Add Health
The National Longitudinal Study of Adolescent to Adult Health

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Renal Function

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This document summarizes the rationale, equipment, protocol, assay, internal quality control, data cleaning, external quality control, and procedures for the measurement and classification of kidney (renal) function at the Wave VI home exam. Whenever possible, data collection and methods in Wave VI mirrored those of Wave V to ensure comparability of data between waves, although important inter-Wave differences exist and are grey-highlighted herein. This document is one in a set of Wave VI user guides. User guides are also available to describe protocols for the following biological measures at Wave VI:

- Anthropometrics
- Baroreflex Sensitivity & Hemodynamic Recovery
- Biomarker Weights
- Cardiovascular Measures
- Glucose Homeostasis
- Hepatic Injury
- Home Exam – Medication use
- Infection
- Inflammation and Immune Function
- Lipids
- Neurodegeneration

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1. Introduction

Renal function was not measured at Wave IV but was measured at Waves V and VI. Briefly, blood was collected by field examiners (FEs) certified in phlebotomy, chilled at 4°C during the remainder of the home exam, centrifuged immediately afterward, aliquoted into transport tubes, and then sent overnight to a laboratory for assay.

Assayed Renal Biomarker:

- Creatine (mg/dl)

In addition, the restricted use Add Health Wave VI data includes constructed measures based on creatinine data designed to facilitate analysis and interpretation of renal function:

- Estimated Glomerular Filtration Rate (eGFR, ml/min/1.73 m2) according to 2021 NIDDK CKD-EPI Guidelines.[1]
- Classifications of eGFR According to KDIGO Guidelines[2]
- Clinical Classifications of eGFR
- Risk of Cardiovascular Disease Incorporating Cardiovascular-Kidney-Metabolic Health[3,4]

2. General Overview of Data Collection

All Wave VI venous blood samples were collected during home exams performed by Exam One, a subsidiary of Quest Diagnostics®. All FEs were trained and certified using a custom program specific to the Add Health protocol. FEs used a 7" Samsung Galaxy Tab A7 Lite tablet to record and transmit data. An Add Health data collection application (Open Data Kit or ODK) installed on the tablet guided the FEs through the home exam protocol. In addition, FEs received a series of job aids, both on paper and on the tablet, to serve as quick reference guides when completing the protocol. Each tablet also contained an in-depth Add Health training manual that could be accessed at any time.

FEs conducted home exams among previously consented participants. All FEs were phlebotomy-certified and had at least two years of experience collecting venous blood. Before home exams, FEs were sent a Visit Supply Kit that included a box for shipping blood to the lab and a Blood Collection Kit containing most required materials for the blood collection. FEs supplied additional materials, as needed (see section 3.2). Protocols for blood collection were dictated to FEs by the handheld 7" Samsung tablet used during all home exams. The tablet gave step-by-step directions for the blood collection and required FEs to enter information about the blood draw for each participant. All participants had the option to decline part or all of the blood draw, although declining did not affect their ability to participate in the rest of the home exam. Overall, 90.8% of the participants agreed to and completed the blood draw. Of

the remainder, 6.4% refused, 2.1% agreed but the blood draw was unsuccessful, and < 1% had exams terminated before the blood draw (see the blood draw status variable H6BLOOD in the *bdemo6* data set and codebook).

Blood collection was the last step in the home exam. Afterwards, all collection tubes were inverted 8-10 times to distribute the blood and contents of the tubes and then chilled at 4^{o} C (on ice or frozen cold packs) for up to two hours. Subsequent processing involved centrifuging specific tubes then aliquoting serum and plasma into color-coded transport tubes pre-labelled with unique barcode identifiers linking the blood to a particular participant. Then the transport tubes were packaged in a Styrofoam Box with frozen cold packs and shipped overnight via FedEx to the Laboratory for Clinical Biochemistry Research (LCBR) at the University of Vermont. Overnight shipment enabled receipt by LCBR before 10:30 am the next morning. Upon receipt, LCBR documented the arrival of the transport tubes, evaluated their condition, processed them, and either assayed the specimens or aliquoted and archived them in -80°C freezers.

3. Blood Collection

3.1 Rationale

Venous blood was collected to provide Add Health with the biological specimens necessary to assay and interpret pre-specified biomarkers of metabolic, hepatic, amyloid-tau-neurodegenerative (ATN), inflammatory, immune, and infectious conditions, including the measures of renal function described herein. It also was collected to establish an archive of serum, plasma, whole blood, RNA, and packed cells capable of supporting future assays and ancillary studies.

