

**Afternoon Day 1**

[https://globalmeetwebinar.webcasts.com/starthere.jsp?ei=1289829&tp\\_key=62557ab93c](https://globalmeetwebinar.webcasts.com/starthere.jsp?ei=1289829&tp_key=62557ab93c)

**Dr. Barbara Schneeman:** Okay, great. This is Barbara Schneeman. This is the afternoon session for the 2020 Dietary Guidelines Advisory Committee meeting. And I'll say good afternoon to those of you who are in afternoon, and good morning to those of you who are still at the—in the morning.

So, before the lunch break, we finished the crosscutting working group, the Birth to 24 Months subcommittee, and the Pregnancy and Lactation subcommittee. Before I move to the next subcommittee report, I just wanted to check and see if there were any additional questions or comments that people wanted to bring up before we move into the Dietary Patterns subcommittee.

**[0:00:59]** So, hearing none, I know from teaching experience, you have to live through those awkward pauses before someone will speak up.

So, Dr. Boushey, are you ready to give the report from the Dietary Patterns subcommittee?

**Dr. Carol Boushey:** Yes, I am ready, and it appears that so are the slides.

**Dr. Barbara Schneeman:** Yep, ready to go. Just and I'll remind the committee members, while Carol's giving the report, please be sure you're on mute, and then we will have the opportunity for discussion.

**Dr. Carol Boushey:** Yes. Thank you so much. It's great to have this opportunity to share the work of the Dietary Patterns subcommittee. We're all listed on this first slide.

So, the topics, the questions that Dietary Patterns—on Dietary Patterns and all-cause mortality were discussed at the last meeting.

**[0:01:59]** So today, we will cover the evidence for the questions on dietary patterns and sarcopenia, cancer, cardiovascular disease, growth, size, body composition, and risk of overweight and obesity, type 2 diabetes, bone health, and neurocognitive health.

We applied the inclusion/exclusion criteria shown here for the intervention or exposure to operationalize the definition of dietary patterns and account for the public interest in examining low-carbohydrate or high-fat diets.

We reached consensus on the inclusion and exclusion criteria for evaluating dietary patterns. They're listed here as studies examining consumption of and/or adherence to a dietary pattern will be considered.

**[0:03:03]** Dietary patterns may be measured or derived using a variety of approaches as specified in the inclusion criteria.

Studies must describe the dietary pattern being tested or examined and a description of the foods and beverages comprising the pattern. Studies not providing a description of the dietary pattern have been excluded, as well as studies labeling a dietary pattern but not describing the foods and beverages in the pattern or base the pattern solely on nutrient.

For the first time, this subcommittee is considering diets based on macronutrient distribution, where at least one macronutrient, and that's either carbohydrate, fat, and/or protein, is outside of the acceptable macronutrient distribution range, the AMDR, set by the National Academies of Sciences Dietary Reference Intakes.

**[0:04:05]** The second criteria on this slide applies to these studies which may include low-carbohydrate or high-fat diets.

The updated inclusion criteria on the bottom left specifies studies examining consumption of and/or adherence to diets varying by macronutrient proportions be included if the level of a macronutrient is outside of the AMDR.

For example, any study in which carbohydrate intake is above or below the AMDR, and that's greater than 65 percent of total energy, or below 45 percent of energy, and also meets the inclusion/exclusion criteria provided in the protocol would be examined in the—to answer these questions.

**[0:05:01]** The updated exclusion criteria proposes studies not providing a description of the macronutrient proportion examined or do not examine macronutrient proportions outside of the AMDR would be excluded pending all other criteria.

Additionally, studies not providing a description of the macronutrient breakdown for all of the macronutrients will be excluded or were excluded. We're in both ends now.

It is possible for some studies to meet the criteria for both a dietary pattern study and a study based on macronutrient distribution, but not all studies have to meet both criteria to be included in this review. This approach allows the committee to systematically review the overall scientific landscape of dietary patterns, including patterns that are both within and outside the AMDR, along with different diet types.

**[0:06:08]** I'm going to shout a little caution right now, just as a heads up. For some reason, I am getting a note that says it's time for my computer to get updated, and if that happens, I will be disconnected and someone will need to continue the presentation, and I did give it to Barbara, because unfortunately, our IT person, who said they were going to be in here early today, didn't make it.

And so, I'm not clear how to turn that little thing off while also talking.

Anyway, so just a heads up, I might give a shout to say "Barbara, finish up." Thank you, Barbara.

**[0:06:59]** So, going—starting with the questions now. "What is the relationship between dietary patterns consumed and sarcopenia?"

The analytical framework for this review question is shown here, and by now, we're all pretty used to this framework.

The subcommittee operationalized the definition of sarcopenia as shown on this slide by consulting consensus statements of several working groups.

Sarcopenia is a progressive and generalized loss of skeletal muscle mass alone or in conjunction with either or both low muscle strength and low muscle performance.

Given the outcome is sarcopenia, that is, it's really age-related muscle loss, the population of interest for this outcome includes adults and older adults only.

**[0:07:59]** As noted in the last meeting, the subcommittee decided to streamline this question to only focus on the endpoint outcomes of sarcopenia and severe sarcopenia.

The flow chart, which we've seen too, demonstrates the literature search and screening results for articles examining dietary patterns and sarcopenia, ranging from January 2000 to June 2019. The results of the electronic database searches, as you can see, after removal of duplicates, were screened independently by two NESR analysts using a step-wise process by reviewing

titles, abstracts, and full text, to determine which articles met the inclusion criteria, and those steps are true for all of the reviews that we'll be going through.

**[0:08:55]** See, we went from 7,314 articles to 624 screened, and ended up with 4 remaining articles in this—for this systematic review.

These were—all articles happened to be prospective cohort study design, which examined the relationship between dietary patterns and sarcopenia.

For the exposures, multiple approaches were used to create the dietary patterns, including factor analysis, cluster analysis, and/or indices or scores. Six different indices or scores were used in the 3 included manuscripts. Four articles applied similar definitions of sarcopenia, which were low muscle mass with low muscle strength based on hand grip strength and/or low muscle performance based on walking speed.

**[0:10:01]** One study used the Asian Working Group for Sarcopenia algorithm, that's the Chan Study, and the other three used the European Working Group on Sarcopenia criteria.

All studies assessed diet once at baseline and did not account for dietary pattern—did not account for dietary patterns earlier in life or possible changes in dietary intake that may have occurred over follow-up.

Studies adjusted for a number of potential confounders but not all key confounders, such as race/ethnicity or physical disability.

**[0:10:55]** None of the studies accounted for missing data either due to loss to follow-up or criteria used when selecting individuals into the analysis.

For the evidence regarding dietary patterns and sarcopenia, we reached the following conclusion statement: insufficient evidence is available to determine the relationship between dietary patterns and sarcopenia in older adults, therefore, a grade was not assignable.

The next question that I'll share for the committee is the relationship between dietary patterns consumed and certain types of cancer.

This is the analytical framework for dietary patterns and cancer.

The cancer outcomes were streamlined to focus on four types of cancers with the highest prevalence: breast, prostate, lung, and colorectal cancers.

**[0:12:02]** These were also examined in the 2015 review. Given the timeline, the next advisory committee may be well-suited to explore additional cancers for which new evidence has begun to emerge.

This is the literature search for this particular question, the cancer systematic review, and papers range from December 2013 to January 2020, and does build upon the existing systematic review conducted in 2015 DGAC, and as with the others, NESR did the screening and went from 4,095 articles to 709 to 112 articles to reviewing 52 articles split between 25 on breast cancer, 26 colorectal cancer, 8 for lung cancer, and 8 for prostate.

**[0:13:13]** The included articles were published between January 2014 and January 2020, and I have already given you the numbers of the articles, and this review updates, again, as previously said, the reviews conducted by the previous Dietary Guidelines Committee.

**[0:13:57]** So, starting with prostate cancer, this included 7 prospective cohort studies and 1 nested case control study. The body of evidence had several risks of bias, including lack of adjustment for all potential confounders, such as race/ethnicity and assessment of dietary pattern once at baseline or in the first few years of follow-up, and did not account for possible changes in dietary intake that may have occurred over follow-up.

Thought the direction and magnitude of a set across the body of evidence was inconsistent, most studies reported no significant associations between adherence to dietary pattern and risk of prostate cancer.

Most studies had large analytical sample size with a sufficient number of prostate cancer cases occurring over follow-up to examine associations.

**[0:15:01]** However, the width of the confidence intervals indicates some degree of imprecision within the body of evidence.

The studies were direct and generalizable in that the populations, intervention/comparators, and outcomes of interest in the included studies are directly related to the systematic review question and are applicable to the US population.

So, with this as being an update to the previous *Dietary Guidelines* and changes the conclusion drawn by the 2015 Dietary Guidelines Committee, which did not draw a conclusion regarding

the relationship between dietary patterns and the risk of prostate cancer due to limited evidence from a small number of studies with wide variation in study design, dietary assessment methodology and prostate cancer outcome ascertainment, therefore, the 2020 Dietary Guidelines Advisory Committee determined that, based on the 8 additional studies in this update, there is now limited evidence to suggest no relationship between dietary patterns and risk of prostate cancer.

**[0:16:21]** This next is a systematic update including 7 prospective cohort studies and 1 nested case control study.

Sorry, let me see here. I've got to make sure. I think I'm not quite in the right place here.

Yeah, okay. No, this is lung. Lung. They match up.

And risk of lung cancer.

**[0:16:57]** All studies examined adherence to dietary patterns using different indices or scores. Most studies reported significant association. Significant associations were primarily evident in former and current smokers.

Studies had some risk of bias, potential for confounding, assessment of diet once at baseline.

The analytical sample sizes ranged from 4,336 to 460,700 with sufficient number of cases over follow-up of a range of 4-20 years.

Therefore, we—the studies were direct and generalizable and applicable to the US population.

**[0:17:57]** The draft conclusion statement for the dietary patterns containing—and lung cancer review states limited evidence to suggest that dietary patterns containing more frequent servings of vegetables, fruits, seafood, grains, cereals, legumes, and lean versus higher-fat meats and lower-fat or non-fat dairy products may be associated with lower risk of lung cancer, primarily among former smokers and current smokers. The grade is limited.

The systematic review, this updates and builds upon and concurs with the conclusion drawn by the 2015 Dietary Guidelines Advisory Committee.

This systematic review next here includes for looking at dietary patterns and breast cancer, includes 3 articles from 2 randomized control trials, 21 prospective cohort studies, and 2 nested case control studies.

**[0:19:04]** Two articles from the same RCT examined a low-fat diet with increased vegetables, fruit, and grains, and the other RCT tested Mediterranean diets with extra virgin olive oil or nuts and a low-fat diet.

Fourteen studies examined adherence to dietary patterns using indices or scores. Five studies identified dietary patterns using factor analysis. Five identified dietary patterns using reduced rank regression. And 1 examined variation of vegetarian diets.

Many studies reported significant associations. Significant associations were primarily evident for post-menopausal breast cancer risk. Fewer studies examined pre-menopausal breast cancer.

Studies had some risks of bias, potential for confounding, assessment of diet once at baseline.

**[0:19:59]** The analytical sample sizes were large, ranging from about 2,500 to 330,766 with sufficient number of cases over follow-up, a range of 4 years to 23 years, and the studies were direct and generalizable, therefore, applicable to the US population.

The draft conclusion statement for dietary patterns and breast cancer review states moderate evidence indicates an inverse association between dietary patterns rich in vegetables, fruit, and whole grains, and lower in animal products and refined carbohydrate are associated with reduced risk of postmenopausal breast cancer.

The data regarding this dietary pattern and pre-menopausal breast cancer risk point in the same direction, but the evidence is limited due to fewer studies.

The grade is moderate, post-menopausal breast cancer risk is limited, pre-menopausal breast cancer risk, and this systematic review updates, builds upon, and concurs with the conclusion drawn by the 2015 Dietary Guidelines Advisory Committee.

**[0:21:17]** And Barbara, I just lost the picture. So, if you don't mind, you can either—do you have the slides?

**Dr. Barbara Schneeman:** Well, Carol, if you're—if you're willing to keep going through your slides, we can change it here on the website.

**Dr. Carol Boushey:** Okay.

**Dr. Barbara Schneeman:** So, if you have that file, we'll just track where you are and keep switching the slides. Is that okay?

**Dr. Carol Boushey:** That's great. That's great.

**[0:21:57]** Because I have—I can—I have little pictures of every single one of them. And the other thing is, when that happened, because I have—you can't log back in.

