

Afternoon

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[0:00:12] **Announcer:** And you are live.

Dr. Barbara Schneeman: Great. Welcome back. So, the first presentation we're going to hear is Dr. Boushey on chapter 8 on dietary patterns. Carol?

Dr. Carol Boushey: Hi. Thank you so much, Barbara. I want to give a shoutout to all the committee members listed here on this slide. And we divided up the work and depended heavily on support staff, but everyone pulled their weight and then some.

In addition, after the question from Rick Mattes, I do want to review the definition of dietary patterns, the quantities, proportions, variety, or combination of different foods, drinks, and nutrients when available, in diets and the frequency with which they are habitually consumed.

[0:01:10] And that was a special technical expert collaborative report with NESR.

So, next slide.

Yes, here's—the dietary patterns chapter reflects evidence the committee considered on the relationship between dietary patterns and eight broad health outcomes. Except for all-cause mortality and sarcopenia, these outcomes were addressed by the—all of the others were addressed by the 2015 committee.

The 2020 committee also examined studies adopting a new exposure, macronutrient distribution, defined as consuming at least one macronutrient outside of the Acceptable Macronutrient Distribution Range.

[0:02:16] As a reminder, to be included in the review on dietary patterns, studies needed to provide a description of the foods and beverages in the pattern. To be examined for diets based on macronutrient distribution studies, the studies did not need to report the foods and food groups consumed but did need to provide the entire distribution of macronutrients in the diet.

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All questions discussed in this chapter were answered using systematic reviews conducted with support from USDA's Nutrition Evidence Systematic Review (NESR) team. NESR's systematic

review methodology provided a rigorous, consistent, and transparent process for the committee to search for, evaluate, analyze, and synthesize evidence.

[0:03:12] The committee's work includes 23 draft conclusion statements across the 8 questions.

Nearly 500 articles were included in the NESR systematic reviews.

For dietary patterns, most conclusions revealed consistency across questions and were graded with Strong to Limited. The majority were graded Moderate.

For the diets based on macronutrient distribution, most conclusions revealed insufficient evidence is available to determine the relationship to health outcomes.

[0:04:01] One conclusion was Limited, while the rest were Grade Not Assignable.

Most evidence was found for middle-aged adults than other age groups. This is likely a function of endpoint outcomes of interest presenting later in life, for example, sarcopenia, all-cause mortality, cardiovascular disease. More evidence was generalizable to the US population, including those at higher risk of overweight or obesity.

Many studies examined were prospective cohort studies and randomized controlled studies— trials, and these were included in most of the reviews.

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The dietary patterns approach captured the relationship between the overall diet and its constituent foods, beverages, and nutrients in relationship to health outcomes of interest.

[0:05:02] The evidence base for associations between dietary patterns and specific health outcomes has grown since the previous review by the 2015 committee. For example, compared to the 2015 NESR systematic review on dietary patterns and cognitive impairment, dementia and Alzheimer's disease, the current review included about the same number of articles, that's about 26, for a 6-year period, as the previous review, 30 included from 1980 to 2014.

Many dietary patterns were identified in the evidence base with the most common ones defined using indices or scores such as the HEI-2015, DASH, a Mediterranean or vegetarian pattern, and there were also data-driven approaches.

[0:06:04] Next slide.

For adults, let's see, the 2020 committee accepts evidence in adults for the relationship of dietary patterns with eight broad health outcomes, CVD and associated risk factors, overweight and obesity, type 2 diabetes, bone health, cancers of the colon, lung, breast, and prostate, neurocognitive health, sarcopenia, and all-cause mortality.

So, I'm on slide 6.

For adults, evidence was considered Moderate or Strong for the association between dietary patterns and all health outcomes except for neurocognitive health and cancers of the prostate and lung, where the evidence was Limited.

[0:07:03] Insufficient evidence was available to evaluate dietary patterns and sarcopenia outcomes.

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The committee's examination of the association between dietary patterns and various health outcomes revealed remarkable consistency in the findings, and implications that are noteworthy.

When looking at the dietary patterns conclusion statements across the various health outcomes, certain characteristics of the diet were consistently identified. Common characteristics of dietary patterns associated with positive health outcomes as shown in this slide include higher intake of vegetables, fruits, legumes, whole grains, low or non-fat dairy, seafood, nuts, and unsaturated vegetable oils, low consumption of red and processed meats, sugar-sweetened foods and drinks, and refined grains.

[0:08:11] Those were lower, and I'll be showing those on the next slide.

Although vegetables and fruits were consistently identified in every conclusion statement across the health outcomes, whole grains were identified in all except one of the health outcomes examined.

Low or non-fat dairy, seafood, legumes, and nuts were identified as beneficial components of the diet for many, but not all outcomes.

A noteworthy difference from the 2015 committee report is that whole grains are now identified with almost the same consistency as vegetables and fruits as beneficial for the outcomes examined, suggesting that these three plant-based food groups are fundamental constituents of a healthy dietary pattern.

Legumes and seafood are also consistently identified.

And so, this blue graph here, it represents a summary of the data.

[0:09:04] So, if something isn't filled in, it doesn't necessarily mean it wasn't— isn't important, but it wasn't noted as much.

Common food groups associated with negative, now the orange slide, detrimental health outcomes include higher intake of red and processed meats, sugar-sweetened foods and beverages, and refined grains.

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The committee also considered evidence for dietary patterns and four health outcomes in children, overweight and obesity, type 2 diabetes, CVD risk factors and bone health.

Overall, the evidence was limited for overweight and obesity and CVD risk factors.

[0:09:58] The characteristics of dietary patterns associated with overweight and obesity and cardiovascular disease risk factors were similar to adults, including dietary patterns that are higher in fruits and vegetables, whole grains, and low-fat dairy, and lower in added sugars, for example, sugar-sweetened beverages, and processed meats.

Type 2 diabetes and bone health were both classified as Grade Not Assignable, indicating that insufficient evidence was available.

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The question of optimal macronutrient distribution in relation to health outcomes is of great public health interest, as demonstrated by the number of books, print media, and internet resources that address this topic, including diets that are low or very low in carbohydrates, high in fat, or promote higher intakes or protein.

In an attempt to address this issue, the committee reviewed studies where at least one macronutrient was outside the Acceptable Macronutrient Distribution Range established by the National Academy of Sciences.

[0:11:10] As a reminder, articles needed to describe the entire macronutrient distribution of the diet by reporting the proportion of energy from carbohydrate, fat, and protein.

The committee established this criteria in order to examine the entire distribution of macronutrients in the diet and not just one macronutrient in isolation. These criteria allowed the committee to both consider the relationships with health outcomes of consuming a diet with one macronutrient outside of the AMDR, and also, how consumption of that macronutrient displaces or replaces intake of other macronutrients within the distribution.

The committee did not label the diets examined as low or high because no standard definition is currently available for low-carbohydrate or high-fat diets.

[0:12:06] Instead, the committee focused on whether and the extent to which the proportions of the macronutrients were below or above the Acceptable Macronutrient Distribution Range (AMDR).

The AMDR is set by the National Academies of Sciences, has a range for adults, protein, 10-35 percent, fat, 20-35 percent, and carbohydrate, 45-65 percent of total energy intake.

Of note, the committee was not charged with evaluating the evidence for dietary patterns to treat disease, and the committee excluded interventions designed to induce weight loss or treat overweight and obesity through energy restriction, hypocaloric diets for the purposes of treating additional or other medical conditions.

[0:13:01] Its review was limited to consideration of macronutrient distribution in relation to reducing risk of overweight, obesity, and related health outcomes.

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The resulting literature was ultimately unable to address the specific outcomes of type 2 diabetes, growth, size, body composition, and risk of overweight and obesity, and all-cause mortality as framed by the committee, due to several issues with study design.

For cardiovascular disease, the evidence was graded as Limited.

The available literature lacked consistency in defining macronutrient distribution, such as low-carbohydrate or high protein, and most did not examine distributions at extreme ends of the ranges for multiple macronutrients.

[0:13:55] In many instances, these qualifiers were labeling macronutrient distributions that were within the AMDR. Studies assessed macronutrient distributions using various statistical methods, and several instances, all of the macronutrients of interest were outside of the AMDR, providing inadequate comparators.

Often, the variability in macronutrient proportions within and between distributions was limited and included only small deviations from the AMDR, providing insufficient contrast of diet comparisons.

A major challenge for the committee was that included studies generally did not maintain the overall dietary pattern as constant, and as a result, the effective differences in macronutrient distribution on outcomes could not be discerned from effects of diet quality and composition.

This made directness difficult to assess across the body of evidence.

[0:14:55] Ideally, to adequately address the question of how a difference in macronutrient distribution affect key health outcomes, studies should be designed to isolate the effects of macronutrients within the context of a constant dietary pattern.

For example, it would be possible to compare the effect of a low-carbohydrate, example less than 25 percent of energy, to a moderate carbohydrate within the AMDR, Mediterranean dietary pattern with specified foods and amounts and an isocaloric design. Overall, particularly given the level of public interest, future research is essential to further the understanding of the effect of altering macronutrient distribution outside of the current AMDR beyond diets currently used to treat CVD, obesity, or type 2 diabetes.

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[0:15:52] The 2020 committee examined dietary patterns and macronutrient linkages as a means of answering eight specific questions related to the broad areas of growth, development, and the risk of chronic metabolic, structural, neoplastic, and neurocognitive diseases.

The committee also examined, for the first time, the association between dietary patterns and all-cause mortality.

A consistent dietary pattern associated with beneficial outcomes was present across all seven of the reviewed questions for which grades of variable strength were assignable.

Higher intake of vegetables, fruits, legumes, whole grains, low or non-fat dairy, lean meat, seafood, nuts, and unsaturated vegetable oils, low consumption—with next going into low consumption of red and processed meats, sugar-sweetened foods and drinks, and refined grains.

[0:17:00] Dietary patterns associated with adverse or detrimental outcomes included higher intake of red and processed meats, sugar-sweetened foods and beverages, and refined grains.

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The committee developed this figure to conceptualize the importance of dietary patterns and the influence of diet quality on health outcomes. This figure depicts the connection between dietary patterns and its component parts. It demonstrates how foods, beverages, food groups, macronutrients, micronutrients are components of dietary patterns, as well as bioactive compounds.

Diet quality runs throughout each component of the pattern as adherence to a healthier dietary pattern increases, the pattern can play a protective role in health, and conversely, less-healthy patterns negatively influence health.

[0:18:00] The figure also recognizes that social determinants of health, such as food access, food security, settings and environments can play a role in influencing diet quality of a dietary pattern.

Additionally, individual factors also impact health outcomes.

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The committee's review supports the use of recommending dietary patterns to the US population.

Collectively, these observations have major implications for recommending dietary patterns to the US population. Although the patterns identified in the committee's reviews represent different named diets, such as DASH or Mediterranean, the committee's review conveys a public health message reflecting key foods across studies that in common comprise a healthy diet that promotes optimum growth and development while minimizing risk factors underlining the onset of chronic diseases.

[0:19:11] These public health messages are vital, especially in an era of undergoing an epidemic of non-communicable disease, including obesity, type 2 diabetes, cardiovascular disease, cancer, sarcopenia, and dementia, and that poses potential further immunological risks associated with infectious diseases as well.

These chronic diseases often have their origins early in life, as we just heard, highlighting the importance of initiating and maintaining a healthy diet across the life course.

As noted at the beginning, our subcommittee depended heavily on support staff and these individuals are highlighted here.

[0:20:03] Thank you.

Dr. Barbara Schneeman: Great. Thank you very much, Carol. And so, the presentation is now open for discussion or comments from the committee. Are there questions for Carol or the Dietary Patterns subcommittee?

Dr. Teresa Davis: Hello, Carol. This is Teresa Davis.

Dr. Barbara Schneeman: Yeah, Teresa. Go ahead.

Dr. Teresa Davis: Yes, so in the studies where you were looking at the effects of red and processed meats, were the red and processed meats lumped together or where they separate studies looking at red meat and separate studies looking at processed meat?

Because we know that the consumption of red and processed meats are generally associated with reduced exercise, reduced fruit and vegetable intake, increased refined grains, and so forth.

[0:21:02] So, there are certain other dietary patterns that are generally associated with the red and processed meats, and also, certain behaviors.

So, were you able to separate out the two, or are the red meat and the processed meats lumped together?

Dr. Carol Boushey: Really, that's a really good question, because with a review such as this, you really are—what is dictated is how the study was put together. And what I think that our table shows, if we go back up to that, that you'll find that red meat is actually in the positive group, that's positively associated with a healthful diet and outcomes.

[0:21:55] And it's also in the negative.

So, it's a case of—so it's either a case of what meat was used to describe the pattern, or other foods that were along with it. But that's one of those that will go both ways. You see lean meat is in—thank you for going back to that. So, lean meat comes up as being in the healthful patterns, and then if we go down, as you had noted, and you see that we're bound by how the studies described and separated them up, but then red meat also occurs in—as being a negative component, along with processed meat.

And you can even see then, the single one, because they used also high-fat meat.

[0:22:54] And so, this is part of the constraints that you have with when you're collecting all this, you have a lot of data that you get, but we are bound by what food was—what food or food group was identified by the study, but meat is one that's definitely a crossover component.

Dr. Heather Leidy: This is Heather. Along those lines then, would it be helpful to clarify under lean meat that it's actually you are including lean red meat? Because you see the red meat category in the negative, but you—it doesn't really come out that it could potentially be part of this beneficial, the blue table, because it just says lean meat.

So, were there studies that actually showed that lean red meat was favorable?

And is it—is that something that actually could be added for clarification?

Dr. Carol Boushey: We can go back and look at that, but what really is the driver of this is how it was described in the—how it was most frequently described in the studies.

[0:24:05] We're **[crosstalk 0:24:12]**

Dr. Teresa Davis: So, this is Teresa Davis. Does that mean that we need to recommend that studies be able to separate up the two of the red meat from the processed meat, or the red meat and the lean meat?

Dr. Carol Boushey: Well, that's—that's—that's an idea to put forward to somehow, when different patterns are put together, that if they want to distinguish different foods separately, then perhaps be more finite.

[0:24:52] One of the complexities that exists, I mean with most of these patterns are consist of maybe 5-20 different components, and it might even be a statistical issue as to how many can you bear. But these are—I think all of this is—I think all of this would be excellent for—to examine. I think these are good ideas as to how best to suggest what can we pull out to better separate these foods that cross over?

Because in essence, we have several crossover foods.

One that—

Yes, Rick, was that you?

Dr. Timothy Naimi: Oh no, this is actually Tim. I was also wondering though, because this is how the study described it, it's also possible that, on the blue table, for the lean meat, that sometimes, those are people that are actually using a combined category that might include poultry and seafood together, for example, or does that always mean that it's a lean meat other than fish or poultry?

[0:26:12] Dr. Carol Boushey: Right. That's absolutely right, Tim, as to that, indeed, that could actually represent a broader spectrum of meats.