3.2 Equipment

Before exams, FEs were shipped a Visit Supply Kit (**Figure 1**) including (1) a cardboard Shipping Box with an inner Styrofoam Box and two cold packs for shipping collected samples to LCBR, (2) a large Tyvek envelope in which to ship the Shipping Box, and (3) a Blood Collection Kit for collecting blood. The Blood Collection Kit contained:

- Biohazard-labelled Ziploc bag
- Latex-free gloves
- 2”x2” gauze
- Latex-free, Band-Aid type adhesive dressings
- Latex-free, strap tourniquet
- Alcohol prep pads, disposable pipets
- Single-use vacutainer (blood collection) tube holder

- 21-gauge Eclipse straight needle
- 21-gauge butterfly needle
- (3) disposable 3 ml graduated transfer pipets
- (2) 8.5 ml serum separation transport (SST) vacutainer tubes
- (1) 3 ml potassium ethylenediaminetetraacetic acid (EDTA)-containing vacutainer tube
- 10 ml EDTA-containing vacutainer tube
- 10 ml PAXgene vacutainer tube (containing 7.5 ml of preservative)
- (4) 10 ml transport tubes with color coded caps
- Extra barcode labels

Figure 1. Visit Supply and Blood Collection Kits

BD Biosciences (San Jose, CA) supplied all vacutainer tubes, and transport tubes were supplied by Simport Scientific (Quebec, Canada).

FEs were responsible for providing ancillary materials for each home exam, including but not limited to a chux-type absorbent under pad, a sharps container, and a cooler with cold packs for keeping samples cold before packaging and shipping them to LCBR.

3.3 General Protocol

3.3.1 Blood Collection

The blood draw was performed as the final stage of the home exam following collection of anthropometric, cardiovascular, and medication information. After confirming participants were comfortable giving blood, participants were asked to either sit or recline at their discretion. They also were asked if they had problems in the past with blood collection such as fainting, bleeding, or hard-to-find veins. FEs were instructed to ensure the blood collection area was private, uncluttered, and fully prepared before beginning the blood draw. Preparation involved placing the chux pad, organizing the vacutainer tubes/supplies, preparing the cooler to accept the blood samples, and scanning the barcode

located on the outside of the Blood Collection Kit and on all vacutainer tubes. Scanning it automatically captured a unique, eight-digit code, thereby linking the participant to the transport tubes / labels within it, the corresponding ODK questionnaire data, and ultimately to LCBR results.

Following standard phlebotomy protocols, FEs asked participants to identify an arm for collecting blood, applied the tourniquet to that arm, and identified a vein in the antecubital fossa for venipuncture. If no vein appeared suitable, FEs asked to try the opposite arm. Unless participants had objections, venipuncture was performed on the best potential vein and whole blood was collected, as summarized below:

- Put on nitrile gloves.
- Have the participant extend his/her arm on the protective pad, palm up and straight at the elbow.
- Inspect the arm. Do not draw blood from an arm that has a rash, open sore, is swollen or shows signs of a recent venipuncture or hematoma. Do not draw blood from an arm that contains an arterial access such as a fistula or shunt.
- Apply the tourniquet several inches above the elbow and palpate for a suitable vein.
- Select a vein that is palpable and well-fixed to surrounding tissue.
- Open the needle assembly unit and attach it to the vacutainer holder.
- Ask the participant to make a tight fist. Cleanse the area with an alcohol wipe using a circular motion and allow the area to air dry.
- Remove the cover from the needle.
- The vein should be fixed or held taut during the puncture. Push the needle firmly and deliberately into the vein. When firmly in the vein, blood appears in the tubing of the needle assembly past the end of the needle.
- Attach the needle holder and quickly push the first vacutainer tube (ordered in Figure 2, below) onto the needle in the holder, puncturing the center of the stopper.
- Release the tourniquet after the flow is established or if the participant becomes uncomfortable. The participant may open his/her fist once blood flow is established.
- When the first vacutainer tube is filled to capacity, remove it from the holder and place the next vacutainer tube in the holder.
- Gently invert each vacutainer tube 8-10 times immediately upon removing each one and while filling the next one. Repeat until all the desired vacutainer tubes are filled.
- Place all filled vacutainer tubes directly into a cooler with ice or ice packs.
- When the last vacutainer tube is filled, remove the tourniquet, carefully withdraw the needle, and cover the venipuncture site with a sterile gauze pad.
- Never apply pressure to the gauze until the needle is clear of the puncture site and away from the arm.
- Have the participant hold the gauze pad with mild pressure and sit quietly for a few minutes.
- Slide the needle safety guard forward to prevent an accidental needle stick. Discard the entire used needle assembly in a sharps container.