**Dr. Barbara Schneeman:** Yeah, so just if you can tell us "Next slide," then we'll just keep up with you.

**Dr. Carol Boushey:** Okay. So, we're going to the next slide, slide 20. The top says, "Summary of Evidence Synthesis: Dietary Patterns: Colorectal Cancer." So, we're starting with the first slide of colorectal cancer.

So, are you there?

**Dr. Barbara Schneeman:** Great. Yeah.

**Dr. Carol Boushey:** Okay. Thank you. I love—this really works out well that we had all this backup. I'm glad we thought of all of this.

**Dr. Barbara Schneeman:** Yeah. So, you can keep talking, because we can still hear you. The telephone connection is fine.

**Dr. Carol Boushey:** Yes, great.

**[0:23:00]** Okay, this systematic review includes 2 articles from the same RCT, 22 prospective cohort studies, and 1 nested case control study.

The RCT examined a low-fat diet with increased vegetables, fruits, and grains.

18 studies examined adherence to a dietary pattern using indices and scores.



3 studies identified dietary patterns using factor or cluster analysis.

1 study identified dietary patterns using reduced rank regression.

1 study examined variations of vegetarian diets.

Many studies reported significant associations.

Now, four dietary patterns, and this probably should have been said sooner really, four dietary patterns emphasizing more healthful foods, for example, DASH, the HEI, the results: higher scores reflect reductions in risk, whereas dietary patterns emphasizing low nutrition quality, the results: higher scores will be associated with higher risk.

**[0:24:12]** So, there was some inconsistency by cancer type.

So, in the case of colon cancer, there's colon, rectal, and colorectal cancer. And so, that's one thing to take into account here.

And then, study participant characteristics varied a lot, that either they were men and women, all men, or women.

Studies had some risk of bias, potential for confounding, assessment of diet once at baseline.

Analytical sample sizes were large, ranging from 8,050 to 471,495, with sufficient number of cases over follow-up and a range of 4 years to 20 years.

**[0:25:05]** And the studies were direct and generalizable, and therefore, applicable to the US population.

So, next slide.

It should say "Draft Conclusion Statement: Dietary Patterns and Colorectal Cancer."

**Dr. Barbara Schneeman:** Got it.

**Dr. Carol Boushey:** The draft conclusion—super. The draft conclusion statement for the dietary patterns and colorectal cancer review states moderate evidence suggests dietary patterns that are higher in vegetables, fruits, legumes, whole grains, lean meats, and seafood, low-fat dairy,

and moderate alcohol, lower in saturated fat and sodas and sweets, and low or no intake of red and processed meats relative to other dietary patterns are associated with reduced risk of colon and rectal cancer.

**[0:25:56]** Moderate evidence also suggests dietary patterns that are higher in red and processed meats, French fries and potatoes, and sources of sugars, such as sodas, sweets, dessert foods, are associated with a greater colon and rectal cancer risk.

The grade is moderate, and this systematic review updates and builds upon and concurs with the conclusion drawn by the 2015 Dietary Guidelines Advisory Committee.

Next slide.

So, question. "What is the relationship..." Is that what's up on the slides?

**Dr. Barbara Schneeman:** Yes.

**Dr. Carol Boushey:** "What is the relationship between dietary patterns consumed and risk of cardiovascular disease? What is the relationship between dietary patterns consumed and growth, size, body composition and risk of overweight or obesity? And what is the relationship between dietary patterns consumed and risk of type 2 diabetes?"

**[0:26:58]** Now, this is quite a long list of questions here that don't seem to match up. The way they match up with our group is these are the ones that we most recently have been tackling." And so, we've sort of separated them from the other group.

So, next slide.

And these are all still sort of a work in progress, too.

So, to better align with criteria applied by other subcommittees, and due to the short timeline relative to the workload volume, the subcommittee discussed and applied additional inclusion and exclusion criteria that would both narrow and strengthen the body of evidence for the remaining questions.

These additional criteria were applied prior to the completion of screening.

Inclusion and exclusion criteria for study duration and size of study groups were applied for the dietary patterns question related to cardiovascular disease, growth, size, body composition, and risk of obesity, type 2 diabetes, bone health, and neurocognitive health.

**[0:28:06]** For duration, a minimum of 12 weeks for an intervention was included. Those less than 12 weeks were excluded.

The size of study groups, a minimum of 30 participants per arm or a power calculation for interventions were needed to be included.

And samples of at least 1,000 participants were included for epidemiology type studies.

An addendum was added to the standard criteria for health status of participants. This additional criteria was applied only to the questions related to cardiovascular disease, growth, size, body composition, and risk of obesity, type 2 diabetes, to ensure and evidence base that would allow the subcommittee to draw more direct comparisons of the effect of dietary patterns on those outcomes that are independent of the effects that weight loss from following hypocaloric diets may have on cardiometabolic health factors.

**[0:29:16]** For this reason, the subcommittee applied criteria that excludes interventions designed to induce weight loss or treat overweight and obesity through energy restriction, hypocaloric diets for the purpose of treating additional or other medical conditions.

This criteria would allow the subcommittee to better articulate the direct relationship between dietary patterns and risk of these diseases in particular.

Next slide.

This is the summary of the literature search and the screening results from the combined search of the three questions.

**[0:30:01]** After removal of duplicates, the remaining were further screened as previously described, and for this review, 64,300 articles were title screened, 13,659 articles were abstract screened, and 2,948 articles were screened at the full text level. And then, in all these cases, too, a manual search to double-check.

And this review resulted in 299 included articles that examined dietary patterns among the three separate questions.

Note that many articles overlapped each question reporting multiple outcomes.

And next slide for the analytical framework.

**[0:30:56]** This analytical framework provides the foundation for the question examining the relationship between dietary patterns and risk of cardiovascular disease.

It builds off an existing review from the previous Advisory Committee.

To streamline this review, intermediate outcomes were included only from intervention studies. Endpoint outcomes were considered for all study designs. So, that box in the middle are those intermediate outcomes that were restricted only to intervention studies.

Next slide.

185 articles were identified for the relationship between dietary patterns and risk of cardiovascular disease. 4 articles were from studies conducted in children, which add new evidence to the existing review. And 181 articles were from studies conducted in adults.

**[0:31:59]** Dietary patterns in adults were examined using various methods, in 147 articles, which updates the evidence included prior to 2013 in the existing review.

Diets based on macronutrient distribution were examined in 45 articles from 19 RCTs and 26 articles from prospective cohort studies, which add new evidence to the existing review.

Next slide.

So, the dietary patterns in cardiovascular disease children. All of the studies conducted in children were from prospective cohort studies. 2 examined dietary patterns identified with factor and cluster analysis. 2 examined adherence to dietary patterns using index or score analysis. All examined intermediate CVD outcomes, such as blood pressure, low-density lipoprotein cholesterol, total cholesterol, and 1 reporting infant CVD.

**[0:33:10]** Associations were reported in the four articles showing limited evidence of protective dietary patterns and improved intermediate CVD outcomes.

Studies adjusted for—studies adjusted for a number of potential confounders, but not all key confounders, such as race/ethnicity, physical activity, or baseline anthropometry.

The magnitude effects were relatively inconsistent.

And analytical sample size ranged from about 1,400 to 4,112, with follow-up ranging from age 10 years to 17 years.

**[0:34:00]** So, that one never showed. If that's correct, that one never showed the actual—yeah, okay.

So now, the next slide should be the dietary patterns and cardiovascular disease. Is that right? What's coming up?

**Dr. Barbara Schneeman:** Yep, that's what we have on the screen now.

**Dr. Carol Boushey:** Okay, good. It's kind of funny not seeing them, but yeah, you're right. This is crazy. Okay.

So, for adults, 45 articles examined the relationship between diets based on macronutrient distribution and CVD outcomes where at least one proportion of macronutrient fell outside the AMDR.

These studies reported both intermediate and endpoint CVD outcomes.

Among these studies, the proportion outside the AMDR ranged between exposure groups as follows: carbohydrate below ranged from 25.3 percent to 44.9 percent. Carbohydrate above ranged from 66 percent to 72.7 percent.

**[0:35:10]** No studies meeting inclusion criteria examined carbohydrate distribution below 25.3 percent.

Fat ranged from 35.2 percent to 46.1 percent. Fat below ranged from 13.1 percent to 18.9 percent.

In one study, protein was above the AMDR, at 43.5 percent.

In most of these studies, carbohydrate was below the AMDR in one or more exposure groups compared.

Significant associations reported in the majority of these studies.

The direction of findings were relatively consistent, reporting macronutrient distributions that were significantly associated with decreased risk of CVD mortality.

**[0:36:04]** Other endpoint outcomes: lower risk of incident coronary heart disease, as well as intermediate outcomes such as lower blood pressure.

The magnitude of effects were relatively inconsistent outcomes.

Studies adjusted for a number of potential confounders, but not all key confounders, such as race/ethnicity, physical activity, or baseline anthropometry.

The magnitude of effects were relatively inconsistent.

Analytical sizes ranged from 1,419 to 42,112, with the follow-up ranging from age 10 to 17 years.

**Dr. Barbara Schneeman:** So, Carol, just I want to make sure we're in sync with your slides. So, which slide did you just finish? Do you have the number?

**[0:37:00]** **Dr. Carol Boushey:** The one that I'm on, it says, "Summary of the Evidence Synthesis: Dietary Patterns and Cardiovascular Disease: Adults," and it's 28.

**Dr. Barbara Schneeman:** Okay.

**Dr. Carol Boushey:** Are we there?

**Dr. Barbara Schneeman:** Yes.

**Dr. Carol Boushey:** Okay. And see, now let me get back on track. Yeah, yeah, yeah. That's right. Okay.

And then, studies—and I think—okay. There were generalizability concerns related to studies conducted in other countries where it's more common for carbohydrate proportions to be above the AMDR.

Grades for these conclusion statements are as follows: limited for dietary patterns in children, strong for dietary patterns in adults.

**[0:38:03]** For diets based on macronutrient distribution, in this outcome, the full body of evidence is still under review.

Now, to the next slide, which should read “Analytical Framework: Dietary Patterns and Growth, Size, Body Composition, and Risk of Overweight or Obesity.”

Is that right, Barbara?

**Dr. Barbara Schneeman:** That’s right. That’s where we are.

**Dr. Carol Boushey:** Good. So, it’s amazing. We’ve stayed on track.

So, the analytical framework for the question examining this relationship builds from an existing review from the previous Advisory Committee.

So, next slide.

**[0:39:04]** First, we’re going to cover obesity, even though it’s on the—it’s a different order on the way we list it. But you should have “Description of the Evidence: Dietary Patterns and Obesity.” 88 articles—

**Dr. Barbara Schneeman:** That’s where we are.

**Dr. Carol Boushey:** Good. 88 articles were identified that examine the relationship between dietary patterns and growth, size, body composition, and risk of overweight or obesity, and met inclusion criteria for this systematic review.

Among the included articles, 12 were prospective cohort studies conducted in children. 76 articles examined the relationship between dietary patterns in adults and body composition and risk of overweight and obesity.

Dietary patterns in adults were examined using various methods in 45 articles, which updates the evidence included prior to 2013 in the existing reviews.

**[0:40:03]** Diets based on macronutrient distribution were examined in 31 of the included articles from 22 RCTs and 9 prospective cohort studies, which add new evidence to the existing reviews.

So, next slide, and that should be “Summary of the Evidence Synthesis: Dietary Patterns and Obesity: Children.”

Among the studies in children, dietary patterns were assessed using a variety of methods, including factor/cluster analysis, indices or scores, latent class analysis, and reduced rank regression.

Significant associations were reported in these articles, but the direction of the results were mixed with small and inconsistent magnitude. No significant associations were also reported, depending on the dietary pattern or a specific outcome examined within studies.

**[0:41:02]** There was no clear pattern of null findings across the studies.

Studies adjusted for most potential confounders but did not adjust for all, such as race/ethnicity.

Analytical sample sizes ranged from 1,018 to 10,918, with follow-up ranging from age 4 years to 25 years.

And now, to the next stop—slide, which is “Summary of the Evidence Synthesis: Dietary Patterns and Obesity: Adults.”

Among these studies addressing the relationship between diets based on macronutrient distribution and body composition or risk of overweight or obesity, the proportions outside of the AMDR ranged between exposure groups as follows:

**[0:41:57]** Carbohydrate below the AMDR ranged from 25.3 percent to 44.9 percent. And I realize we’ve shared these earlier, but it was over the global group, not by specific, like this one being specific for obesity in adults.

No studies identified that met inclusion criteria examined carbohydrate distributions below 25.3 percent.

Carbohydrate above ranged from 66 to 77.5 percent.



