



# Start-up Checklist for UDSv4 Digital Voice Data Collection

---

## About:

This resource was developed in collaboration with NACC, the CTF Technology Workgroup, and the Framingham Heart Study.

## Purpose:

This checklist is intended to guide Alzheimer's Disease Research Centers (ADRCs) and other interested groups in getting started to collect digital voice audio recordings as part of the UDSv4 cognitive exam for research analysis. This involves recording and storing a digital audio file of the UDSv4 cognitive exam with a prescribed file naming convention and data log for later research analysis.

**PLEASE NOTE:** Currently, digital voice capture is encouraged but not required.

## Contents:

1. [Ensure regulatory compliance and institutional approval for data sharing](#)
2. [Identify participants that are eligible for your study](#)
3. [Select audio recording equipment](#)
4. [Setup your equipment and testing space for digital voice collection](#)
5. [Train your tester\(s\)](#)
6. [Collect digital voice data from participant\(s\)](#)
7. [Save audio files and data logs](#)
8. [\(Optional\) Post-processing digital voice data](#)
9. [COMING SOON: Upload digital voice data to NACC](#)
10. [Contact Us](#)



# Start-up Checklist for UDSv4 Digital Voice Data Collection

---

## 1. Ensure regulatory compliance and institutional approval for data sharing

- a. Review example IRB protocols and informed consent language  
[UDSv4 Digital Voice IRB Protocol and Consent Language](#)
- b. Consult with your IRB to determine if your IRB will need to be updated to collect and share digital voice data with NACC.
- c. Obtain IRB approval to collect and share digital voice data

**PLEASE NOTE:** NACC will not share any raw voice recordings until robust voice de-identification standards have been determined by NACC, NIA, ADRCs, and the CTF Technology Workgroup. NACC will provide additional guidance on data submission and sharing as this process is further defined.

## 2. Identify participants that are eligible for your study

- a. Ensure your participants are adequately consented  
[UDSv4 Digital Voice IRB Protocol and Consent Language](#)
- b. All participants must have a NACCID

## 3. Select audio recording equipment

- a. The recommended device for in-person recording is the [Zoom H4n Pro](#), along with the accessories below.
  - i. [SD Card](#) (e.g., SanDisk 32GB Extreme PRO UHS-I SDHC Memory Card).
  - ii. [Zoom AD-14 AC Adapter](#)
  - iii. [USB to Mini USB cable](#)
- b. Recorders must capture audio at the recommended settings:
  - i. Uncompressed audio formats (e.g., WAV) are highly preferable.
    1. Sampling rate: 16KHz at a minimum (48KHz is recommended)
    2. Bit depth: 16-bit at a minimum (32-bit is recommended)
  - ii. Compressed audio formats (e.g., MP3)
    1. Sampling rate: must be 256kbps bit rate or higher
- c. Please see the [Digital Voice Data Collection Manual](#) for recommended devices.



# Start-up Checklist for UDSv4 Digital Voice Data Collection

---

## 4. Setup your equipment and testing space for digital voice collection

- a. Identify your testing room, recommended ideal conditions include:
  - i. Small to medium size
  - ii. Multiple soft surfaces like carpet, couches, pillows, etc.
  - iii. Avoid rooms that have a lot of hard surfaces that will make sound bounce around, such as windows, bare walls, and hard floors
  - iv. Minimal exposure to external sounds and background noise
  - v. Lay a towel or piece of cloth under the recorder
  
- b. Determine where the recorder will be placed
  - i. Ensure the mic(s) of the recorder are pointed toward the participant and away from tester
  - ii. Place it in a location where it will be out of the way of testing (once you start recording, you don't want to be moving the recorder around)
  - iii. If possible, place the recorder on furniture that is NOT the desk/table you are working on (because sounds such as pages turning, bangs on the table, etc. get picked up), but be sure it is close to the participant
  
- c. Check your equipment
  - i. We recommend checking the recorder battery levels prior to recording. It is recommended that you use the recorder in battery mode as some users have experienced power source background noise in their recordings.
  - ii. Check your recorder settings: sampling rate, bit depth, channel selection, etc.
  - iii. Phantom power: Some digital recorders like Zoom H4n have electric condenser microphones which require "phantom power". The phantom power should be 'on' - otherwise the mic turns into a dynamic mic which leads to worse quality and more line noise.
  - iv. Recommended: Test your recording equipment prior to any participant assessments to gauge the quality of your recordings.
  
