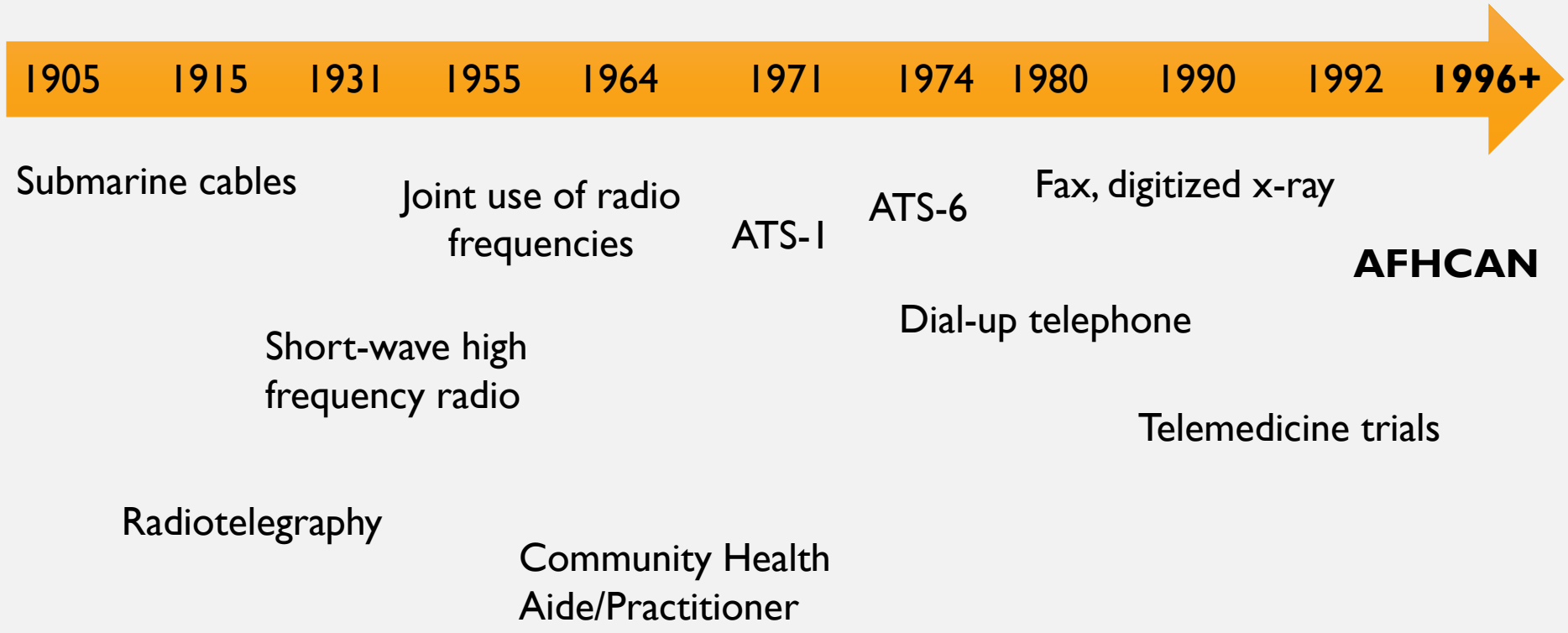
The minimum equipment during the summers months is: food for each occupant for one week; one axe or hatchet; one first aid kit; an assortment of fishing tackle such as hooks, flies, and sinkers; one knife; fire starter; one mosquito headnet for each occupant; and two signaling devices such as colored smoke bombs, pistol shells, etc. sealed in metal containers.

In addition to the above, the following must be carried as minimum equipment from October 15 to April 1 of each year: one pair of snowshoes; one sleeping bag; one wool blanket for each occupant over four.

HEALTH CARE STRUCTURE



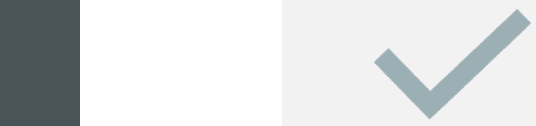
HISTORY OF TELEHEALTH IN ALASKA



DEVELOPMENT OF AFHCAN

- Alaska Federal Health Care Partnership (AFHCP)
  - VA, DoD, Coast Guard, IHS, ANTHC
- Connects 248 sites (44 organizations)
- Dermatology, Dentistry, Cardiology, Otolaryngology, Audiology, Primary Care, Optometry

ALASKA'S FEDERAL HEALTH CARE ACCESS NETWORK (AFHCAN)



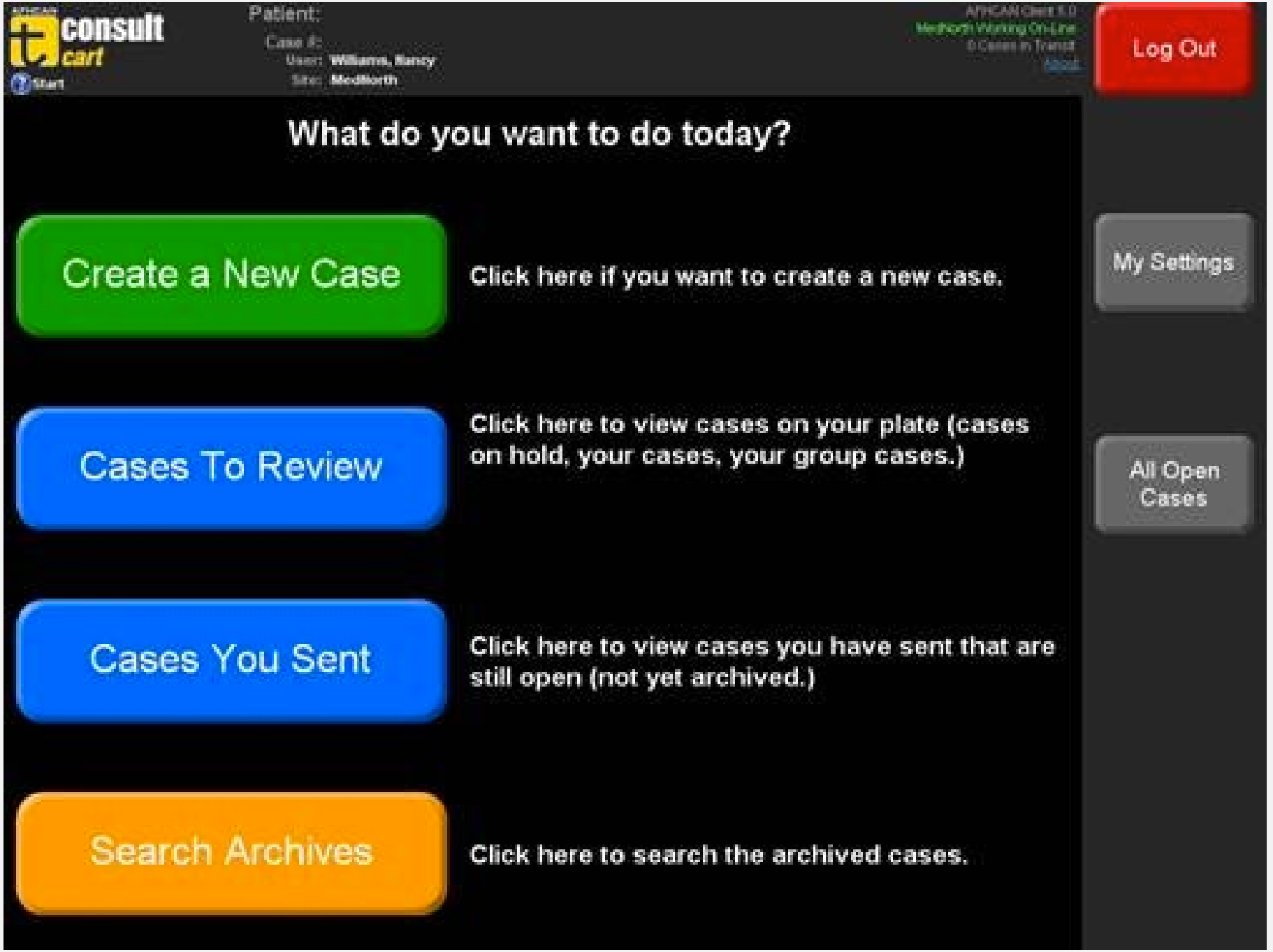
AFHCAN, is a program of the Alaska Native Tribal Health Consortium (ANTHC)