Dr. Richard Mattes: Carol, just to reinforce where you were going with that, so grains would be another one of those. It shows on both sides. We differentiate it into whole grains and refined, but probably, there's three categories, whole grains, staple grains, and indulgent grains.

So, future work to differentiate those three classes probably would be useful.

Dr. Carol Boushey: The other one that, too, is dairy.

[0:27:00] Dairy's another one that likely could have several locations, too.

[crosstalk 0:27:13]

We do have documented, Joan, you're the king of this, is that we do have all of these foods documented in files. But Joan, go on. You're the one that waded through them the most.

Dr. Joan Sabate: Yes, I would like to add to the comments here. The names in this table are the ones that come directly from the conclusion statements for each one of these health outcomes.

And the conclusion statements were taken as literally as possible, although not 100 percent, but I mean the majority of the times, based on the names on the actual published papers.

[0:28:05] As you know, dietary patterns can be put into the analysis in different ways. And the researchers in different centers and in different countries, they use different names.

And I agree with this idea that has been presented, that lean meats sometimes means lean red meat, but in other occasions, or for other studies, that is basically to say that is fish and poultry. Nevertheless, I mean these names are taken from the conclusion statements, and that's what it represents.

Dr. Carol Boushey: And it does bring up an interesting idea about how do we harmonize these words?

[0:28:55] How do we—and we have an evolving food supply, so where—these are difficult questions, but we do at least have a fairly good message and results that the more healthful choices do come—have a lot of benefits.

Dr. Barbara Schneeman: Right. But it sounds like something that could be used to go back through the chapter and just, where it hasn't been explained further, point that out as a limitation or something that needs further work.

Dr. Carol Boushey: Good idea.

Dr. Heather Leidy: This is Heather. Because if I remember correctly, some of the summary statements, I don't know if it's in the discussion or the conclusions, has like parentheses saying that it's including whatever food, and I remember one, I can't remember the outcome, I apologize, it said including red meat.

And so, it might just be more of an awareness for like lean meat, that lean meat does in fact include lean red meat, and it's not just that red meat on the other side with processed meat has a detrimental effect.

[0:30:12] I think it's those types of things that it could just be misleading or just confusing to people because of the fact that it is in both categories, but the fact that red meat actually isn't listed as part of the lean meat category here, it might just be something to consider.

And then, just one unrelated topic, but we've had previous discussions, and I think I had mentioned this in our last in-person meeting, I just wanted to follow up with another comment on that.

With this subcommittee's decision, as well as others, sometimes strong evidence has been promoted when the majority of the studies are from prospective cohort studies, and I know with all-cause mortality, that has been one of the main ones where it's primarily driven by prospective cohort studies.

[0:30:54] So, Carol, can you just comment on why that the committee's decision was to include that as strong evidence versus moderate? It could be my interpretation. I think of strong evidence, in some of our other subcommittees, we talked about this, if something's really strong, it kind of suggests that additional research isn't needed, but the sense that there really aren't any randomized controlled trials that are tackling some of these topics, it's hard when you're hitting the ceiling of our range for limited to strong, and we're at strong with just prospective cohort studies.

So, can you just comment on that?

Dr. Carol Boushey: I think that the number of studies were so many. I mean it was—it was in the, I hope I'm not too exaggerating, but it was in the double digits, hundreds.

[0:33:54] Well, that might be an exaggeration.

But the number that consistently had the same result, and I'm a bit loath to recommend that someone do a randomized trial with death as an outcome.

And so, one of the ways that we can monitor this is take advantage of these studies that have monitored people, they've taken measures of them, and they've followed them over time. And so, when they die, it's—it's a natural death by what they—based on what their lifestyle was.

And I'm not sure. I haven't tried this yet. Sign people up for studies and say, "By the way, our endpoint is your death."

"And we're randomizing you." So, I think it's just something we might need to sort of maybe have an ethicist working with us to kind of deal with this, but—

[0:33:04] Dr. Heather Leidy: Just to be clear, I'm not suggesting that we have randomized controlled trials with that as an endpoint. I think that the concern that I just have is that it's just hard to go—it's strong based on observational evidence.

And I guess another question, and I apologize, I don't know, I forget the methodology with this, if there were multiple time points where dietary intake was collected over—with multiple times, that might be more informative.

[crosstalk 0:33:36]

Dr. Carol Boushey: Yeah, and some of them had multiple, but not—the majority do not. But some did have multiple.

So then, if they didn't, what they're addressing is dietary intake at a certain time, but they still somehow separate it out.

[0:33:58] Dr. Barbara Schneeman: So, Carol, if I could comment, one thing I recall when the all-cause mortality was presented at the public meeting, one of the things they talked about is that, particularly because you have the indices and the scores where you get almost a dose response effect, you start to see that the more you adhere to the dietary pattern, the better the outcome in terms of all-cause mortality.

So, with prospective cohort studies, I know some—the work with WHO, when you start to see that kind of relationship, that can help strengthen the observational data as well.

Dr. Carol Boushey: Right, yes. Good—that is so—that's a really—I'm glad you remembered that.

Dr. Joan Sabate: Joan Sabate here. If I can comment on that, Heather's question.

[0:35:03] Yes, I concur, I mean that clinical trials I mean probably is considered the highest evidence. However, they impact—I mean it's impractical to do a clinical trial with total mortality.

And the strong conclusion was based on several factors.

One is the large number of studies, that is over 100.

Two, the remarkable I would say coincidence in the results of those. There were no studies going in the opposite direction out of the many studies.

Also, the dose response effect.

So yes, based on all this, I mean the committee or the subcommittee I mean concluded that was strong evidence to propose these dietary patterns as related to total mortality.

[0:36:00] *Dr. Heather Leidy:* Thanks. That was really helpful. Appreciate it.

Dr. Barbara Schneeman: —the next presentation. This is a good discussion, but again, there's still opportunity for comments from the committee as we keep progressing.

So, the next chapter is Dr. Snetselaar, chapter 9, Dietary Fats and Seafood. Linda?

Dr. Linda Snetselaar: Yes, thank you.

This first slide shows you our subcommittee members – Regan Bailey, Joan Sabate, and Linda Van Horn, and our chair rep was Barbara Schneeman. And we very much worked as a team. I think that's important to note.

And many thanks to them for all the work that they did, and I will be recognizing the NESR team at the end of my presentation as well.

[0:37:00] Our subcommittee's review of evidence focused on the following questions included in chapter 9.

What is the relationship between types of dietary fat consumed and risk of cardiovascular disease?

And then, the second question, what is the relationship between seafood consumption during childhood and adolescence up to 18 years of age and risk of cardiovascular disease?

And third then, what is the relationship between seafood consumption during childhood and adolescence up to 18 years of age and neurocognitive development?

This subcommittee also examined evidence on seafood consumption during pregnancy and lactation and neurocognitive outcomes in the child, and updates to conclusion statements, discussion and recommendations for that population occurred earlier in today's meeting.

[0:38:05] The question on dietary fats and cardiovascular disease was answered using a new NESR systematic review conducted to build on evidence reviewed by the 2015 committee.

The questions on seafood were answered using new NESR systematic reviews.

Our subcommittee developed 23 draft conclusion statements across the three questions that I just mentioned.

For the first question on dietary fats and CVD outcomes, our review included 228 articles from 164 different studies.

[0:38:55] About 60 percent of the studies examined were randomized controlled trials. This review built upon the 2015 Advisory Committee's review of saturated fats. The conclusion statements were graded from Strong to Insufficient, but there was consistency in the findings across age groups and outcomes.

For the questions on seafood consumption during childhood and adolescence, our review included four articles from four studies reporting on CVD outcomes. 50 percent of these studies were randomized controlled trials.

13 articles from 9 different studies reported on neurocognitive outcomes. 1/3 of these studies were randomized controlled trials.

The majority of studies addressed developmental domain outcomes.

There was insufficient evidence or no evidence to determine the relationship for all outcomes.

[0:40:02] Our review of the studies which examined the relationship between dietary fat intake and cardiovascular risk in children found that diets lower in saturated fat and dietary cholesterol and higher in polyunsaturated fatty acids during childhood had beneficial effects on total and/or LDL cholesterol.

And we noted that this was particularly true in boys.

Two prominent sources of evidence for our review were the STRIP study and the DISK study.

Our subcommittee determined there is a need for more longitudinal randomized controlled trials involving dietary intervention among growing children to better understand how puberty, sex hormones, and male/female differences modify the effect of dietary fats on blood lipids and other CVD risk factors.

[0:41:10] Our review of studies which examined the relationship between dietary fat intake during adulthood and CVD risk was broken up between those which reported on intermediate outcomes, including total blood cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides, and those studies which reported on CVD endpoint outcomes.

As mentioned at previous public meetings, this subcommittee's review of dietary fats and CVD in adults built upon the 2015 Advisory Committee's review of saturated fats and cardiovascular disease risk.

[0:42:00] The 2015 review considered evidence prior to January 2010 and included landmark studies that dated back to the 1960s.

The 2015 conclusion statements were starting points as we reviewed and synthesized the evidence from the 191 articles in adults which were included in our own research, and that included 97 articles from randomized controlled trials and 94 articles from prospective cohort studies.

Our review determined that this more current evidence was consistent with the findings from the 2015 committee.

As I mentioned earlier in this meeting, we concluded that replacing saturated fat with unsaturated fats, especially polyunsaturated fats, had beneficial effects on total and LDL cholesterol.

[0:43:01] New evidence remains inadequate to differentiate among sources of carbohydrates and their impact on blood lipids.

Our committee discussed at length the importance of specifying the type and source of carbohydrate, whether it was simple or complex, and that was used as a replacement. However, few studies reported this information.

And I might add here that earlier, we discussed the concept also of defining simple and complex carbohydrate and how important that is.

Our review of dietary fats also included dietary cholesterol, which is important due to its cooccurrence with saturated fats in many animal-source foods.

There were only a few articles included in the review which assessed the relationship between dietary cholesterol intake and blood lipids.

[0:44:04] Among the articles that found significant results, higher intake of dietary cholesterol compared to lower intake significantly increased our results in higher levels of total and LDL cholesterol.

With regards to CVD endpoint outcomes, our review was also indicating that diets which replaced saturated fats with polyunsaturated fats reduced risk of coronary heart disease and CVD mortality.

The evidence was not as clear for replacement of saturated fats with monounsaturated fats, though there is an indication that plant-based monounsaturated fat sources may confer CVD health benefits.

[0:44:55] There was insufficient evidence to differentiate types or sources of carbohydrate as replacement for saturated fat and risk of cardiovascular disease. However, in the context of dietary patterns, benefits in CVD risk factors have been shown in dietary patterns that include whole grains and were lower in refined carbohydrates.

We found insufficient evidence examining dietary cholesterol and CVD endpoint outcomes. However, there was evidence from a longitudinal US study of 6 data-harmonized cohorts with a median follow-up of 7.5 years that supported a relationship between higher intake of dietary cholesterol and greater risk of incident cardiovascular disease and cardiovascular disease mortality.

[0:45:54] We recognize that the cooccurrence of dietary cholesterol and saturated fat in animal-source foods adds complexity to determining independent associations between dietary cholesterol and CVD endpoint outcomes. More research is needed, including feeding trials, to better isolate the effect of dietary cholesterol on blood lipids and risk of cardiovascular disease.

It's important to note that controlling for other cardiovascular disease risk factors, such as baseline blood cholesterol levels and BMI would be of value to the existing literature.

Our subcommittee also conducted two systematic reviews focused on seafood intake during childhood and adolescence.

One examined risk of developing CVD and the other examined neurocognitive development and health.

We found insufficient evidence was available to accurately describe these relationships.

[0:47:05] This is distinct from the conclusions we made in regard to evidence reviewed in the relationship between seafood consumption during pregnancy and neurocognitive outcomes of the child.

Few studies were available that examined seafood consumption during childhood and risk of CVD. Of these, several have serious methodologic limitations barring the development of a conclusion.

Evidence on neurocognitive development was predominantly null or favorable.

The committee's questions did not specifically focus on safety. However, the vast majority of analyses showed no detrimental relationship.

The evidence base was limited due to a variety of factors including an inadequate number of studies, inconsistency in results, risk of bias, and classification of exposures, and heterogeneity in outcome assessment measures for some domains.

[0:48:11] Additional research is needed in diverse populations to examine neurocognitive health outcomes. Researchers should use valid and reliable methods to assess the amount, the frequency, the type, the source, and cooking method of seafood consumed by children, and use age-appropriate, objective neurocognitive assessment tools.

Based on the totality of the evidence we reviewed, we recommend the *Dietary Guidelines for Americans* continue its current recommendation on saturated fat. Intake of saturated fat should be limited to less than 10 percent of energy per day by replacing them with unsaturated fats.

[0:49:03] This recommendation applies to adults and children ages 2 years and older.

We know that approximately 77 percent of Americans consume saturated fat in amounts higher than 10 percent of total energy based on statistics from NHANES data 2015-2016.

Because of the high incidence of CVD in the US population, the health effects of reducing saturated fat in the diet are of particular public health importance.

We recommend that Americans replace saturated fat with unsaturated fat by substituting some animal protein sources, especially processed meats, and certain dairy products with sources of polyunsaturated fat, such as seafood, seeds, nuts, legumes, and appropriate vegetable oils.

[0:49:59] This review focused on types rather than sources of dietary fats. However, the committee recognizes the importance of a growing body of research on food matrix and sources of fat, specifically saturated fat. Differences in the effects of specific saturated fats on cardiovascular disease are important to examine in future research.

Because humans have no dietary requirements for cholesterol and because dietary patterns that include lower intake of dietary cholesterol are associated with reduced risk of cardiovascular disease, we recommend the *Dietary Guidelines for Americans* continue its current recommendation on dietary cholesterol.

Individuals should eat as little dietary cholesterol as possible while consuming a healthy dietary pattern.

[0:51:01] We know that population-level dietary cholesterol intakes have decreased from the levels they were in 1980 when the *Guidelines* first recommended lowering cholesterol intake. However, NHANES data shows that mean dietary cholesterol intakes have increased in the recent years as shown in this particular table.

Currently, the mean intake of dietary cholesterol is 282 milligrams per day for the general population ages 2 years and older. This represents an increase in mean dietary cholesterol

consumption compared to four years prior when the mean population intake was 267 milligrams per day.

To avoid a progressive increase in dietary cholesterol intake, we concur with the current recommendation.

[0:52:01] For seafood intake in children, we recommend the following:

Two or more servings of cooked seafood per week are recommended for ages 2 years and older to ensure intake of key nutrients as a part of an overall healthy diet pattern. Serving size varies depending upon the age of the child.

NHANES 2013-2016 data indicates that only approximately 5 percent of US children and adolescents ages 2 to 19 years report consuming seafood at least two times per week with little variation by age group.

Increased seafood intake with emphasis on species higher in omega-3 polyunsaturated fatty acids and with low methyl mercury content would be advised.

The *Dietary Guidelines* should provide information on types of seafood to consume as well as those to avoid based on the methyl mercury content.

