

## 2020 DIETARY GUIDELINES ADVISORY COMMITTEE

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## PUBLIC MEETING

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THURSDAY  
MARCH 12, 2020

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The Dietary Guidelines Advisory Committee met via webinar at 9:00 a.m. Eastern Time, Barbara Schneeman, Chair, presiding.

MEMBERS PRESENT:

DR. BARBARA SCHNEEMAN, PhD, Chair  
 DR. RONALD KLEINMAN, MD, Vice Chair  
 DR. JAMY ARD, MD, Member  
 DR. REGAN BAILEY, PhD, MPH, RD, Member  
 DR. LYDIA BAZZANO, MD, PhD, Member  
 DR. CAROL BOUSHEY, PhD, MPH, RDN, Member  
 DR. TERESA DAVIS, PhD, Member  
 DR. KATHRYN DEWEY, PhD, Member  
 DR. SHARON DONOVAN, PhD, RD, Member  
 DR. STEVEN HEYMSFIELD, MD, Member  
 DR. HEATHER LEIDY, PhD, Member  
 DR. RICHARD MATTES, PhD, MPH, RD, Member  
 DR. ELIZABETH MAYER-DAVIS, PhD, RD, Member  
 DR. TIMOTHY NAIMI, MD, MPH, Member  
 DR. RACHEL NOVOTNY, PhD, RDN, LD, Member  
 DR. JOAN SABATÉ, MD, DrPH, Member  
 DR. LINDA SNETSELAAR, PhD, RD, Member  
 DR. JAMIE STANG, PhD, MPH, RD, Member  
 DR. ELSIE TAVERAS, MD, MPH, Member  
 DR. LINDA VAN HORN, PhD, RDN, LD, Member

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## P-R-O-C-E-E-D-I-N-G-S

(9:00 a.m.)

DR. STOODY: Good morning. This is Eve Stoody, and I'm with USDA's Center for Nutrition Policy and Promotion.

Welcome to meeting 5 of the 2020 Dietary Guidelines Advisory Committee. This is a virtual meeting for members of the Committee, that it is being webcast to the public.

For members of the public, you are joining this meeting in listen-only mode. If you have any technology issues, please use the question box to the left on your screen. And this will be the only use for the ask-a-question box throughout the meeting.

All 20 members were able to join us remotely for this meeting. We do want to note that we have a few members whose universities and hospitals are engaged in coronavirus response activities, so there may be times during this meeting when they need to step out from the discussion.

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We have Committee members who are joining us from across the country, including Hawaii, California, Texas, Louisiana, Minnesota, Iowa, Illinois, Indiana, North Carolina, New England, and Washington, D.C. So good morning, good very early morning. I think we have people joining us at kind of a range of time zones that is over six hours -- or is six hours. So very, very early good morning.

As always, we start the meeting by stating the charge to the Committee. This Committee was established to examine the evidence on specific topics and scientific questions identified by Departments of Agriculture and Health and Human Services to develop a report that outlines your science based review and recommendations to the Departments, and then to submit your report to the Secretaries of USDA and HHS for consideration as the Departments develop the next edition of the Dietary Guidelines.

This timeline provides an overview of our steps so far in the process to update the Dietary

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Guidelines. As a reminder, we announced the Committee in February of 2019, and this is the fifth meeting of the Committee.

Meeting 5 will be held today and tomorrow from 9:00 a.m. until 4:30 p.m. each day.

Please note that there are different webcast links for the morning and afternoon sessions each day.

The webcast links were sent out through our listserv and are also available at [DietaryGuidelines.gov](http://DietaryGuidelines.gov).

The agenda is also available at [DietaryGuidelines.gov](http://DietaryGuidelines.gov), and Dr. Schneeman will provide an overview of the agenda in her remarks.

So a few notes about future dates of interest. As we announced at meeting 4, the Committee plans to hold a meeting on its draft scientific report on Monday, May 11th, and they plan to submit their final report to the Departments by the end of May.

To ensure all public comments can be considered by the Committee as it develops its report, the ongoing public comment period will

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close at 11:59 p.m. Eastern Time on Friday, May\_1st.