Fat above the AMDR ranged from 35.2 to 47 percent.

Fat below the AMDR ranged from 9.9 to 19.3 percent.

In one study, protein was above the AMDR at 43.5 percent.

In most of these studies, carbohydrate was below the AMDR in one or more exposure groups compared, where the proportion of fat was above the AMDR.

**[0:43:01]** Results were mixed among included studies.

The direction and magnitude of effects were inconsistent.

Studies adjusted for many potential confounders, but not all key confounders, specifically, race/ethnicity.

Analytical samples ranged from 16 with a power calculation, even that was below our cutoff, they had a power calculation, or up to 131,342, with follow-up ranging from 12 weeks to 32 weeks.

Many studies emphasized one particular macronutrient of interest, such as low-carbohydrate, but not the proportion reported for that macronutrient was not necessarily below the AMDR. Therefore, confidence in reported proportions falling outside of the AMDR is limited due to variation in nutrient intake methods or estimation between studies.

**[0:44:03]** So, next slide.

This is a draft conclusion statement, dietary patterns and obesity. This is draft.

To answer the question on the relationship between dietary patterns and growth, size, body composition, and risk of overweight or obesity, the following statements are drafted.

For dietary patterns in children, limited evidence suggests that dietary patterns in childhood or adolescence higher in added sugars, refined grains, fried potatoes, and processed meat, while being lower in fruits, vegetables, whole grain, and low-fat dairy, are associated with increased fat mass index and BMI later in adolescence.

For dietary patterns in adults, we agree with the existing conclusion statement of moderate evidence indicates dietary patterns emphasizing vegetables, fruits, and whole grains, seafoods, and legumes, moderate in dairy products, particularly low- and non-fat dairy, and alcohol, lower in meats, including red and processed meats, and low in sugar-sweetened foods and beverages and refined grains, are associated with favorable outcomes related to body weight, including lower BMI, waist circumference, or percent body fat, or risk of obesity.

**[0:45:24]** Components of the dietary patterns associated with these favorable outcomes include higher intakes of unsaturated fats and lower intakes of saturated fats, cholesterol, and sodium.

Grades for these conclusion statements are as follows: limited for dietary patterns in children, moderate for dietary patterns in adults. For diets based on macronutrient distribution and this outcome, the full body of evidence is still under review. And again, though, these are drafts.

So, next slide.

**[0:45:59]** This is Dietary Patterns for Type 2 Diabetes. This is a streamlined analytical framework, which will provide the foundation for the question examining the relationship between dietary patterns and risk of type 2 diabetes.

The review builds off an existing review from the previous Advisory Committee.

In addition to this streamlined inclusion/exclusion criteria, intermediate outcomes were included only in intervention studies in adults or all study designs in children.

So, next slide.

And that should be “Description of the Evidence: Dietary Patterns and Type 2 Diabetes.”

73 articles were identified that examine the relationship between dietary patterns and risk of type 2 diabetes and met inclusion criteria for this systematic review.

**[0:47:02]** One prospective cohort study was conducted in children, which is new to the existing review. 72 articles were from studies conducted in adults.

Dietary patterns in adults were examined using various methods in these articles, which updates the evidence included prior to 2013 in the existing review.

The relationship between diets based on macronutrient distribution and type 2 diabetes was examined in 23 articles, from 2 RCTs and 21 prospective cohort studies, which brings new evidence to the existing review.

Next slide, which is the “Summary of Evidence Synthesis: Dietary Patterns and Type 2 Diabetes.”

Among these studies addressing the relationship between diets based on macronutrient distribution and risk of type 2 diabetes, the proportions outside the AMDR ranged between exposure groups as follows:

**[0:48:08]** Carbohydrate below the AMDR ranged from 29.6 and 44.8. No studies identified met inclusion criteria examined carbohydrate distributions below 29.6 percent.

Carbohydrate above the AMDR ranged from 65 percent to 80.5 percent.

Fat above the AMDR ranged from 35.1 percent and 46.3 percent.

Fat below the AMDR ranged from 8.1 percent to 19 percent.

In most of the studies, carbohydrate was below the AMDR in one or more exposure groups compared with where fat was also above the AMDR in that distribution.

**[0:48:58]** Significant associations were reported in the majority of these included articles, 19 of 23, that were consistent in direction.

Diets based on macronutrient distributions within or closer to the AMDR limits compared to outside the AMDR were significantly associated with lower risk of type 2 diabetes.

Studies adjusted for many potential confounders, but not all key confounders, such as race/ethnicity.

Analytical sample sizes ranged from 418 to 92,088, with follow-up ranging from 16 weeks to 19 years.

Confidence in the reported proportions falling outside of the AMDR is low due to variation in nutrient intake methods or estimation between studies.

Many studies reported to be examining one particular macronutrient of interest, such as low-carbohydrate, or high protein intake, but the proportion for that nutrient was within or near the AMDR.

**[0:50:06]** So, next slide, which should read “Draft Conclusion Statement: Dietary Patterns and Type 2 Diabetes.”

The following conclusion statements were drafted to answer the question on the relationship between dietary patterns and risk of type 2 diabetes.

The dietary patterns in children, there was only 1 observational study identified that met inclusion criteria. Therefore, the conclusion drafted is insufficient evidence is available to determine the relationship between dietary patterns consumed in children and risk of type 2 diabetes.

For dietary patterns in adults, the subcommittee agrees with the existing conclusion statement of moderate evidence indicates that healthy dietary patterns higher in vegetables, fruits, and whole grains, and lower in red and processed meats, high-fat dairy products, refined grains, and sweets, sugar-sweetened beverages, reduce the risk of developing type 2 diabetes.

**[0:51:12]** Grades for these conclusion statements are as follows: grade not assignable for dietary patterns in children and type 2 diabetes, moderate for dietary patterns in adults. For diets based on macronutrient distribution and this outcome, the full body of evidence is still under review.

So now, the next slide, which is “What is the relationship between dietary patterns consumed and bone health?” I think this is our second to the last question, but a very important question, of course, like all the others.

**[0:51:57]** This should be then to the next slide for the “Analytical Framework: Dietary Patterns and Bone Health.”

This streamlined analytical framework is shown on this slide. It provides the foundation for the question examining the relationship between dietary patterns and bone health.

This review does build off an existing review from the previous Advisory Committee.

In addition to the streamlined inclusion/exclusion criteria, intermediate outcomes were included only for intervention studies in adults or all study designs in children.

So, next slide, to see the screening results, the literature search and screening results for dietary patterns and bone health.

The search for this systematic review was from March, 2014 to September, 2019, and it builds as noted, upon that existing systematic review conducted by the 2015 Dietary Guidelines, which was 2000-2014.

**[0:53:08]** So, the standard review and removal was done, and to update this existing review, 3,248 articles were title screened, 512 articles were abstract screened, and 167 articles were screened at the full text level.

After all of that, this update to the existing systematic review for dietary patterns and bone health contains 9 included articles.

So, next page for “Description of the Evidence: Dietary Patterns and Bone Health.”

9 prospective cohort studies were identified that met the inclusion criteria and were published between March 2014 and September 2019.

**[0:54:02]** 2 studies were conducted in children/adolescents, and 7 studies were conducted in adults.

Dietary patterns were examined using various methods across these studies, including different indices or scores, factor and cluster analysis, or reduced rank regression.

Included articles examined bone health outcomes that included risk of hip fracture, osteoporotic fracture, or total fracture risk, and in adolescents, bone mineral density.

So, next slide for “Summary of the Evidence Synthesis: Dietary Patterns and Bone Health.”

Several risks of bias were identified, including lack of adjustment for all potential confounders, such as race/ethnicity, socioeconomic status, and vitamin D status.

**[0:54:58]** In addition, diet was commonly assessed once at baseline, so possible changes in dietary intake over follow-up and dietary patterns early in life were not accounted for.

The majority of studies reported that dietary patterns of higher diet quality were associated with significant reduction in hip fracture risk, and those patterns classified as less healthy were significantly associated with increased risk of hip fracture.

While the magnitude of effects were somewhat consistent, the narrow width of confidence intervals indicates relative precision across the body of evidence.

Analytical sample sizes ranged from 1,007 to 140,755, with sufficient cases over follow-up, a range from 4 years to 32 years.

Studies were direct but may not be completely generalizable to the US population as the result of differing participant characteristics and variability in dietary patterns evaluated.

**[0:56:05]** So, next slide should be our draft conclusion statement for dietary patterns and bone health.

We reached the following conclusion statement: insufficient evidence was available to determine the relationship between dietary patterns in children and bone health outcomes. Therefore, a grade was not assignable.

The evidence in adults is still under review.

So, the next slide then is the question, "What is the relationship between dietary patterns consumed and neurocognitive health?"

So, if you go to the next slide then, Barbara, it should be the analytical framework for the dietary patterns and neurocognitive health.

**[0:57:01]** So, here, the analytical framework shown here provides the streamlined scope of the question examining the relationship between dietary patterns and neurocognitive health.

This review updates an existing review from the previous Advisory Committee.

In addition to this streamlined inclusion/exclusion criteria shown earlier that were applied to this question, the outcomes currently under review shown on this slide were focused on cognitive decline, mild cognitive impairment, dementia, and Alzheimer's disease.

The key confounders are also listed on this slide.

So, Barbara, you can go to the next slide, which is the “Description of the Evidence: Dietary Patterns and Neurocognitive Health.”

28 articles were identified that met inclusion criteria and examined the relationship between dietary patterns and these outcomes.

**[0:58:03]** 4 were randomized control trials. 24 were from prospective cohort studies.

The dietary patterns examined were various patterns, indices or scores, factor/cluster analysis, and other methods.

It included articles that examined dementia, cognitive decline, cognitive impairment, and cognitive function.

The body of evidence and the results from these included articles are still under review.

So, if you go to the next slide, that’s outlined clearly that “Draft Conclusion Statement: Dietary Patterns and Neurocognitive Health,” under review and status relative to inclusion reached the systematic review updates builds on the conclusion drawn by the 2015 Dietary Guidelines Committee, and individuals are still working through that.

**[0:59:04]** So, next slide, Barbara, because that—the next slide has our next steps. I think I used the word next more than any other word today.

So, refine evidence synthesis and conclusion statements based on feedback received.

Refine the conceptual framework for this subcommittee to facilitate evidence synthesis based on dietary patterns and their components, micro and macronutrients.

Build out the conceptual framework for the subcommittee to facilitate the evidence synthesis based on dietary patterns and their components.

And prepare report chapter based on the conclusion statements reached.

So, next slide shows the, again, displays the Dietary Patterns Subcommittee members and the staff, support staff, which have done a lot of heavy lifting.

**[1:00:04]** And with that, I believe we are done with an update of the Dietary Patterns Subcommittee for this meeting.

**Dr. Barbara Schneeman:** Tremendous amount of work by this subcommittee. Thank you, Carol, and thank you for—we stayed right on track with your slides.

**Dr. Carol Boushey:** Yeah, that was great. It really shows. It really shows how well we do work together.

**Dr. Barbara Schneeman:** Yeah.

**Dr. Carol Boushey:** And right, so we can—we can open it up to questions, and I—we talked as a group, we talked as a group, and so, I might—we agreed that we can push questions onto one another.

**[1:00:59]** Of course, no one knows who I'm going to push it onto, but no, the people who reviewed them.

But if there are any questions, we can field them now. Is that right?

**Dr. Barbara Schneeman:** Absolutely.

**Dr. Jamy Ard:** So, Carol, this is Jamy. Great presentation. Thank you for doing that for the group. I think we—there's a clarification for the draft conclusion related to cardiovascular health in children and dietary patterns.

I think we may not have had the full edit of that draft statement. So, I just want to call that out. Yeah.

So, I think we wanted to change the wording of this, because right now, the—on slide 29, it reads "Limited evidence suggests dietary patterns in childhood or adolescence that are higher in added sugars, refined grains, fried potatoes, and processed meats, while being lower in fruits, vegetables, whole grain, and low-fat dairy are associated with improved blood pressure and triglyceride levels in children and adolescents."

**[1:02:22]** And I think that's not what we intended. I think it's actually the opposite of that, right?



So, it's patterns that are higher in fruits and vegetables, whole grains, and low-fat dairy, while being lower in added sugars, refined grains, fried potatoes, and processed meats, are associated with lower blood pressure and triglyceride levels in children and adolescents.

**Dr. Carol Boushey:** Oh, okay. Yeah, I don't know if that was a typo or what, and I should have caught it while—I should have caught it while I was looking—saying it.