- Check the venipuncture site. If it is adequately clotted, remove the gauze and apply a bandage. If after a few minutes, bleeding continues keep direct pressure on the site for 5 minutes.
- Encourage the participant to sit quietly for a few minutes. Due to a fasting blood draw encourage the participant to eat a snack if needed.

When the first attempt at blood collection was unsuccessful, FEs were allowed to ask to draw blood from the opposite arm. However, no more than two blood collection attempts were permitted. Moreover, only the antecubital fossa was acceptable for blood draw. FEs were not allowed to collect blood from any other sites, such as the back of the hand.

5 tubes of blood were collected per participant. Collection order, tube type, and processing information are listed below (**Figure 2**).

Order	Tube Type	Centrifuged	Resultant supernatant	Resultant precipitate	Use
1	8.5 ml SST	Yes	Serum	Discarded	Assay: glucose, total cholesterol, high- & low-density lipoprotein-cholesterol, triglycerides, AST, ALT, creatinine, hsCRP, IL-1β, IL-6, IL-8, IL-10, TNFα, CMV, HSV, SARS CoV-2 (RBD; spike; nucleocapsid) IgG
2	10 ml EDTA	Yes	Plasma	Packed cells	Assay: Neurofilament light, Tau, GFAP. Archival: packed cells for future use
3	3 ml EDTA	No	N/A	N/A	Assay: hemoglobin A1c Archival: for future use
4	8.5 ml SST	Yes	Serum	Discarded	Archival: for future use
5	10 ml PAXgene	No	N/A	N/A	Archival: for future use

Figure 2. Tubes of Blood Collected

3.3.2 Blood Processing

The venous blood draw concluded the home exam. After cleaning up all supplies and equipment, FEs left the exam sites and were allowed a maximum of two hours before processing the blood which was chilled at 4^{o} C (on ice or frozen cold packs) in the interim.

All FEs centrifuged the 8.5 ml SST and the 10 ml EDTA vacutainer tubes. The 3 ml EDTA vacutainer tube used for the HbA1c assay and the PAXgene tube were *not* centrifuged. FEs centrifuged tubes for ≥ 10 min at ≥ 1300 g, depending on the capabilities of their centrifuge. After centrifugation, FEs used the graduated transfer pipettes included in the Blood Collection Kit to aliquot serum from the SST tubes, and plasma/packed cells from the 10 ml EDTA tubes into 10 ml, round bottom, skirted transport tubes (BD Biosciences, NJ). FEs aliquoted as much supernatant as possible into the transport tubes but avoided disturbing the precipitate layer. A red cap identified transport tubes containing serum from the SST vacutainer tubes and a blue cap identified transport tubes containing plasma from the 10 ml EDTA vacutainer tube. Transport tubes were chilled at 4^{o} C (on ice or frozen cold packs) until packaged for shipment to LCBR. **Figure 3** demonstrates the complete blood processing protocol.