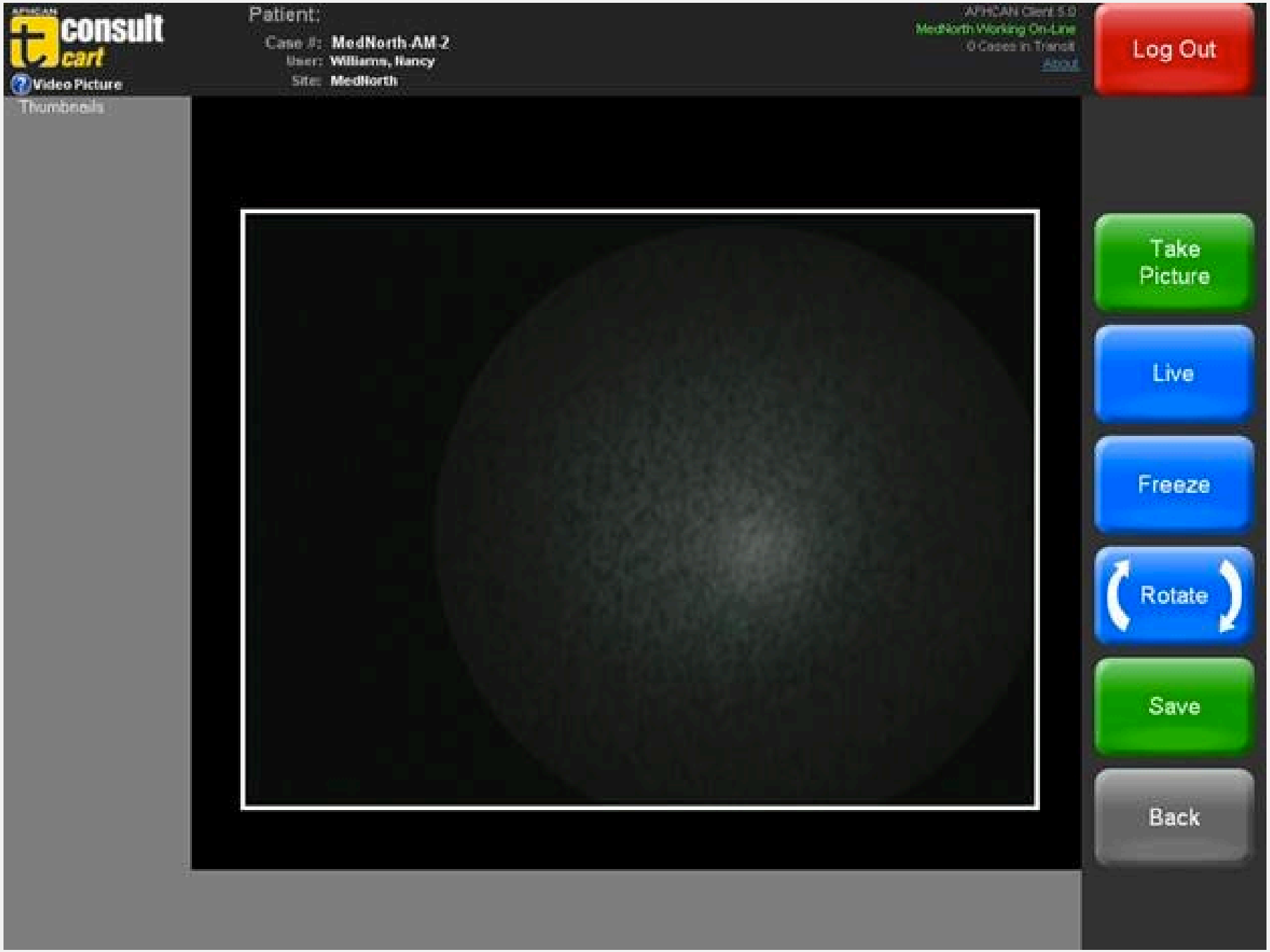
Provide information technology consultation, training and support

AFHCAN
http://afhcan.org/about.aspx

AFHCAN CART

- Equipment
  - Video otoscope
  - Tympanometer/audiometer/OAE
  - Dental Camera
  - Vitals/EKG
  - Digital Camera
  - Scanner
  - Camera and speaker
  - Stethoscope


consult cart
Start
Patient:
Case #:
User: Williams, Nancy
Site: MedNorth
APPCAN Client 8.0
MedNorth Working On-Line
0 Cases in Transit
About
Log Out
What do you want to do today?
Create a New Case
Click here if you want to create a new case.
My Settings
Cases To Review
Click here to view cases on your plate (cases on hold, your cases, your group cases.)
All Open 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.


consult
cart
Video Picture
Patient:
Case #: MedNorth-AM-2
User: Williams, Nancy
Site: MedNorth
APHCAN Client 5.0
MedNorth Working On-Line
0 Cases in Transit
About
Log Out
Thumbnails
Take Picture
Live
Freeze
Rotate
Save
Back

consult cart

Tympano meter

Patient:

Case #: MedNorth-AF-27

User: Williams, Nancy

Site: MedNorth

AFHCAN Client 5.0

MedNorth Working On-Line

0 Cases in Transit

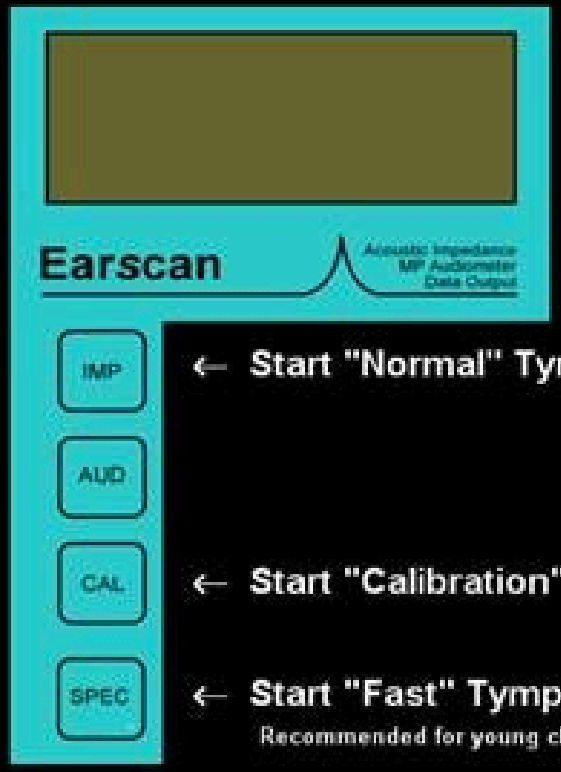
About

Log Out

Thumbnails

Tympanometry

TO START ... Press a button on the Earscan.
Please do a calibration first.



← Start "Normal" Tympanogram

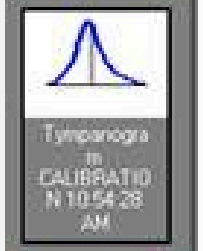
← Start "Calibration" Tympanogram

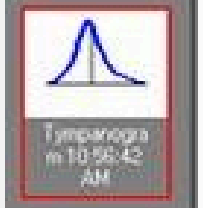
← Start "Fast" Tympanogram

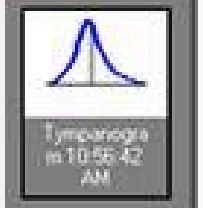
Recommended for young children

Save

Back







Patient: Joe, Doe
DOB: 10/15/1967 Age: 43 Gender: M

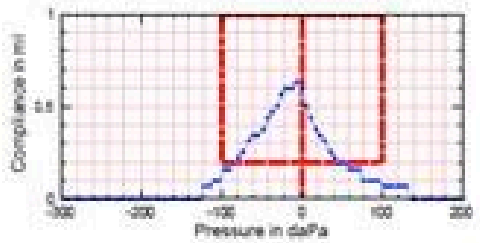
AFHCAN tConsult
Case Number: Test-R-25

Test Date & Time: 8/31/2011 10:56:04

Label: Tympanogram 10:56:04 AM

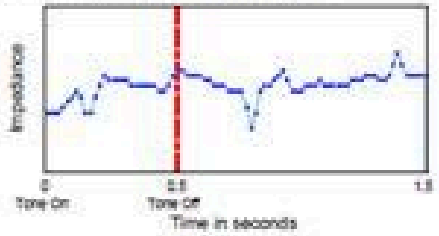
Tympanogram - Normal Speed

Pressure (of middle ear)	-6 daPa
Gradient (pressure width)	96 daPa
Compliance (of TM)	0.6 ml
Volume (of ear canal)	1.3 ml

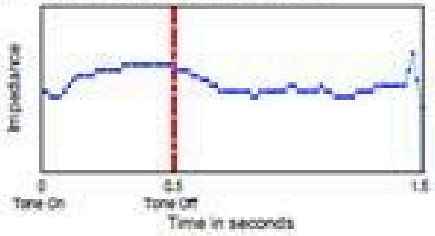


Acoustic Reflex Test - Ipsilateral

Tone presented at 1000 Hz and 105 dB



Tone presented at 2000 Hz and 105 dB



The graphs displayed are not intended for diagnostic purposes. They are provided for reference only.