**[1:03:01]** That's probably why I stumbled over it.

**Dr. Barbara Schneeman:** Yeah, I think it's—

**Dr. Carol Boushey:** So, we'll swap that out.

**Dr. Barbara Schneeman:** Yeah, we were trying to make some of the slides parallel in the way they were worded, and so, as it's structured now, it would be associated with higher blood pressure and triglyceride levels, or if we switched the order of the food groups, it would be consistent.

But just to make it clear that it was an editing error and it will be corrected.

**Dr. Carol Boushey:** Yeah, right. Right. So, we don't—so, don't let this current document go out yet. If anything. But yeah, good, thanks, Jamy, for noticing that. That was really good.

**Dr. Linda Van Horn:** Hi, Carol, this is Linda.

**Dr. Carol Boushey:** You've been awake longer. Yes, Linda.

**[1:03:57] Dr. Linda Van Horn:** Hi. I just want—I would just like to follow up what Jamy was pointing out, because I do remember our discussion about this, and recognizing that, indeed, that that probably was a typo, and how we also pause to recognize that, when we were looking at the dietary patterns and obesity in children, we were also recognizing that that type of dietary pattern, i.e., and this is in I think slide 34, showing limited evidence, but definitely recognizing that same type of dietary pattern in childhood and adolescence, that are higher in added sugars, refined grains, etcetera, same list, and lower in fruits and vegetables are associated with increased fat mass index and BMI later in adolescence.

**[1:04:56]** And I think where we have yet to go with this is, again, the recognition that, in children, at least on the basis of the studies, limited as they may be, that we currently have available to us, there

is recognition that, in childhood, rapid or excessive weight gain in childhood triggers increased risk later in life for those very cardiovascular risk factors that we were examining.

And of course, in childhood, we're not talking about cardiovascular mortality.

So, I think what we are recognizing, thanks to the opportunity to look at life course issues related to diet over the life course and risk later in life, we're recognizing that that dietary pattern that we're recommending for adults, in terms of reduced risk of both obesity and cardiovascular disease, certainly applies to earlier initiation from the context of primary prevention of cardiovascular disease.

**[1:06:11]** So, I think that's what we're still in the process of exploring. And so, additional attention will be paid to our conclusion regarding this topic, I believe, as we are able to continue with some of the work, even the volume of papers that we've been reviewing. Thank you.

**Dr. Carol Boushey:** Yeah, and in fact, actually, I really apologize, because we clearly, on our last call, so and I didn't catch this at all, and I apologize, because we had actually wanted these, all of them to not be—to make sure that we marked them as being not final. I think that's what we had in our last phone call.

But not all of them got that marking, yeah, that these are—these are just—these are not final conclusions.

**[1:07:04]** But I see that wasn't clear in all of them. And so, I'm glad you noticed that, because we—I think we need to—we need to—I don't know how we should deal with this. This is done as a discussion amongst ourselves, and we have these slides. We'll share them with everyone.

So, I think we should edit them and have this—these be updated slides.

Because when we've—all the members would have copies. Isn't that right?

**Dr. Richard Mattes:** Yeah.

**Dr. Carol Boushey:** Yeah.

**Dr. Barbara Schneeman:** Yes.

**Dr. Carol Boushey:** So, I'm glad—

**Dr. Barbara Schneeman:** And the headers for each of these refers to draft conclusion statements. And Carol, I think I mentioned, just to remind everyone, and it may have been too early in Hawaii, that everything is draft until our report is submitted.

**Dr. Carol Boushey:** Oh, okay.

**[1:08:00]** That's really good. And I, Barb, I'm really sorry. I did miss your—well, part of it was a little glitch that happened, but I knew I wasn't going to be able to get on until 4:00 am, which happened. Yeah. 3:00 am was just asking too much.

**Dr. Barbara Schneeman:** We really appreciate it. Let's open to the committee as a whole for discussion and other questions.

**Dr. Carol Boushey:** Yeah.

**Dr. Richard Mattes:** This is Rick Mattes. Committee, can you comment? We received a fair amount of public testimony about the health benefits of very high-fat diets, and I guess high protein as well. Is the evidence base sufficient to address that question?

**[1:08:58]** Were the diets that you examined extreme enough to be able to draw conclusions about the value of that pattern, or is there just not an evidence base to speak to that?

**Dr. Jamy Ard:** Carol, I can—

**Dr. Carol Boushey:** Well, Jamy—yeah, I was going to say, Jamy and Linda can probably do better, but I—go ahead, Jamy. Yeah, go ahead.

**Dr. Jamy Ard:** Yeah, so this is Jamy. So, I think there are a couple of things to think about in regards to how we interpret the literature relative to that question.

So, the first thing is, Carol had pointed out, is that the range of diet, or the range of macronutrients outside of the sort of standard AMDR, the distribution range, was fairly limited.

**[1:09:59]** And I think in regards to things like high fat intakes, there were rarely studies that had fat intakes above 40 percent of calories, let alone in the range that you might see with a typical type of ketogenic or other sort of "high-fat diet."

So, there's definitely a difference in the literature that we have versus what people colloquially think of as a high-fat intake.

So, that's number one.

Number two, I think a lot of times, when people are, in the sort of common vernacular, talking about a high-fat diet, it's often in the context of a prescribed or intentional weight loss effort.

**[1:11:01]** It may not be 100 percent of the time, but most people are engaging in that type of intake because they are actually trying to modify their weight.

And we wanted to isolate the dietary pattern effect on body weight and these other risk factors. So, it was important to exclude studies where the intent was some type of weight reduction or energy restriction.

Now, there were some studies that were randomized trials and did not specify energy intakes and advised people on various dietary changes that resulted in macronutrients below or above the AMDR, but they're a very small number of those types of trials.

**[1:11:55]** So, I think in some, the body of evidence that we have is probably not going to be sufficient to fully address what people think of as a "high-fat intake," or on the other hand, a very low-carbohydrate intake.

The lowest carbohydrate intake we saw was 29 percent.

So, this does not match what people are actually talking about.

And then, I think the third point is, in all of the studies that we reviewed, where they were either above or below the AMDR, there's a fairly consistent pairing or relative relationship between the carbohydrate intake and the fat intake.

So, when the fat intake goes up, carbohydrate intake goes down, and vice versa.

**[1:12:57]** And so, if you call something a high-fat diet, it's also likely a low-carbohydrate intake, or if it's a high-carbohydrate intake, it's also a very low-fat intake.

And I think those things, you probably, in the eye of the beholder in terms of how they might want to characterize the particular dietary intake.

But with all of those sort of caveats aside, and the definitions in the literature that we had, it seems fairly equivocal in terms of small changes outside of the AMDR do not seem to be beneficial. And it's hard to know or understand why that might be except for getting down to try to understand what are the differences in the food group intakes when people are making those types of changes.

**[1:14:02]** Are they making changes that are, from a food group standpoint, less beneficial overall so that it nullifies what you might think of as a potentially helpful strategy? And it may not be a wise type of sort of area to focus in on in terms of just saying, "Hey, I've reduced my carbohydrate intake," or "I've increased my fat intake," or those types of things.

Simply saying those things alone doesn't mean that you're leading to a healthier dietary pattern.

**Dr. Linda Van Horn:** Yeah. And Carol, this is Linda again, just jumping in. Jamy covered most of it, but just for the record, these are delineated on slides 28, 33, and 37, giving further details regarding how we looked at some of these.

**[1:15:06]** It might be of interest to some to also realize there was only 1 study that was claiming to be a high protein diet. So, there's that in the mix as well. And of course, if you increase any of the macronutrients, it's going to alter the other two.

The other thing our committee had not had an opportunity to discuss, and Jamy was pointing out that, if this is intended for weight loss, that's a different set of criteria then, looking at overall—either—any of the other—cardiovascular, or diabetes, or obesity relationships.

And one of the things that we also quickly identified is that there are cross-cultural differences what we're recognizing, that, in a study among certain ethnic groups, where BMI, average BMI is 20, or 21, a high-carbohydrate diet is the norm, and is associated, within that culture, better outcomes.

**[1:16:16]** Whereas in cultures or countries where the average BMI, such as in the United States, is well above that. We have an overweight concern, obesity problem here.

Those kinds of studies are typically addressing something like overweight or obesity.

And again, the total number of studies that met our criteria were fairly limited in—at this point in time. That could change, and probably will, but for now, we had to work with what we had available to us.

So, I think those are further identified on some of the slides.

**[1:16:59]** And again, I'm sure we'll address all of this more specifically in the final conclusion statement.

**Dr. Carol Boushey:** Thank you, Rick, for bringing that up, because that actually—that was a salient piece of those messages to our group, too.

**Dr. Richard Mattes:** Yeah, I think it would be valuable to incorporate it into the discussion of this section.

**Dr. Carol Boushey:** Yeah, yeah. Thank you. That—

**Dr. Elizabeth Mayer-Davis:** And this is Beth, just jumping in, too. Beth Mayer-Davis. We have opportunity, ultimately when we write the report, to indicate areas that we think would be useful in terms of future research.

And it is interesting, throughout this process, how often we've actually identified areas where we certainly would like to have had a lot more studies of good quality available to us.

**[1:17:57]** And this is obviously an area where many people are very interested, in certainly lower carbohydrate intakes than were represented in the studies that we had. And so, this, and a number of other areas could be things that we could think about in terms of identifying areas for future research.

**Dr. Carol Boushey:** Right.

And I will tell you, being on this committee, because of this myself, I have, on the acceptable macronutrient distribution ranges, I have them everywhere. Become my new favorite table.

**[1:18:57]** **Dr. Barbara Schneeman:** So, comments or questions from other committee members, or even members of the subcommittee, you may want to amplify on something?

**Dr. Kathryn Dewey:** This is Kay Dewey. I have a general question regarding the outcomes where there were some randomized control trials as well as the prospective cohort studies. Can you

comment on whether the results of the randomized trials were generally in strong agreement with the rest of the body of evidence, or were there discrepancies?

And I think this is relevant to breast and colorectal cancer, cardiovascular disease, and diabetes.

And then, I have a follow-up question after you answer that.

**Dr. Carol Boushey:** Well, and I—you're absolutely right. They were not always aligned in that the—the results from the randomized trials were not as, what we'd say as positive as coming from the cohort studies.

**[1:20:11]** But I think that, unless you think otherwise, it'd be nice to give feedback on that.

We did try to take that into account. We did recognize that we're getting different streams of information. So, yeah.

**Dr. Kathryn Dewey:** Well, there could be many reasons why they don't align. So, what I think would be useful is, in the report, to make some comment about that and potential explanations for, if they're not in good alignment, to consider what the potential explanations for that might be.

**[1:21:00] Dr. Carol Boushey:** Yeah, and I think—I think it a thing with the strengths of it. It's not necessarily that—well I guess, no, not for some of them. It was—yeah, that's right, that we have some that are—we really batted around, but good point. We do need to go into that. That's a really good suggestion.

**Dr. Kathryn Dewey:** So, that then is my follow-up question has to do with the wording of the draft conclusion statement on slide 38, if somebody could put that up?

This is the only one, and this is the one for dietary patterns in adults, where, at the end of the statement, it says the used diet reduced the risk of developing type 2 diabetes. That's sort of a causal wording. All the other statements say, "are associated with reduced risk."

**[1:21:58]** And unless you feel really confident in the randomized trial evidence base, I would avoid the wording of "reduce the risk."

**Dr. Carol Boushey:** Oh, good catch. Beautiful catch, absolutely. Fantastic catch. Oh, my goodness. Good eye. Thank you.

**Dr. Kathryn Dewey:** Thanks.

**Dr. Carol Boushey:** No, thank you. I'm glad you're awake. Fantastic.

**Dr. Barbara Schneeman:** So, other comments?

**Dr. Steven Heymsfield:** Barbara, this is Steve. I have come comments from the current draft of the report. Who should I send it to? Liz?

**[1:22:59] Dr. Carol Boushey:** Oh, yeah, or bring it up at our next call.

**Dr. Steven Heymsfield:** Okay.

**Dr. Carol Boushey:** Isn't that Steve Heymsfield?

**Dr. Steven Heymsfield:** It is. It is. And I made a few technical edits to the draft.

**Dr. Carol Boushey:** Good. Yeah, because we can use this information to help us with writing our report. So, that'd be great if you found these various little blips.

**Dr. Steven Heymsfield:** Yeah.

**Dr. Linda Van Horn:** Carol, one other thing that I don't think was mentioned yet, that we discussed as a group, that I think is very timely in regard to the data that we're reviewing, and that is the whole idea of dietary patterns has triggered discussion based on scores of different dietary patterns that are out there.

And of course, it relates to AGI, and the Mediterranean, and DASH, etcetera.