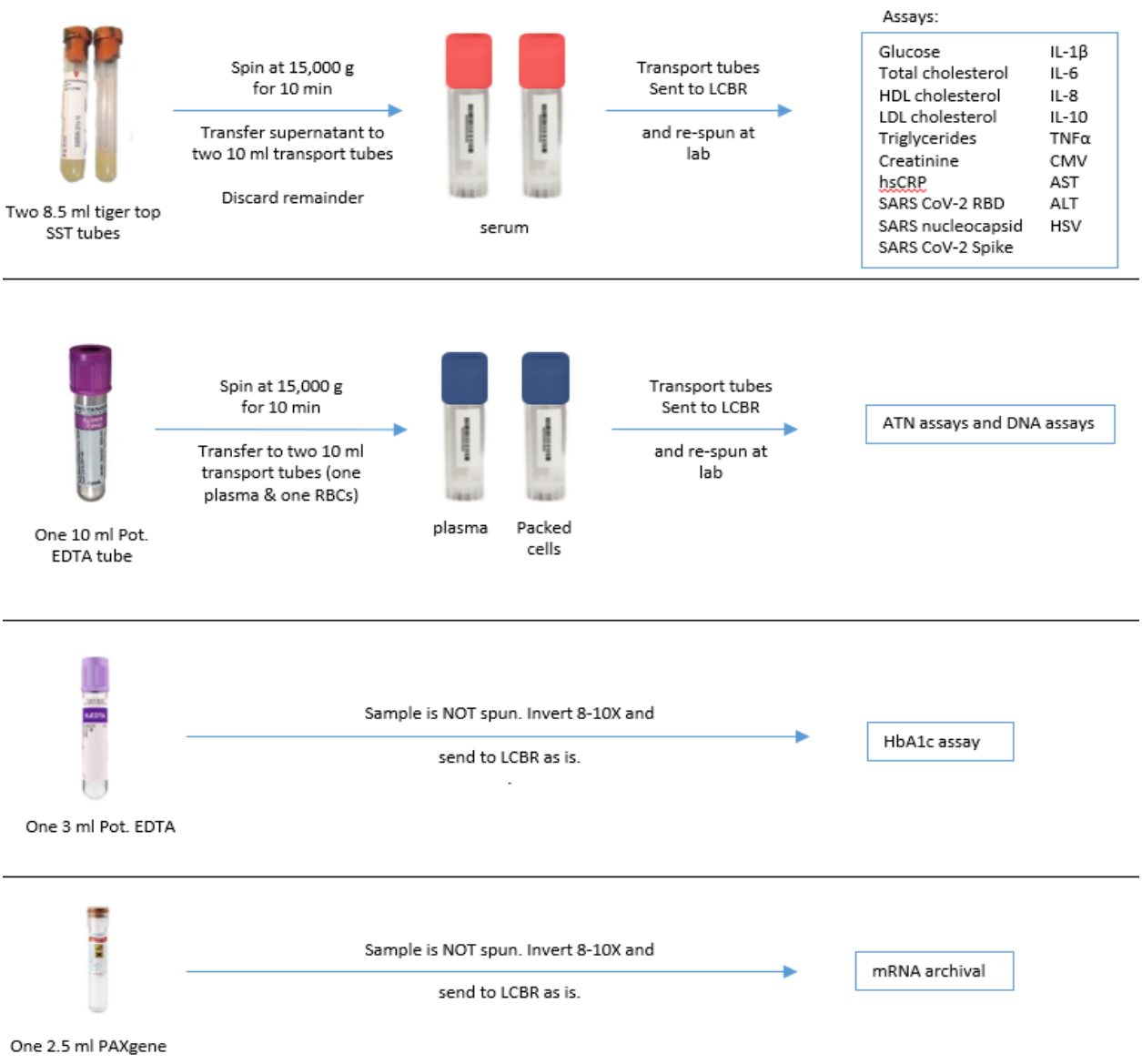

Figure 3. Blood Processing Protocol

After processing the blood, FEs took a loose barcode label provided in the Blood Collection Kit and affixed it to a paper manifest designed to accompany the transport tubes to LCBR. The loose barcode label matched the barcode labels on the transport tubes and the Shipping Box. FEs recorded all vacutainer tubes that were collected and identified all difficulties during blood draw or processing on the manifest as well as in the tablet. The barcode-labelled manifest was designed to be scanned on arrival at LCBR to associate it with an individual participant's transport tubes.

3.3.3 Shipment of Samples

Immediately before shipment, FEs removed two cold packs from the freezer, placed the transport tubes in a sleeve, sandwiched the transport tubes between the ice packs, enclosed the sandwich within the Styrofoam box, placed the manifest on top of the Styrofoam box, sealed the cardboard shipping box around it, put the cardboard shipping box inside the Tyvek envelope, applied a pre-printed FedEx shipping label to the envelope, carried it to a FedEx office, and handed it to a FedEx representative (*in person*) for Priority Overnight shipment to LCBR with arrival the following morning. FEs were not permitted to leave shipments at unattended FedEx drop boxes.

When overnight shipment was impossible, FEs noted this on the manifest and held unboxed transport tubes in a refrigerator approved for biological specimens or cooler with enough cold packs to keep them chilled at 4^{o} C overnight without risk of freezing (or thawing), as is possible on wet or dry ice. The transport tubes were packaged and shipped the next day using freshly frozen cold packs.

3.3.4 Receipt of Samples at LCBR

LCBR technicians specifically trained for Add Health Wave VI received and immediately processed samples each morning. They unpacked the shipping boxes one at a time, evaluated the volume and quality of each transport tube, and entered them into a custom-made laboratory information management system (LIMS) program.