[0:53:06] For those following dietary patterns that do not include seafood, regular intake of other foods high in omega-3 fatty acids, such as flax seeds, walnuts, soy oil, algae, eggs that contain omega-3 fatty acids would be appropriate.

All these recommendations can be achieved within the context on overall healthy dietary pattern as described by the Dietary Patterns subcommittee.

And this slide acknowledges the incredible support that this particular subcommittee gave us, and this includes names of the NESR team who did a huge amount of work in terms of looking at various studies and working with us on the dietary chapter as well.

[0:54:06] And at this time, that concludes the review of chapter 9, and I thank you and would welcome questions if you have them.

Dr. Barbara Schneeman: Great. Thank you, Linda. Do we have questions or comments?

I'm not hearing any questions or comments.

Dr. Linda Van Horn: Maybe I'll just make one quick comment. This is Linda Van Horn. And just a point that I think, again in the spirit of looking at these types of topics over the life course, I think we as a group continue to identify opportunities for initiating a healthy dietary pattern intending to reduce risk for cardiovascular disease starting in childhood.

[0:55:23] It's not because of immediate impact on risk for cardiovascular disease. The obvious improvement in lifestyle behavior and an adaptation to a cardiovascular-beneficial diet starting earlier in life could, in fact, help in the long run as far as achieving better dietary adherence long-term.

[0:55:56] So, I'm sure this is true of a variety of different disease endpoints, including type 2 diabetes, etcetera, and discussions that we had repeatedly regarding prevention of overweight and obesity in children is a major focus in order to prevent the trigger that is often what initiates these risk factors that develop over time.

So, I think it seems important here, recognizing that there were in fact limited data, especially longitudinal data like the STRIP study, which has 20 years of data, that prohibit us from making a stronger statement, but there certainly seems to be evidence from everything we've reviewed that initiating these dietary behaviors early in life is helpful in the long run in terms of both reducing risk for developing overweight and obesity as well as adapting this type of dietary pattern and lifestyle for future benefits.

[0:57:17] Dr. Barbara Schneeman: Great. Thanks. Thank you, Linda.

Other comments or questions?

I think we can move to the next chapter, and that will be done by Regan Bailey for chapter 14, the USDA Food Patterns for individuals ages 2 years and older. Regan?

Dr. Regan Bailey: Thank you. It's good to be back.

So, I'm really presenting the work that was led by Dr. Jamy Ard, who is a physician and is in clinic today, so couldn't be here.

[0:58:02] But just really wanted to acknowledge and thank him for all the efforts as well as all of this subcommittee in terms of working through chapter 14 and the food pattern modeling.

So, these are the list of questions that we've had, and we'll go through each one individually, so I'm not going to read those to you here.

And Kay did a really good job explaining food pattern modeling and how we utilize it in this type of work, so again, I'm not going to read this particular slide to you, but we've gone over this extensively in previous meetings as well.

So, in terms of methods, something new that we worked on, in order to account for the variation in eating patterns across different age groups, the committee employed this new approach.

Proportions by life stage were calculated for ages 2-3, 4-18, 19-70, and 71 and older.

[0:59:02] So, using the nutrients in a representative food and the item cluster's proportional intake, using this life stage approach, a nutrient profile was calculated for each food group or subgroup. Thus, a nutrient profile specific to each life stage was developed and then used to estimate the anticipated nutrient or other food components in the pattern.

So, the patterns are derived by estimating target energy levels first, and then they're built to represent a variety of food groups that provide nutrients and fiber at levels recommended by the Dietary Reference Intakes.

So, in doing so, they're really at the individual level at this point.

So, we utilize an RDA to evaluate them when available, and an Adequate Intake if one is not available.

And again, these patterns are derived using the least amounts of added sugars and solid fats that are possible.

[0:59:58] So, the first question, are changes to the patterns needed based on the relationships identified in the systematic review?

And the answer was no. The three existing USDA food patterns will still be recommended, including the US Healthy-Style eating pattern, the vegetarian eating pattern, and the Mediterranean-Style pattern.

And so, the Healthy US eating pattern serves as the basis for the HEI. There were no additional patterns identified in systematic reviews that provided both a clearly-defined food pattern and were consistently associated with health outcomes across different life stages.

The second question is how well do these pattern variations meet the nutrient recommendations for each stage of life?

Well, they meet the RDA and the AIs for most nutrients with the ability to stay under the UL or the CDRR.

[1:00:59] There are four exceptions. Those are iron, vitamin D, vitamin E, and choline, and I will show you that data as this presentation continues.

So, Kay Dewey did a great job in explaining these types of graphs that we calculated, but just to go over them, this is looking at the main groups representative of, in this case, individuals 2-3 years of age, so these are the larger main food groups by sex. And again, the darker bars are the recommended range of intakes in a given pattern, and that's compared with the actual intake from NHANES for 2-3-year-olds.

So, you can see, for certain things like whole grains, intakes are well below recommendations, and intakes of refined grains are well above recommendations, even for these young children 2-3 years of age, whereas fruit intake in general is closely-approximating recommendations.

[1:02:09] We talked previously about how adolescents were a particular life stage that we were concerned about. And so, utilizing this life course perspective, we just wanted to show how the Healthy US pattern would be able to help achieve needs in this age group.

But you can see, again, there's some real deviation.

Whereas in younger children, intakes of dairy foods more closely approximate recommendations, we see that that really deviates here in 14-18-year-olds. A similar story with whole grains and low intakes of vegetables.

[1:03:00] And so, this is the last slide that I'll show you like this. This is looking at all adults age 19 and older.

And again, you'll see very similar, similar patterns across the life course.

So, this is a really, really busy slide, and I don't expect you to try to read those numbers, but there's a couple of things we wanted to convey.

First, you can see that there's multiple calorie levels. They're provided by sex as well as age group. Those all go into the food pattern modeling exercises to support our life course approach.

So, don't focus too much on these numbers, because this is just a sample pattern for 2 years and older, but the DRIs are for 1-3.

So, it's a little tricky, and again, that's one of those life stage things that we talked about where the DRI is 1-3 and the guidelines are 2 and older.

[1:04:02] And so, don't get too bogged down in that.

But note that when comparing the proposed patterns, we've utilized the RDA or the AI, which represents the recommendations for almost everyone in the population. So, for many of these, these percentages are likely to be pretty conservative.

We chose to show macronutrients and selected food components for which we identified intakes as being low in the US population rather than showing each nutrient or food component in this presentation, but they will all be available in the full report with a lot more detail.

So, this is, as we've mentioned, these patterns align with the Acceptable Macronutrient Distribution Range that's developed by the National Academies of Sciences.

You'll see, just following Linda's presentation, that the Healthy US-Style pattern also has an estimated saturated fat as a percent of energy that hovers around 7-8 percent.

[1:05:02] So, they're able to help Americans achieve the previous *Dietary Guidelines* for less than 10 percent of energy, but it should be noted that other authoritative bodies, like the American Heart Association, recommend even lower intakes of saturated fat to 5-6 percent.

Only 23 percent of Americans have intakes less than 10 percent at the current time.

So, this slide presents some calorie levels for pregnant women, 19-30. One DRI age group, but again, all the other age groups are in the report.

The patterns for the pregnancy macronutrient distribution align with the AMDR, again.

Just further supporting their utility.

I'd like to call out two things in these patterns. So, the first is that iron, we identified as a nutrient of public health concern in pregnancy, and the existing patterns provide lower than we would like them to amounts of iron, and it's just very difficult to get higher levels.

[1:06:19] I do want to emphasize though that these are just from food sources alone. We know that during pregnancy, 77 percent of women take a prenatal vitamin that has both iron and folic acid in it, so these are likely to be representing an underestimation, but as Sharon mentioned earlier, when a woman is lactating, the iron requirements or recommendations are even much lower.

And so, you'll see that even at a given calorie level how that changes the percent these patterns provide.

And then again, we've talked about the importance of folate, particularly in the first trimester, and that seems to be where the patterns are the lowest.

[1:07:05] But still achieving 86 percent of the folate RDA.

So, the nutrients that I alluded to earlier that were not being met by the current patterns, the first is iron for females 4-8, 19-30, 31-50. And for pregnant women.

The patterns achieve 30-45 percent of the RDA for children for vitamin D and approximately 55-70 percent for the rest of the population.

Vitamin D has always been tricky because it's not ubiquitously found in a high concentration in a large number of foods, and so, it's been very difficult and has been consistently identified as a nutrient of public health concern for that reason.

[1:08:00] The patterns provide less than 80 percent of the RDA for vitamin E, except for very young children. But as we talked about in previous meetings, vitamin E has been identified as a shortfall nutrient but not a nutrient of public health concern, because the low intakes seen from dietary data have not been consistent with the clinical or the biomarker data, which suggest very low risk of inadequacy of vitamin E from biomarkers.

And then, across all the patterns, choline was provided at about 85 percent of the adequate intake.

So, transitioning from a more nutrient to a more food-based, kind of what do these patterns look like?

So, across the first column, we have the main groups, for the most part. And then, the Healthy pattern, the Vegetarian pattern, and the Mediterranean pattern.

[1:09:02] And so, these are the recommended servings either per day, or for some of the protein food subgroups, per week.

So, I'll just call out a few of the major differences. And again, these are all styles. These are not prescriptive.

So, the Mediterranean dietary pattern style has slightly more fruit.

The Vegetarian style has more grains, particularly whole grains.

You'll see the biggest difference would be around protein foods, particularly in that Vegetarian diet has—is represented by more nuts, seeds, legumes, and eggs.

And so, again, as Kay noted, the Vegetarian is a lacto-Ovo vegetarian, and that is because, when participants in NHANES were asked about what type of vegetarian diet they were following, if they were, the vast majority were lacto-Ovo vegetarians.

[1:10:13] So, this was continued to be assumed, though we have no current data on that.

And then, the Mediterranean diet would have more seafood in it than, of course, the Vegetarian diet, which has none, and the Healthy US pattern.

But remember, these are all, for the most part, food subgroups. Individuals can customize and tailor these in any way or any fashion at a given calorie level. This is kind of a guide, if you will, to help people make the appropriate choices at the right calorie levels for them.

So, in this slide, I'm back to showing kind of food component level information across the three patterns.

[1:11:00] So, again, here, just 19-30 years for women who are not pregnant or lactating. So, this is just an example, but we have all of the age/sex groups in the report.

So, the main focus on this slide is macronutrients and selected food components where notable differences are underlined here for comparison.

So, you'll see that the Vegetarian pattern has more fiber. You'll remember this pattern from the previous slide had higher intakes of whole grains and legumes, which are both good sources of dietary fiber. It is lower in dietary cholesterol. And it provides some—

We should talk about this iron estimate, because if you just looked at the numbers, you would say the Vegetarian diet provides 91 percent of the RDA for iron, but if you read in the DRI chapter, the RDA is estimated to be 1.8 times higher for vegetarians.

[1:12:03] And so, if you take that into consideration, it would provide 51 percent of the iron, and that's because of the lower assumed intake of heme iron than non-heme iron, as well as higher levels of *phytate*, which may compromise iron absorption.

And then finally, is there current evidence to support supplementation or consumption of fortified foods to meet nutrient adequacy?

And I have nutrient adequacy underlined, because we're really looking at this in terms of meeting the Dietary Reference Intake recommendations.

So, we do support the use of supplements or fortification, foods that are fortified with iron for females, especially during adolescence and pregnancy.

[1:13:00] Vitamin D is, as I mentioned, has been a very difficult nutrient to get through foods alone. Of course, some UV exposure is assumed for older age groups in consideration of the RDA, but it's difficult to quantify and account for UV exposure here.

And as I described earlier, folic acid should be met before and during the first trimester of pregnancy to reduce the risk of neural tube defects.

And so, then I have some discussion slides to present to you.

With this and given the context of the data presented from chapter 1, the American diet is not now and has never been aligned with the *Dietary Guidelines for Americans*. Most Americans would benefit from making different food and beverage choices.

[1:13:00] The three patterns here, as I said, are just example patterns to help provide a context, but they are not a prescription for any person. They can be easily tailored to accommodate personal preferences in an individual context.

We, as a committee, did not address the cost of food and how this can be a barrier to access to healthy food options, but the USDA does have extensive work on this, on the CMPP website, where one can access information on how food plans can be tailored to meet recommendations at four different cost levels.

Energy balance always has to be given consideration, given the high prevalence of overweight and obesity in our nation.

We consider—we also have to consider how the food supply, and thus, the food industry plays a role in the production of foods. We've seen reductions in added sugars over time, as well as slight increases in whole grain.

Given the cross-sectional nature of NHANES, we can't know if this is because people are changing behaviors or if it's a concerted effort to produce foods with lower added sugar or more whole grains.

[1:15:09] We know that, from the trans-fat previous history, that reductions in dietary intakes were a result of the removal of trans-fat from the food supply.

And so, I guess the point that I'm trying to make here is just echoing and amplifying the work of previous committees that utilized the socioecological model or a systems science framework to aid in the promotion of positive dietary behavior changes, engaging multiple sectors and settings.

I guess I should have been advancing the slides. I'm just having a good time here in my office talking to myself. Sorry.

Okay, so we as a committee, recommend that the USDA and HHS, and future committees, continue to build on this food pattern modeling using this life stage approach that we identified, using different nutritional issues at different ages.

[1:16:05] We talked about the transition from toddlerhood. That becomes a critical time. Teenage years.

We also recognize the structural influences on dietary patterns at transition points, like when a child enters school or when an adult leaves the workforce.

We would envision this work to help proactively identify at-risk periods and times when dietary patterns shift. For example, young children have high HEI scores, but older children and teens have the lowest diet quality.

So, this transition from childhood to adolescence is complicated, and more work is needed to understand how to support those higher-quality diets from early on in life and throughout the life course.

The American dietary pattern, while extraordinarily complicated, is represented by a large proportion of energy coming from a really limited set of foods.

[1:16:59] So, helping consumers shift from energy-dense nutrient-poor foods and beverages consistent with the work that Carol Boushey presented from the dietary patterns subcommittee.

And finally, food pattern modeling can be expanded using techniques like linear programming to include other factors in the development of these types of patterns, including cross-cultural preferences, food availability, or any number of constraints.

So, in closing, the committee recommends to continue with the three established eating styles. They are represented by a number of core foods that have been identified and supported by systematic review of the literature.

And so, Carol just went over those types of foods, so I won't read those all to you again.

So, at the end of the day, once all nutrient recommendations are met, there's a little bit of energy that is left, that has been referred to as discretionary calories.

[1:17:57] So, after all nutrient requirements or recommendations have been met, there's still a little bit of room to customize for individuals on how they might want to include or use those calories if they want to remain weight-stable, of course.

If weight loss is a target, those calories may not need to be utilized.

Finally, and this is a huge finally, we need to help the public to shift dietary intake in healthy directions, including strategies for maintaining energy balance.

So, this has been a real joy to work with not only this committee, but all of the support staff, and we would be happy to hear any questions or comments that you have.