Instrument Serial Number: 23201 EPROM Revision: EX71A Calibration Date: 8/5/2008

Add To Case

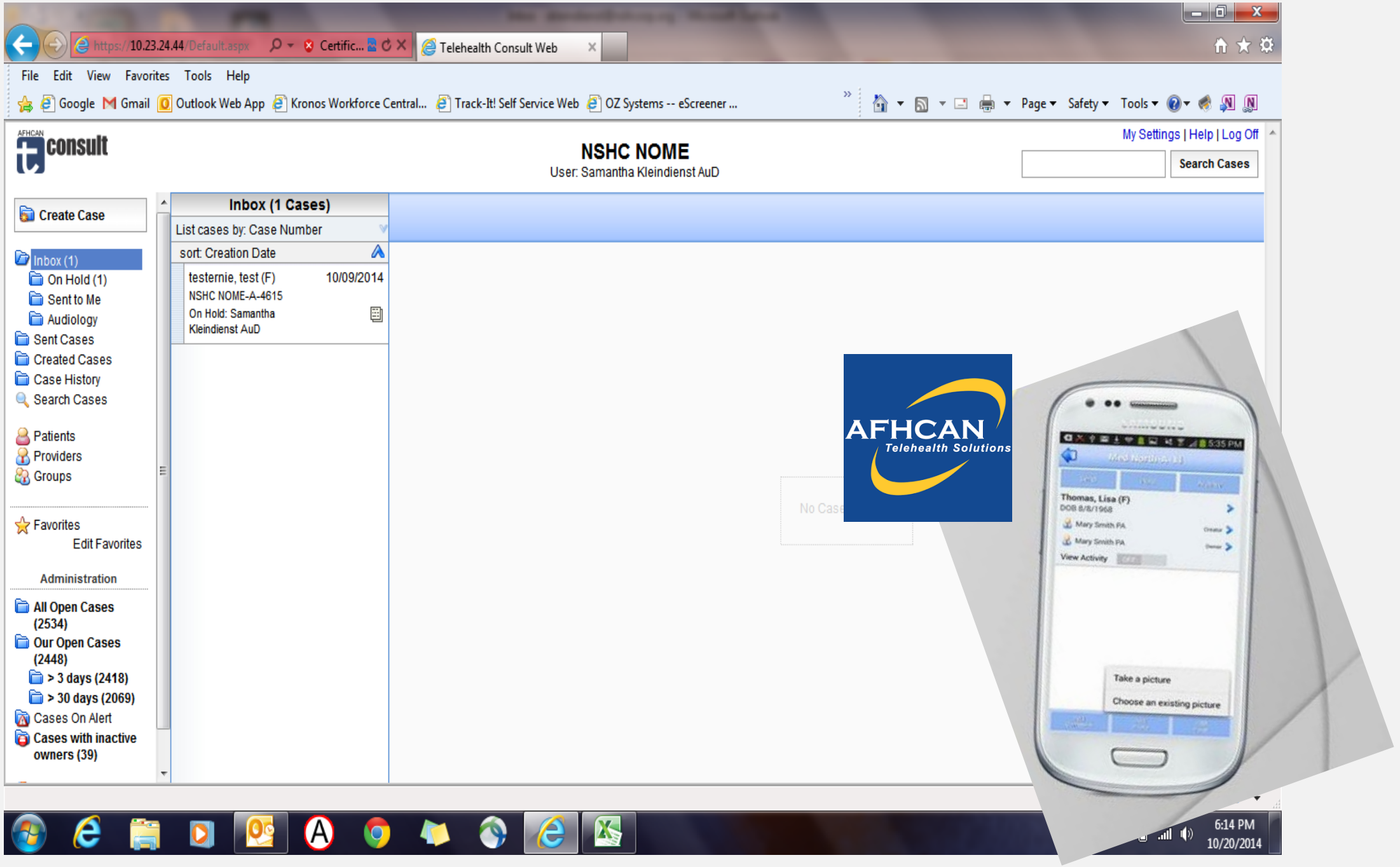
Add Comment

Print

Mark As Sensitive

Done


4:20
Audio
DPOAE Quick
DPOAE Diag
Tymp
15:56
DPQ65(QUICKSCRN)
dB
20
10
0
-10
-20
750 1k 2k 3k 4k 6k 8k Hz
L2=65 dB SPL
12dB
FM
13:29
DPQ65(QUICK SCRN)
L2=65dB
PASS
dB
20
10
0
-10
-20
f2 1.5 2 3 4 5 6 8 kHz
DP -2 0 10 14
N -10 -8 -2 -0
SNR 8 8 12 14
Retest
3 / 4 @ 6dB
FM


https://10.23.24.44/Default.aspx
Telehealth Consult Web
File Edit View Favorites Tools Help
Google Gmail Outlook Web App Kronos Workforce Central... Track-It! Self Service Web OZ Systems -- eScreener ...
Page Safety Tools
AFHCAN consult
NSHC NOME
User: Samantha Kleindienst AuD
My Settings | Help | Log Off
Search Cases
Create Case
Inbox (1)
On Hold (1)
Sent to Me
Audiology
Sent Cases
Created Cases
Case History
Search Cases
Patients
Providers
Groups
Favorites
Edit Favorites
Administration
All Open Cases (2534)
Our Open Cases (2448)
> 3 days (2418)
> 30 days (2069)
Cases On Alert
Cases with inactive owners (39)
Inbox (1 Cases)
List cases by: Case Number
sort: Creation Date
testernie, test (F) 10/09/2014
NSHC NOME-A-4615
On Hold: Samantha Kleindienst AuD
AFHCAN Telehealth Solutions
Thomas, Lisa (F)
Take a picture
Choose an existing picture
6:14 PM
10/20/2014