After re-centrifuging the serum samples for renal biomarker assays at 4° C for 10 min at 30,000 g, the technicians aspirated the supernatant, discarded all remaining precipitate, transferred the aspirate to pre-labelled tubes, and placed them in a biospecimen refrigerator for archival (in 1 ml aliquots at -80° C) or assay (500 ul aliquot). The LCBR technicians entered all aliquot information into the LIMS system. Samples for the creatinine assay were transferred to a pre-labelled tube for a 5-10-minute cold transport via a daily 3:00 pm courier to Pathology and Laboratory Medicine, in the University of Vermont Medical Center (UVMMC) for analysis. All assays were performed on the same day that the samples arrived at LCBR.

4. Assay and Internal Quality Control

4.1 Creatinine [H6CREAT]

4.1.1 Rationale

Creatinine is a waste product derived from the normal breakdown of muscle in the body. As it is produced, it is filtered through the glomeruli of the kidneys. Serum creatinine concentrations are therefore instrumental in determining normal kidney function and can be increased in acute or chronic

renal failure, urinary tract obstruction, reduced renal blood flow, shock, dehydration, and rhabdomyolysis.

4.1.2 Colorimetric Assay Protocol

All creatinine assays were run on the same day of sample arrival at LCBR using an Ortho VITROS 5600 Integrated System (Ortho Clinical Diagnostics, Raritan, NJ) and VITROS Chemistry Products CREA slides, i.e. multilayered, analytical elements coated on a polyester support (**Figure 4**). Serum from venous blood collected using the SST vacutainer tubes was introduced into the VITROS system by placing sample vials holding 500 µl of serum into an automatic sampling tray, after which all processes were automatically performed and results output by the VITROS system.

The VITROS system read barcodes on the vials to automatically determine which assays to run. In addition to creatinine, other assays were run from the same serum sample, including total cholesterol, high-density lipoprotein cholesterol, triglycerides, and glucose. Only the creatinine assay is described below. Assay protocols for other analytes can be found in other Add Health User Guides.

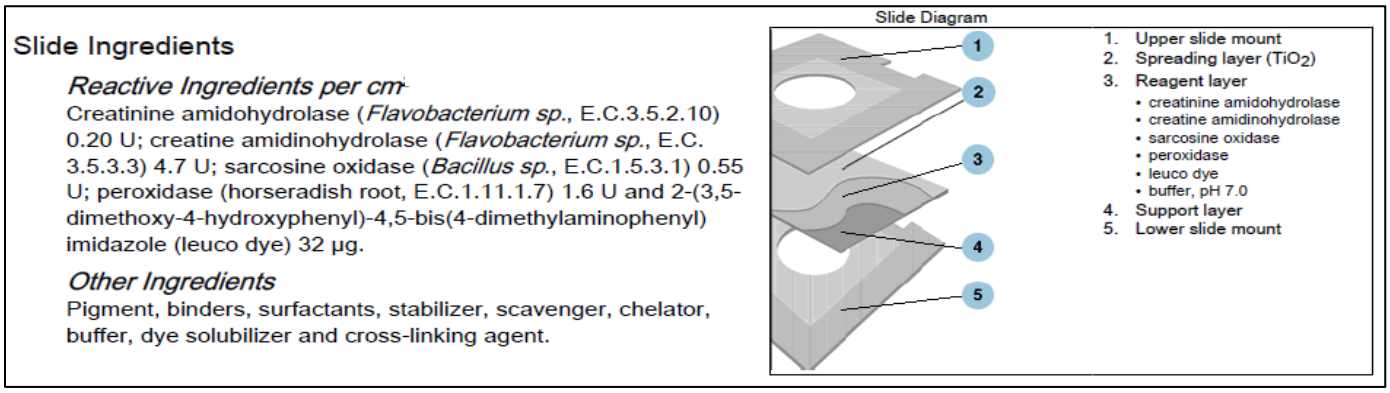

Figure 4. Ortho-Vitros CREA Slide

Upon introduction of each vial into the analyzer, 40 µl of serum was aspirated, deposited onto a CREA slide for analysis, and evenly distributed by the spreading layer to the underlying layers. Creatinine diffused to the reagent layer, where it was hydrolyzed to creatine in the rate-determining step. The creatine was converted to sarcosine and urea by creatine amidinohydrolase. The sarcosine, in the presence of sarcosine oxidase, was oxidized to glycine, formaldehyde, and hydrogen peroxide. The final reaction involved the peroxidase-catalyzed oxidation of a leuco dye to produce a colored product.[5]

Following the addition of the sample, the slide was incubated. During the initial reaction phase, endogenous creatine in the sample was oxidized. The resulting change in reflection density at a wavelength of 670 nm was measured at two time points, 5 minutes apart. The difference in reflection

density was determined using the software-resident two-point rate math model and was proportional to the concentration of creatinine present in the sample. The specific reaction scheme is listed in **Figure 5**.