After the Committee submits its report to the Departments, USDA and HHS will post the Committee's final report for public comment in the summer of this year. So, as usual, please sign up for the email updates on these and other announcements at [DietaryGuidelines.gov](http://DietaryGuidelines.gov).

And with that, I'd like to turn it over to my colleague, Janet de Jesus, from the HHS Office of Disease Prevention and Health Promotion for opening remarks.

MS. DE JESUS: Good morning, everyone.

Welcome to meeting 5 of the Dietary Guidelines Advisory Committee. It is my pleasure to introduce Dr. Don Wright, who has served as the Deputy Assistant Secretary for Health and the Director of Office of Disease Prevention and Health Promotion since January of 2012.

In this capacity, Dr. Wright leads coordination and policy development for public health and prevention activities within Office of the Assistant Secretary for Health at the

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Department of Health and Human Services.

Dr. Wright provides leadership for Healthy People and oversees the development of evidence-based health policies, such as the Dietary Guidelines for Americans and Physical Activity Guidelines for Americans, and a national plan that addresses adverse drug events and health care-associated infections.

So prior to joining ODPHP, Dr. Wright served in a variety of federal roles and in government, and before his government service he was a dedicated clinician in central Texas for 15 years.

Dr. Wright has an exciting new opportunity coming up. He will serve as the U.S. Ambassador to Tanzania. So we're very thrilled for him. He has been in intensive training, including learning Swahili, so we're thrilled that he can be with us here today.

So without further ado, I will turn it over to Dr. Wright.

DR. WRIGHT: Well, thank you, Janet.

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And to all of the Committee members, asante sana in Swahili. Thank you very much for your contributions.

Let me say it has been an honor to be here this morning to welcome you all to the fifth meeting of the Dietary Guidelines for America and the last scheduled in-person meeting that was rescheduled before the Committee presents its report to the Secretaries of USDA and HHS.

On behalf of USDA and HHS, I would like to thank all of you for the excellent work that you have done over the course of this appointment.

After a little more than a year from your first public meeting, we are nearing the finish line for the 2020 Dietary Guidelines Advisory Committee. We know that we have asked a lot of you, particularly in the last three months, and we appreciate your commitment to science and public health and your contributions to this evidence-based, transparent process.

To Dr. Schneeman and Dr. Kleinman, thank you for your leadership as Advisory Committee

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Chair and Vice Chair and all of the time you have dedicated to this effort. Between participating on numerous subcommittee calls and responding to a deluge of related emails, I imagine you are due for a well-deserved break once the Committee's report is submitted in a few months.

And to the entire Committee, I am truly amazed at how much work you have been able to accomplish. You are the first committee we have asked to review the evidence on nutrition across all -- Across the life stages, including pregnancy, lactation, and the first two years of life.

In addition, the body of evidence on the role of nutrition and disease prevention and health promotion has grown exponentially since the last Committee submitted its report, and you've done an impressive job of reviewing this unprecedented evidence base while maintaining a rigorous and thorough process.

This was an ambitious ask for the Departments, and we appreciate your enthusiasm in accepting the task. We look forward to receiving

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the report, which will include your recommendations for USDA and HHS to use as we develop the 2020 to 2025 Dietary Guidelines for Americans.

We are confident that the rigorous, systematic reviews, data analysis, and food pattern modeling that you have completed over the course of your work will provide the evidence base we need to update the guidelines.

I'd like to recognize and thank the talented, hardworking staff who have made all of this work possible. Federal employees and contractors from both U.S. Department of Agriculture and the U.S. Department of Health and Human Services have worked seamlessly together and are truly dedicated to supporting the Dietary Guidelines Advisory Committee.

To all staff, I am confident I speak for leadership from USDA and HHS when I say we can't thank you enough for your support of this Committee and the work that you will continue to do in developing the Dietary Guidelines for Americans in the coming months.

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I think it's appropriate that this group of nutrition experts is meeting publicly during National Nutrition Month. As most of you know, yesterday was Registered Dietitian Nutritionist Day. And given that many dietitians are watching, I'd like to recognize and applaud the work these professionals do to improve the health of their patients, clients, and communities.