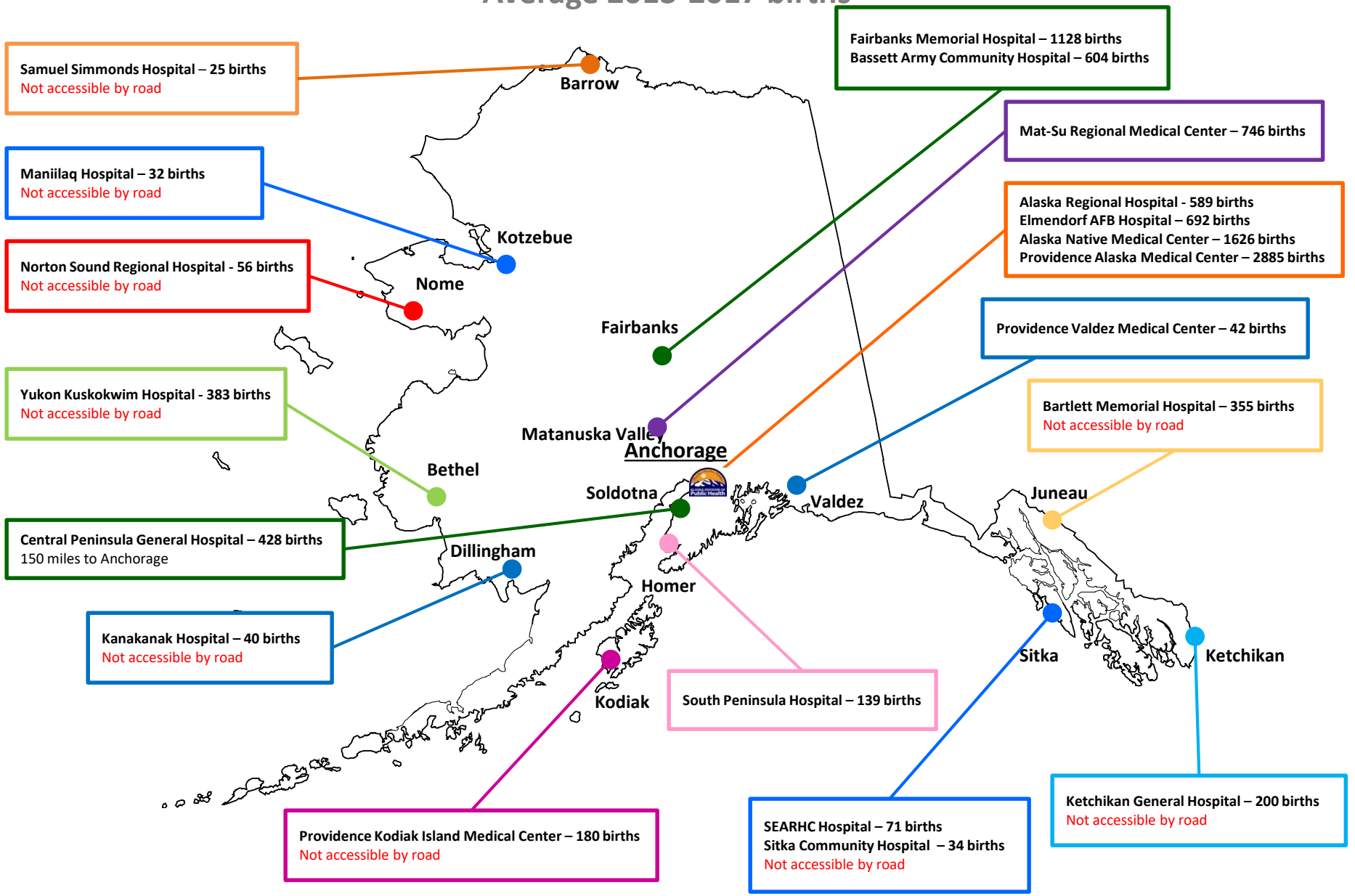
COMMUNITY HEALTH AIDE PROGRAM

- The Community Health Aide Program (CHAP) consists of a network of approximately 550 Community Health Aides/Practitioners (CHA/Ps) in over 170 rural Alaska villages. CHA/Ps work within the guidelines of the *Alaska Community Health Aide/Practitioner Manual* in assessing and referring members of their communities who seek medical care and consultation. Alaska CHA/Ps are the frontline of healthcare in their communities.
- Three training centers:
  - Anchorage, Norton Sound, Yukon-Kuskokwim

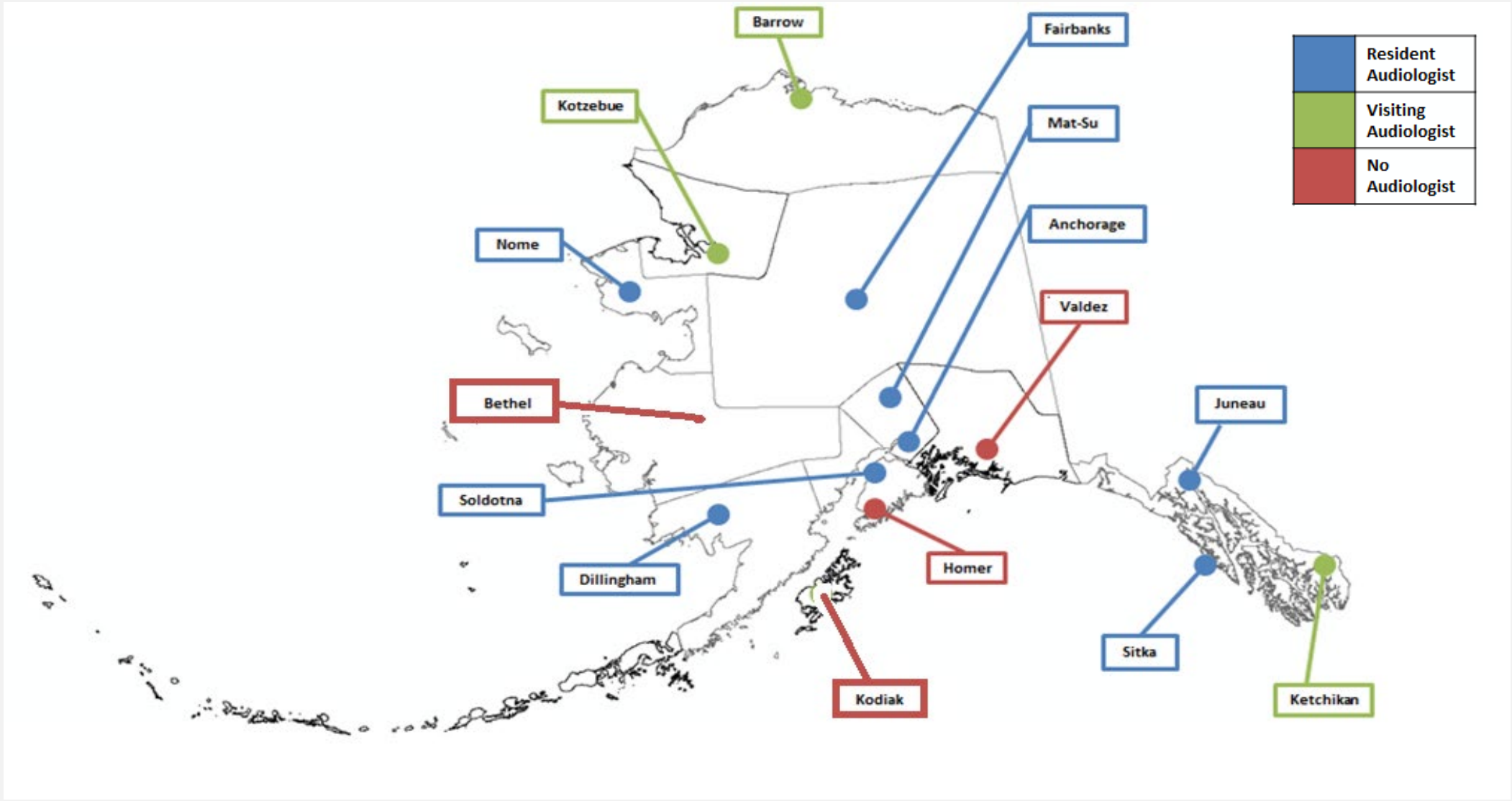
http://www.akchap.org/html/home-page.html