**[1:23:58]** And I think we were all agreeing that part of the difficulty in this systematic review of the literature relates to the fact that, even the scoring of these different adherence levels vary tremendously.

The Mediterranean diet, of course, has a certain recognition currently as being healthy, but in terms of scoring it, even within and across various Mediterranean countries, those scores can be very different.



And yeah, what foods are included, and the assessment methodology that's capable even of scoring a US eating pattern using the Mediterranean diet scoring from a Mediterranean country can vary tremendously, because of course, if we're looking at something as specific as olive oil, the US just doesn't use that as regularly or as a typical dietary fat consumed by the American public.

**[1:25:09]** So, there are some inconsistencies and concerns as far as trying to, again, align even some of the patterns that are identified, due to the fact that we have these differences across scoring systems and the type of diet data that were collected, which is why, so often, we go back to the macronutrient elements to help us further differentiate and try to be more consistent across some of these studies.

So, just I think that was a very poignant message that our group was discussing yesterday. So, that further, hopefully, elaborates a bit about the difficulty of coming up with a standardized method to make meaningful conclusions from all these different dietary pattern studies, both the RCTs as well as the much more common prospective studies.

**[1:26:13]** **Dr. Carol Boushey:** And that might be a really nice way to highlight the NCI-initiated Dietary Patterns Methods Project that harmonized for diet quality patterns and then, indeed, were able to get the exact same, almost precisely the same results, even across the board.

So, that'd be a nice thing to highlight, and since it's very available, and because it does show that it can be done, and it's something that—so people can't say, "Oh, it can't be done." It can be done.

So, that's a nice—that's a good idea.

**Dr. Linda Van Horn:** You're an expert in that one, which is great.

**[1:27:00]** **Dr. Carol Boushey:** It's the only reason I knew about it. No.

But that's—no, it's great. It's a really nice message.

**Dr. Rachel Novotny:** Sorry, this is Rachel Novotny. I just—just thinking broadly across the work of the whole committee, thinking about Regan's presentation, and some—the allergies with the specific foods, and anticipating the beverages and so on, and this, with diet patterns, and if we're going to be able to—I suppose at least we could have an appendix, our groupings of

foods, but whether we can make any methodologic recommendations about food groupings for pattern—for moving into more patterning kind of work.

**[1:27:58]** And of course, ours would be focused on the US, but then, with an eye, and even in our own review, with other countries that use different systems with the naming of those groups. I'm thinking of there's a paper out by KD, where he's, for the purpose of prices, and he's come up with some nice kind of more global food grouping terms.

But at any rate, just thinking whether we can collectively come up with any methodologic recommendation about for future research on food groupings for future food patterning? I don't know if anybody dares comment on that, but at least the need to do that perhaps? Just a comment.

**[1:28:57]** **Dr. Carol Boushey:** Sure. Well, we did, you know, we did—it's actually—that's a really nice comment, because we are drawing upon these patterns coming from around the world. So, there is something to be said.

Maybe WHO has a committee on that?

But thanks, Rachel.

**Dr. Rachel Novotny:** Or even just starting, of course. Yeah, just starting, of course, with NHANES data, and the sources we're working with. Maybe we can say something. Anyway...

**Dr. Barbara Schneeman:** So, Carol, I think Lydia Bazzano was having a little bit of trouble calling in, but she sent in a comment in the presenter chat asking about describing the results of the group for the macronutrient manipulation in the report.

**[1:29:57]** I think, particularly for the randomized control trials, for what the thinking is about that.

And I don't know. You might be able to comment.

**Dr. Carol Boushey:** Well, I'm going to—yeah, that's—no, I think we kind of already sort of went over that, too, with some of the previous questions, that we need to outline that clearly and enumerate it.

Because it is, it's not just—it's with—I guess we only looked at it with overweight and obese. Is that right?

No, we looked at it for everything. So, it gets complex, but I agree.

**Dr. Jamy Ard:** Well, so, this is Jamy.

**Dr. Carol Boushey:** I'll put her in charge of it. We'll put her in charge of it. Jamy?

**[1:30:56] Dr. Jamy Ard:** Yes, I was just going to say, I think, in looking at those studies in some detail, and we haven't had a chance to fully review all of that, but actually, a lot of the randomized control trials are consistent with the prospective cohort studies in that they don't necessarily, one, achieve large differences in macronutrient distributions, and two, in some instances, actually in most instances, the types of changes that you end up seeing are either very small or not significant with regards to things like body weight.

So, this is—I'm speaking specifically about the growth, size, body composition outcomes.

**[1:32:01]** And I think, as there are, in that set for adults, there are 22 RCTs, and a lot of them, again, use words like high protein intake, but the high protein might be 31 percent of calories. And so, that's on the upper end of the AMDR, but it's not outside of the AMDR. And so, it may be higher than the sort of average population, for example, depending on the country, as Linda was mentioning.

So, I think, yeah, as you get deeper into those results, you start to see our thoughts about how we characterize these particular diets in the phrasing that we use, i.e. high or low is somewhat relative.

**[1:33:07]** And so, I think we just have to be really careful, as we've talked about before, when we describe these results, this is actually what we mean in terms of the percentage of intake, because, just like we said for Mediterranean diet, there's lots of different Mediterranean diets, there are lots of different things that people call low-carbohydrate or high-fat or high protein.

**Dr. Carol Boushey:** Mm-hmm.

**Dr. Heather Leidy:** This is Heather Leidy. I just have a couple questions. Can everybody hear me okay? This is the first time I've chimed in.

**Dr. Carol Boushey:** Yeah, the first time your voice is back. Very exciting.

**Dr. Heather Leidy:** Yeah, thanks. So, just a clarification. We know, when you looked at the macronutrient focus with this subcommittee, just to make sure I'm understanding it, most of the articles would have went from 2013 forward, right?

**[1:34:05]** So, when you look at the Dietary Guidelines' previous recommendations, it seemed like the dietary patterning, you're building on existing evidence, but the macronutrient focus wouldn't have been able to do that because that wasn't the focus in the past. Am I understanding that correctly, that the 2013 and forward focus was still with macronutrients, and so, it wasn't possible to actually go back and look at the totality of evidence around that? Is that correct?

**Dr. Carol Boushey:** To my knowledge, that was—the reason that it was at—and indeed, it wasn't originally in our task, either. It was the first meeting that we—it was our first public meeting that this appeared to be a huge interest of the public. So, that's why we put it in.

**Dr. Jamy Ard:** We have articles—

**Dr. Carol Boushey:** *[crosstalk 1:34:53]*

**Dr. Jamy Ard:** This is Jamy. We have articles in the abstraction that go from 2000 all the way up to present, to 2019.

**[1:35:11]** **Dr. Carol Boushey:** That's right.

**Dr. Heather Leidy:** Oh, okay.

**Dr. Jamy Ard:** It goes back beyond, yeah.

**Dr. Carol Boushey:** So, what happened, the ones we truncated were the ones we had papers with already. That one we couldn't truncate. So, any of the new ones go back all the way.

**Dr. Heather Leidy:** Got it. Yep. Okay.

**Dr. Carol Boushey:** But the ones we already had, we truncated those.

**Dr. Heather Leidy:** Yep. And then, my second—

**Dr. Carol Boushey:** But that's a good thing to clarify.

**Dr. Heather Leidy:** Well, good. And then, my second question is really around the—it was a really good discussion with everybody on that committee, on your committee. I'm just wondering, in terms of higher protein intake, and Jamy, when you had made the example of a higher protein diet of 31 percent, it's—anything that's still within the AMDR, even though they're on the higher ranges of what most people are consuming wouldn't actually have been—in essence, that would be out of scope from what you were setting out to do.

**[1:36:04]** I'm just wondering if those, the higher ranges of those, whether it's protein or any of the macronutrients, whether that actually would get captured in the dietary patterning approach? And I'm guessing the answer is probably no, because the dietary patterning is more along the lines of, I don't know, patterning names of diets, or food types.

And so, I'm just wondering if we're missing some studies where, obviously it's within the AMDR, and so, they're—I think that's a different question. But when they're higher than what most Americans are consuming, I'm just wondering if we're just missing a body of evidence with those studies because they're not meeting, really, they're not meeting the criteria for this—for what was—what the task you were given.

**Dr. Carol Boushey:** I—with these topic areas, I think it would have, but we can check with the staff that abstracted the abstractions.

**[1:37:05]** So, that would be Liz and Laurel are probably online.

**Dr. Heather Leidy:** And I'm not sure if that was—I'm not sure if I was clear in what I meant. So...

**Dr. Carol Boushey:** I think what may be—

**Dr. Jamy Ard:** I can try to—

**Dr. Carol Boushey:** It was, of course, it would only be related to the topics that we were examining, but we would have looked at the macronutrient distribution within that—those topics.

But you're right. If there's a topic that's not on here, we wouldn't have gone out and just searched the acceptable macronutrient distribution range on its own. I mean, so if there's a topic, like let's say you have a topic of—let's say you had a topic of pregnant women, which we didn't have, and we wouldn't have looked at macronutrient range among that population.

**[1:38:02] Dr. Heather Leidy:** Sure.

**Dr. Carol Boushey:** So, if that was there, we missed it. Because you're right. It's only within these topics that we had.

**Dr. Heather Leidy:** I think what I'm asking, if I use an example, and Jamy had brought this up so I'll just use it, the higher protein diet versus whatever. When you look at them on—search this value with the abstract, it might look like it could be potentially a dietary pattern, but it could actually be falling within that macronutrient distribution that's outside of the AMDR, but then when you actually do a full text approach, it's very possible that the majority of those studies are just on the higher range of those AMDRs.

And so, I think my question is, is would those studies have gotten excluded because they had a macronutrient focus that was outside of your scope, given that they were within the AMDR, or would they actually have gotten shuttled over to a dietary pattern?

**Dr. Carol Boushey:** Right. That's a good question. I should—that we should check with the abstractors to make sure.

**[1:39:00]** So, because did we keep it within our framework? Because that's—I would be—I would prefer to get confirmation. Because I don't—

**Dr. Jamy Ard:** Let me try to—

**Dr. Carol Boushey:** —think we went out of our way.

**Dr. Jamy Ard:** This is Jamy. Let me see if I can try to respond, because I think if I understand the question, you're saying, "Well, if a study made an adjustment in a macronutrient, but did not have that macronutrient target land outside of the AMDR, was that totally sort of pushed to the side, or would it have been captured in something else, like dietary pattern and obesity but not in the macronutrient distribution?" Is that what you're saying?

**[1:39:57] Dr. Heather Leidy:** Yep, correct.

**Dr. Jamy Ard:** Okay. So, nutrient distribution **[audio breaking up 1:40:07]**

**Dr. Heather Leidy:** Hello?

**Dr. Jamy Ard:** —pattern or intervention—

**[Crosstalk 1:40:15]**

**Dr. Carol Boushey:** Are we past the time?

**Dr. Heather Leidy:** I can't hear you.

**Dr. Jamy Ard:** Hello? Hello?

**Dr. Carol Boushey:** I think you're blocking out or...

**Dr. Jamy Ard:** Hello? No?

**Dr. Linda Van Horn:** Now we hear you.

**Dr. Jamy Ard:** You can hear me now?

**Group:** Yes.

**Dr. Jamy Ard:** Okay. I don't know what's going on. I'm on my landline. So, what I was saying was the way I understand it, is that for the macronutrient distribution question, the study had to have a macronutrient distribution in one of the treatment arms or groups that was outside of the AMDR, and it could be carbohydrate, fat, or protein, as it's shown on the screen.

**[1:41:07]** So, for that particular question, you had to have a—meet that inclusion criteria. Otherwise, yeah, I think if the study did not have a macronutrient distribution outside of the AMDR but met the other inclusion criteria in terms of a dietary pattern, then it's likely that it would have been or could have been part of the other literature around dietary pattern.

So, it just needed to describe the dietary pattern and then meet all the other inclusion criteria.

**Dr. Heather Leidy:** And I just brought that up because I think that's a tricky point then, I mean as far as knowing whether something is a pattern versus a manipulated diet from a macronutrient standpoint.

**[1:42:00]** And so, in looking at the summaries of a lot of the dietary patterns, they are very food-specific. And so, I think that was just why I brought it up, because I think a lot of those studies that are in

the AMDR but are manipulating macronutrients would probably not end up making it through from a dietary patterning standpoint, because a lot of them just don't describe the foods that are included within that.

**Dr. Carol Boushey:** Right. And we—the thing is, you bring up a really good point, but we couldn't think of any place else to put it, because you're right. It doesn't fit into the dietary pattern definition. But we can think of them as patterns of macronutrient.