As you're all well aware, the Dietary Guidelines form the basis for federal food and nutrition policy. From an HHS perspective, we use the Dietary Guidelines to inform, first and foremost, consumer dietary guidance delivered through our grants and educational materials.

We also use them for food assistance programs, like the Older Americans Act Nutrition Program. We use them for national health objectives, such as the nutrition and weight status objectives in Healthy People, and we use them in nutrition monitoring and research. It's also used in regulation on food labeling and fortification.

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My office at HHS also leads the Healthy People initiative. Since 1979, Healthy People has identified science-based national goals and objectives and ambitious, yet achievable, targets for improving the health of the nation by the close of each decade.

In this way, Healthy People serves as a roadmap for benchmarking, charting, and assessing the nation's health promotion and disease prevention efforts. The Dietary Guidelines help to inform many of the Healthy People nutrition and weight status objectives and targets.

On March 31st of this year, HHS will launch the fifth iteration of the Healthy People initiative, Healthy People 2030. I encourage you to check out [HealthyPeople.gov](http://HealthyPeople.gov) when we unveil the nutrition and weight status objectives for the decade.

Another HHS office, the Office of Women's Health, is looking forward to the Advisory Committee's science-based recommendations to promote women's health across the lifespan, but

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particularly during pregnancy and lactation.

We know that proper nutrition during the early stages of life is critical to support healthy growth and development during childhood and to help promote health and prevent chronic disease through adulthood, as we know that proper nutrition is important to maintaining a healthy pregnancy and keeping moms healthy.

We are confident that your report will enable us to develop dietary guidelines for these populations and across the lifespan that are based on the best-available scientific evidence and will improve the health of the American people.

Again, I want to thank you for your willingness to serve on this very important Advisory Committee. I know your work will be instrumental in ensuring that a strong scientific foundation underlines the dietary guidance we provide for all Americans across the lifespan.

At this point, I will turn it back to Dr. Schneeman.

CHAIR SCHNEEMAN: Great. Thank you

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very much, Dr. Wright, and congratulations on your new position. It sounds exciting.

DR. WRIGHT: Thank you.

CHAIR SCHNEEMAN: And interesting.

So before going into my formal slides, I do want to express my appreciation to the staff.

We know that the situation has been changing on a regular basis in all the states that you are coming from, and the ability to meet virtually means we can continue the very hard work that this committee has been putting forward.

So thank you to the staff, and thank you for your flexibility in adapting to current reality as it exists. And also, my appreciation to the Committee members who really put in tremendous effort, so that we could be ready for this public meeting, and your willingness to be there at all sorts of odd hours of the day, so we can have this public meeting.

So just to review for you the agenda that we will be going through, we'll -- I'm going to just quickly review the subcommittee structure

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and the approaches used to examine the evidence.

I'll review our meeting purpose and agenda, and then some reminders about the public comments, which have been very important to the Committee members as they work through their subcommittee.

So just to remind you that in order to accomplish work between the public meeting sessions, we have been divided into six subcommittees -- Dietary Patterns, Pregnancy and Lactation, Birth to 24 Months, Beverages and Added Sugars, Dietary Fats and Seafood, and Frequency of Eating; and then one cross-cutting group that has been looking at the data analysis and the food pattern modeling.

So members of the Committee serve on at least two subcommittees, and Dr. Kleinman and I have divided the Committee, so that we have some cross-representation.

The subcommittees have been dealing with the questions that came to us from the Departments of Agriculture and Health and Human Services, and we use these approaches to examine

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the evidence; data analysis, food pattern modeling, and the NESR systematic reviews.

And I'm not going to repeat what I have said in other public meetings about the details of each of these approaches, but certainly you can find much more detailed information at the website, [DietaryGuidelines.gov](http://DietaryGuidelines.gov).

I would note that while each question or topic has maybe focused on one of these approaches to examine the evidence, as we are now reaching the point where we're developing our conclusions and beginning to look across the topics, there will be more opportunity for integrating the conclusions from each of these areas into our report as we work toward putting that together to deliver by the end of the month.