Dr. Barbara Schneeman: Great. Thank you, Regan. So, we'll open it up for questions or comments from committee members.

[1:19:00] I think Jamy Ard would be proud of the presentation you've given.

Dr. Regan Bailey: I hope so.

Dr. Barbara Schneeman: Any comments?

I'm hearing none. I guess we can move to the next presentation, which will be by Dr. Mayer-Davis on chapter 10: Beverages, and chapter 12 for Added Sugars. So, Beth?

Dr. Elizabeth Mayer-Davis: Okay. Can you hear me alright?

Dr. Barbara Schneeman: Yes.

Dr. Elizabeth Mayer-Davis: Okay, great. So first, Regan, thank you. That was a great presentation and you just made my life so much easier for these next two segments, so thank you for that. It's a team effort, that's for sure.

[1:19:59] Alright, so we're going to jump into beverages, and I hope everyone is still awake in this not quite so getting close to the end time in this webinar.

So, these are two questions that we had for this chapter that we're going to talk about today.

What's the relationship between beverage consumption and achieving nutrient and food group recommendations?

And we approached this using data analyses.

And then, the second question, what is the relationship between beverage consumption and growth, size, body composition, and risk of overweight and obesity?

And that, we answered using NESR systematic reviews.

So, for the first question, as you know, federal data were reviewed, looking at infancy through older adults, including women pregnant and lactating, and just recalling that we're focusing here on beverages.

[1:20:55] And so, analyses did reflect the most current NHANES cycle. We did present this information at a couple of the previous public meetings but wanted to provide a little bit of a summary here, just for context for the rest of what we're going to talk about, because as Barbara mentioned earlier, ultimately, we really do use all three approaches of data analysis, food pattern modeling, and the systematic reviews in our work.

So, the overall findings that we had in this case were that beverages such as 100 percent fruit juice, plain milk, and plain milk substitutes, do contribute considerably to some under consumed food groups and nutrients that are important.

They also can contribute a substantial amount of energy and added sugars in the diet.

So, it's a little bit of two-edged sword here in some cases.

And so, beverages contribute 13-18 percent of total energy across the different age groups and contribute 32-58 percent of added sugars intake across the age groups.

[1:22:08] Soda, fruit drinks, sports and energy drinks, and coffee and tea with additions are the top beverage sources of added sugars, and sugar-sweetened beverages contribute the highest percent of energy from beverages to the diet of all of those, but obviously, they typically contribute very little towards nutrient or food group recommendations. That's some context.

For infants and toddlers, older infants, the 6-12-month group, in terms of their beverage consumption, consumed predominantly human milk or infant formula. About a third consumed 100 percent fruit juice.

For toddlers, they consume a greater variety of beverages. Over half consume 100 percent juice, and the majority consume cow milk.

[1:23:00] 29 percent of toddlers consume sweetened beverages, and those account for about 27 percent of added sugars intake for that group.

For children, the proportion of children consuming milk goes down with age. So, about 65 percent for children age 2-5, and then down to 34 percent for those aged 12-19.

Milk and 100 percent juice account for about 50 percent of vitamins C and D for children age 2-5, about 40 percent for older kids, and the contribution of sugar-sweetened beverages to total beverage energy intake goes up with age, from about 19 percent up to about 44 percent.

And sweetened beverages account for about 32 percent of added sugars for kids aged 2-5, and then 39 percent for 6-11, and 49 percent for those aged 12-19.

[1:24:04] So, that's considerable.

And then, last for adults, water is consumed more than any other beverage, and the total volume of daily beverage is about 88 fluid ounces for those aged 20-64, and then goes down to about 66 fluid ounces for those aged 65 and older.

About half of adults aged 20-64 do consume sweetened beverages compared to about 15 percent of adults who consume diet beverages.

Only about 17 percent of adults aged 20-64 consume milk or milk substitutes, a little bit more for the older adults aged 65 plus.

So, with that as the background, our question two is what is the relationship between beverage consumption and growth, size, body composition, and risk of overweight and obesity?

[1:25:04] And this was from the systematic review that was done.

And we've presented a lot of this information before, but I wanted to, again, provide some context here.

So, for—first, a little bit of detail about the systematic review. For the milk, 100 percent juice, and low- and no-calorie-sweetened beverages, we did the literature search for the years back to 2000 up through 2019, whereas for sugar-sweetened beverages, we just looked at the years 2012-2019, which was because the 2015 Dietary Guidelines committee reviewed evidence on added sugars and health outcomes through 2012.

And the intake of added sugars included added sugars from food, as well as sugar-sweetened beverages, finding that those were associated with excess body weight in children and adults.

[1:26:07] Now, I'll also note that you'll hear more about sugar-sweetened beverages as those were considered as well in chapter 12 on added sugars.

So, from our systematic review, there were 12 draft conclusion statements based on 152 unique articles, and these were presented during the last public meeting, but again, just wanted to make sure we had the full context today.

And some summary statements here.

Milk and 100 percent juice were not associated with indices of adiposity, but the strength of the evidence for this conclusion was Limited.

There were no significant associations observed between the low- and no-calorie-sweetened beverages with adiposity outcomes in children, but the low- and no-calorie-sweetened beverage intake was associated with reduced adiposity in adults, although the grade for that was Limited.

[1:27:11] Among the beverage types examined, only sugar-sweetened beverage intake was associated with greater adiposity, and the grade for this was Moderate in children and Limited in adults. And again, this was presented previously, and this, as a reminder, was from that time period of 2012-2019.

The majority of studies did find a significant effect between sugar-sweetened beverage intake and at least one adiposity outcome but results for different outcome measures within a study very often varied with few studies finding significant associations across all the various reported outcomes.

[1:27:58] So, in summary here, in terms of draft evidence-based advice to agencies, when nutrient-rich beverages, for example, milk and 100 percent juice, are incorporated into the diet, it will be important to be mindful of their contribution to total energy intake.

And we recommend only limited intake of sugar-sweetened beverages. And again, we'll be revisiting sugar-sweetened beverages in the next segment, from the chapter 12 work on Added Sugars.

Although limited evidence, it's important to acknowledge that the low- and no-calorie-sweetened beverages may be a useful aid in weight management in adults.

And the role that beverages play in diet quality and energy balance does vary across the lifespan, and we've just heard a good bit about that.

And so, recommendations do need to be tailored appropriately across that lifespan.

There is a need for additional research related to beverage consumption.

[1:29:04] We looked at these various particular exposures, and we've shared those data. We really wanted to be able to look at beverage patterns, but those could not be examined because of the lack of available literature.

And by that, we're thinking in a way that is analogous to the concept of dietary patterns, in which we would consider beverage patterns as a function of the quantity, proportions, variety, or combinations of different beverages in the diet.

Beverage intake behaviors are also important to consider in developing guidelines, and you can think in terms of the time of day of consumption of these various beverages, the frequency of their ingestion, the typical and the range of portion sizes.

You can imagine how that varies when you purchase beverages and whether beverages are consumed alone or whether they're in association with foods.

[1:30:02] Future research should also address whether the form of the food, whether it's solid or liquid, or the mode of ingestion, whether you're drinking it, whether it's a spoon as a thicker beverage or a thick smoothie or something, whether that mode of ingestion may be relevant in terms of implications for health.

So, there really is a great deal about beverages yet to be studied and considered for recommendations.

So, that closes this much shorter presentation than the next, and again, as many speakers already have, I want to add my thanks to the support staff for the fabulous work that they do in support of our committee effort.

So, where there any questions about this presentation on beverages?

Dr. Barbara Schneeman: Beth, one thing that occurs to me, because you made some reference to what you're going to cover in the next one, I'm thinking maybe it would be good to go ahead and then discuss the two of them together?

[1:31:11] Dr. Elizabeth Mayer-Davis: Yeah, makes sense to me. I'm fine, happy to do that. So, I will carry on.

Okay, so added sugars.

So, the questions here are three that we'll talk about.

What is the relationship between added sugars consumption and achieving nutrient and food group recommendations?

And this, we answered using data analyses.

And then, the second question, what's the relationship between added sugars consumption and risk for cardiovascular disease?

And here, we focused on a NESR systematic review.

And then third, how much added sugars can be added or can be accommodated in a healthy diet while still meeting food group and nutrient needs?

[1:32:00] And this was answered using our food pattern modeling.

So, for this first question of added sugars and achieving food and nutrient recommendations, again, using the most current NHANES cycle available, although there were some earlier cycles used when we wanted to make some comparisons over time.

And so, here are some of the main findings briefly.

In the US population, for individuals aged 1 year and older, the usual—excuse me—the mean usual consumption of added sugars was about 13 percent of daily energy intake, and that was for the 2013-2016 data.

The estimated proportion of the population that met the current guidance, which is to consume less than 10 percent of energy from added sugars, has increased from 30 percent in 2007-2010 to 37 percent in 2013-2016.

[1:33:04] So, that's a win. That's progress, anyway.

Now, thinking about added sugars, nearly 70 percent of added sugars come from five food categories – sweetened beverages, desserts and sweet snacks, coffee and tea with additions to those beverages, candy and sugars, and breakfast cereals and bars.

That's a little bit of background.

And now, looking at this question of added sugars and cardiovascular disease risk and a review of the science. Again, we presented this before, but the full context of this effort is important.

So here, we looked at what is the relationship between added sugars consumption and risk for cardiovascular disease? And this was addressed with a NESR systematic review for literature published September 2012 through September of 2019 and noting then that the 2015 dietary guidelines committee had examined literature that went back to January of 2000 up to August of 2012, so that's obviously why we picked up with September of 2012.

[1:34:23] So, for this question, there were 23 articles that met our inclusion criteria, just 3 articles in children and 2 in adults, and those represented—actually 20 studies, and most of these were prospective cohort studies, although there were a small number of RCTs.

So, the conclusions from that review were that there was limited evidence of a relationship between greater consumption of added sugars and increased risk of cardiovascular disease mortality, and that was based on 8 studies.

[1:35:03] Most of those were based primarily on sugar-sweetened beverage consumption.

And there was insufficient evidence in children to answer this question. There were 3 studies there.

And insufficient evidence in adults for CVD risk profiles, ischemic cardiovascular events, peripheral arterial disease, and stroke.

So now, this is new information that will take a little bit of time to go through, and this is the third question, accommodating—related to accommodating added sugars using food pattern modeling.

Now, there were three exercises that were done to address this question, and so, I'm going to go through each of those three. This is the first one.

So, for this first exercise, the idea here was to estimate the number of calories in the base USDA food patterns that can be available for added sugars.

[1:36:04] And so, the methods here were to identify the amount of essential calories in the base USDA food patterns and to assign any remaining calories exclusively to potential intake of solid fats and added sugars.

So, a couple of things to note here that are actually quite important to understand what was actually done.

Which first to say, that for the base USDA food pattern, this was constructed using selection or assuming selection of nutrient-dense representative foods that contain low or no saturated fat, added sugars, and sodium.

So, for the different food groups, again, a nutrient-dense representative food was selected, and it's not that that selected food would be absent of any added sugar or saturated fat or sodium, it's that it was a representative food that was nutrient-dense, so it was low in those components.

[1:37:08] And then, it is worth taking a moment to define this term of essential calories, and that is the energy associated with the foods and beverages ingested to meet a nutritional goal through choices that align with the USDA food pattern in the forms with the least amount of saturated fat, added sugars, and sodium.

Okay. So, let me walk you through this slide. I actually have three of these slides with different things highlighted and this is actually very important, as you will come to see by the end of this particular presentation.

So, if you look on the left column of calories, there's a red bar around the 2,000 calorie mark, and it turns out that when you select the representative food that's nutrient-dense, in order to

achieve that USDA food pattern, you use essentially the 1,770 calories, and you then have 230 calories that could be used for solid fats and added sugars.

[1:38:26] And for those of you with a photographic memory, you actually will recall that you've actually seen that number of 230 on previous slides, in earlier presentations.

So, for those 230 calories, based on what is consumed in the population, there was a split of those calories assuming 55 percent of calories would come from solid fats and 45 percent of those calories could come from added sugars.

[1:38:55] And that leads to consumption of 26 grams of added sugar. That's the second to last column on the right. And that turns out to be about 5 percent of calories from added sugars that would essentially fit into that 2,000 calorie plan.

So, with exactly the same layout, you'll notice, focusing on that last column to the right, that we're now seeing 8 percent of calories from added sugars that could be incorporated into this 3,200 calorie level diet. And that's the highest calorie level that you see on this slide, and that's also the highest percent of calories from added sugars.

And one more of these slides.

There's a block of calorie levels from 2,400 up to 3,000, and as it turns out for all of those, what can be accommodated in these food patterns is 6 percent of calories from added sugars.

[1:40:11] So then, summarizing those tables, the energy required to meet food group and nutrient needs using energy-dense food choices takes about 85 percent or more of total energy across most energy levels.

And assuming that the remaining energy is distributed exclusively to solid fats and added sugars, according to population proportional intakes, meaning no alcohol, that leaves you with less than or equal to 6 percent of additional calories that are available for consumption of added sugars for most energy levels, and less than or equal to 8 percent of additional calories just for the highest energy level that was analyzed, which was that 3,200 calorie level that I showed you.

[1:41:07] And again, these scenarios assume that individuals consume just the recommended amounts of nutrient-dense foods and beverages with no calories from alcohol in order to have available to them that amount of additional calories available for added sugars.

Okay, so then there was the second exercise, and this is about redistributing calories, and specifically, it's redistributing calories from those top sources of added sugars to foods and beverages that could instead achieve food group and nutrient goals.

And you'll recall that there are some food group and nutrients of public health concern. And so, the question is, can you redeploy some calories otherwise coming from added sugars in order to better meet those needs in terms of the under consumed food and nutrient goals?

[1:42:09] So, the methods here, we calculated—well, I didn't do any of this work actually. So, the team calculated calories from the top 5 contributing food and beverage sources of added sugars and quantified mean intake across five food groups to identify those that were under consumed, and then reassigned calories from the food and beverages sources of added sugars in order to increase intake of under consumed food groups.

And I'll give you some examples of how this actually played out.

So, let me take a minute and explain this graphic that I was really excited to see. I thought this was a really cool way that the food pattern modeling team put this information together.

[1:43:00] So, on the graphic, on the figure, what you see is there's a green diamond that is the actual intake of the food group. There's fruit, vegetable, dairy, and protein foods.

And then, there's a blue bar that gives the range of recommended intake.

And this particular graph is for females aged 14-18, and you can see quite a gap between the green mean intake and the blue bar of recommended intake.

And then, you see a red triangle. That red triangle represents foods that could be added by redeploying those added sugar calories to a nutrient-dense selection from fruit, from vegetables, from dairy, from protein foods.

And so, then what you see in the table, the adjacent table, is the theoretical improvement in nutrient intake through that reallocation of energy from sources of added sugars to nutrient-dense fruits, vegetables, dairy, and protein foods.