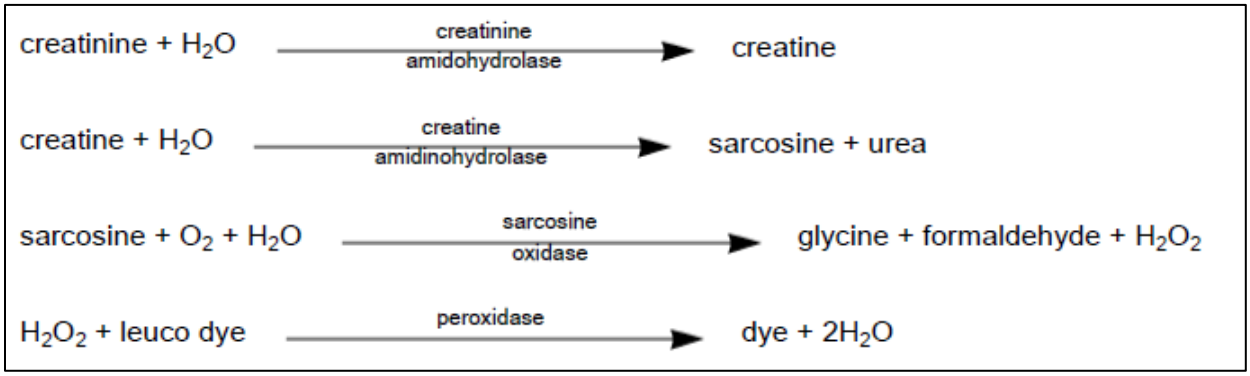

Figure 5. Creatinine Assay Reaction Scheme

Once the assay was carried out, the reflected light output was compared to a standard curve generated by the use of a VITROS Chemistry Products Calibrator Kit 1 (Ortho Clinical Diagnostics, Raritan, NJ). The concentrations were output to a Sunquest computer system (Sunquest Information Systems, Tucson AZ) that linked the UVMMC data with LCBR's LIMS system.

The VITROS 5600 system's dynamic reporting range of the creatinine assay was from 0.05 – 14.0 mg/dl. When concentrations exceeded the upper limit, the VITROS system automatically diluted the samples 1:2 with a VITROS Chemistry Products FS Diluent Pack 2 (Ortho Clinical Diagnostics, Raritan, NJ) until the concentrations were within range. Any dilutions were reported along with the creatinine concentrations in the assay results. Dilutions and creatinine concentrations that accounted for the reflexive dilutions via multiplication by the dilution factor were reported simultaneously. The final creatinine concentrations (H6CREAT**)** ranged from 0.22 to 14.99 mg/dl.

4.1.3 Internal Quality Control

The Ortho-VITROS system was maintained daily by cleaning machine components, replacing all reagents, and running known quality control samples (Thermo Fisher Scientific, Waltham, MA). Internal quality control lots from MAS OmniCORE™ (OCR2406, OCR2511, OCR2608) were used throughout Wave VI, but all lots had similar known control values. For Creatinine, the low, middle, and high control values typically ranged from 0.6 - 1.0, 3 - 4, and 4 - 6 mg/dl, respectively.

The values assigned to the VITROS Chemistry Products Calibrator Kit 1 for creatinine are traceable to a Gas Chromatography Isotope Dilution Mass Spectrometry (GC/IDMS) method[6] and National Institute of Standards and Technology (NIST) SRM® 914 creatinine standard reference material.

In addition to the daily quality control, LCBR used two pools of samples from twenty normal donors (US Biologicals, Salem, MA) in longitudinal quality control analyses. One pool was an EDTA plasma normal donor pool (Lot #E011221). The other pool was a serum normal donor pool (Lot #S120419). LCBR periodically assayed both pools over the course of Wave VI. The plasma and serum creatinine concentration means and coefficients of variation based on those assays were 1.01 mg/dl (2.66%) and 0.91 mg/dl (2.68%), respectively. When creatinine concentrations exceeded acceptable parameters, the Ortho-VITROS system was investigated and repaired.

5. External Quality Control

5.1. Reliability

Within a race/ethnicity- and sex-stratified random sample of 123 Add Health participants among whom venous blood was collected twice, on average 13.2 (95% confidence interval: 12.0 -14.4) days apart, typically by the same FE and at approximately the same time of day, the reliability of creatinine (mg/dl) was estimated as an intra-class correlation coefficient (ICC, 95% confidence interval). The resulting estimates (**Figure 6**) suggest that the home exam venous blood yielded highly reliable creatinine concentrations.