Locations of Newborn Hearing Screening Hospitals

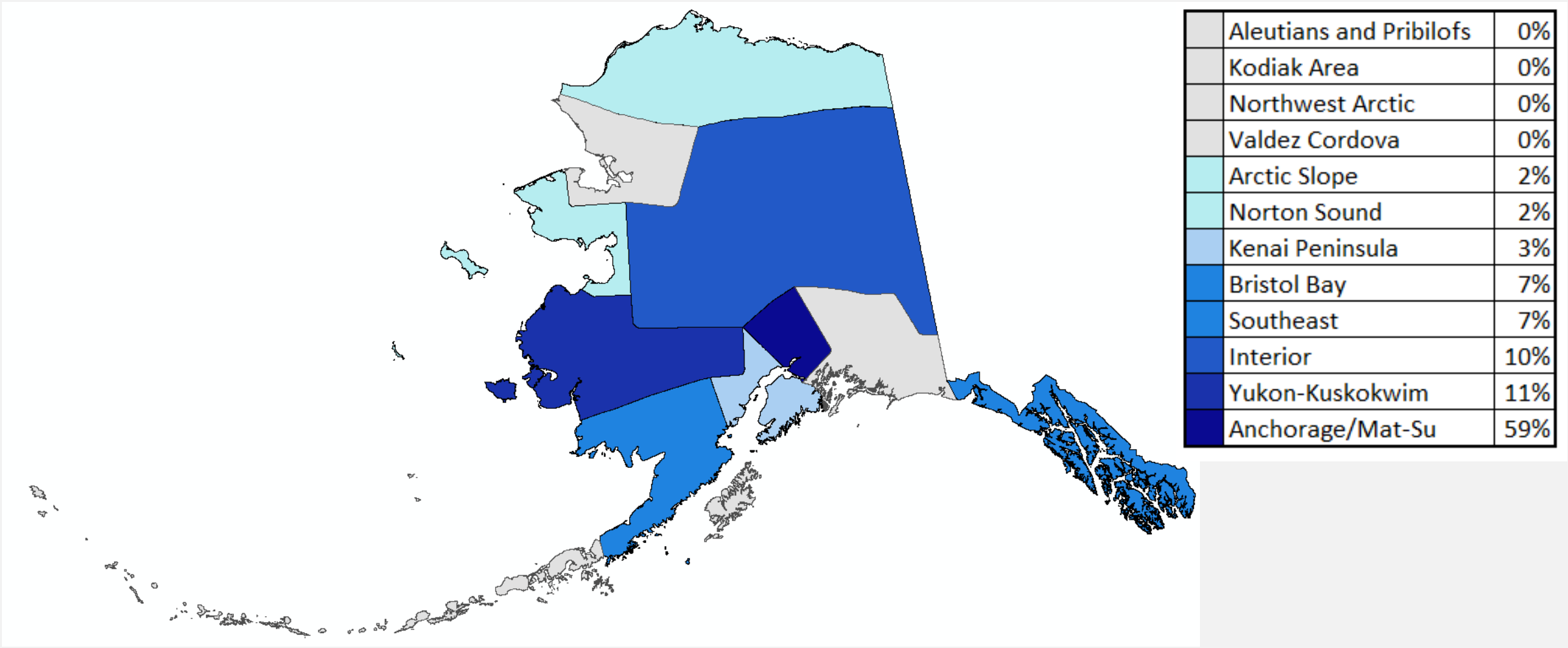
Average 2013-2017 births



PEDIATRIC AUDIOLOGICAL AVAILABILITY IN COMMUNITIES WITH BIRTHING FACILITIES, 2017

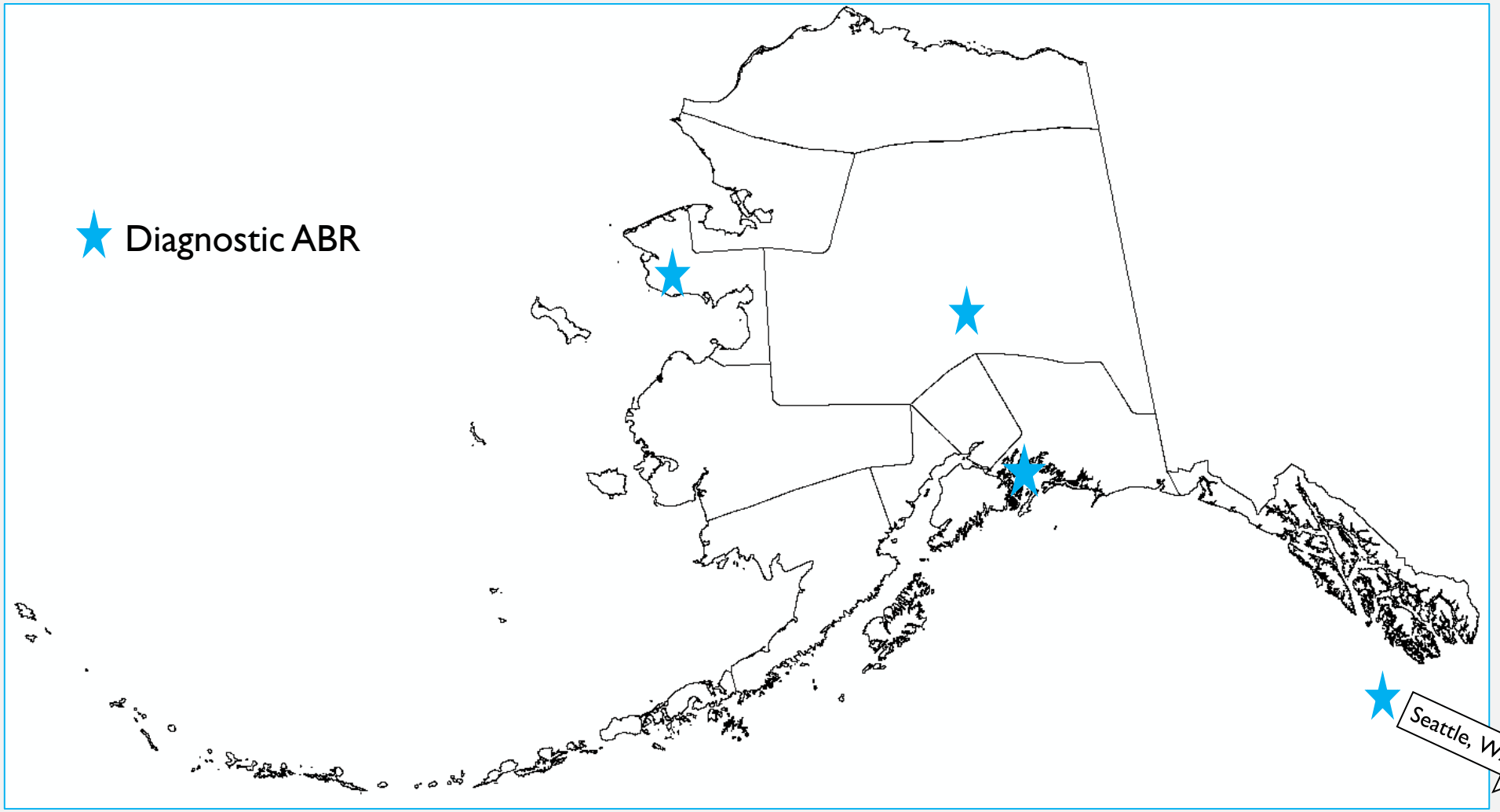


DIAGNOSED, REPORTED, HEARING LOSS IN CHILDREN STATEWIDE BY PLACE OF RESIDENCE BY TRIBAL HEALTH REGION, 2013-2015



Aleutians and Pribilofs	0%
Kodiak Area	0%
Northwest Arctic	0%
Valdez Cordova	0%
Arctic Slope	2%
Norton Sound	2%
Kenai Peninsula	3%
Bristol Bay	7%
Southeast	7%
Interior	10%
Yukon-Kuskokwim	11%
Anchorage/Mat-Su	59%

AUDIOLOGY DIAGNOSTIC AUDITORY BRAINSTEM RESPONSE (ABR) AVAILABILITY 2017



TRANSPORTATION TO PEDIATRIC AUDIOLOGY DIAGNOSTIC CENTER

GOAL: INCREASE PERCENTAGE OF CHILDREN DIAGNOSED BEFORE THREE MONTHS OF AGE

									Includes cases of normal hearing and hearing loss			
Birth year	total births	Total Screened	Total Not Pass	No Hearing Loss	No Hearing Loss Diagnosed Before 3 Months of Age	Hearing Loss	Hearing Loss Diagnosed Before 3 Months of Age	Prevalence per 1,000 Screened	Total Diagnosed	Total Diagnosed Before 3 Months of Age	Diagnosed Before 3 Months of Age among the Diagnosed	Diagnosed Before 3 Months of Age among those Not Passing the Screen
2013	11,278	10,969	148	36	20	20	16	1.8	56	36	64.3%	37.8%
2014	11,256	10,860	126	51	42	19	10	1.7	70	52	74.3%	41.3%
2015	11,175	10,771	142	70	47	19	12	1.8	89	59	66.3%	41.5%
2016	11,110	10,699	135	61	35	19	15	1.8	80	50	62.5%	37%

Program Evaluation

Learning Community

Quality improvement work group

INITIATIVES

LEARNING COMMUNITIES FOCUS AREAS

- Increase awareness that "children who are deaf or hard of hearing face a potential developmental emergency and should be identified as quickly as possible so that appropriate intervention services can be started." (AAP)
- Require that parents receive full information about JCIH recommendations
- Provide families of children at risk or newly diagnosed with parent support
- Family support services Family Navigators contact families of children who refer on their final screen for families who do not receive follow up within 90 days of not passing the newborn hearing screening. (based on a clinical trial conducted at the University of Kentucky)

American Academy of Pediatrics (AAP) Early Hearing Detection and Intervention (EHDI) Program
https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/PEHDIC/Pages/Early-Hearing-Detection-and-Intervention.aspx

EHDI PROGRAM EVALUATION

The first barrier to timely diagnosis was identified as incomplete or late data entry by audiologists.

Program conducted outreach to all audiologists in the state

Statewide audiology training developed

Quick reference guide for reporting electronically developed for Alaska

QUALITY IMPROVEMENT (QI) TEAM

- Identify barriers by contracting with Alaska's University Center of Excellence (USED), the UAA Center for Human Development (CHD) to survey families with infants who are referred and awaiting a diagnostic assessment as well as infants diagnosed with hearing loss who have not enrolled in EI. All family surveys will be conducted by researchers who are parents of children who are deaf or hard of hearing.
- Teleaudiology pilot project to reach families reluctant to travel