[1:44:10] And you see that, here, there are 217 calories from added sugars that are redistributed, that they're redeployed, and the estimated improvement then, or contributions from those

reallocated—that reallocated energy from added sugars gives you an extra 490 milligrams of calcium, an extra 2 milligrams of iron, 1,178 of potassium, and an extra 18 grams of protein.

So, that represents the—basically the benefit to achieving appropriate nutrient intake for those nutrients from this redeployment of calories.

And this was for females age 14-18.

[1:44:58] And again, there are three of these examples, so this is the same thing, the same exercise for females age 51-70 years of age, looking at fruits, vegetables, and dairy.

And here, with the redistribution of 150 calories, there's a theoretical benefit of an additional 350 milligrams of calcium, 2 grams of fiber, 480 milligrams of potassium—whoops! Somehow this—what happened?

Okay, there was a ghost. Anyway, a gremlin, a slide gremlin. Anyway.

And then, 1 microgram of vitamin B12.

So, that's the potential benefit of the 150 calories redistributed.

And then, the last of these examples is for men aged 31-50 years of age, redeploying 230 calories through nutrient-dense choices of fruit, vegetables, and dairy to improve calcium intake by 349 milligrams, fiber by 5.3 grams, and potassium by 862 milligrams.

[1:46:17] So, those are some examples of redeploying calories from added sugars to improve food and nutrient intake.

So, in conclusion from that exercise, this exercise number two, these 5 food categories contribute the majority of added sugars in the US population, and often, those energy-dense foods with low amounts of key dietary nutrients are providing just those added sugars and really not a lot else.

And redistributing energy from those, those sources, towards under consumed food groups and nutrients really can have a very significant positive impact on overall diet quality and nutrient status, such that, for each of the age/sex groups, individuals could better meet food group recommendations, particularly for fruits, vegetables, and dairy, and increase consumption of key nutrients that are contained in those food groups.

[1:47:23] And then, the last exercise, exercise three, has to do with typical choice analysis as opposed to choice of nutrient-dense foods, and this one is really pretty straightforward, in which you can estimate the excess calories coming from added sugars when the USDA food patterns are met through selection of typical foods versus selection of nutrient-dense foods.

And so, the methods here were to calculate the food patterns with typical rather than nutrient-dense choices, and then to identify the contributions of added sugars to total energy in those patterns when constructed with the typical choices, so you can really see what difference it makes.

[1:48:08] And I just have one figure to show the results here and let me walk you through this.

If you look at the lower bar, this is for 2,000 calorie level, and that first gray bar that's to the right, you see the 230 calories, and I've highlighted that value before, and that's the number of calories remaining after selection of the appropriate number of servings of these food groups – fruit, vegetable, grains, protein foods, dairy, and oils.

And that's when nutrient-dense foods are selected.

The bar above that, what you see would be the results for typical foods that actually are selected, and for each of those food groups, in the lighter color of any of the colors, you can see the additional calories that are coming from solid fats and added sugars.

[1:49:09] And you see the difference in total calories when that happens, when you switch from the nutrient-dense choice to the typical choice, the difference in energy is actually 264 calories.

So, that's just an example of the difference in total between choice of the nutrient-dense foods versus the typical choice that's actually made in the US.

[1:49:54] So, a conclusion statement for that exercise is that the typical choice rather than nutrient-dense choice leads to higher total energy intake, and a converse of that, if consumers meet recommended quantities from each food group or subgroup, but they don't choose the nutrient-dense foods, they will exceed their daily need in terms of energy.

And now for discussion.

Clearly, a high proportion of total energy is accounted for by added sugars, and the totality of evidence does suggest that limiting consumption of added sugars should be, at most, to very low amounts.

Now, there are limitations within the body of evidence that need to be considered, and these are given in some detail in the chapter.

There are certainly some challenges in exposure assessment for added sugars, and most studies focus on sugar-sweetened beverages, which is certainly a significant part of and a marker of added sugars but does not necessarily reflect all of added sugars.

[1:50:56] And many of the observational studies don't assess change in intake over time or don't properly incorporate that information into the statistical methods that are used.

And there are a limited number of well-done randomized controlled trials.

Nonetheless, there are recent systematic reviews and meta-analyses that provide additional supporting evidence of adverse effects of added sugars, particularly sugar-sweetened beverages, that may indeed contribute to unhealthy weight gain and the whole range of obesity-related health outcomes.

So, the *2015-2020 Dietary Guidelines for Americans* recommends consumption of added sugars be limited to 10 percent or less of total energy intake.

You'll recall now, about 37 percent of the population meet that goal.

[1:51:59] The problems of overweight and obesity is, as you know, very high, and added sugars provide energy and generally don't provide additional nutrient content.

Based on updated analyses of dietary intakes, the model-based estimations of discretionary calories available for added sugars, as well as evidence for potential health impacts, this committee suggests that less than 6 percent of energy from added sugars is more consistent with the dietary pattern that is nutritionally-adequate, while avoiding excess energy intake than is a pattern with less than 10 percent of energy from added sugars.

So, this is a recommendation for a change.

Reducing the amount of added sugars in the diet through changes in consumer behavior, changes in how food is produced and sold, as well as food policies, is an achievable objective that could improve the population health.

So, with that, I'll close, and happy to address any questions.

[1:51:59] Dr. Barbara Schneeman: Great. Thank you, Beth. Yeah, so we can now have some discussion on chapters 10 and 12, both beverages and the added sugars. Dr. Dewey?

Dr. Kathryn Dewey: Thanks very much. That was excellent. I really enjoyed seeing all those new exercises, and I just have a question about whether there—I know there was some added sugar in the representative foods in the pattern, and I'm just wondering what percent of energy that was, and if you added that to the 6 percent, would it change it at all?

Dr. Elizabeth Mayer-Davis: Yeah, we actually did that calculation, and someone else can chime in. I think it changed it to about 7.6 percent, something like that. So, it did make a difference, and that was a really good question, Kay. I'm glad that you asked it.

The reason that we still ended up with the less than 6 percent of calories from added sugars is because this really is a food-based approach.

[1:54:08] The exercise was designed as a food-based approach. People choose foods.

And given the food supply in this country, it would be quite an artificial exercise to do the calculation entirely absent of added sugars. So, keeping with the philosophy of a food-based exercise, we just carried on in that way and then ended up with the 6 percent.

So, that was a great observation. It doesn't make very much difference, but we still came back around to the recommendation of less than 6 percent of calories from added sugars.

Dr. Kathryn Dewey: Well, if I could follow up. I just am wondering how consumers are going to calculate their percent of calories from added sugars.

[1:55:00] It's not an easy thing to do. So, it seems to me that the recommendation should probably be couched in the terms that are easily translatable into how people can actually achieve that.

Maybe that's where—

Dr. Elizabeth Mayer-Davis: Yeah, we did also—yeah, it is another step, right. So, we were first specifically addressing the current recommendation, which is the less than 10 percent, and obviously recommending a change to that.

I think in some applications, say school lunch programs, things like that, where you could consider a calculation around a menu and make the calculation, it's a different question then to consider translation in terms of nutrition education, say SNAP-Ed, or education associated with the WIC program that would also need to be food-based and not percent of calories from added sugars.

Because yeah, you're right. That's just not something that you're going to have people go around and calculate on the back of a napkin, although there are plenty of apps out there that actually could do that.

[1:56:06] But that is a different question in terms of the implementation and dissemination.

Dr. Kathryn Dewey: Right. Thanks.

Dr. Barbara Schneeman: And part of that, I think, is linking it back to the foods and beverages that are the primary sources of the added sugars, especially when those foods are coming with added sugar but they're not coming with other nutrients. And that, I thought that linkage between the beverage discussion and the added sugars is an important dimension.

Dr. Elizabeth Mayer-Davis: Yeah, right.

Dr. Barbara Schneeman: Other questions or comments?

Dr. Sharon Donovan: Yeah, this is Sharon, and I guess I just wanted some clarification, I'm sorry if I missed it. But the 6 percent of calories begins at what age?

[1:57:00] Is it above age 2? Is it prior to that?

Dr. Elizabeth Mayer-Davis: Yeah, that—this exercise was really for 2+ as I'm recalling. Yeah. Yeah, we didn't look beyond that, or earlier than that.

[crosstalk 1:57:21]

Dr. Elizabeth Mayer-Davis: Oh, go ahead.

Yeah, because your recommendation was basically just keep it low, low, low.

Dr. Sharon Donovan: Yeah, there's not much room from Kay's presentation.

Dr. Elizabeth Mayer-Davis: Very little room. Correct, right. Yeah, you just have to be so nutrient-dense for the really young kids. Yeah, so that is different.

Dr. Sharon Donovan: Yeah. I just—just wondered, when you state that, if you can somehow be clear that it's for ages 2 and above?

Dr. Elizabeth Mayer-Davis: Yeah, it's worth—yeah, for sure.

[1:57:58] And actually, it would be even well, in that statement, to refer back, to be explicit, that for younger individuals, the need for nutrient-dense choices is really so great. That would be different.

Dr. Barbara Schneeman: Kay, were you going to comment also?

Dr. Kathryn Dewey: Yeah, I just wanted to make one other comment. I think it was a combination of chapter 1 and this one that hit me hard, and that is the number of calories from added sugars being consumed by pregnant women. I think it was something like 300 calories if I have that right.

And I just realized, this is an incredible number of calories that could be going towards far more nutritious choices.

So, it's not just for the whole population, but specifically, the pregnant and lactating women, to make this shift is just so important, given that they need really high dietary quality.

Dr. Sharon Donovan: Yeah, you're right.

Dr. Elizabeth Mayer-Davis: That's a good comment.

Dr. Sharon Donovan: 288.

[1:59:00] Dr. Ronald Kleinman: Beth, I think you do mention this in the chapter, but you didn't in the slides, the water as a beverage and hydration as a value of consuming water or even beverages in general.

Do you make that point someplace?

Dr. Elizabeth Mayer-Davis: Yeah, so this is actually a really great point to make, and our subcommittee discussed about this a few times. It's really difficult in the literature to find studies with accurate assessment of water intakes.

That is really a challenge.

So, we definitely see hydration is a really critical role and function of consumption of beverages, and for water itself, obviously important for the same reasons.

[2:00:02] We weren't able to really look into that literature, and our main concern, or at least one of the main concerns, was the difficulties in accuracy/inaccuracy of assessment of water intake.

And Rick, I know Rick Mattes was part of those conversations as I recall. So, Rick, you might want to chime in on this issue as well.

Dr. Richard Mattes: Yeah, I think we do want to be clear that this recommendation is not a recommendation to reduce beverage intake. Meeting hydration needs really is important. It's really a recommendation about the nature of the beverage that is critical.

Dr. Ronald Kleinman: So, if there isn't a statement, maybe that's something that should go into the discussion or into recommendations.

[2:01:00] But what Rick was just raising, I think was really important to include in this document somewhere.

Dr. Richard Mattes: Oh, it's in there. It's in the discussion. We elaborate on that.

Dr. Elizabeth Mayer-Davis: Yeah.

Dr. Ronald Kleinman: I thought I saw it, but I just wanted to make sure. Okay.

Dr. Elizabeth Mayer-Davis: What we don't have is a specific recommendation about volume of water for various age and sex groups, which would be wonderful to have, but the concept of hydration and the importance of hydration is definitely in there, yeah.

Dr. Barbara Schneeman: Other comments or questions?

So, I'm going to propose we take a 15-minute break right now, before we start with Tim Naimi's presentation, because—and Tim will be going through the update on the NESR review as well as reviewing then chapter 11, the alcoholic beverages.

[2:02:03] So, we can reconvene at 6:00 p.m. Is that good for everyone?

Dr. Sharon Donovan: Sure.

Dr. Barbara Schneeman: Okay. So, 15 minutes.

[Break 2:02:18-2:16:49]

Dr. Barbara Schneeman: Great. Welcome back, everyone. I do want to point out that we did not that there was an error on one of the slides in the chapter on added sugars, and it's slide number 12, which we're looking at the reallocation of energy from sources of added sugars for females 51-70.

[2:17:14] And the symbols for the redistributed intake and the mean intake on fruits and vegetables were switched. That slide will be corrected, and obviously, it will be done correctly in the report.

So, I'm glad we caught that now.

So, we'll move to our next chapter, which is chapter 11 on alcoholic beverages, and Tim Naimi will be doing that presentation. But he's going to start out by doing the NESR update, which was to be in the morning, but we moved it to this point to accommodate. So, Dr. Naimi?

Dr. Timothy Naimi: Okay, thank you very much, Barbara. Yeah, so as Barbara mentioned, the first thing we're going to cover in this little two-part session, and thanks to everyone who has managed to hang in there so far.

[2:18:04] I'm watching the audience numbers drop off, but we're going to talk about the NESR review on alcohol and all-cause mortality.

And our approach to answering this question was the NESR systematic review. And again, this is part of the beverages and added sugars subcommittee. We've been talking a lot lately.

So, some of this will be review. Some of this was presented back in the last meeting, but to kind of finish it off, we'll bring you back up to speed.

So, for the alcohol and all-cause mortality review, there were 60 studies in total that we assessed. There were 58 prospective cohort studies, one retrospective cohort study, and one MR study, which for the all-cause outcome, was not terribly helpful.

In terms of the population, most studies enrolled a broad range of adult ages, but it's important to note that many—most of the studies skewed on the high side of age because these are large cohorts that are designed to study chronic disease outcomes.

[2:19:09] A third of them enrolled only adults over age 50. And most of them, there were some population-based ones, but most of them enrolled people with an age distribution that would be higher than that of adults who drink alcohol of that distribution.

So, in terms of our exposure, we were looking at the—two components of that.

One was average consumption per day, drinks per day, and the other one was pattern of consumption, and that was really what we mean there is the number of drinks consumed per drinking day or the number of drinks consumed per drinking occasion.

And as you'll see, there are a lot more studies of average consumption than based on the number of drinks consumed per drinking day.

And we had to—kind of two comparators.

[2:19:58] Our primary comparator was we assessed differing average alcohol consumption levels or patterns among those who currently drink alcohol, and our secondary comparison was between those who currently drink alcohol and those who have never consumed alcohol, who those people are sometimes referred to as lifetime abstainers.

Now, in terms of the primary comparison, as you'll remember, this is the comparison between groups of people who consume alcohol, one difficulty is that the studies often used widely-varying definitions of low, and that's in parentheses, or moderate consumption.

But it was quite remarkable among the studies, that among people who currently drink, the evidence consistently reported that higher average volume of alcohol consumption was significantly associated with higher risk of all-cause mortality, and that was pretty consistent, again, despite how the—kind of the low level of consumption was defined.

[2:21:08] And the other finding, which was already presented in a previous meeting, is that more frequent binge drinking was significantly associated with higher risk of all-cause mortality.

Most of the studies had large samples. However, there were a number of limitations.

Again, there was this issue of the generalizability of older cohorts, and that gets into the issue of survival bias, which is a type of selection bias.

There was inadequate adjustment for confounders.

And there was inconsistency in exposure measurement and definitions.