So today we will be focusing on draft conclusion statements, and I do want to emphasize the draft word in conclusion statements. These are how we developed our answers to the questions based on the evidence that is reviewed. They have been drafted by the subcommittees and are being

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brought to the full Committee, so as a full Committee we can discuss and reach agreement at these public meetings. But do keep in mind that any conclusion statement that we show is considered draft until the Committee submits its final report to the Secretaries. So these are being brought forward for discussion.

Okay. So for this meeting, our purpose, then, is to describe the status and provide updates on the work of the Committee, and discuss our next step as we finalize our work. There is an agenda. As Eve pointed out, the agenda is available at [DietaryGuidelines.gov](http://DietaryGuidelines.gov).

Both today and tomorrow we're starting at 9:00 a.m. Eastern Time, and our afternoon session will begin at 1:00 p.m. Eastern Time. And as Dr. Stody already pointed out, I think you have a log-in for each of those times.

So, and I would note we will plan on breaks. They are not set for specific times, but we will take them as they fit within our discussions.

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So for today's agenda, following the opening remarks, we will move straight into our subcommittee reports, and the plan for today is to focus on the Data Analysis cross-cutting working group, the Birth to 24 Months subcommittee, Pregnancy and Lactation subcommittee, Dietary Patterns subcommittee, Frequency of Eating. And we have been trying to be sensitive to the time differences in terms of when the subcommittees give their report.

So, and for tomorrow's agenda, again, we will begin at 9:00 a.m., and we'll continue with the subcommittee reports. So what we anticipate for tomorrow is, again, from the cross-cutting working group, the Food Pattern Modeling, but then move to Dietary Fats and Seafood, Beverages and Added Sugars.

Of course, we will have Committee discussion as we move through each of those discussions, each of those subcommittee reports, but then hope to have some broader discussion.

And then, at the end of the day, we'll

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talk about next steps, the peer review for the Committee's systematic reviews, and an outline of the Committee's report and where we are in terms of starting to integrate across the chapters, and then closing remarks at the end of the day.

So, as mentioned, we are very interested in public comments. At this point, we have received over 40,000 written public comments since March 12, 2019. So within a year, that's a lot of public comments. If there are public comments related to the discussion at this particular meeting, we encourage you to submit them to the committee by Friday, March\_27th. Again, that's when they are going to be most useful to the subcommittees.

In terms of the written public comments, the comment period will close May 1st, at 11:59 p.m. Eastern on Friday, May 1st. And our members are reviewing and considering the public comments received, that they are part of the discussion within the subcommittees as the Committee goes through how it's looking at the

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protocols and the nature of the evidence that it's bringing together. So those public comments are an important part of what we do.

So with that, we will be ready to start with our subcommittee reports. And so -- yes, and so, Dr. Bailey, are you ready for the working group report on data analysis?

MEMBER BAILEY: Yes, Dr. Schneeman. Can you hear me okay?

CHAIR SCHNEEMAN: Yes, we can hear you fine.

MEMBER BAILEY: Okay.

CHAIR SCHNEEMAN: And we're going to go on mute now, while you do your report.

MEMBER BAILEY: Okay. Great. Good morning, everyone. Today we'll be going over some of the topics we discussed at previous meetings, but specific to the Birth to 24 Months and Pregnancy and Lactation groups -- and those are listed here on the slide -- we'll also be talking about the relationship between added sugar and meeting food group and nutrient recommendations, frequency of

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eating, beverages and meeting food group and nutrient recommendations as well as alcohol relative to those same endpoints.

So in this data presentation, I'll refer to HM infants. This means infants who receive no infant formula, so infants receiving human milk, and we will talk about infants who are receiving infant formula, including mixed-fed infants as FMF.

So this was done -- Mainly, we wanted to look at primary source in six to 12 months of age. And we didn't have a sample size to look at mixed-fed infants, those receiving both breast milk and formula, so those have been -- those infants are categorized as FMF.

So as has been the case for most of the work that we do, we rely on the National Health and Nutrition Examination Survey and similar databases that have been discussed in the past. New to this presentation are two data sources where we will have information on breastfeeding initiation and duration, as well as the timing and

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introduction of foods and beverages from the surveys listed here.