AK EHDI PILOT PROJECT

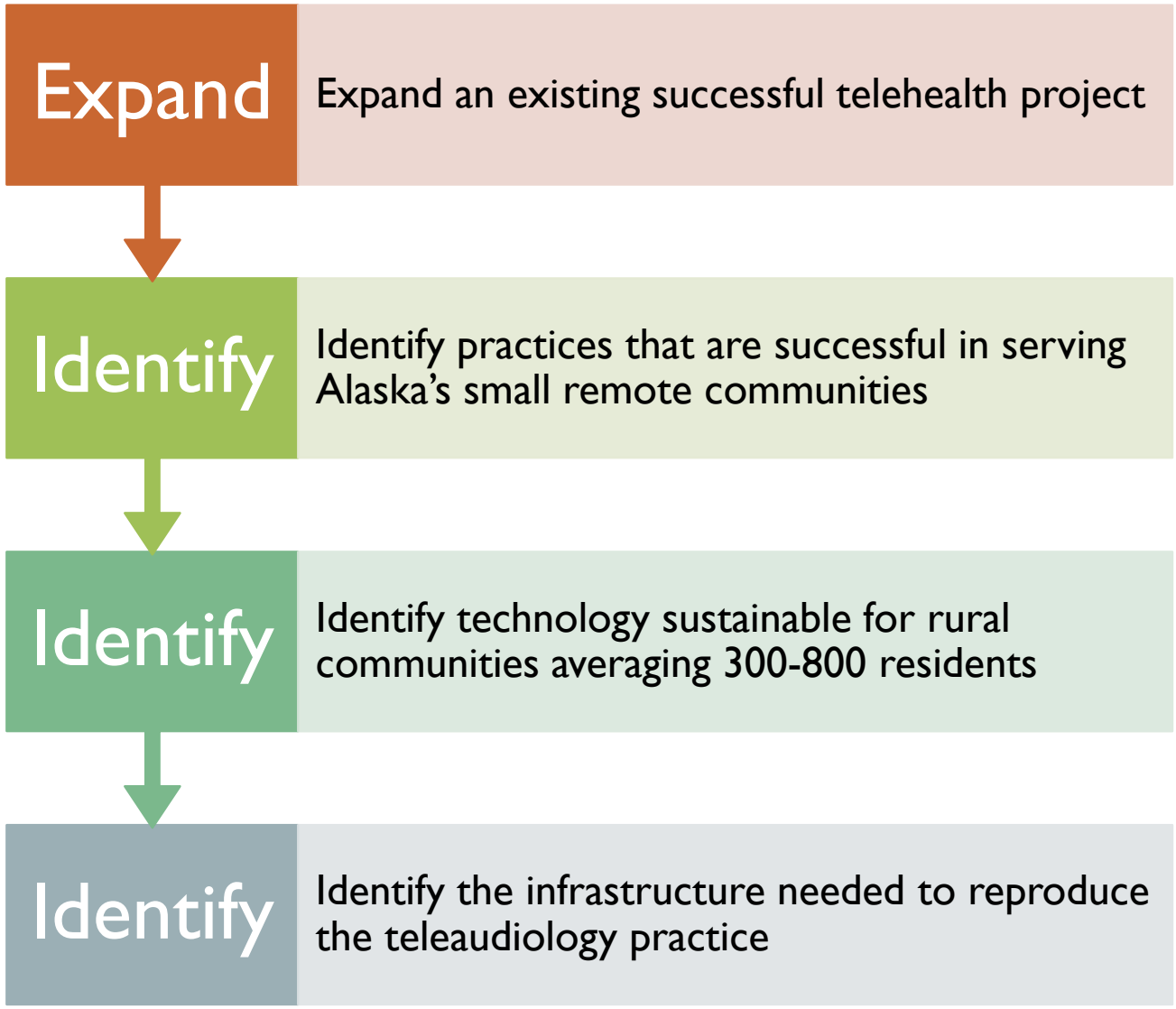
Telemedicine use active in Alaska's native health care System

Consulted partners in native health care system

TELEAUDIOLOGY FUNDING

- 2016 EDHI program received $44,900 supplementary funding from HRSA for teleaudiology
- The funding was directed to expanding the existing tele-audiology practice in Alaska

GOALS FOR PILOT PROGRAM



PLANNING

Is there a clear demand for services?

Realistic appraisal of costs to implement and maintain the system.

Plans to sustain equipment after start-up funding is expended.

Mission, Vision & Values of the partner agency should guide the plan development.

SITE CHOSEN

- Norton Sound Health Corporation (NSHC) was chosen based on history of successful telehealth practice and infrastructure in place:
  - Motivated leaders
  - Provider buy-in, support, and motivation
  - Training support
  - IT buy-in and support
  - Agency history of commitment to trying novel approaches to address access to care and staff shortage and turnover

NSHC MISSION, VISION & VALUES

- We will ensure that all patients receive quality and respectful health care.
- We will educate our patients and communities to be proactive in caring for themselves and promoting wellness.
- We will listen to, honor, and respect our elders, preserve their right to speak, and ensure they receive the best care in gratitude for their leadership.
- We will develop state of the art and efficient health care facilities throughout the region.
- We will be financially strong through aggressive, effective and efficient financial management

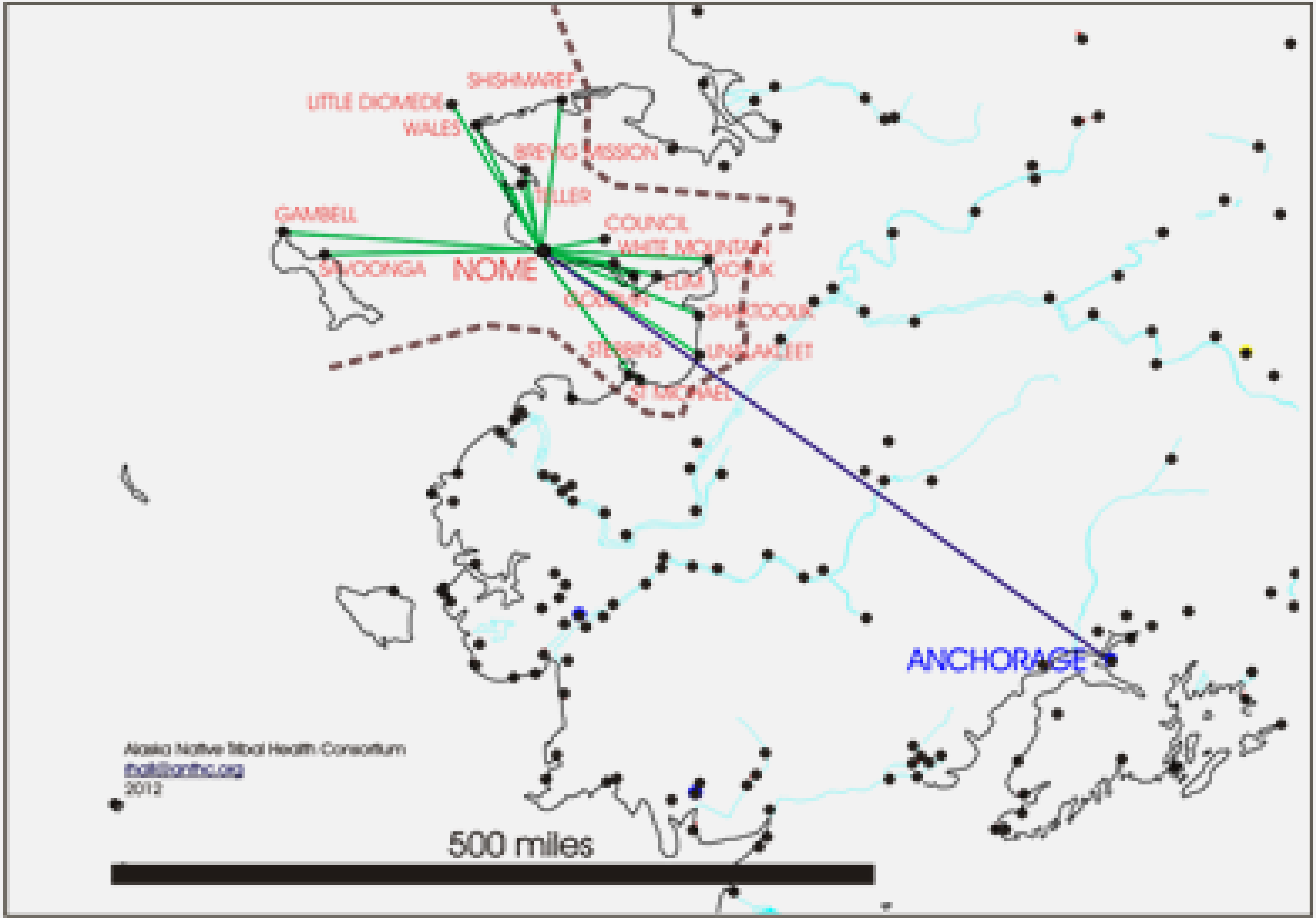
https://www.nortonsoundhealth.org/about-us/mission-vision-and-values/

SITE READINESS

- Use of innovative telemedicine solutions
- Resource availability
- Access to audiology and otolaryngology specialties

NORTON SOUND HEALTH CORPORATION

- Bering Strait Region in Northwest Alaska


LITTLE DIOMEDE
SHISHMAREF
WALES
BREVIG MISSION
TELLER
GAMBELL
SAVOONGA
NOME
COUNCIL
WHITE MOUNTAIN
KOYUK
ELIM
GOLOVIN
SHAKTOOLIK
STEBBINS
UNALAKLEET
ST MICHAEL
ANCHORAGE
Alaska Native Tribal Health Consortium
500 miles


KOYUK
Emergency Patient Transport
ASAP

AUDIOLOGICAL SERVICES

- Diagnostics
  - Sound booth (Nome, Unalakleet)
  - Electrophysiological testing
  - Immittance testing
  - Vestibular testing
- Rehabilitation
  - Full digital selection
  - CI/Baha
  - ALDs
  - Verification/Validation