- d. **Optional:** Improve recording quality through sound treating testing rooms
  - i. Carpet/rugs
  - ii. Bass Traps



# Start-up Checklist for UDSv4 Digital Voice Data Collection

- iii. Acoustic Panels (can also use packing blankets or mattress foam)
- 

## 5. Train your tester(s)

Ensure every tester is trained in how to use the recording equipment, how to properly save recordings and data logs, and what to do with the audio recording(s) after the testing session(s).

**Recommendation:** The test administrator should chat with the participant prior to the recording session to determine the optimal gain levels and microphone distance. Gain is the amount of amplification applied to an audio signal before it's processed, and it's measured in decibels (dB).

For example: When the gain is too high - the audio becomes “overdriven” and gets clipped. The gain meters (if available) should stay mostly in the green zone with very occasional yellow/red splashes when the participant laughs, coughs or exclaims something.

## 6. Collect digital voice data from participant(s)

Following the audio recording device and testing room setup parameters above, collect participant voice recordings during the UDSv4 cognitive battery. Centers are not expected to process voice recording data; we want to encourage sites to collect and properly store data for future processing and research analysis.

### [UDSv4 Digital Voice Data Collection Manual](#)

**Please note:** We recommend centers record each cognitive test as a separate audio file. If you record the entire UDS4 cognitive battery in a single recording, you can split recordings by test using post-processing software such as Audacity or mark the timestamps for each individual test – see post processing section below.



# Start-up Checklist for UDSv4 Digital Voice Data Collection

---

## 7. Save audio files and data logs

- a. After testing, the tester/examiner will download the recording from the recorder to a computer and save it.
- b. All files should be saved with the naming convention:  
**NACCID\_DATE\_COGNITIVETEST.wav**
- c. It is imperative that centers maintain a data log with the following recommended metadata variables for each recording:  
[View Digital Voice Metadata Dictionary](#)  
[Download template data log file](#)

### Minimum recommended data variables:

- i. NACCID
- ii. Visit date and number
- iii. Cognitive tests (NACC Code) and timestamps for each cognitive test recorded (if captured in a single recording)
- iv. Whether the participant and/or interviewer were wearing masks
- v. The setting in which the visit took place
- vi. Microphone location
- vii. Device manufacturer and model
- viii. Number of voices present in the recording and whose they are

### If your center is processing data before uploading it to NACC, these additional variables should be tracked in the data log:

- ix. If PHI was removed
- x. If recording was spliced
- xi. Date of processing
- xii. Processing program used
- xiii. Type of quality check(s) performed
- xiv. Whether recording passed quality check
- xv. Why QC failed, if failed



# Start-up Checklist for UDSv4 Digital Voice Data Collection

---

## 8. (Optional) Post-processing digital voice data

- a. PII Removal
  - i. Logging which parts of the battery contained spoken PII can be helpful for future PII removal and is optional.
  - ii. Manually identifying the timestamps of spoken PII via programs such as Audacity is also optional.
  - iii. Please see the “Personally Identifiable Information” and “Labeling and Silencing PII in Audacity” sections of the [Digital Voice Data Collection Manual](#) for examples of how to mark and/or manually remove spoken PII.
  
- b. Cognitive test marking
  - i. Logging the timestamps for the start and end of each subtest within the battery will be helpful for future analysis. Please see the “Using Labels to Save Cognitive Tests as Individual Files” section of the [Digital Voice Data Collection Manual](#) for an example.
  
- c. Split a recording
  - i. [Learn how to split a recording using Audacity here.](#)



# Start-up Checklist for UDSv4 Digital Voice Data Collection

---

## 9. COMING SOON: Upload digital voice data to NACC

NACC will be providing ADRC's with a digital voice data submission option via the ADRC Portals hosted on NACC's Data Platform. [Learn more about the ADRC Portals.](#)

**PLEASE NOTE:** NACC will not share any raw voice recordings until robust voice de-identification standards have been determined by NACC, NIA, ADRCs, and the CTF Technology Workgroup. NACC will provide additional guidance on data submission and sharing as this process is further defined.

In preparation for data submission, we encourage sites to:

- a. Confirm the PTID and NACCID in your data logs are correct.  
To access your site's PTID and NACCID pairs, please work with your ADRC site data manager to utilize the [PTID to NACCID Map tool](#) available via the NACC portal.
- b. Ensure voice recording files are properly named and correct.  
Recommended naming convention:  
**NACCID\_DATE\_COGNITIVETEST.wav**
- c. Ensure you have collected the minimum metadata variables required to accompany voice recordings (see recommendations regarding data logs above - [Item #7](#))  
[View Digital Voice Metadata Dictionary](#)  
[Download template data log file](#)

## 10. Contact Us

Have questions about getting started with digital voice?

Email the NACC team at [naccmail@uw.edu](mailto:naccmail@uw.edu)