We have gone over their key definitions several times. I just want to point out that we use consistent definitions as the B24 subcommittee, and you have these on the slide set.

So the questions now that we will start with, we will go to Birth to 24 Months, and examine these four questions together.

So in terms of the B24 group, the sample size for each two-year cycle of NHANES is very small. Ideally, we would have a lot more data in each survey cycle, but that's not the reality that we have. So what we've done for the presentation of data in this age group is combined data from 2007 to 2014 in order to get adequate sample size to be able to stratify FM and mixed-feeding and formula-feeding infants.

So the strength of that is that we have the ability to look at those different groups, but there is also a weakness associated with that, because the nature of the food supply is pretty

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dynamic, and trends in infant feeding practices could have occurred over these time periods, as well as potential lags in the database to reflect the food supply.

There is measurement error inherent with all self-reported dietary data, the extent to which that exists for proxy interviewers. So, obviously, the infants aren't reporting for themselves, so it's generally a parent or caregiver.

However, this may not be the person who is most familiar with an infant's dietary intake at particular time periods. So if a child is in someone's else's care for the day, you know, that might be a limitation of proxy report.

Also, consider that it's difficult to categorize usual intakes, and this is an ongoing research question. Especially in this age group, where eating trajectories are quite dynamic and evolving. And there are a variety of age ranges, so even within six to 12 months, there is going to be different energy needs for a six-month old

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versus an 11-month old. So just keep that in the back of your mind.

And, finally, while we did categorize intake into these two groups, they were not statistically compared. So I might say something is higher or lower. I don't want you to assume that that means it's statistically different.

So let's start to first look at and focus on breastfeeding rates and duration, and then timing of complementary foods and beverages. And we'd like to thank Cria Perrine and her team at CDC for providing this data to us.

So this is the percent of U.S. infants who were -- Where breastfeeding was initiated, so about 84 percent. And then you can see during different time periods that that decreases to 57 percent at six months and 36 percent at 12 months.

And the exclusive rates at three months and six months are also presented on this slide.

This slide looks at the same type of data, but it categorizes by race and Hispanic origin, and you'll see that breastfeeding rates

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appear to be higher for non-Hispanic white and non-Hispanic Asians, both in terms of initiation and at six and 12 months.

This is looking at exclusive breastfeeding. And so just for frame of reference, the Healthy People 2020 goal at three months is 46.2 percent. So Americans are meeting this goal.

However, at six months, the goal is 25.5 percent, and we're just shy of that at 24.9.

So this is a slide showing the timing of introduction of complementary foods. It is generally recommended that that be anywhere between four to six months, but we do see about 32 percent of infants who are receiving complementary foods before four months of age. That seems to differ by the source of whether an infant is receiving human milk only or infant formula. And so for the purposes of this slide, you can see the mixed-fed group here, which is so the rest of the top will be lumped in with infant formula, but infants receiving infant formula, there is a higher percentage having complementary foods.

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So we'll next focus on these three bullet points, and I will walk you through the data as to not read the slide to you.

So this is a slide that is looking at the proportion of reported intake. So this compares the percent of the group that is reporting a food, and then under the main food category there are food subgroups.

So I pulled a few comparisons out in bold, just to show you and to highlight the point that infants who are receiving formula or are mixed fed, there is a higher percent of reported consumption on any given day across most food groups, but then also to note that within all infants there is a low prevalence of, for example, dark green leafy vegetables being reported. So that's at six percent, less than one percent with total fish and seafood, and about 20 percent for eggs.

So we'll see some of this food data translated into nutrient data in the upcoming slides.

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So this slide compares the mean amounts consumed by age group to begin to examine what changes occur at what age. So, remember, this is cross-sectional data, so we can't say intakes, you know, for a particular child increase this much.

But at the population level for these age groups, here is the mean amount of these main groups that are being consumed.

And so that helps us start to get a sense of when shifts are starting to occur and for what types of mean good groups. And so the first column is six to 11 months and 12 to 23 months, and then we have older children, two to five, that is further stratified by sex.

So in terms of the results for infants six to 12 months, as I mentioned, formula and mixed-fed infants get a larger proportion of food groups from baby food than human milk infants do.