So, our draft conclusion statement, which was presented before, on this primary comparison among those who drink was that moderate evidence indicates that higher average alcohol consumption is associated with an increased risk of all-cause mortality compared with lower average alcohol consumption among those who drink, and the grade was Moderate.

[2:22:05] And then, our second conclusion statement from this primary comparison was that moderate evidence indicates that binge drinking, in other words, consuming five or more drinks for men or four or more drinks for women, during a drinking occasion, is associated with increased risk of all-cause mortality, and that, not surprisingly, more frequent binge drinking is associated with increased risk of all-cause mortality compared with less frequent or no binge drinking, again, among those who drink alcohol.

So, in terms of the secondary comparison, as you recall, for the whole thing, we had 60 studies.

Among those, 25 studies examined never drinkers, or self-reported never drinkers in comparison to low average volumes of consumption. That was the comparison we focused on.

[2:23:01] Among these studies, roughly half of them reported significantly reduced risk of all-cause mortality for low average consumption compared with never drinking alcohol. About half of studies showed no significant association between low average consumption versus never

consuming, so about half were positive in favor of the low average consumption, half showed no significant effect.

And two studies showed greater all-cause mortality with low average consumption compared to never drinking alcohol.

So, again, this subset of the evidence that we discussed previously has many of the same limitations.

There is an additional limitation around the misclassification of never drinkers, and therefore, sometimes, there are people who are former drinkers that may be classified as never drinkers.

[2:24:02] That's important because former drinkers are arguably a type of drinker and are—tend to be very unhealthy.

And if you look at studies in the US, where you look at people who are—get surveyed every 5 years or so, you'll find that, actually, about half of people who report never drinking alcohol reported drinking alcohol in a previous wave. So, that is an additional limitation to note.

So, our draft conclusion statement and grade for this secondary comparison is that limited evidence suggest that low average alcohol consumption, particularly without binge drinking, is associated with a lower risk of all-cause mortality compared with never drinking alcohol.

However, in light of the many scientific and public health issues associated with alcoholic beverages, any conclusions about low average alcohol consumption compared to never drinking require careful consideration.

[2:24:59] And we have some detail on this in the report, considerable detail.

But I'll just discuss that a little bit more here.

And the main kind of caveat, or the main context, is that these findings shouldn't be interpreted to mean or don't translate into a recommendation to begin drinking alcohol for better health.

And I think the simplest way to summarize it is to say the following, that initiating alcohol consumption obviously involves risk. We have no randomized controlled trials randomizing those who never drank or who don't currently drink to initiate alcohol consumption for any study looking at any morbidity or mortality outcome.

And the key point is that, compared to those who might begin to drink, for example, because of a public health recommendation, established low-volume drinkers enrolled in cohort studies are a very select group.

[2:26:06] In other words, let's say you started drinking at age 20 and if at age 50, you're still kind of a moderate drinker and you have the wherewithal to be enrolled in a cohort study, that group of established moderate drinkers obviously has not died prematurely from alcohol-related cause.

They didn't become a heavy drinker or otherwise they wouldn't be classified as a low-volume drinker to be studied, and they didn't quit drinking and become a former drinker.

So, there's a big source of selection bias.

So, established moderate drinkers who get into cohort studies are not the same as somebody who might initiate drinking.

And then, the other big limitation is that in addition to the differences in alcohol consumption, lifetime abstainers differ in many other ways from established low-volume drinkers. They tend to be more likely from immigrant status and religious minorities, and a variety of other factors.

[2:27:05] So, that, I think, is the last slide for this presentation, and I'm happy to pause here and, if there are any questions, we can address them now, or you can save them until the end of this—the next presentation.

Alright, and I don't see anything in the presenter chat, so in that case, should we move ahead to the next one?

Dr. Barbara Schneeman: Yes.

Dr. Timothy Naimi: So now comes the presentation for chapter 11, 2020 Dietary Guidelines Advisory Committee, our draft of chapter 11 on alcoholic beverages.

Here's the other members on our subcommittee listed here.

[2:28:01] And at the end, we're going to list all the fantastic staff who helped, and I'm not sure why they get presented last, but it must be sort of like dessert, we save the best for last. So, they'll be coming later on.

So, in terms of the overall chapter, we had two broad questions.

The first was what is the relationship between alcohol consumption and achieving nutrient and food group recommendations?

This was answered using data analysis, and we reviewed federal data from the National Health and Nutrition Examination Survey and the National Survey on Drug Use and Health for adults of legal drinking age, including women who are pregnant or lactating.

And we used the most current data cycles that were available.

[2:28:58] And our second question is what is the relationship between alcohol consumption and all-cause mortality, which we just reviewed a few moments ago.

So, the first one, question one, was about—was a question about alcohol and meeting food and nutrient recommendations, and this was the conclusion statement that was also presented at the public meeting, and it reads as follows:

Alcohol consumption has increased in the United States since 2000, and most states exceed Healthy People 2020 objectives for per capita alcohol consumption. Approximately 60 percent of individuals report alcoholic beverage consumption in the past month, and of those, approximately 40 percent binge drink, often multiple times per month, in those slides for definitions.

During days when or men or women consume alcohol, their consumption also typically exceeds *Dietary Guidelines* recommendations for Americans recommended limits of less than or equal to one drink per day for women and two for men under the current guidelines.

[2:30:03] Alcohol consumption during pregnancy remains a persistent public health problem, and beyond contributing to energy intake, alcoholic beverages contribute little towards average intakes for food groups or nutrients.

So, question two, we're going to turn back to the alcohol and all-cause mortality review of the evidence, which was in our chapter.

So, in terms of the NESR systematic review, we had three draft conclusion statements on alcohol and all-cause mortality from 60 articles.

Our primary comparison was different levels of consumption among those who currently drink alcohol, and our secondary comparison, as we discussed, is between those who currently drink alcohol with those who have never consumed alcohol.

Most of the studies examined were prospective cohort studies and enrolled a broad range of adults.

[2:31:00] And our conclusion statements were graded from Limited to Moderate.

So, you've already seen the results. We'll kind of skip ahead to kind of the discussion section.

So, previous *Dietary Guidelines for Americans* provided advice for those who drink alcohol and recommended that individuals do not begin drinking or drink more for any reason, particularly on the basis of health considerations.

And therefore, we want to stress that never drinking alcohol, zero consumption, was predesignated as a secondary comparison in the review of alcohol and all-cause mortality.

Now, in addition to the—we prioritized the all-cause mortality review over reviews that were also requested for CVD and cancers as outcomes of the NESR systematic review, and we prioritized the alcohol and all-cause mortality because of time constraints and because alcohol and all-cause mortality has not been reviewed previously by the Dietary Guidelines Advisory Committee.

[2:32:18] And also, alcohol and CVD has been reviewed by the Dietary Guidelines Advisory Committee back in 2010.

And their conclusion then, which would not change today, is that the observational studies suggest this well-known J-shaped curve between alcohol consumption and cardiovascular disease, such that people who don't drink alcohol have somewhat higher risk of those outcomes than people who drink low amounts of alcohol on average, but then, above those low average amounts, risk of CVD starts to increase.

[2:33:02] So, that conclusion, I think, is—would be unchanged.

And then, alcohol in terms of alcohol and cancer, this is a really an emerging area of literature, and we would have liked to be able to review that, but that's been reviewed extensively by

other organizations and alcohol is—has been recognized as a human carcinogen for 40 or 50 years and is believed to be causally related to at least 7 different kinds of cancers.

But anyways, because we didn't have time to do reviews on CVD or cancer, but we did—thought it was important to consider Mendelian randomization studies on both CVD and cancer to provide additional supporting evidence, given that these are leading contributors to all-cause mortality, and because MR studies are kind of an emerging and important new type of evidence.

[2:34:02] So, and this thing on MR studies was sort of a supplement to the main review, and actually was not conducted by NESR, but the overview of MR studies is that Mendelian randomization studies assess genetic variants or genotypes of alcohol metabolism genes that associate with higher or lower alcohol consumption.

And then, these genotypes are then related to the outcomes of interest, for example, the risk of cardiovascular disease.

So, for those of you who are familiar with using an instrumental variable in an epidemiological analysis, these genetic variants could be thought of as instrumental variables.

Well, the main problem with the observational studies of alcohol, not only theoretically but in fact, is that there's lots of confounding. People who drink particularly low amounts of alcohol regularly are—tend to be very socially advantaged and so forth.

[2:35:05] So, the idea with Mendelian randomization studies is that they greatly reduce confounding, and here, the idea is that genes, in theory, should associate randomly or should be distributed randomly in the population.

They have reduced selection bias. Studying genes makes—basically does not allow for reverse causation. Because somebody's genotype clearly precedes any outcome. Whereas, sometimes, with alcohol, if people become unwell, possibly become because of drinking, and then they, for example, stop drinking, this can be an example of reverse causation.

And then, again, there's no exposure misclassification because your genotype is generally invariant over the life course. So, you only have to measure it one point in time.

[2:35:57] And that's another limitation of the observational studies that we didn't discuss, which is that they are typically just measuring alcohol consumption at **[no audio 2:36:05-2:36:07]** their limitations.

So, some of the genetic instruments may lack a robust association between that genotype and alcohol consumption. So, in other words, when you use a genetic marker, it has to be able to explain or be associated with a reasonable difference in consumption.

Then, the other thing is the genetic variants, in theory, could have an effect that's independent of alcohol consumption. In other words, the ideal is to have a genetic variant that is conditional on being exposed to alcohol, and that's very important and that can be assessed in studies.

And finally, the genetic variant may be associated with other favorable genes. So, in other words, even if it itself is not beneficial apart from its effect on alcohol consumption, it may not be randomly associated with other genes.

[2:37:03] And for both of these last two, people typically will look at the effect of survival with and without the gene among people who don't drink alcohol to make sure that, in fact, these associations are conditional on alcohol exposure.

So, the bottom line in terms of MR studies findings are that the variant genotypes that are associated with lower alcohol consumption find no protective association for coronary heart disease or for ischemic stroke, including those with low volumes of consumption when you go back and ascertain that or when you do genotype-predicted consumption.

So, the bottom line is, when it comes to cardiovascular disease, is that the findings from MR studies are inconsistent with observational studies, which find that J-shaped association curve that we discussed earlier.

[2:37:59] Now, there are fewer studies of Mendelian randomization studies in cancer, but the few that have come out so far indicate that alcohol consumption is positively associated with three types of cancers, and this is consistent with all the observational studies of alcohol and particular cancer types.

So now, we're going to shift gears a little bit and we're going to move to the summary section, and this, again, is our draft evidence-based advice to USDA and HHS.

And so, many US adults exceed the *2015-2020 Dietary Guidelines for Americans* recommended limits for drinking in moderation during days when alcohol is consumed, as it is.

Excessive alcohol consumption is the leading behavioral risk factor for a variety of morbidity and mortality outcomes, social harms, and economic costs.

[2:39:03] Apart from energy, ethanol has no nutritional value.

And finally, the preponderance of evidence finds that for all-cause mortality, risks increase at levels above one drink per day on average for both men and women.

So then, we posed a series of questions based on what the *Dietary Guidelines for Americans* has done previously.

The first of those is should the *Dietary Guidelines for Americans* continue to recommend against initiating alcohol consumption for health reasons for those who don't currently drink?

And our answer to that is yes. Alcohol is a substance that is intoxicating, potentially addictive. 20 percent of people who begin drinking will end up with an alcohol use disorder at some point. And a leading preventable cause of death and other harms.

[2:40:00] The current observational evidence base is insufficient to recommend drinking initiation at any level.

And so, our kind of conclusion around this is that we agree, and that we would continue the advice that non-drinkers or never drinkers should not begin to drink on the basis of the notion that alcohol would improve their health.

The next question is, are current recommended limits of no more than two drinks per day for men and no more than one drink per day for women, i.e., the current 2/1 consumption limits, are they reasonable?

So, the 2/1 consumption limits, which have been present since 1990, and Barbara was involved in the committee that wrote them in only three pages back then, were based somewhat on theoretical basis of, for example, the difference in body mass between men and women, but those 2/1 cut points also aligned with an early and influential meta-analysis on alcohol and all-cause mortality that was published soon thereafter in 1996.

[2:41:11] Overall, the 2/1 consumption limits constitute reasonably low risk. However, more recent evidence justifies tightening the guidelines for men in particular.

And this, again, we have quite a bit of text on this in the report.

But basically, why is tightening recommendations for men, why is it justified?

And the most important reason is, even based on existing observational evidence, that consuming two drinks per day among men, drinks per day among men, is associated with a modest but meaningful increase in all-cause mortality risk compared to one drink per day based on existing observational data.

Now, these findings are consistent with findings from our systematic review of alcohol and all-cause mortality, but they're even more specifically supported by studies where you can get kind finer gradations of consumption, so these include meta-analyses, survival analyses, and modeling studies.

[2:42:14] And when I refer to modeling studies, what I'm talking about is it's similar to doing a meta-analysis of all-cause mortality, but a lot of people would say, "Well, if you're studying the relationship of drinking to every single death under the sun, there may be sort of a lack of specificity in that approach in that it's being driven by confounding," or...

Some causes of death are not known to be alcohol-related, either based in theory or based on statistical associations.

So, another approach that people are doing now is basically using—is kind of aggregating weighted condition-specific risk curves for the multiple conditions that are associated with alcohol consumption.

[2:43:06] And then, you can kind of determine.

So, it's kind of like doing a meta-analysis, but it's using more specific risk curves for a variety of conditions.

So, they are all finding, those studies tend to find, again, meaningful modest increases risk in men for 2 versus 1.

Now, it's true that, for women, at all levels of consumption, the risk from alcohol are higher from those for men, but different recommendations for men and women are not supported, because risk differences between those two sexes is quite small at lower levels of consumption, less than sort of a fraction of a drink.

So, the second consideration about why guidelines are being—might be tightened for men is kind of an add-on.

[2:44:04] I think the first one is the most important.

But that more recent observational studies and meta-analyses that attempt to control for better control for confounding and selection bias find reduced risk reduction or no risk reduction for low-volume alcohol consumption in comparison to never drinking.

And then, we also have these MR studies that do not find protective effects for low-volume alcohol consumption on CVD.

So, I think the bottom line here is that, although there's been lots of study about the health effects of alcohol, it remains a very controversial area, and that, given this uncertainty, that we should really be very careful about recommending the consumption of higher levels of alcohol, for example, two drinks, only if there's good evidence to show that there's not increased risk compared to one drink, and there is no such evidence to suggest that drinking two drinks is similar or lower risk than drinking one.

[2:45:10] So, in summary, our recommendations about advice to the public in the next *Dietary Guidelines*, all these pages and words can be boiled down to the following three points:

The first is do not begin to drink alcohol or purposely continue to drink because you think it will make you healthier.

The second is if you drink alcohol, at all levels of consumption, drinking less is generally better for health than drinking more.

And finally, for those who drink alcohol, recommended limits for better health are up to one drink per day for both men and women.