**Dr. Heather Leidy:** Thanks for the clarification.

**Dr. Barbara Schneeman:** Great. So, are there other comments or questions at this point?

**[1:42:59] Dr. Jamy Ard:** This is Jamy. I just wanted to circle back to Kay's point, because I knew that there was something about that that I couldn't quite call at the time that she brought that up. But that conclusion statement in particular is one that was carried forward from the previous cycle. So, it's—that's the exact language from the previous DGAC report.

And so, this is one of those things that we have kind of talked about in subcommittees, but I don't know if other subcommittees have had this discussion, around those areas where we're not doing a formal update because we think that, well, the literature substantiates or validates the previous conclusion, even though there may be some differences in the composition of that literature.

**[1:44:06]** So, we didn't have as many randomized control trials as they had in the previous review. I think they had, based on my quick look, they had 8 randomized control trials, some of which we had carried over in our review because they reported some additional outcomes or something like that that were relevant.

So, that becomes an area where we need to get guidance or understand exactly what to do, because yeah, is it reduce because it just got carried over from the previous one, or is it associated with and that's based on a more definitive evidence review that we're actually going to do, rather than just a carry-forward?

**[1:45:01] Dr. Barbara Schneeman:** Great. Thanks for adding that in, Jamy, because it's an important point. And it is a topic that many of the subcommittees are looking at. How do they carry/build on the 2015, but also reflect the nature of the literature that they're evaluating?

So, are there other questions or comments?



**Dr. Carol Boushey:** You know, that's really interesting because science evolves on the way we look at exposures, the way we look at outcomes evolve. So, that's—this is something that will always take place, of that these descriptions might change over time.

**Dr. Barbara Schneeman:** So, I'm just waiting to see if there are any more comments coming forward.

**[1:46:00]** So, I'm going to suggest we take our break now, and we can resume again in about 15 minutes. So, maybe 3:05, and we'll have the—

**Dr. Carol Boushey:** But we can't hang up though, right? We can't hang up because we don't have another way in. Isn't that right?

**Dr. Barbara Schneeman:** Do not leave the website, do not hang up. Use mute. Because if you hang up, you may have trouble getting back in.

**Dr. Carol Boushey:** Right, right.

**Dr. Barbara Schneeman:** So, stay tuned in, but on mute, and we'll take a quick break and be back around 5 after 3 to resume again, 5 after 3 Eastern time.

**Dr. Steven Heymsfield:** Okay. Thank you.

**Dr. Barbara Schneeman:** Okay, great. Thanks.

**[Break 1:46:49-2:03:53]**

**Dr. Barbara Schneeman:** So, we're about ready to reconvene. And I just wanted to check and see if there were any more comments or questions before we move to the next subcommittee report?

Okay, I'm hearing none right away.

We'll go to the Frequency of Eating Subcommittee. Dr. Heymsfield, are you ready to present?

**Dr. Steven Heymsfield:** I am. Can you hear me okay?

**Dr. Barbara Schneeman:** Yep, we can hear you. I can hear you.

**Dr. Steven Heymsfield:** Okay. I want to start by thanking my committee members: Carol Boushey, Heather Leidy, Rick Mattes, and also, Ron Kleinman for his oversight of the committee.

And so, those of you who don't know, this is the first time this topic, frequency of eating, has come up in the *Dietary Guidelines*. And so, we were treading on new territory here.

**[2:04:56]** And as you'll see from the report, which we actually gave at the 4<sup>th</sup> public meeting in Houston, a couple months ago I guess at this point. And this is a summary of that summary report.

Just to acknowledge Regan Bailey's early presentation today, reporting on some aspects of frequency of eating, her report also will be included in some of the topics presented in our official report.

And I'll just give you a few examples for frequency of eating is the number of eating events or ingestive events over a 24-hour period, and Regan noted that the average for Americans is 5.7 eating events per day, and that includes snacks. 1/5 of our energy intake comes from snacks.

**[2:05:58]** So, this is a topic of great interest, not just from a nutritional quality perspective, but also for people interested in physiology. Frequency of eating has become a very interesting and important question, including water ingestion, which has a number of nutritional and physiological effects.

Now, to examine this topic, 41,000 articles were screened, and of them, 10 were included in our report, and they addressed 6 topics shown here: frequency of eating and all-cause mortality, eating during pregnancy and gestational weight gain, eating during lactation and postpartum weight loss, eating and growth, size, body composition, and risk of overweight and obesity, and frequency of eating and cardiovascular disease and type 2 diabetes.

**[2:06:57]** And we've heard a number of presentations today that address these topics. This one focuses very specifically on frequency of eating.

One of the most important aspects of our subcommittee's tasks was to define what frequency of eating is, and the frequency of eating in our evaluation is defined as the number of daily eating occasions as an ingestive event, and that includes pre-loads, meals, or snacks, beverages or foods, and beverages can be energy or non-energy-yielding.

We spent a lot of time developing these ideas, and we feel it's a very firm criteria for screening studies, one that will possibly be explored in future *Dietary Guidelines*.

The other thing we spent a lot of time on is that there are two types of studies that come up.

**[2:08:03]** One is observational studies, and the other is interventional studies. We developed criteria. We spent a lot of time developing and refining criteria for both of those types of studies that are included in our screening and in our report.

Okay.

So, the first question relates to "What is the relationship between frequency of eating and all-cause mortality?"

And when we screened on this question, we found no papers, no publications that met criteria, and therefore, our conclusion statement is very straightforward, that no evidence is available to determine the relationship between the frequency of eating and all-cause mortality, and accordingly, no grade is assignable.

**[2:08:59]** Very similar conclusion was for eating during pregnancy and gestational weight gain. Here, no papers came up on frequency of eating that met our criteria, and accordingly, our conclusion is that no evidence is available to draw conclusions about the relationship between the frequency of eating during pregnancy and gestational weight gain, so no grade was assignable there.

The third question was "What is the relationship between frequency of eating during lactation and postpartum weight loss?"

Here, we did find one study, and that study was actually done in Sweden, and it was a 12-week prospective study, and it had very ambiguous/neutral results, nothing that led us to conclude that there's sufficient evidence to make a firm conclusion, and therefore, we decided to rate this as insufficient evidence available to determine the relationship between the frequency of eating during lactation and postpartum weight loss, and no grade was assignable.

**[2:10:18]** Now, the next topic, "What is the relationship between the frequency of eating and growth, size, body composition, and risk of overweight and obesity?"

The most papers we had fell into this category. There were 6 of them. One was in children and 5 were in adults, and they were all prospective cohort studies.

And review of these 6 studies were quite ambiguous. There were a number of issues related to bias.

**[2:10:57]** And our conclusion was that there was insufficient evidence available to determine the relationship between the frequency of eating and growth, size, body composition, and risk of overweight and obesity.

The next question also had a publication, but again, it was only 2 publications we found on “What is the relationship between the frequency of eating and cardiovascular disease?”

And one of these studies related to the intermediate outcome of blood pressure, and the second related directly to the distal outcome of cardiovascular disease as a prospective cohort study. And neither of those shed emphatic results on this question, and of course, only 2 publications, and they differed in the outcome variables.

So, we concluded that insufficient evidence was available to determine the relationship between the frequency of eating and cardiovascular disease, and no grade was assigned for it.

**[2:12:07]** And the last question was “What is the relationship between the frequency of eating and type 2 diabetes?”

And here, again, there were 2 prospective cohort studies that we evaluated, both from the same group. They had slightly different outcomes that were looked at, different populations, neither of which allowed us to come up with any firm conclusions, and accordingly, our conclusion is that insufficient evidence was available to determine the relationship between the frequency of eating during lactation and type 2 diabetes, and so, no grade was assigned there.

We learned a lot going through the papers that we reviewed, and a number of things came up that are relevant.

**[2:12:56]** One is that the results were quite inconsistent and insufficient findings were present to draw conclusions about the relationships between frequency of eating and health outcomes.

A topic that came up a lot was water consumption is rarely quantified in studies, and it’s not mentioned, and very little information was obtained on the line of water.

On the prospective cohort studies, which were most of the studies we reviewed, the measures were inconsistent on frequency of eating. Assessments, eating frequency was often only assessed at baseline. Of course, that makes it difficult when you have studies that go out many years, knowing what people ate, not just at baseline, but at various time points.

The various comparisons were inconsistent across the studies. Both energy-yielding and non-energy-yielding beverages were inconsistently accounted for, and I mentioned the water question earlier.

**[2:14:01]** And the attrition rates were often high or unknown in a number of the papers we evaluated.

The reported outcomes varied across the studies, and the study populations often did not fully represent the race or ethnic and socioeconomic diversity of the US population.

And we had a number of drafts recommend—research recommendations. We're still pondering those, and maybe adding some more.

But the ones we have decided on, we feel there's a definite need to conduct more control trials, particularly randomized control trials.

There's a need to develop a consistent definition of an ingestive event that includes eating and drinking. This is a very important topic for future work. We did the best we could. We spent a lot of time thinking about our definition. But definitely, more work on that is needed.

**[2:15:00]** And more measures of eating frequency that are validated and needed. And there are mobile devices now that can collect eating frequency data, so this is a very interesting and actually evolving rapidly as a topic of research.

The studies on frequency of eating should report the number of ingestive events across 24 hours, a minimum of 3 days of ingestive event data, and on at least two discrete occasions, to allow assessment of reliability. This is a fairly high bar in many ways, but it's the one we used, and we have spent a lot of time, again, thinking about that.

Frequency of water consumption should be reported.

Key confounders should also be examined.

And finally, studies of food insecurity to allow isolation of voluntary versus involuntary ingestive event effects need to be considered.

**[2:16:05]** So, that's our report. We've done a draft document of our chapter. And I want to thank everybody for their contributions.

And the next step, obviously, is that these reviews will be peer-reviewed.

We have ongoing collaboration, as I mentioned earlier, with the Data Analysis and Food Pattern Modeling Working Group for the question "What is the relationship between the frequency of eating and achieving nutrient and food group recommendations?"

And Regan Bailey presented some very interesting findings this morning, which will definitely enhance our report.

And finally, we need to continue to draft the scientific report of our project.

Thanks very much.

**[2:16:58]** Okay, Barbara.

**Dr. Barbara Schneeman:** Great. Yeah, thank you, Steve.

So, let me just see if there are members of the committee that have any questions or comments?

**Dr. Elizabeth Mayer-Davis:** Yeah, this is Beth. So, I'm really happy to see that list of research recommendations. I mean, obviously, a lot of people are interested in this topic, and clearly, there's not very much to go on right now.

So, I'm wondering if your committee thought about the issue of timing of ingestive behaviors and how timing relates to frequency of ingestive behaviors, and what metrics one can come up with.

I mean I've heard various conversations that can be all over the map in this regard, and I wonder if, as part of the research recommendations, there might be some statement about the need for some agreement in the field about at least some key metrics.

**[2:18:01]** Because once you combine the frequency of eating occasions with anything about timing, you can pretty quickly end up with what you can imagine to be a very confusing and inconsistent literature that would be really hard to compare across studies.

**Dr. Steven Heymsfield:** Yes, that's a—Beth, that's a great question, one that we addressed early on. Originally, timing and frequency of eating were coupled together in our criteria, and very early on, we uncoupled them and only focused on frequency of eating, because the literature was very spotty in terms of timing of meal ingestion in relation to frequency of eating.

And I heard some interesting comments this morning in Regan's presentation, where she looked at both timing and frequency of eating.

**[2:18:57]** And I think it's a very interesting and important topic, one perhaps that we should add to the research recommendations, which we haven't.

And I'll ask Rick and Heather to chime in on that, also, if they have any suggestions.

**Dr. Richard Mattes:** Yeah, well—yes, it's an important topic that's basically unaddressed. The problem was the papers that reported on temporal patterns of eating didn't include the total number of eating occasions in a day.

And so, knowing a temporal pattern doesn't really give you the answer, because you don't know to what degree they compensated by eating at other times of the day. You really need both total number and pattern to be able to answer any questions.

So, that clearly would be a research recommendation that, if the study is interested in meal-skipping, or intermittent fasting, or eating late at night, or any of these variations on the theme, that, along with that, they have to report the total number of eating occasions.

**[2:20:09]** **Dr. Heather Leidy:** This is Heather. Just a follow-up with that. We actually have some paragraphs, I think, drafted, where we're emphasizing that issue and why it wasn't included in our scope as well. It's always hard to know where these conclusions are going.

And so, although it's not in our slides today, we do actually have that in our draft version of our document so far.