Sixty-one percent of added sugars in human milk-fed infants come from the categories milk and dairy, grains, and fruit, whereas the majority of added sugar among those formula and mixed-fed

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infants comes from snacks and sweets, baby food, and milk and dairy.

In terms of the older age group within B24, so 12 to 24 months, the food category source of food is really similar to that of all Americans age two-plus, and we have pulled out some data on the top sources of added sugar here, but those top three are among the top five in all age groups.

So to summarize some of the data here, breastfeeding initiation rates are high, but exclusive breastfeeding past three months and any duration past six months is below 50 percent. And we looked at some of those differences by race and ethnicity.

Complementary foods are introduced at less than six months of age for the majority of infants, and introduction of complementary foods and beverages at less than four months is more prevalent among those infants who are receiving formula or who are mixed fed.

We looked at some of the different patterns between human milk and formula and

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mixed-fed group in terms of the types of complementary foods and beverages being reported.

And, in general, mean intake of complementary foods and beverages is higher among formula and mixed-fed infants, and a greater proportion of complementary foods and beverages come from sources such as baby foods for formula-fed infants when compared to human milk-fed infants.

And what that translates to, in general -- and this is an estimate -- but around 100\_calories difference on average on any given day, higher intakes for formula-fed than human milk-fed infants.

And so the pattern of food group intake and sources of food groups among one-year-olds are similar to that of the rest of the population that we have looked at for several iterations of the Dietary Guidelines. There is a notable increase in the intake of added sugars when one-year-olds are compared to infants that are less than 12 months of age.

So this seems to be a real breakpoint

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in terms of some food sources and food categories, but particularly for added sugars.

Moving on next to talk about nutrients of public health concern and current intakes of nutrients. So you will remember that we had talked about nutrients of public health concern in ages two-plus at meeting 4 in Houston, and that we will focus on these specific life stages here today.

And, again, here is -- just by way of a refresher -- and I'll go through these really quickly because I think you've seen them at least once but maybe twice now. When we identify nutrients or food components of public health concern, the goal is always to have more than one measure. So we would ideally have nutrient data or intake data paired with a biological endpoint or clinical health outcome.

We created this decision tree before we got into the data for how we would make decisions on -- when we didn't have certain data or how we would kind of have a streamlined way to make decisions based on the availability of data and

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the science behind some of the outcomes or validated intermediary outcomes.

So, quickly, we refer to an underconsumed or overconsumed nutrient or food component when it's a problem in five percent or more of the population, or within specific population subgroups. We also have a term "nutrient or food component of public health concern," again, where we link that with some other indicators, such as a biomarker or clinical health outcome.

And then we have nutrients or food components that pose special challenges, and so the challenges may be in identifying risk groups or -- for which dietary guidance to meet recommended intake levels is challenging to develop.

Okay. So let's go into a little bit deeper dive here with the data. The analytical framework -- we'll look at the mean nutrient intakes, usual intake distributions, and compare those to the Dietary Reference Intakes. And just a quick note that we did present data on

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one-year-olds as part of the one- to three-year-old age grouping, which is the basis for the Dietary Reference Intakes. So I'll try to make flags here where we're referring to certain age groups.

So in this slide, we are looking at infants who are receiving human milk or formula or mixed fed, and we really focused on the nutrients that have an EAR for this age group. And that is limited to protein, iron, and zinc. So without an EAR, it's very hard to make conclusions around the adequacy of dietary intakes.

So you will see for all infants on the far right column the prevalence that are either below the EAR or above the UL, and there's just substantial differences between infants who have human milk or formula-fed infants, especially with regard to iron and protein and zinc, and that also translates into the prevalence above the UL for those nutrients for infants who are receiving formula or are mixed fed.

So this slide is a little bit complicated, and I'll just take a moment to walk

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you through it. The first column is the adequate intake. So for food components with an adequate intake, that is the Dietary Reference Intake value that is associated with that in the first column.

The next column is the amount that is assumed to be contributed from complementary foods and beverages as outlined in the Dietary Reference Intakes. And then in the next three columns you will see whether or not the intakes are either above those AIs assumed to be contributed for all infants, for infants receiving human milk, and for infants receiving formula or are mixed fed.