Measure	n	ICC	95% CI
Creatinine (mg/dl)	123	0.93	(0.91, 0.96)

Figure 6. Reliability of Creatinine

6. Constructed Measures

6.1 Estimated Glomerular Filtration Rate (eGFR) according to 2021 NIDDK CKD-EPI Guidelines [H6GFRCR2]

The glomerular filtration rate (GFR, ml/min/1.73 m^2) was estimated using the following National Institute of Diabetes and Digestive and Kidney Diseases Chronic Kidney Disease Epidemiology Collaboration (NIDDK CKD-EPI) equation:[1]

$$\text{eGFRcr} = 142 \times \min(\text{Scr}/\kappa, 1)^{\alpha} \times \max(\text{Scr}/\kappa, 1)^{-1.200} \times 0.9938^{\text{Age}} \; [\times 1.012 \text{ if female}]$$

where:

- Scr = creatinine concentration (mg/dl)
- κ = 0.7 (female) or 0.9 (male)
- α = −0.241 (female) or −0.302 (male)

6.2 Classifications of eGFR According to KDIGO Guidelines [H6C2GFKR]

The following classification variable (**Figure 7**) was constructed according to the Kidney Disease: Improving Global Outcomes (KDIGO) guidelines[2] based on creatinine, using the 2021 eGFR equation.

Classification	eGFR (ml/min/1.73 m^2)	KDIGO Class
1	≥ 90	Normal/High (G1)
2	60-89	Mildly decreased (G2)
3	45-59	Mildly to moderately decreased (G3a)
4	30-44	Moderately to severely decreased (G3b)
5	15-29	Severely decreased (G4)
6	< 15	Kidney failure (G5)

Figure 7. KDIGO Classification of eGFR based on Creatinine

6.3. Clinical Classifications of eGFR [H6C2GFCR]

The following classification variables (**Figure 8**) were constructed based on creatinine, using the 2021 eGFR equation.

Classification	GFR (ml/min/1.73 m^2)	Clinical Class
1	≥ 60	Neither
2	15-59	Chronic kidney disease (CKD)
3	< 15	End-stage kidney disease (ESKD)

Figure 8. Clinical Classification of eGFR based on Creatinine

6.4 Risk of Cardiovascular Disease Incorporating Cardiovascular-Kidney-Metabolic Health

The absolute risk of incident cardiovascular disease (CVD) incorporating cardiovascular-kidney-metabolic health was estimated using the American Heart Association sex-specific, race-free risk equations.[3,4] The so-called PREVENT (*Predicting Risk of CVD Events*) equations estimated ten- and thirty- year risk (%) of total CVD (TCVD), atherosclerotic CVD (ASCVD), heart failure (HF), coronary heart disease (CHD), and stroke by incorporating eGFR and adjusting for the competing risk of non-CVD death in the base model, then adding hemoglobin A1c (HbA1c, %) in the enhanced model. In both models, TCVD = ASCVD or HF. Estimation was restricted to participants aged 30 to 79 years with no self-reported history of ASCVD or HF at Wave VI (**Figure 9**) and no PREVENT base model variable with a value identified either as missing or outside an allowable range (**Figure 10**).

Variable	Description	Source
H6CQ47C	CQ47C: EVER DX WITH HEART ATTACK/SURGERY-W6	In-Home Exam
H6CQ47E	CQ47E: EVER DX WITH STROKE/CLOGGED ARTERY -W6	
H6ID7E	S4Q7E EVER BEEN DX: HEART ATTACK-W6	Main Survey
H6ID7O	S4Q7O EVER BEEN DX: STROKE-W6	
H6ID7P	S4Q7P EVER BEEN DX: HEART FAILURE-W6	

* Self-reported history of ASCVD or HF if H6CQ47C=1 or H6CQ47E=1 or H6ID7E=1 or H6ID7O=1 or H6ID7P=1.