So, really great point. We struggled with that, because I know it's a really important hot topic, and just based on what our charge was with eating frequency, we just weren't able to go any further.

If it was the other way around, there are timing studies, but then, they obviously—the majority of them didn't control for eating frequency. And so, those studies just weren't included.

That's a really good point.

**[2:20:58] Dr. Steven Heymsfield:** Yeah, excellent. Thank you.

**Dr. Carol Boushey:** And in the recommendations that you had mentioned, the—is that we'll be able to, with that recommendation of using technology, and those will capture both. And so, that actually is—we can add that in.

**Dr. Steven Heymsfield:** That's right. I forgot about that, Carol.

**Dr. Carol Boushey:** And that will add more accuracy to the timing, too.

**Dr. Steven Heymsfield:** Yeah, that's right. Thank you.

**Dr. Joan Sabate:** Joan Sabate here. I know that in your topic, you have discussed in previous meetings, I mean the intake of water, but I don't know what conclusions you reached as far as your particular report, if just drinking plain water is considered an ingesting occasion or the discussions you have just taken as ingestion when there isn't any caloric intake associated to whatever foods or drink I mean is consumed.

**[2:22:09] Dr. Steven Heymsfield:** Well, we did define an eating occasion as including water ingestion, and so, that non-caloric beverages are included in our eating equation. So, Rick, do you want to talk about that a bit? Because I know that's an interest of yours.

**Dr. Richard Mattes:** Yeah. Well, we believe that water should be included because, when you drink, that influences what you eat and may alter how you metabolize what you eat. So, it's physiologically relevant.

The problem is that we really have no way to capture water intake. It's so easily overlooked in any kind of recall.



**[2:22:57]** And often, it is not a planned ingestive event, it's just you're passing by a drinking fountain or whatever. And those kinds of ingestive events are especially difficult to capture.

So, what we are proposing is that it be important dimension in studies, and that methodologies be developed to quantitatively assess it.

**Dr. Joan Sabate:** And besides the frequency of water consumption, did you encounter, in your review of the literature, that many studies that quantified the volume of water, plain water ingestion?

**Dr. Richard Mattes:** No, no. The short answer to that is no.

**Dr. Steven Heymsfield:** No. Right. Yeah. But to be clear, they had to be coupled to eating frequency, right? So, if they—the studies that had a number of ingestive events didn't have very clear picture of water ingestion.

**[2:24:05]** **Dr. Joan Sabate:** Okay, thank you.

**Dr. Steven Heymsfield:** Okay, Barbara?

**Dr. Barbara Schneeman:** Okay. Great. Just double-check, any other questions or comments?

Okay. Well, thank you, Steve, and thank you for the report from this subcommittee. You're clearly leading the way when it comes to report-writing.

**Dr. Steven Heymsfield:** Well, I wish we had more to write, but it definitely is a very interesting topic and one I'm sure will get more attention in the future.

**Dr. Barbara Schneeman:** Yeah. Well, I think at the last meeting, it was also pointed out that this becomes an example of the way we eat is—provides an interesting information.

**[2:25:00]** It's not just what we eat. And I think that's come out of your subcommittee discussion. So...

**Dr. Steven Heymsfield:** Right.

**Dr. Barbara Schneeman:** So, what I would like to do, since we have time, I want to just go around the way we usually do it, of go around the table to get comments from the committee members online. And obviously, I can't see you, so I'm going to just go down the list. If you

don't need to say anything, that's fine. If I don't hear you, I'll assume there's some technical problem.

But if you don't mind, I would just like to end the day by collecting those comments, just perspectives, observations you have about where we are right now and what you've been hearing.

So, I'll start at the end of the alphabet this time.

**[2:25:56]** So, Linda Van Horn? Do you want to comment?

**Dr. Linda Van Horn:** Oh, thank you. My goodness. Well, I guess really, I'm just struck with the amount of work that has gone on across and within each of the subcommittees. And just how exciting it really is to both discover what we have and uncover what we're missing as we go forward with some of these key questions and introducing some new topic areas.

I am further stuck with the opportunity that still lies ahead for us as a total committee to unite some of our respective key concepts, perhaps, in further writing of the overall report, because I think we are both building from what the 2015 group did so well, but also, recognizing some areas that I think really would benefit from further concerted effort research-wise to provide some data so that we can be better-informed and more systematic about some of the decisions that still lie ahead.

**[2:27:22]** And then, lastly, as I mentioned earlier, I'm just thrilled with the opportunity to look at the life course, starting at birth, and recognizing that what we eat, even starting in utero, really does lay some potential groundwork for long-term health and risk of disease.

And I think all of us recognize that diet plays an important role across that spectrum, but it's been not possible really to connect all these dots. And I think we're off to that direction.

**[2:28:01]** So, really just thanking everyone and appreciate the opportunity to participate.

**Dr. Barbara Schneeman:** Great, thanks. And Elsie, are you on? Elsie?

**Dr. Elsie Taveras:** I am on. I just want to second what Linda said. It's just an incredible and impressive amount of work that was presented today.

And also, second what Linda said about how important the findings that Regan presented this morning, about how diet is tracking and how important early life is, is an opportunity for change.

I'm hoping tomorrow, we might have time to talk about some of the questions that we might not be able to get to and how we might address that in our report.

**[2:28:57]** I know that, at least in my subcommittees, there are going to be some questions. And so, I'll hold that thought 'till tomorrow.

**Dr. Barbara Schneeman:** Okay, great. Thanks. Jamie Stang?

**Dr. Jamie Stang:** Hi, Barbara. Can you hear me?

**Dr. Barbara Schneeman:** Yeah.

**Dr. Jamie Stang:** Okay. I would echo what others have said and thank all of the staff. They have done a tremendous amount of work, and we couldn't be doing these presentations today without all of the expertise that they have and the many, many hours that they've put in.

And I guess overall, my biggest, having listened to the sessions today, my biggest takeaway is how consistent, when we actually get down to talking about the food components of, not necessarily the means of the diet, but the food components, how consistent they have been across the different health conditions and across the different life cycle times.

**[2:30:05]** It always seems to come back to the fruits, the vegetables, the legumes, the fish, certain components. And I think that that's exciting, because it means that we can have a consistent set of *Dietary Guidelines* that can probably cover many, many conditions and not have to have a lot of disparate recommendations for different conditions and different time points in life.

**Dr. Barbara Schneeman:** Great, thanks. Linda Snetselaar?

**Dr. Linda Snetselaar:** Yes. Certainly, I agree with everything that has been said. I think that the additions this time of sort of looking at things at earlier ages is incredibly important.

**[2:30:57]** And then, also, I am struck with the idea of how important dietary patterns, at least the way they're being looked at this time around, how important they are to the work that we're doing.

And that, I think, is incredibly important overall, because I, for example, see the dietary fats and seafood group also playing into some of what we're seeing with dietary patterns. And I think, in the end, we're going to have a very nice kind of overall consensus around what is truly important as we look at the *Dietary Guidelines*. Thank you.

**Dr. Barbara Schneeman:** Great. Oh, I'm next. So, I'll go to Joan Sabate.

**[2:31:57] Dr. Joan Sabate:** Okay. I think I agree on what most has been said, so my comment will be brief. I am happy that, in this iteration of the *Dietary Guidelines*, we also pay attention to the dietary patterns. That was kind of a new topic in the previous edition.

And but at the same time, I'm overwhelmed by the amount of literature that has been produced in dietary patterns. And I **[no audio 2:32:39]** this area, because, ultimately, I mean individuals do not eat nutrients or even isolated foods but eating a group of patterns.

And by patterns is not only the constituent foods, but also the timing, the frequency, and the distribution of the amounts throughout the day.

**[2:33:03]** And I think is important to note that there is not much literature on that, and the subcommittee has not been able to capture much information in this respect, but I do think that, in the future, I mean the amount, distribution, and frequencies, options of new locations during the day, I mean will be all so very informative.

**Dr. Barbara Schneeman:** Great. Thank you. So, Rachel Novotny?

**Dr. Rachel Novotny:** Yeah, thank you. Yeah, also still, I appreciate what others have said. Still thinking about integration, and in some ways, almost redefining food patterns or dietary patterns a bit more broadly to encompass a lot of what we've been saying to include: life course, frequency, food groups, other dimensions of eating.

**[2:34:21]** And just basically, how to—how to present that, whether—even whether there might be a graphic that might help us present that.

And then, in sort of practical way, wondering, even in the research recommendations, how those can all come together. I think we're starting appropriately with each group, but whether those can be integrated into some focal directions.

So, those are things I'm thinking about.

**[2:35:01]** *Dr. Barbara Schneeman:* Great, thanks. Tim Naimi?

*Dr. Timothy Naimi:* Yes, I don't have much to add, other than can I say thank you so much to all of my fellow committee members and to the staff who've put in so much work. And it's fun, now that we're really kind of seeing all the results coming through and thinking about how to integrate that into the broader report, which we'll be discussing tomorrow. So, thank you.

*Dr. Barbara Schneeman:* Great. Beth?

*Dr. Elizabeth Mayer-Davis:* Yes. So, one thought that I am having is that we are going to have a number of research recommendations, largely driven by the number of specific questions to which it turned out that there was just very little data, very few studies or studies of appropriate quality published in the literature for us to be able to address.

**[2:36:03]** And so, we have a number of situations where we have "grade not assignable" or "limited" as a result of not having those kinds of studies.

And so, I'm just wondering if there could be a process where we have some direct communication with societies that really are, and agencies that really do promote and fund nutrition research. So, obviously, NIH, American Society for Nutrition, The Obesity Society. There's probably a couple of others.

Just so that the research recommendations are actually seen and discussed and made more prominent.

Because there's just such a number of questions that I think are really important in public health and of great interest to the public, that we really would love to be able to have the data to work with and make something of.

**[2:37:02]** So, that's just a thought, to just really try to get the field to advance in the way that would really address these questions that are so important in public health.

*Dr. Barbara Schneeman:* Great. And that's something maybe we can come back and ask for some comments from our liaisons later, after we go through. So, Rick Mattes?

Rick? Did we lose you?

**Dr. Richard Mattes:** Oh, I'm sorry. I was muted there. I too have dietary patterning envy. That really, I think, is the future of trying to understand diet and health. We identify a number of food constituents – alcohol, sweetened beverages, fat, and so on – and we might look at what they contribute to the diet, and that's interesting and that's important.

**[2:38:00]** And now, we've gone to the level of, okay, intake of those is associated with various health outcomes, and that's important and that's interesting. But I think it's also very important that we go one more step to know to what degree do we know that intake of one food component actually, in some causal way, alters the food choices, the other food choices in the diet and their impact on outcomes.

And that brings into the whole equation cultural preferences and so on.

So, I see this as a progression, and we've just kind of opened the door to what we recognize as a needed next step.

**Dr. Barbara Schneeman:** Great. Thank you. Heather Leidy?

**Dr. Heather Leidy:** Yeah, hi. I don't have too much to comment on, except for I think this will come out a little bit more tomorrow, too, with the rest of the subcommittees.

**[2:39:05]** I don't want to call it a concern. I think for me, maybe it's just an internal concern. There are obviously criteria that we use in terms of grading, using the NESR grading rubric for different types of studies, and some of the joking comments that we've said, at least within some of our subcommittees, are "Well, we're a tough crowd."

And I think it's just concerning sometimes, where you have maybe one or two randomized control trials and maybe 15 or 20 observational studies, and I think at times, some subcommittees may rate those a bit differently than other subcommittees.

And so, it's just interesting to me that sometimes, with these, we'll get a moderate rating versus a limited. And although we still have the definitions, I think it's still challenging.

**[2:39:57]** I think we all know what a randomized control is, and the sense and limitations with those, and cohorts. But I think the interpretation of that data sometimes can be I think a little more gray in terms of the totality of the evidence.

I think, for me, it's just this process has just shown that it's just hard, because we all have our own tasks within the subcommittees, and I still think there's some gray areas in terms of overall grading of the overall findings.

And it's just a point to bring up. I don't think there's really nothing that we can do about it. I don't know if adding some context within our discussion sections could be helpful in terms of some—especially with all-cause mortality, it kind of warrants itself to have observational or a lot of the cohort studies versus maybe some of the others could be different.

I just think the interpretation of the data, whether we're talking about whether something is directly causing the effects. I feel like all of our summary statements are associative in nature, whether they're relationships or associations.

**[2:40:58]** And I think, for me, that's just a point of it's really hard to know how to write those up effectively.

**Dr. Barbara Schneeman:** Okay, great. Ron, I assume that you're on the phone, but I'd like to come back to you at the end.