So the nutrients in green are where infants are receiving more than the expected from complementary foods and beverages, and in that pink or salmon color it's less than the AI value, and then the white is pretty close to what the expectations would be.

So based on this data, the proposed nutrients of public health concern for infants who are receiving human milk would include iron, zinc, and protein. Based on what we call nutrients or

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food components that pose special challenges, this is for all infants. We characterize potassium, vitamin D, and choline, and then among infants who are receiving formula or mixed fed, intakes are notably high, above the UL, for zinc and for retinol.

So our draft conclusion statement is that complementary foods should be nutrient dense, especially for sources of dietary components for which potential risk of inadequacy is noted. So that was for six to 12 months.

Moving on to infants and toddlers 12 to 24 months, similar to what we proposed in the last meeting, potassium, fiber, vitamin D, sodium, and added sugars. Proposed nutrients or food components with special challenges in this age group include choline and linoleic acid.

And just noting that in this age group many one-year-olds still exceed the recommendations for zinc and from retinol from foods alone.

So we mentioned kind of at the start

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of this there are many caveats to consider with looking at this age range. So at around 12\_months, children start to transition. The caveats here are we really don't have a lot of biomarker data available in this age range.

We do have serum ferritin concentration, but that is for one- to five-year-olds entirely, combined together. And that data says that about four percent overall U.S. children, one to five, have potential iron inadequacy based on biomarkers.

So in terms of DRIs, there has been a lot of talk about the basis for the DRIs. Oftentimes, they are extrapolated down from adult data. There is very little experimental data to inform the Dietary Reference Intakes, and so that's one caveat in mind, particularly among the UL, because there are such large proportions of infants and young children exceeding the UL from foods alone for certain nutrients.

Existing food composition data on human milk are outdated and don't account for known

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variations that exist for a number of components.

And then it's always challenging to estimate the volume of human milk that is consumed, and so in NHANES and in most studies, assumptions are made about the volume of human milk that is being consumed.

Okay. So we'll move on now to pregnancy and lactation. This is a radar plot showing the differences in HEI scores between pregnant women in purple, lactating women in red or maroon, and then similarly aged women who are not pregnant or lactating in blue.

And you can see straightaway that the HEI scores are notably higher among pregnant and lactating women than their non-pregnant or lactating peers. And this seems to be driven by higher intakes of fruit, greens and beans, whole grains, fatty acids, and seafood and plant proteins, specifically seafood and plant proteins in lactating women, combined with lower intakes of refined grains, sodium, and saturated fats.

So our draft summary statement is that

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during pregnancy and lactation the diet quality of women, as reflected by HEI, is higher than women of the same age range who are not pregnant or lactating.

Moving on to look at the nutrients of public health concern and intakes during pregnancy and lactation, it's a time when many women are using dietary supplements, particularly dietary supplements containing micronutrients. And on this slide is the prevalence of any dietary supplement, so you can see that 77 percent of pregnant women are taking a supplement.

So among pregnant women, those in the first trimester, those who are a little bit younger, 20 to 34, and those who are living in a family with lower incomes, are less likely to use supplements compared to their counterparts.

So this is just a broad summary of energy. So energy intakes increase as recommended to meet the demands, either for growth or during lactation, to produce milk. In general, similar to what we saw from the HEI slide, dietary fiber

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intake, while it is still low, is notably higher.

So this is the percent exceeding the adequate intake.

And most pregnant and lactating women are within the AMDR for protein, carbohydrate, and for essential fatty acids.

And this is a really busy slide, but we wanted to be able to provide a comprehensive comparison of how pregnant, in green, and lactating women, what their intakes are relative to the EAR.

So, remember, when we have an EAR, the percent less than the EAR would be considered at risk for inadequacy. And so the first number is from foods alone, and the second number is from total intake, inclusive of dietary supplements. And so you can see the estimates here for the EAR.

And then, remember, when we have an adequate intake, we can't say anything below that is at risk for inadequacy. We simply can characterize the percent of the population that is above the AI to assume adequacy. And those

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numbers in the purple can be interpreted as intakes that are at risk for potential excess.