Figure 9. Variables Used to Identify History of ASCVD or HF at Wave VI

Variable	Description	Allowable Range
H6AGE	Age, years	30 to 79
H6TC	Total cholesterol (TC), mg/dl	130 to 320
H6HDL	High-density lipoprotein cholesterol (HDL-C), mg/dl	20 to 100
H6SBP	Systolic blood pressure (SBP), mmHg	90 to 200
H6DIABJC	Diabetes, yes=1 no=0	0 or 1
H6BQ06	Current smoking (Cursmk), yes=1 no=0	0 or 1
H6BMI	Body-mass index (BMI), kg/m^2	18.5 to <40
H6GFRCR2	Estimated GFR (eGFR), $ml/min/1.73m^2$	15 to 150
H6EAHT	Anti-hypertension medication use (Antihtn), yes=1 no=0	0 or 1
H6STATIN*	Statin use, yes=1 no=0	0 or 1

* Statins are HMG-CoA reductase inhibitors (358-019-173) or Antihyperlipidemic combinations (358-019-317).[7]

Figure 10. Variables Used to Estimate Risk in the PREVENT Base Model

An exclusion flag was created and was coded as true (H6EXPREVENT=1) for any of the following reasons.

- self-reported history of ASCVD/HF **(Figure 9)**
- any variable with a value identified either as missing or outside its allowable range (**Figure 10**)

6.4.1 10-Year CVD Risk from the PREVENT Base Model [H6B10*]

When H6EXPREVENT=0, estimated using regression coefficients from the PREVENT ten-year CVD risk Base model (Table S12.A),[3] where * = TCVD, ASCVD, HF, CHD, or STROKE.

6.4.2 30-Year CVD Risk from the PREVENT Base Model [H6B30*]

When H6EXPREVENT=0, estimated using regression coefficients from the PREVENT thirty-year CVD risk Base model (Table S12.F),[3] where * = TCVD, ASCVD, HF, CHD, or STROKE.

6.4.3 10-Year CVD Risk from the PREVENT Enhanced Model [H6H10*]

When H6EXPREVENT=0, estimated using regression coefficients from the PREVENT ten-year CVD risk Enhanced model including HbA1c (Table S12.C),[3] where * = TCVD, ASCVD, HF, CHD, or STROKE and the H6HBA1C allowable range = 3%-15%.

6.4.4 30-Year CVD Risk from the PREVENT Enhanced Model [H6H30*]

When H6EXPREVENT=0, estimated using regression coefficients from the PREVENT thirty-year CVD risk Enhanced model including HbA1c (Table S12.H),[3] where * = TCVD, ASCVD, HF, CHD, or STROKE and the H6HBA1C allowable range = 3%-15%.

7. The Renal Function Data Files *(brenal6.sas7bdat)*

7.1. Structure

The structure of the disseminated renal data file is flat. This means that it is a participant-level data file, where each participant has one and only one record. The participant's identifying number (the AID variable) will appear in the data file only once.

7.2. Contents

The renal data file includes the variables below, which are described in the corresponding codebook documentation that also contains frequencies.

Variable Name	Variable Description
AID	Participant Identifier
H6CREAT	Creatinine (CREAT, mg/dl)
H6GFRCR2	eGFR Creatinine 2021 (ml/min/1.73 m^2)
H6C2GFKR	KDIGO class eGFR creatinine 2021
H6C2GFCR	Clinical class eGFR creatinine 2021
H6CQ47D	CQ47D: Ever diagnosed with kidney disease/failure
H6EXPREVENT	Exclusion for Prevent model
H6B10TCVD	10YR Total CVD risk (base, %)
H6B10ASCVD	10YR ASCVD risk (base, %)
H6B10HF	10YR Heart failure risk (base, %)
H6B10CHD	10YR Coronary heart disease risk (base, %)
H6B10STROKE	10YR Stroke risk (base, %)
H6B30TCVD	30YR Total CVD risk (base, %)
H6B30ASCVD	30YR ASCVD risk (base, %)
H6B30HF	30YR Heart failure risk (base, %)
H6B30CHD	30YR Coronary heart disease risk (base, %)
H6B30STROKE	30YR Stroke risk (base, %)
H6H10TCVD	10YR Total CVD risk (with HbA1c, %)
H6H10ASCVD	10YR ASCVD risk (with HbA1c, %)
H6H10HF	10YR Heart failure risk (with HbA1c, %)
H6H10CHD	10YR Coronary heart disease risk (with HbA1c, %)
H6H10STROKE	10YR Stroke risk (with HbA1c, %)
H6H30TCVD	30YR Total CVD risk (with HbA1c, %)
H6H30ASCVD	30YR ASCVD risk (with HbA1c, %)
H6H30HF	30YR Heart failure risk (with HbA1c, %)
H6H30CHD	30YR Coronary heart disease risk (with HbA1c, %)
H6H30STROKE	30YR Stroke risk (with HbA1c, %)

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