Height: A Seca brand stadiometer was used to measure the height of the senior adults. The measurement was not taken if the person had major deformations of the spine.

Knee height: The measurement was carried out in the right leg whenever the interviewee did not have a lesion on it. For this measurement an inclinometer was used to indicate the angle of 90 degrees, and then height was measured with a stadiometer manufactured by Shorr Productions (USES Knee-Height Caliper).

Abdominal measurement and Hip circumference: These measurements were made with the participants standing, in a semi-anatomical position (with the feet separated and the palm of the hands resting on the lateral thigh). The metric tapes used were the Dry and the Quick Medical brand tapes.

Calf circumference: The person was seated, with the right leg exposed.

Arm circumference: With the person seated or standing, the circumference was measured in the half point between the acromion (or posterior bone of the shoulder) and the olecranon or protruding bone of the elbow.

Tricipital and sub-scapular skin folds: The interviewer carried out the measurements using his or her thumbs and index fingers in order to make sure to take only the fatty tissue and not muscles or nerves. For this, a Lange Skinfold caliper, from Beta Technology Incorporated, was used.

Hand strength
Two measurements of hand strength were taken (the highest value is used in the analysis) with the interviewee standing with the dominant arm extended beside their body. A Creative Health Products Inc. dynamometer of was used, model T-18.

Flexibility and mobility
The flexibility and mobility tests were carried out with the purpose of measuring (1) equilibrium and balance, (2) agility and (3) walking speed. The exercises that were carried out were the following:

Equilibrium and balance: To measure equilibrium and balance two tests conducted, (1) to remain standing with feet together for 10 seconds and (2) to stand up five times from a sitting position, with arms crossed on the chest.

Agility: The agility was measured beginning with the senior’s ability to bend over, to pick up a pencil and to straighten out. If the interviewee could not do it in less than 30 seconds the test was not continued. The test was also not conducted if the senior had a cataract operation or another retinal procedure in the six weeks previous to the test.

Walking speed: To measure the senior’s ability to rise off of a chair and walk, the interviewee was asked to rise from a chair and walk a distance of 3 meters in the manner that he normally does it; neither slower nor faster. The test was registered with a chronometer, noting the time in seconds that it took to carry out the test.

Laboratory procedures

The blood sample was obtained by venipuncture, normally during the second visit, the day after the main interview, with the participant fasting (for 14 hours). Three tubes of blood samples were collected: One with anticoagulant (VACUTAINER / EDTA) of 3-4 ml that was centrifuged later to separate the plasma of the cells and two tubes without anticoagulant with coagulum activator (VACUTAINER SST, 5 ml) for obtaining serum. In the laboratory a fraction of serum was separated in a conical tube type Eppendorf for total cholesterol tests, HDL, LDL, triglycerides, glucose, and serum creatine and 1 ml of complete blood in the tube EDTA for the
analysis of glycosylated hemoglobin. These tubes were sent immediately to the participant laboratories for analysis. The remaining fractions of serum and plasma were aliquoted in red-top cryovials and they were stored in ultra-refrigeration (-140°C).

The biomarkers from blood of the CRELES project second wave were measured in two laboratories. The clinical chemistry tests and that of glycosylated hemoglobin were conducted in the Clinical Chemistry Laboratory of the Department of Clinical Analysis of the School of Microbiology of the University of Costa Rica using automated methods. C-reactive protein was determined in the laboratory of the Central American Center of Hormonal Analysis (Cenahce Ltda) using a high-sensitivity CRP method with the automated equipment KONELAB™. Some of the results were adjusted to make them comparables to the results from other laboratories used in the first wave, as follows (\(y\) is the adjusted value and \(x\) is the original value):

- Glucose mg/dl \(y = 6.687 + 0.930x\)
- Triglycerides mg/dl \(y = 0.924x\)
- Glycosylated Hemoglobin % \(y = 0.888x\)
- C-reactive protein mg/dl \(y = 0.073 + 0.731x\)

These adjustments were determined during the first wave with comparisons of results in different laboratories for batches of 20 blood samples taken at random and without the laboratories knowing that this comparison was being conducted (Méndez-Chacón, Rosero-Bixby et al 2007).

**Nutrients in the diet**

Data on the participants’ diet were gathered with an abbreviated food frequency questionnaire (FFQ) developed specifically to evaluate the intake of macronutrients in the adult population in Costa Rica. It was developed and validated from a Costa Rican coronary health study that contained a full FFQ (Ek-Sohemy, Baylin et al 2001; Kabagambe, Baylin et al 2001; Kabagambe, Baylin et al 2005).

The original full FFQ in the coronary health study contained 147 foods in the Costa Rican diet, and it required approximately 45 minutes of interview time (Kabagambe, Baylin et al 2005). That study collected information on about 2000 residents in the Central Valley of Costa Rica, ages 60 and older who were the population control group in a case-control study of myocardial heart attack patients (the heart attack patients were not used in the FFQ validation study). The FFQ asked for the average consumption during the year prior to the survey, providing 9 possible answers to categorize the consumption frequency, which range from "never or less than once a month" to "6 or more times a day." The frequencies were converted by computer to a daily number of servings to estimate the quantity consumed. The FFQ also asked for the consumption of vitamins and nutritional supplements, the brands of cooking shortening, oil margarine used, and certain kinds of food preparation.

The coronary health study estimated for each individual the energy intake of several dozens of nutrients by multiplying the frequency of consumption of each food by the nutritional content of the respective portion using values of composition of the foods from the database of the Department of Agriculture of the US, in addition to data from producers and published reports as well as specific data for Costa Rica regarding the nutritional content of foods and local food preparation practices.

Using stepwise regression to optimize the goodness-of-fit and the parsimony of the model that explains the nutrient with the foods, CRELES researchers reduced the original FFQ to a 10 minute interview by identifying the minimum number of foods that maximizes the variance explained in a selection of macronutrients of interest to CRELES. In this way 27 tracer foods were identified for the abbreviated CRELES FFQ, which together with