**Dr. Ronald Kleinman:** Okay.

**Dr. Barbara Schneeman:** So, Steve Heymsfield?

**Dr. Steven Heymsfield:** Okay, thanks, Barbara. I guess the first instance that I want to say has been said already, which is I think it's critical to have all of these chapters and ideas integrated using the same language and the same consistency of recommendations.

I noticed, as I heard some of the presentations today, that they differed, not in major ways, but in modest ways, from some of the things that we've talked about in patterns and frequency of eating.

**[2:41:55]** So, obviously, there will be editing done, but I do think that's really critical.

The second comment I have is more of an editorial, and that is I come from a world where people do bench experiments, and they do randomized trials. And I led a group at Merck for a while in my career, where studies were done in a very rigorous way.

And as I read through many of these papers on food patterns and outcomes, so many of them were so weak, even though they ended up in our report, but their designs and their analysis strategies, and so on, were very weak.

And I think that if you go to the top journals today, like *JAMA*, *New England Journal*, these other journals, if you go to what they require when they accept a paper, it's becoming more and more rigorous, particularly, for example, longitudinal cohort studies and so on. They're very rigorous.

And I think it's important for our report to emphasize that how important it is to conduct studies in a very rigorous way so they can be included in our reports and that they have some real meaning.

**[2:43:08]** That's the major thing that I've learned in this whole process, is that there's a lot of weak literature out there and I think people need to ramp up how they do these kinds of studies. That's my part, Barbara.

**Dr. Barbara Schneeman:** Great, thanks. Sharon Donovan?

**Dr. Sharon Donovan:** Yes. I don't have too much more to add. I think I'm probably going to reiterate a little bit of what I talked about in Houston, in terms of the need for more data, particularly as we're looking at this B-24 and the pregnancy and lactation. We have very few studies to look at.

So, I'm echoing what Steve just said, and hopefully through the report, we'll be pretty candid in terms of the recommendations of the types of studies and study designs that are really required to make definitive conclusions.

**[2:44:09]** I also really enjoyed Regan's presentation this morning, to see what we're seeing in terms of the intakes of and patterns of feeding. And that will be very nice to integrate into our systematic reviews in thinking about how women are eating during pregnancy and lactation and how they're feeding their children.

So, again, looking forward to pulling all of the various parts together. I think—I don't know if you've noticed, we've been fairly siloed in our individual committees, and now we're just beginning to see the data on intakes, and also, the food pattern modeling, which is going to be very critically important, I think, to pulling it all together.



**[2:44:58]** That's all.

**Dr. Barbara Schneeman:** Thanks. Kay?

**Dr. Kathryn Dewey:** Yeah, thank you. I would like to build a little bit on what Sharon just said, and emphasize the need to link what we heard this morning on food intake and nutrient intakes to the other evidence that we've been looking at, and in particular, where are the largest discrepancies between the food intake patterns and the desirable dietary patterns that we heard about later in the day, where the easiest places to target for improvements.

And in addition, coupling what we know about the nutrients of public health concern with what the foods in the desirable dietary patterns can provide.

I know that part of that will be addressed with the food intake pattern modeling work that's coming up, but I'd love to hear more about some of these connections between the desirable dietary patterns and the actual food intake patterns that we have seen.

**[2:46:11]** That's all.

**Dr. Barbara Schneeman:** Great, thanks. Carol Boushey?

**Dr. Carol Boushey:** I—this is really difficult. Everything that people have said has been fantastic, and I—so the only thing I thought to add a little bit more, and it did come up from Jamie Stang, but I can't thank the staff enough. I know some of them must not ever go to sleep. And it's really been helpful to us.

This has been a lot of work, and I did wonder how we were going to make it through, and we have had to cut back on things, but the staff has been totally supportive and they, they work, work, work, until they get the item done.

**[2:47:02]** And I just think we're so lucky that we have individuals such as these folks who—we're just lucky that we have the opportunity to work with them, as well as all of the members of the committee, too. But I'm really grateful for their assistance.

**Dr. Barbara Schneeman:** Yeah, I don't think they'll miss us when we're gone. So, Teresa Davis?

**Dr. Teresa Davis:** Yes, so I'd like to echo the other committee members' appreciation of the staff. And they've just been fantastic in all of the hard work that they've done in providing information for us.

I also thank the subcommittee chairs for their excellent presentations today, as well as the committee members who contributed to these reports, as well as Dr. Schneeman and Dr. Kleinman.

**[2:48:03]** We have a lot of work to do ahead of us, and we're anxious to dive into that and complete the report.

One of the things that stood out to me, particularly from the presentations today, particularly this morning, was that there was data that suggested that dietary patterns are being established in early life, particularly in the 1-2-year-olds. And so, it's critical that they consume nutrient-dense foods.

And what they're consuming is reflecting what the family is consuming. So, the family needs to consume these nutrient-rich foods, because I think there's a lot of evidence now that nutrition during early life impacts our long-term health.

So, I think it's really important, and I'm so happy that this young age group, as well as pregnancy and lactation, is being included in this report.

**[2:49:03]** That's all.

**Dr. Barbara Schneeman:** Great, thanks. And Lydia, I know you've been having some telephone challenges. Are you able to speak?

Yeah, and I see that she's provided us a comment. She's "seconding Linda's comments about the life course nature of dietary intake, and more specifically, add aging as an important opportunity that should be taken up in the next committee's work."

"While we have sarcopenia as an outcome in dietary patterns, this is an issue specific to aging and should be covered in a life course perspective, along with other outcomes that are not yet covered."

And I think she also had had a question on collecting data on water consumption as "How can that be handled?"

**[2:50:06]** But I think that's something we can reflect in feedback to the subcommittee.

And hopefully, tomorrow, we will have you well-connected, Lydia.

So, Regan?

**Dr. Regan Bailey:** Hi, can you hear me?

**Dr. Barbara Schneeman:** Yes.

**Dr. Regan Bailey:** Hello? Okay, great. I think today highlighted for me, the complexity of measuring the diet. We talked about frequency and timing, amounts, whether meals and snacks, there's compensation, context, motivations like income, whether it's important to look at micronutrients or macronutrients or bioactives or water.

It's just really hard to measure the diet, and we're seeing that in a lot of papers are limited by they're only measuring one aspect and not others.

**[2:50:57]** So, moving forward, we need to be better as a research community at trying to capture this complexity in our work.

And I think while our questions all surround how diet relates to health, I think that the federal staff will also have to keep in mind issues of food safety that we haven't really talked about as a committee but are important to be vigilant of.

And then, just thanks to all the committee members and echoing how wonderful the staff is, but especially extending that to the Data Analysis team that are running all of the numbers that were presented this morning in my presentation. Thanks.

**Dr. Barbara Schneeman:** Great, thanks. And Jamy Ard?

**Dr. Jamy Ard:** One of the few times in my life I get to go last. Thank you, Barbara.

**Dr. Barbara Schneeman:** I did that special for you.

**[2:51:56]** **Dr. Jamy Ard:** I appreciate that. So, I think, for me, the thing that sort of sticks out now as we are nearing our impending deadline for producing this report, is what's the take-home

message, and trying to be as clear as possible for those folks who are creating a policy document and being able to translate this science into guidelines.

So, I wanted to be very clear, and also, sort of understanding what's the take-home message? What do these data say? What do they not say? And being clear in discussions that we had today about the limitations of the evidence relative to questions that people have around macronutrient intake, for example.

And, being sure that we get that messaging correct so that people understand this is what this means, and this is what this is limited in various ways so that we can have a report that sort of speaks for itself.

**[2:53:12]** So, that's it.

**Dr. Barbara Schneeman:** Great, thanks. And then, Ron, I want to come back to you.

**Dr. Ronald Kleinman:** Thank you. So, I want to really reinforce what all of you have said about the staff that we've been working with. Their work ethic is really incredible, and in particular, their flexibility as we pile on even more work every time we meet as a subcommittee. So, really, they've given us the pleasure of being able to examine this extensive evidence base and evaluate it in a way that is really exceptional.

**[2:53:56]** So, thanks once again.

I do think that, when we meet in this way, it's very impressive that, while we have a very focused task in front of us, it's impressive just how much overlap there is with what we're uncovering in our various subcommittees. So, this is going to be very important as we move into this next phase, and in particular, as we develop the integration chapter, which Barbara's going to talk more about tomorrow.

I particularly appreciated what Regan presented this morning. I think that really does reinforce and give us a different knowledge base to underpin the evidence that we've been discussing in our subcommittees in a very different way.

**[2:54:57]** So, I found that to be particularly enlightening.

If we had a way to link, now putting on my pediatric hat, if we had a way to link what a child in a family consumes to what the adults in the family are consuming, or even the older children, I

think that would really help us to understand the continuity of dietary patterns over time. And so, I hope that NHANES and other databases can find a way to do that going forward.

And then, I guess the last comment relates to cause and effect in methodologies, and I think it's going to be very important for us to, as we write this up and we get to the message sections, to comment not only on what methodologies we've used, but the limitations of those methodologies.

**[2:56:09]** And I'm thinking about the impact that this report is going to have, in the light of some very recent reports that have gained an awful lot of public attention. For example, the publications on red meat, or the letter that Kay provided yesterday around the impact of fat on cardiovascular—saturated fat on cardiovascular outcomes.

I think it'll be very important for us to talk about the methods that we've used versus others, where there might be discordant conclusions from what we publish versus what people have been publishing over the last year or year and a half.

**[2:57:04]** So, I think that's pretty much all I have to say without repeating what all the rest of you have said, which I completely agree with. So, thanks to all of you. It's been really a pleasure working with you, and I look forward to tomorrow. Thanks.

**Dr. Barbara Schneeman:** Great. Thank you. And I really appreciate everyone's comments, and doubly appreciate all of the effort that has gone into the reports that we had today and the further reports that we will have tomorrow.

I'm going to just check with Eve and Janet and see if there's anything they want to add, or was there anything in the comments you thought you might want to respond to or just add for the good of the order at...?

**[2:57:04]** **Dr. Eve Stoddy:** We can just quickly, in relation to Beth, your comment about research recommendations, I think research recommendations is one of the things I think is so important out of the work that you do, and the last few rounds, you've really tried to amplify that information.

That is one of the reasons why we had suggested in to pull those out separately into a separate chapter, so that they are all together rather than sprinkled throughout the report.

So, I mean we echo that we do think that's important. I know, a few years ago, NIH did create a national research road map, and they did look at the committee's report informing that road map. But there's certainly a lot of other opportunities.

I think presentations at public meetings or publications, I think there are other ways that the committee could, like I said, amplify that message.

**[2:58:58]** So, there are—we try to promote those, but I definitely think there are things in your activities that we could add after you finish the report if you all still want to work with us. If you all have time to do more, there's definitely ways that I think would be great to spread that word.

**Dr. Barbara Schneeman:** Janet's nodding her head.

Okay. So, I guess we're going to give people back 30 minutes of their time, and so, we will begin again tomorrow morning at 9:00 Eastern time, 9:00 am Eastern time. And we have several more subcommittee reports to go through.

And I did want to just remind you of the dates, in case some of you are not—some of you who are in the public webinar, are not on tomorrow, that if you do have comments related to some of the discussions you hear at this meeting, including today and tomorrow, please submit them to the committee by Friday, March 27<sup>th</sup>.

**[3:00:15]** And the ongoing public comment period, the general comment period, which opened March 12, 2019, will close at 11:59 pm Eastern time on May 1<sup>st</sup>. So, specific comments to today's meeting by March 27<sup>th</sup> to be most useful to the subcommittees, but you still have until May 1<sup>st</sup> for more general comments.

And then, just to remind you that we also will have a meeting on the draft scientific report Monday, May 11<sup>th</sup>.

So, again, we will convene tomorrow, and we'll be starting with, again, the cross-cutting working group, hear from that working group, Dietary Fats and Seafoods, Beverages and Added Sugars, and then have some committee discussion around the next step and where we're going with the report.

**[3:01:08]** So, with that, I think we can adjourn. Any—I'll just ask is there any last comments from committee members that you'd like to add at this point?

**Dr. Elizabeth Mayer-Davis:** I'm just glad the technology worked, at least for the most part.

**Dr. Barbara Schneeman:** For the most part, it did, yeah. Great.

**Dr. Carol Boushey:** Unless something shuts down, **[indiscernible 3:01:35]**. You're right. It worked well.

**Dr. Barbara Schneeman:** Yeah. Okay, so I look forward to virtually seeing you all tomorrow.

**Dr. Ronald Kleinman:** Thank you.

**Dr. Elizabeth Mayer-Davis:** Have a good evening, everyone.

**Group:** [Goodbyes]