OTITIS MEDIA IN AI/AN POPULATION

Higher rates of OM compared to non-native population

3x higher in children < 1yr

1.5x higher 1-4yr (Curns et al., 2002)

NSHC (88.7% AN)

OM is one of the top 5 diagnoses for nearly all communities

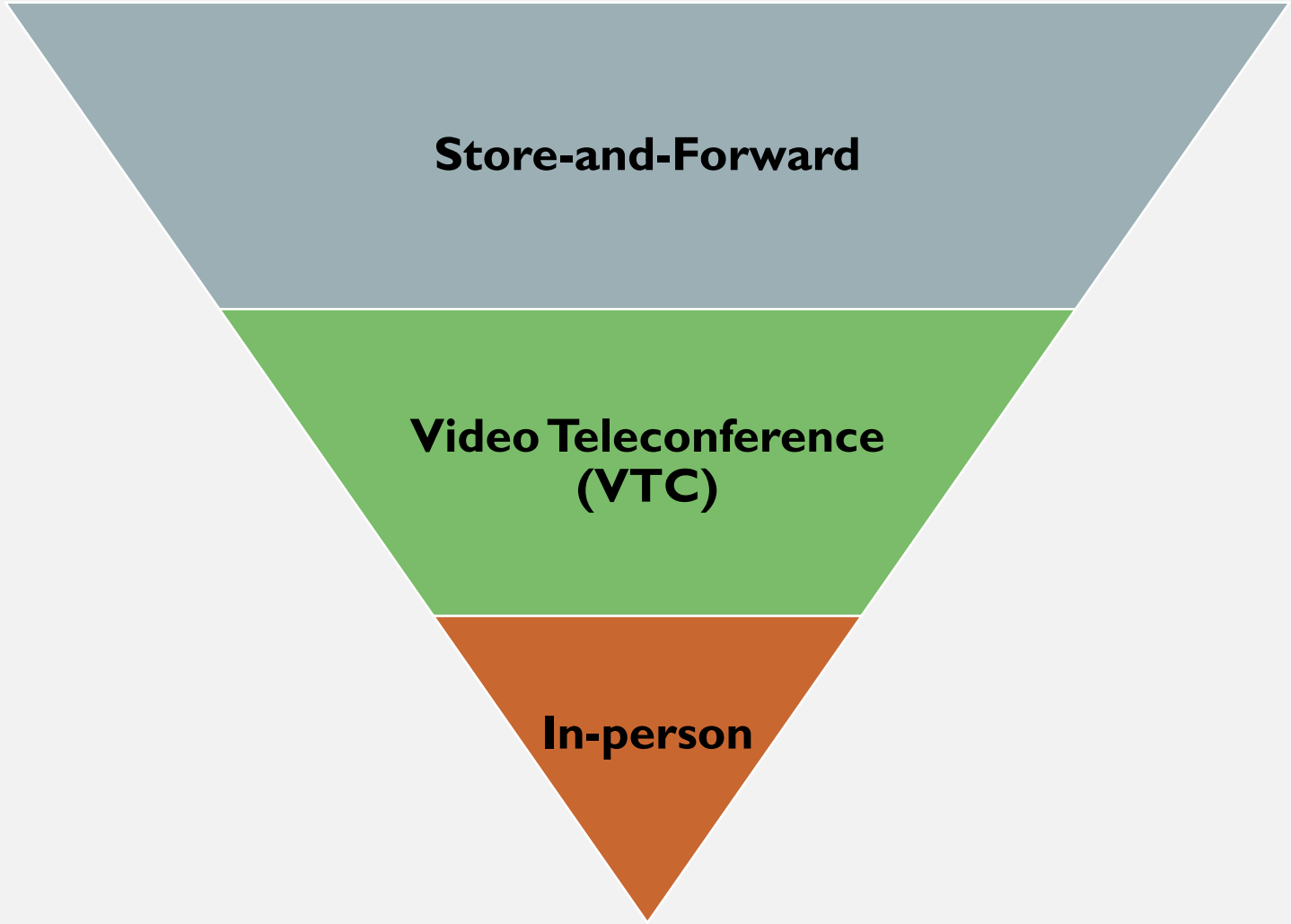
OTITIS MEDIA IN THE AK NATIVE POPULATION

TELEHEALTH SERVICES

Telehealth Methods: Store and forward, real time (video/remote desktop), hybrid, mobile

Video otoscopy, tympanometry, acoustic reflexes, OAEs, surgical/medical management, hearing aid fitting and programming, troubleshooting, counseling, aural rehabilitation, newborn hearing screening

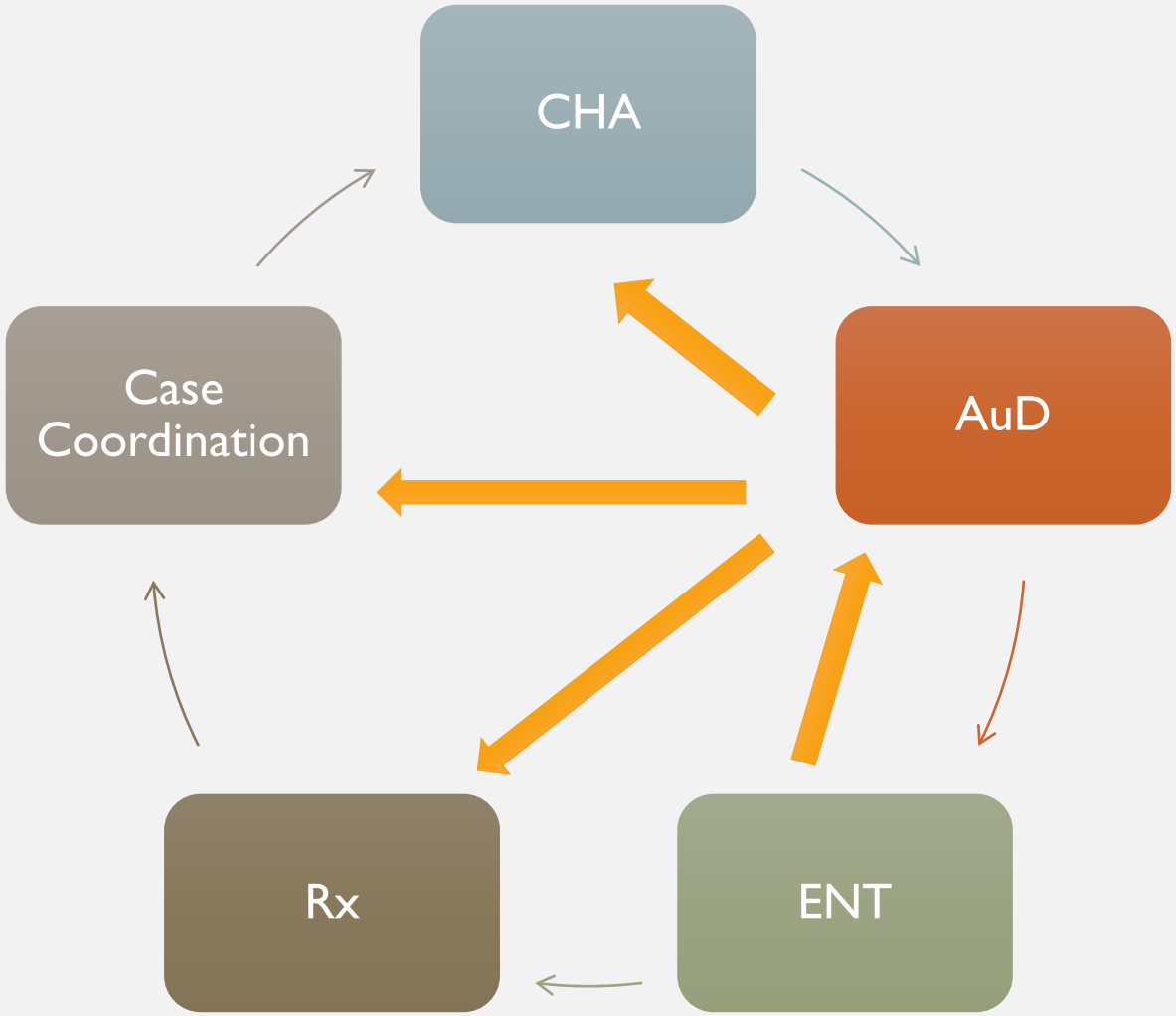
Not yet tackled: Balance assessment, CI mapping, electrophysiologic testing



NSHC Audiology Workflow for use of telemedicine in audiology and otolaryngology specialty care to increase access and timeliness of care, while reducing travel

ACCESS TO ENT CARE

WORKFLOW



OUTCOMES

01

Reduced wait-time

- Ferguson et al. (2008)
- Hofstetter, Kokesh, Ferguson, Hood (2010)