We also had some advice on future directions for the alcohol field.

[2:45:58] And that is, I think, as you can tell from the earlier discussion, there's a need for more studies with stronger research designs, including RCTs, more MR studies, which will be coming, and intervention studies with morbidity and mortality outcomes.

For observational studies, which will continue to be important in this field, there needs to be a lot more work done to disentangle associations of average consumption from those based on the quantity consumed per dinking day and the frequency of consumption.

And over the past decade, people are really recognizing the importance of patterns of consumption and not just the average amount. But unfortunately, there's relatively little of this research, particularly for all-cause mortality.

There's also an incomplete understanding of the relationships between various levels of consumption and patterns of consumption, again, with other dietary and beverage consumption characteristics.

[2:47:01] So, we know a fair amount about people who tend to drink primarily beer versus wine versus spirits and how they think, but there's lots that we don't know about, again, different levels and patterns and how those associated with consumption of other beverages and other foods and that sort of thing.

And finally, we need to assess effects of changing alcohol consumption and consumption patterns over the life course in relation to health outcomes. So, as I mentioned previously, most studies are measuring alcohol consumption at one point in time, and yet, alcohol consumption is very dynamic across the life course, both on the basis on average consumption and patterns of consumption.

And we have a very incomplete understanding of how that all fits in to looking at important health and even social outcomes.

I think that's the last.

No, this is the most important part, the incredible support staff that have done so much work reviewing all the papers and making slides and offering just great suggestions and doing so much fantastic work.

[2:48:07] So, thank you to everyone on this list.

Dr. Barbara Schneeman: Great. And thank you, Tim. So, we now have opportunity for questions or comments from the committee members.

Dr. Steven Heymsfield: Tim, this is Steve Heymsfield. I have a question. So, can I interpret that one drink a day is—doesn't pose an increase in risk?

Dr. Timothy Naimi: Well, that's—

It says compared to what?

So, if you look at kind of continuous risk curves, the—for most of those studies, the lowest, kind of denotor of risk, if you will, for men and women, for both of them, the kind of the low point of risk, this is among people who drink, is at less than a drink per day.

[2:49:06] So, for women, and again, it's not all the studies are exactly the same, but for women, it's probably somewhere between—somewhere maybe around $\frac{1}{2}$ a drink a day, and for men, it's somewhere between $\frac{1}{2}$ and 1 drink per day.

So, does that address your question?

But I think the point is, is that it's hard to base recommendations on fractions of drinks. It's interesting that, in France, for example, where they've actually reduced their recommended limits also to a drink a day, and their drink size is actually slightly smaller than ours, that for some people, they recommend not drinking every day, or—and so on and so forth.

So, this, this recommendation is not to imply, again, that people should drink alcohol or that they should drink perhaps a bit less.

[2:50:00] But I think it's fair to say that one drink, on days when alcohol is consumed, constitutes reasonably low risk.

Dr. Steven Heymsfield: Okay, thank you.

Dr. Regan Bailey: Hey, Tim, this is Regan. I thought that was a wonderful presentation, and it was very clear, and I really want to complement you and the group on this work, and I think it's going to make a good contribution. Thank you.

Dr. Timothy Naimi: Thanks for the nice comment.

Dr. Carol Boushey: Hi, Tim, this is Carol. And this is very interesting. And the interesting thing that I was thinking of is how to implement RCTs when it's one thing to ask a person to eat Brussels sprouts, but it's quite another to ask a person to pick up drinking alcohol when they don't.

[2:51:03] So, there must be some kind of work going on to address. But this is a difficult group to really truly randomize, I would think.

Dr. Timothy Naimi: Yeah. Well, the—there have been randomized studies done. There was a large one that was actually planned and then cancelled for other reasons. But again, so of course, it would be unethical to randomize people to a study of binge drinking, or it would be unethical to randomize a study for people to drink an average amount of consumption that was clearly hazardous.

But I think for low amounts of alcohol, it is possible to do studies of this nature, particularly, again, these are kind of supervised trial participants. And I think it's important that they get done if it's possible, because if you think about it, as difficult as that is, think about the ethical hazards of making drinking recommendations in the absence of randomized trials.

[2:52:13] So, you can say, "Well, some people rightly are concerned about making sure that trials are conducted ethically," and yet, we end up making recommendations around drinking to the general public based on observational evidence base that has a lot of—that has a lot of issues when it comes to alcohol.

So, it is a tough question.

Dr. Carol Boushey: Yes. Yeah, no, I think it—I really like the way that you've outlined how—this is something that will take a lot of attention to adequately address.

Very nice.

Dr. Timothy Naimi: Yeah, and I think, to be clear, that a lot of the harms are obviously coming—are coming at higher levels of consumption, but I think the point is, I think the solid point is that for most people who drink, that drinking less is better for health, and I think the evidence on that is, at least based on what we have, that part is very consistent and very solid.

[2:53:19] Dr. Barbara Schneeman: Great. Other questions or comments?

Dr. Jamy Ard: Tim, this is Jamy. Thanks for that presentation. Do we know anything about the interaction between a dietary pattern and alcohol intake?

Dr. Timothy Naimi: Again, not a lot. And that's why it's one of the recommendations for more future studies.

So, for example—we know some things. So, for example, we talked about there are sort of—each, for drinkers of various beverage types, we know a little something.

[2:54:04] There have been some studies about what their—kind of what they eat.

We know that people who—from Europe, who consume more of a Mediterranean-style of diet tend to be wine drinkers, and they tend to drink—they tend to drink more socially and these types of things.

But I think we're really kind of just scratching the surface, and I think for people in the US, it would be very important, because we have—there's so many—well, there's so many—there's more than 60 different health outcomes related to alcohol, and there's probably equally or more than that related to dietary patterns.

And there are very powerful interactions between alcohol consumption and these different dietary patterns. And so, I think understanding those better is critically important, both for, again, sort of disentangling the effects of the alcohol versus the diet and looking at patterns and that kind of thing.

[2:55:06] Dr. Barbara Schneeman: Great. Thank you so much, Tim, for the presentation on the topic. And yes, alcohol has been one of those popular topics for a long time in the *Dietary Guidelines*. And so, I think we'll move to the next chapter, chapter 13, the Frequency of Eating, and Dr. Heymsfield will be doing that.

Dr. Steven Heymsfield: Thanks very much, Barbara. This chapter includes questions examined by two subcommittees – the Frequency of Eating subcommittee and the Food Pattern Modeling subcommittee.

And I want to thank the members on the committee – Regan Bailey, Carol Boushey, Heather Leidy, Rick Mattes, and Ron Kleinman, who were all very instrumental in working through this chapter.

[2:56:04] This is the first time the *Dietary Guidelines* have included frequency of eating as a topic, and I want to also point out that mention of frequency of eating was made earlier by Regan, who talked about some of the complexities of the instruments used to quantify frequency of eating and the timing of eating.

It was also mentioned by Sharon Donovan in relation to pregnancy—frequency of eating and pregnancy.

So, very interesting topic.

Now, the committee had five questions, so specifically:

What is the relationship between the frequency of eating and achieving nutrient and food group recommendations?

Between the frequency of eating and growth, size, body composition, and risk of overweight and obesity?

Between the frequency of eating and all-cause mortality?

[2:57:01] Between the frequency of eating and risk of cardiovascular disease?

And finally, on the relationship between the frequency of eating and risk of type 2 diabetes?

Question 1 was answered by the Food Pattern Modeling subcommittee using data analysis, national databases.

And the other questions, 2, 3, 4, and 5, were answered using NESR systematic reviews.

Now, just as a little bit of a background for those of you who don't do this every day, the committee spent a lot of time discussing about how to quantify frequency of eating.

Frequency of eating is the number of daily eating occasions, and the eating occasion was defined as an ingestive event, including pre-loads, meals, or snacks, and beverages or food, and beverages could be energy or non-energy yielding beverages.

[2:58:08] The committee also spent a lot of time discussing the criteria on the number of evaluations needed for establishing the frequency of eating and the sample sizes for intervention studies.

Now, to begin with, this is work done by the Food Pattern Modeling group. Eating patterns vary by frequency and timing in the United States and are shaped by age, race, ethnicity, and income.

On average, the US population reports 5.7 eating occasions per day, occurring most often at noon or in the evening.

Most of the US population reports consuming three meals, 64 percent, roughly 2/3 of the population, or two meals, about roughly 28 percent or 1/4 of the population per day.

[2:59:08] When compared with two meals, Americans who consume three meals per day tend to have approximately 5 points higher Healthy Index Scores.

And as—it might be said that snacking is ubiquitous. It occurs in 93 percent of the US population. Snacks provide 22-23 percent, or roughly about 1/4 of total energy consumed, and 2-3 snacking events are reported on average per day.

Late-night eating events often include alcohol intake, as we just heard from the previous presentation.

And intakes of added sugar, sodium, saturated fats in adolescents and adults.

Now, moving on to the other specific questions.

[2:59:59] 11 studies, a very small number of studies, were identified as meeting inclusion criteria for NESR systematic review but provided insufficient evidence for answering questions on frequency of eating and health. Those are the questions I mentioned, questions 2-5.

So then, in summary then, the NESR review did not yield specific answers to the questions 2-5 concerning the relationship between frequency of eating and health outcomes of obesity, all-cause mortality, risk of cardiovascular disease, or risk of type 2 diabetes.

This was primarily due to the limited availability of high-quality data.

And bottom line then, the committee cannot therefore make recommendations to the Departments on frequency of eating and health.

The committee does recommend the scientific community raise the standardization of frequency of eating terms to a high-priority and ensure adequate data collection to evaluate habitual or usual eating frequency.

[3:01:07] Our committee spent a lot of time discussing how to standardize this terminology. It's an important topic for future consideration.

The 2025 Dietary Guidelines Advisory Committee should consider separate questions examining how the timing of ingestive events influences health.

And we also made a number of additional recommendations that are—will be in our full report.

And as a bit of a closing comment, the committee, Frequency of Eating committee confirms that healthy dietary patterns and eating frequencies can be constructed in a variety of ways to suit differing life stages and cultural practices, so some creativity can be involved there.

And second, the committee's findings also suggest that following a dietary pattern that reduces snacking and emphasizes meals, both of which are primarily comprised of foods and beverages that contribute to nutrient and food group recommendations, can help align eating patterns with dietary guideline recommendations.

[3:02:17] So, I want to thank the support staff, who really did the bulk of the deep dive on this work. Incredible amount of review of literature. And I want to thank them profusely for their contributions.

Thanks very much.

Okay, Barbara.

Dr. Barbara Schneeman: Any questions or comments?

Great. So, I think we can move to the next section, to talk about integrating the evidence and future directions.

[3:02:59] I would just note, knowing sort of the schedule, we're scheduled to adjourn at 7, but we may need to go a little bit past 7:00 to finish covering the integration and the other comments to wrap up the report meeting.

So, with—let me see. I've got too many windows open on my computer here.

Okay, so Dr. Kleinman and I will talk about the chapter on integrating the evidence and future directions.

And just to remind you that, to pull this material together relies on part B, with Setting the Stage and Integrating the Evidence, but also part D, the Evidence on Diet and Health, which you've been hearing about.

[3:03:56] So, just to remind you, the integration chapter purpose is to describe the major themes from the committee's review of the evidence and provide an overview of our advice to the Departments for updating the upcoming edition of the *Dietary Guidelines*.

To develop the integration chapter, we had a working group formed, and they worked with myself and with Dr. Kleinman to draft the chapter. Those working group members included Jamy Ard, Teresa Davis, Rick Mattes, Jamie Stang, Elsie Taveras, and Linda Van Horn, and we appreciate the many contributions to the draft.

The draft has been discussed within subcommittees to be sure we're reflecting that body of evidence and has been shared for full committee review as well.

So, at the last meeting, Meeting 5, the major themes for the integration chapter were presented, and I'll just summarize some key points about these major themes.

[3:05:03] First of all, from the public health challenges. That draws on the evidence that is presented—has been presented for chapter 1 that you heard Dr. Bailey talk about, and we're just presenting a brief summary in the integration chapter.

One of our major themes has been, as you can tell from the discussions, the importance of considering life stages in the *Dietary Guidelines for Americans*. We've talked about those life stages as pregnancy, lactation, birth to age 24 months, childhood, adolescence, and adulthood. And we noted that special nutrition considerations exist at each life stage and improvements in recommended food patterns at each stage have the potential to influence healthy food choices at the next life stage.

The other major theme is that dietary patterns provide a framework for the *Dietary Guidelines for Americans* within and across life stages, and we've had quite a bit of discussion about what those healthy dietary patterns are, looking at it both from the large picture of dietary patterns, but also, looking at evidence for specific dietary components, which again, support the dietary pattern approach.

[3:06:26] So, in addition to these major themes from the evidence reviewed, the chapter considered topics for the *Dietary Guidelines for Americans* and important resources so that these guidelines remain evidence-based.

And those topics were discussed at the last public meeting, so I'm not going to go through them again.

So, Ron, I'm going to turn it to you to talk about our figure and the first set of suggestions we have.

[3:07:00] **Dr. Ronald Kleinman:** Great. Thanks very much, Barbara. So, as everyone knows, this edition of the committee's report is really the first to extensively review the period from birth to age 24 months, and also, to fully integrate evidence reviewed on pregnancy and lactation.

And in doing this, it enables the Departments, the USDA and HHS, to take a full lifespan or life course approach in its dietary recommendations.

I should note that, in the chapter and throughout the full committee's report, we use lifespan and life course interchangeably.

So, the figure in this slide depicts the framework of a lifespan approach, and I should say that it incorporates the dietary pattern figure that Carol showed when she talked about the chapter 8.

[3:08:07] And it highlights the importance of implementing dietary patterns that are most associated with nutrition adequacy, energy balance, and reduced risk of diet-related chronic health conditions that start at the earliest life stages.

This framework further emphasizes the importance of adhering to these nutrient-dense dietary patterns throughout each subsequent life stage and meet nutritional needs appropriate to each life stage, and to maintain health and wellbeing.

So, the *2015-2020 Dietary Guidelines for Americans* identified 5 principles as overarching guidelines.

[3:08:58] This committee's analysis reinforces the continuing relevance of these overarching guidelines and suggests modifications and expansion of these guidelines to reflect new evidence.

These suggestions on the overarching guidelines are in addition to the specific conclusions and advice to the Departments that we've all just heard about in each chapter.

So, in the following slides, each of the overarching guidelines is noted, followed by suggestions for ways that they can be updated. These suggestions reflect the committee's recommendations that the *2020-2025 Dietary Guidelines for Americans* incorporate a recognition of the special nutrient concern that exists at each life stage.

Recognizing these concerns can help Americans improve their dietary practices at that life stage and potentially influence the practice of healthy food choices at the next life stage.

[3:10:03] Dietary patterns can incorporate foods consistent with cultural preferences and socioeconomic factors but should be structured around the identified core foods that meet nutrient needs associated with health and reduce the risk of chronic disease.