02

Improved Cost effectiveness, reduced travel

- Kokesh, Ferguson, Patricoski, LeMaster (2009)

03

Reduced burden on family and healthcare system

COLLABORATION

Audiology/ENT

Audiology/Primary Care

Emergency Dept/Specialty Care

Case Management

Ancillary Dept Care Management

- Audiology/PT
- Audiology/SLP

CASES EXAMPLES

- Cholesteatoma
- Sudden sensorineural hearing loss
- Brain Tumor/Throat Cancer
- Tube/tympanoplasty/mastoidectomy follow-up
- NBHS

TELEMEDICINE USES

NSHC or ANMC diagnostic centers perform NBHS at birth

Children whose screenings do not pass are encouraged to fly to diagnostic center for follow up

If a family cannot travel or is unwilling to travel, then telemedicine is used to complete NBHS follow-up

NSHC may use telemedicine for follow up screens; audiologist can communicate directly with parent during live sessions

Children identified with risk factors followed more regularly through telemedicine

ENT consultation and medical clearance done through telemedicine

Follow-up rehabilitative care possible with telemedicine

PILOT PROJECT EQUIPMENT DECISIONS

- The AFHCAN CART contains diverse technology with a small footprint that is portable in the regional health clinic location
- The chosen manufacturer had to be willing to share programming code with AFHCAN IT so the system could be fully integrated in to Cart
- Features: Fully diagnostic, included robust tympanometry and objective hearing assessment
- For the program to be sustainable and reproducible in other regions the equipment costs must be supported by clinics that serve between 200-800 residents.

SENTIERO PATH MEDICAL

EQUIPMENT IMPLEMENTATION

- Build into the AFHCAN cart
- Set-up and configured for use
- Installation of hardware
- Preparation of supplies
- Training of staff and instructions on use

Norton Sound Health Corporation

COMMUNITY POPULATIONS

Location determined by:

- ✓ Need
- ✓ Population size
- ✓ Geographic location
- ✓ Staff resources
- ✓ Successful telemedicine use

COMMUNITY	POPULATION
Nome (regional hub) ★	3598
Brevig Mission ★	388
Elim ★	330
Gambell ★	681
Golovin	156
Koyuk	330
Little Diomede	115
Savoonga ★	671
Shaktoolik ★	260
Shishmaref ★	582
Saint Michael	401
Stebbins ★	556
Teller	229
Unalakleet (Sub Regional)	688
Wales	145
White Mountain	190

US Census 2010


Village Clinics in the Bering Strait Region
Norton Sound Health Corporation (NSHC) is a nonprofit consortium owned by twenty Tribes in the 44,000 square-mile Bering Strait Region of Northwest Alaska, which is home to approximately 9,500 residents; 74.6 percent are Alaska Native.
NSHC operates the Norton Sound Regional Hospital in Nome, as well as clinics in the region's fifteen Native villages, which range in size from 150 to 900 residents. Each Village Clinic is staffed by local residents trained as Community Health Aides. In addition, NSHC stations a Physician Assistant or Nurse Practitioner in larger villages and Dental Health Aides are located in Savoonga, Shishmaref, Stebbins and Unalakleet. Although NSHC operates its own medevac service and telemedicine is available, the vast geographic distances within the service area can present challenges during inclement weather.
Siberia
Bering Strait
Norton Sound
SHISHMAREF
(123)
DIOMEDE
(135)
WALES
(109)
BREVIG MISSION
(65)
TELLER
(60)
NOME
(129)
KOYUK
(61)
WHITE MOUNTAIN
(94)
ELIM
GOLOVIN
(71)
SHAKTOOLIK
(121)
UNALAKLEET
(145)
(197)
GAMBELL
(163)
SAVOONGA
(117)
STEBBINS
(121)
ST. MICHAEL
(xxx) Air Miles to Nome

CASE STUDY

- Newborn male
- Born at 36 weeks, no complications with pregnancy/birth
- No family history of hearing loss but 3 older siblings with h/o recurrent ear infections and tubes
- Referred NBHS (AABR) left ear, passed right ear
- 5 weeks- completed VTC appt (otoscopy, tympanometry, OAEs, counseling)
  - Referred DPOAE screening (4 freq) left, passed right
- 7 weeks- completed AABR (In Nome)
  - Referred left, concern for possible effusion (type C tympanogram)
  - Consult with ENT via telemedicine resulted in recommendation for course of amoxicillin
- 8 weeks- completed diagnostic ABR (in Nome)
  - No sign of acute infection but tymps shallow with slight negative pressure
  - ABR normal Wave V right on click @ 20 dB nHL , ABR NR left @ 90 dB nHL
  - Consult with ENT via telemedicine resulted in scheduled for exam with binocular microscope, genetics, ophthalmology
  - In discussion for amplification

DREAM VS REALITY

Remote regions = shortage of audiologists and ENT

Balance best practice with clinical need and accessibility

TIPS AND TAKE AWAYS

TELEAUDIOLOGY PRACTICE LESSONS

- Staff for project should have a desire to become knowledgeable and skilled with the equipment chosen.
- Teleaudiology is still new and successful usage requires flexible thinking and commitment to work through challenges that arise.
- Troubleshooting and adapting to changing situations is a regular part of remote practice.
- Some professionals are extremely skilled and superb service providers; however, if they value predictability and routine they may not enjoy teleaudiology practice.

MORE TELEAUDIOLOGY PRACTICE

- In this system of care, the use of the tele-audiology device is only a small part of the remote staff's regular duties. The remote staff may be looking to provider for direction, encouragement and coaching with the system
- When the clinic audiology staff travel to remote sites they provide refresher training to brush up skills
- If an in-person visit to remote site is infrequent make time to communicate one-on-one with the clinic staff outside of the patient visit to consult on what they need to feel proficient and confident with the process

TRAINING

Consider having a team member(s) become a subject matter expert/Super User

Learn enough yourself to troubleshoot simple issues

Ask IT for a checklist of most common issues or develop a list in house

Frequent team communication

Consider including both informal communication channels and regular check-ins

Share what you learned the hard way with the team - both successes and challenges

INFRASTRUCTURE

EQUIPMENT

SUPPORT

PERSONNEL/RELATIONSHIPS

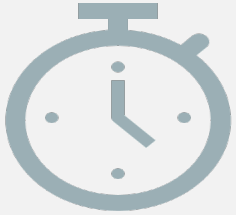
BENEFITS AND CHALLENGES

Benefits

Earlier identification

Patient-Centered

Access to early Audiology/ENT consult through telemedicine process without travel



Challenges

Infrastructure

- Start-up costs
- Training- initial, continuing, and new staff
- Maintenance services and costs

Personnel

Best Practice

PLANS TO EXPAND

- NSHC has plans to expand the PATH equipment upgrades to additional health clinic locations and NSHC HAT program
- Move toward AABR via telemedicine
- The Tribal health care system will evaluate the need and resources to expand to other regions
- Private pediatric audiology practices in the state have indicated they currently do not have plans to expand their practice to include teleaudiology

DEMONSTRATION

REFERENCES

- Alaska Mapping Business Plan. (2018, September). Retrieved January 10, 2019, from https://www.commerce.alaska.gov/web/Portals/4/pub/RiskMAP/2018_Alaska_Mapping_Business_Plan_Appendix_FINAL.pdfState of Alaska / Commerce / Community & Regional Affairs
- Alaska Department of Transportation and Public Facilities Division of Statewide Aviation, from http://dot.alaska.gov/stwdav/index.shtml
- American Academy of Pediatrics (AAP) Early Hearing Detection and Intervention (EHDI) https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/PEHDIC/Pages/Early-Hearing-Detection-and-Intervention.aspx
- Curns, A. T., Holman, R. C., Shay, D., K., Cheek, J. E., Raufman, S. F., Singleton, R. J., & Anderson, L. J. (2002). Outpatient and hospital visits associated with otitis media among American Indian and Alaska Native children younger than 5 years. *Pediatrics, 109*(3), 1-6. doi: 20.2542/peds.109.3.e41
- Ferguson, A. S., Kokesh, J., Patricoski, C., Hofstetter, P., & Hoge, N. (2008). *Impact of store-and-forward telehealth in Alaska: A seven-year retrospective*. Anchorage, AK: Alaska Native Tribal Health Consortium.
- Hofstetter, P. J., Kokesh, J. Ferguson, A. S., & Hood, L. J. (2010). Impact of telehealth on wait time for ENT specialty clinic. *Telemedicine and e-Health, 16*(5), 551-556. doi: 10.1089/tmj.2009.0142
- Kokesh, J., Ferguson, A. S., Patricoski, C., & LeMaster, B. (2009). Traveling an audiologist to provide otolaryngology care using store-and-forward telemedicine. *Telemedicine and e-Health, 15*(8), 758-763.