So, moving on to the first overarching principle – following a healthy eating pattern across the lifespan.

The suggested update from the committee is that this guideline should introduce the importance of a healthy dietary pattern to support each life stage and of maintaining a healthy dietary pattern across each life stage.

Barbara mentioned the various life stages in her introduction to this chapter, so I won't go through them again here, except to point out that it's important to initiate these healthy dietary patterns early in life for infants and young children, follow these healthy dietary patterns as they are appropriate for the nutritional needs of each life stage, and then modify the patterns over the lifespan to meet the nutritional needs of each life stage.

[3:11:26] And then, the second is to focus on variety, nutrient density, and amount.

The committee's review focused on the core elements of a healthful dietary pattern, including the nutritional quality of food choices, but incorporating variety.

And our review also focused on frequency of eating as determinant of the amount of food consumed.

So, with that then, I'm going to turn it back to Barbara to go through the remaining overarching principles.

[3:12:06] Dr. Barbara Schneeman: Great. Thanks, Ron. So, the third overarching principle from 2015 was about limiting calories from added sugars, saturated fats, and reduce sodium intake.

And our committee's review emphasized the importance of identifying the foods to limit or replacing the diet to limit intake of certain food components.

And so, those who consume alcoholic beverages, current evidence indicates that lower intakes are better than higher intakes, and consistent with previous guidelines that some groups should not drink alcoholic beverages.

So, we focused then on limiting the food and beverage choices that are sources of added sugars, saturated fats, alcohol, and sought to reduce intake of excess energy, solid fats, and sodium, replace foods and beverages that are sources of these with more healthful choices, and in the first 2 years of life, foods such as sugar-sweetened beverages should be avoided.

[3:13:13] So, the fourth area was to shift to healthier food and beverage choices.

And our committee's review found that this approach is actually liked to achieving the food guidelines, but in addition, this approach can help individuals understand that it is never too late to start making improvements in their dietary pattern, and to use this approach effectively, and individual would need to recognize that food and beverage, there are food and beverage choices that are most important to shift.

And so, making that shift in eating patterns to food and beverage choices that have a higher nutrient to energy ratio and shift to higher-quality food and beverage choices at every age to achieve a more healthful dietary pattern.

[3:14:07] And then, the fifth overarching guideline was—has been to support healthy eating patterns for all.

And our committee's discussion emphasized the importance of supporting the ability of all Americans at all ages to have access to food choices that enable a healthful dietary pattern, and to support access to healthful foods and dietary patterns for all Americans, consideration needs to be given to the cultural, ethnic, and socioeconomic factors that influence food preferences and access to healthful food choices.

And we identified support healthful eating patterns in all food environments for all Americans at all ages.

[3:15:00] And other suggested updates are to promote and support breastfeeding, support healthful eating patterns for all ages where people live, learn, work, play, and gather.

So, while we found these five overarching guidelines from the *2015-2020 Dietary Guidelines* useful and relevant, the committee's review has suggested several—has developed several suggestions to update and expand on these overarching guidelines, again, in addition to the specific recommendations and advice that you've been hearing from the various chapters.

So, we will open it up for comments from the committee or any questions or discussion from the committee.

Kay, do you have a question?

[3:16:03] So, Kay, did you have a question?

Dr. Kathryn Dewey: Sorry, I was trying to unmute, and it wasn't working. Okay, can you hear me?

Dr. Barbara Schneeman: Yes.

Dr. Kathryn Dewey: Okay. So, my question has to do with the definition of food environment. Would you care to elaborate on that? I'm just wondering if that includes things like access and economic status. Or what do you mean by a food environment?

Dr. Barbara Schneeman: That's a good question.

I think we saw that then as connected with the bullet of healthful eating patterns where people live, learn, work, play, and gather, that all of these create different types of food environments.

[3:17:02] Dr. Kathryn Dewey: Right. The first bullet on that slide, maybe if you go back to that slide, talked about all Americans—

Dr. Barbara Schneeman: Food environments.

Dr. Kathryn Dewey: Yeah.

Dr. Barbara Schneeman: Yes. So, food environments can include where people live, learn, work, play, and gather.

Dr. Ronald Kleinman: Yeah, I think it's meant to be where food is consumed.

Dr. Kathryn Dewey: So, the first bullet and the third bullet are kind of the same thing?

I'm sorry, I just—

Dr. Ronald Kleinman: Good point. No, it's—you're right.

Dr. Kathryn Dewey: Well, because in the chapter, I remember some discussion about access to food that enables a healthy dietary pattern. And to me, that signaled something about access both economically and even perhaps physically.

[3:18:05] Dr. Barbara Schneeman: Right. And there is more in the chapter that we went through last time, where we talked about those. Those are still part of the chapter. But we figured, giving the timing, we were mainly going to talk about this newer section, this advice to the Departments.

But that background information is still there in the integration chapter.

Dr. Ronald Kleinman: Mm-hmm.

Dr. Kathryn Dewey: Okay. Well, I just—I would perhaps suggest slightly different wording so that the first and third bullets don't seem like they're the same thing here.

Dr. Barbara Schneeman: Okay.

I'm just taking notes, yeah.

[3:19:00] Other comments?

Dr. Rachel Novotny: This is Rachel Novotny. Thanks for that. I'm trying to think through. I certainly understand that our primary goal is to help people think about diet and food. I think, kind of along the lines of the way that Kay was going, all of those six items are all behavior, and they all may be needed.

But it would be nice if we look for an opportunity, each one, to pull it back a little and think about the structure around choices people make that could be called out and kind of help provide guidance to kind of push us along that continuum of supporting and recommending structural change, changes in our programs, in our environment that ultimately help people have better diets.

[3:20:17] So, I know that's a little vague, but my sort of instinct, as I was listening to those, was that they were very much individual choice versus some of the contextual factors.

Dr. Barbara Schneeman: Great. Thanks.

And again, there's more in the chapter that we discussed the last time around the context for the *Dietary Guidelines*.

[3:21:07] Any other comments at this point?

I know we're moving past the 7:00, so we'll—I guess we'll just keep going forward.

So, right, so I wanted to just comment briefly about the future directions section of the report.

And just to—the purpose of this section is to highlight research recommendations, work needed to complement the *Dietary Guidelines*, topics to be considered in future Dietary Guidelines processes, data needs, and more.

[3:22:04] And our process has been that many of these future directions have been developed by the subcommittees as they've done their work, and staff has continued to compile and collate these. And so, we're now at the point where it's going to be reviewed by the full committee as we finalize the report.

And in developing the future directions, the committee hopes that it will be a useful resource to continue to advance nutrition research and support activities to improve public health.

So, just to check, are there any questions or comments about the future directions section?

[3:23:00] So, Eve, do you want to move to the—

Dr. Eve Stody: Sure, as a wrapping up, Barbara, do you want to see if there are any other final comments before? The next pieces will really be next steps and closing remarks. So, if you want to just pause for one second and see if anybody else had any other comments before wrapping it up?

More broadly on anything from today.

Dr. Barbara Schneeman: Oh, right. Okay. Any—yes, anything reflecting back on the day?

And normally, I would go around and ask each of you, because we're running a little bit on the late side, I'm just going to hope that you will volunteer a comment if you have one.

[3:24:00] So Eve, I think we can move to the closing comments.

Dr. Eve Stody: Great. Thank you.

Okay, so it's hard to believe that we are putting the check mark. It's been kind of a nice movement to put the check mark next to each meeting, and it's really hard to believe that we just put the check mark next to the final meeting.

I think this has really been a fantastic discussion. Thanks for really taking the time to speak to your report. It was a really great discussion.

For the previous meetings, meetings 1-5, the presentations, transcripts, and recordings are currently available at DietaryGuidelines.gov, and we will work to get materials from this meeting posted as quickly as possible.

For those who are interested, you can earn free CPE credits for watching the meetings and you can learn more about that on our website.

[3:24:57] Okay, so for next steps, as has been mentioned a few times today, in the coming weeks, the committee will finalize their report based on today's meeting, and they will submit the report to the Secretaries of USDA and HHS at the end of this month.

When the committee submits their report, the committee will disband.

And then, USDA and HHS will take the committee's final report and post it online for public comment. It does take us a little bit of time to prepare it for posting, and we expect to post the final report on or around July 15th.

The public will also be invited to present oral comments on the committee's report, and those actually go to the Departments of USDA and HHS, and we have that planned for August 11th.

So, more information will be posted at DietaryGuidelines.gov, where you can also sign up for email updates.

So, later this summer, in the fall, USDA and HHS will then write and publish the *Dietary Guidelines for Americans*, and our goal continues to be to publish the next edition by the end of this year.

[3:26:03] So, at this time, I'd really like to say, on behalf of USDA and HHS leadership and staff, thank you to the members of this committee. Thank you to Barbara and Ron for really just providing some outstanding leadership throughout this process. Thank you to the subcommittee chairs – Regan, Carol, Kay, Sharon, Steve, Beth, and Linda.

And really, just thank you to every single one of the members. Y'all have really contributed great work over the course of this process and we really appreciate you volunteering your time as well as your expertise.

As you have also heard today, there are a number of staff from USDA and HHS who support this process, particularly across the review of the evidence, but also, helping to make the information available on our website, processing public comments, and more.

[3:26:59] So, this slide does include the team who supported this process. Kind of, at this point in the process, I want to give a special thank you to Ann Rogers, our science writer, who supported report development.

Thank you also to the leadership at USDA, particularly the USDA's Food, Nutrition, and Consumer Services and the Center for Nutrition Policy and Promotion, as well as the USDA Research, Education, and Economics Agricultural Research Service.

Thank you to HHS and leadership at the Office of the Assistant Secretary for Health and the Office of Disease Prevention and Health Promotion.

And finally, a special thank you to Janet De Jesus, Rick Olson, Julie Obbagy, and TusaRebecca Panucci, who helped lead the staff support of this process.

So, collectively, just thank you for all the work across the members and the support staff. You've heard a lot of that today, and here's just a few little highlights, or rather, they're big highlights.

[3:28:00] The draft report is a total of over 500 pages, plus online supplements.

For the NESR systematic reviews, staff screened over 270,000 citations and nearly 1,500 articles were included in the new NESR systematic reviews.

As Regan noted, for data analyses, over 150 analyses of federal data sets were reviewed.

And for the first time, as was discussed today, the food pattern modeling analyses represented from 6 months to older adulthood.

So, across the board, this was really an enormous task. We appreciate the work of the members, of the support staff, to support this effort.

So with that, I'm going to turn it over to Barbara and Ron, who also have some closing remarks.

Dr. Barbara Schneeman: Great. Thank you, Eve. And yes, before going to closing remarks directly, from Dr. Kleinman and myself, we do want to acknowledge the public comments that have been received.

[3:29:06] And the committee received approximately 62,350 written public comments from March 12, 2019 to June 10, 2020, when they were closed.

Amongst those, 4,000 were unique comments.

This is the most comments ever submitted to a Dietary Guidelines Advisory Committee, and in response to the National Academies report on the Dietary Guidelines process, several steps have been taken to make the committee's process more transparent and inclusive, including posting updates on the committee's work, which I believe facilitated comments and public input.

Thank you to the public for being a part of this process, and to the staff for summarizing the comments for the committee's work.

[3:30:01] So, just in closing comments, as we near the end of our work, this has indeed been an incredible journey. I recall the advice I think we all received at our first meeting about the amount of work to accomplish the goals set out by the task for the committee.

I think at this point, and after hearing Dr. Stoodly's summary of what we've worked on, I think we would all agree.

I'm reminded of one of my current favorite quotes from Nelson Mandela, who stated that it always seems impossible until it is done.

We are not done yet, but I think we are definitely in the realm of possible for completing our charge.

I think it's important to also note that certainly one of the dramatic changes since we began our work is the COVID-19 epidemic that has affected so many Americans, including how the committee and staff interacted, but still kept the work progressing.

[3:31:05] And I know that all of us on the committee have been struck by the fact that those most at risk for the most serious outcomes of COVID-19, including hospitalization and death, are people afflicted by diet-related chronic disease and the apparent synergy between the non-infectious epidemic of obesity and diet-related chronic disease and the infectious epidemic due to COVID-19.

This coincidence has highlighted the importance of nutrition and healthful dietary patterns and needs additional examination in future *Dietary Guidelines*.

The situation around COVID-19 has also brought to our attention and heightened the implication of food insecurity related to access to foods for a healthful diet as part of the public

health strategy to lower disease risk, an issue that we have pointed to as important for USDA and HHS to address in the implementation of the recommendations.

[3:32:13] This current situation has illustrated the importance of taking steps to improve nutrition for all Americans.

And just some thank yous to the staff supporting our work. I know that we do not have enough words to express our appreciation and somehow capture the scope and the excellent quality of your work to enable the committee to accomplish its task.

I'd also note that, as a committee, we benefited from the peer review process organized by the Agricultural Research Service. This was a new step in the process, and it provided very useful feedback. Thank you to all those scientists involved.

[3:33:00] And to my fellow committee members, you have brought a unique and essential expertise to this process. I appreciate your respect to the opinions of fellow committee members, the evaluation of the public comments, providing constructive suggestions on our drafts, and keeping the focus on the scientific evidence.

It has been great working with you and learning from each of you, especially as we move into this final stage to finalize our work by the end of the month.

So, thank you, and thank you especially to Dr. Kleinman. As Vice Chair, it has really been great working with you.

So, Ron, I will turn it over for you—to you for any final comments.

Dr. Ronald Kleinman: Well, thanks so much, Barbara. And right back at you. It's been really a pleasure to work with you. You are an extraordinary leader, and I've learned a lot from you about how to make a process like this move forward.

[3:34:04] I can only echo the other comments that you made, and say from my personal perspective, this is perhaps the most collegial committee I've served on, and the dedication to getting at the evidence, understanding it, and translating it into advice has been really exceptional.

The staff, I have to say that, when—at the end of the first meeting, my thought was, "No way. It just isn't going to work."

"There's way too much to do here, much too little time to do it in, and we're probably going to have to give this up sometime in the next two or three months."

[3:35:02] The staff, you made it possible to complete this task, and you did it in the most professional, dedicated way I can imagine.

So, I think so much credit goes to you for your dedication, your skill, experience, and your knowledge of all of these issues, and you really made it a much easier task for all of us.

So, I'll end, again, by thanking all of you. You really are an absolutely wonderful group, and I hope we get to work together again in a much more limited way.

Dr. Barbara Schneeman: Great.

Dr. Ronald Kleinman: Thank you.

Dr. Barbara Schneeman: And so, now we turn it back to Eve, because she's the one who has to adjourn us.

[3:36:00] Dr. Eve Stody: Yeah. So, thank you again, and thanks everyone for joining us. This does adjourn the final meeting of the 2020 Dietary Guidelines Advisory Committee. Stay tuned for updates at DietaryGuidelines.gov and thank you.

Dr. Barbara Schneeman: Great. Thank you all. Bye-bye.

Announcer: And that does conclude our call for today. Thank you for your participation. You may now disconnect.