So above the tolerable intake level or above the CDRR, the current disease risk reduction, and for right now we only have a CDRR for sodium.

And so with the dietary data and taking into account other things that we know relative to potential biomarkers or health outcomes, we really focus our conclusion statements around these nutrients that are listed in red.

And we'll talk a little bit about supplement use during pregnancy and lactation, but it's very difficult to meet the recommendations for iron without the use of a supplement, but then among supplement users it really increases the proportion above the UL.

So we have biomarker data on non-pregnant, non-lactating women of similar ages, but we don't have data specific to pregnancy and lactation. But based on transferrin receptor and serum ferritin, about 20 percent of reproductive age females in the U.S. have biomarkers indicative

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of low iron status.

So we don't have dietary data on iodine in the food databases, given the variable nature of iodine in the soil and differential uses of iodine-containing products or ingredients in the food supply. So, for example, some salt is iodized, some salt is not iodized, so it's really challenging to try to estimate dietary intake, but at the group level median urinary iodine is a pretty good tool to look at a population or a group.

And so in terms of U.S. pregnant women, you know, regardless of what survey years you use -- There is two different survey years presented on this slide -- The estimate is close to, but it falls below 150. So that's the World Health Organization cutoff for insufficiency.

And based on these two publications, we know that dairy consumption, iodized salt, and supplements, prenatal supplements containing iodine, are factors that are related to increasing iodine status.

Reproductive age females appear to be

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adequate from their median urinary iodine concentration, but iodine requirements increase exponentially during pregnancy.

So based on that, we have some summary of the data here. As I said, most pregnant and lactating women are using nutrient-containing products. Supplements decrease the risk of inadequacy, but they also increase the risk of high intakes, especially among users for folic acid and iron.

Without supplement use, it is very difficult to meet iron recommendations, and 95\_percent of U.S. women who are not taking a prenatal or dietary supplement containing iron will be at risk.

What's interesting is that iron requirements are much lower in lactation, even lower than reproductive age females, but many lactating women continue to use prenatal levels of iron. So I'm not going to imagine that you recall the last slide, but their percent above the UL is higher than that of pregnancy.

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So it's important to note, too, that pregnant and lactating women don't exceed the UL from food sources alone. So based on what I have described to you, our proposed nutrients of public health concern are similar to those that are carried forward from the two plus vitamin D, calcium, fiber, potassium, sodium, saturated fat, and added sugars, with the addition of iron in pregnancy.

We wanted to mention, though, that there are some of those food components that pose special challenges, and so given the importance of iodine for cognitive development of infants in utero, we want to keep a close eye on iodine but are not elevating it at this point, but would like to hear your thoughts on it.

Also, folate, for the first trimester, so folic acid is important for closing the neural tube and is associated with risk of neural tube defects. And so while biomarker data of non-pregnant and non-lactating women do not indicate issues with folate deficiency. We think it should be kept as a special challenge,

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particularly in the first trimester.

And then choline and magnesium have been related to health outcomes and pregnancy, but we only have dietary data, and so we have from the dietary data a high prevalence of potential inadequacy. So characterizing that as a food component, that poses a special challenge.

Moving on to the relationship of eating frequency and food group and nutrient recommendations. So just a reminder of the analytical framework. We look at the frequency of eating with and without naming occasions in a 24-hour period, and as well as the hourly distribution and the percent engaging in self described meals and snacks. And then we'll provide some data on meals and snacks, including beverage events.

And then the proportion of total energy that is -- we have looked at it based on like what I would call later-in-the-day eating, so from 8:00 p.m. to 11:59 p.m. We have some data there.

And we have talked about this with the

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Frequency of Eating committee in our joint calls, but this is going to look like an overwhelming slide. But I will try my best to just go over it quickly.

So, on average, Americans have 5.7 eating occasions per day. Those eating occasions tend to cluster, primarily around noon or evening hours. Most people report three or two meals, and you can see the estimates in parens there.

So the first blue box focuses on breakfast. So 85 percent of Americans report breakfast, typically between 7:00 and 9:00 a.m. It provides around 18 percent of energy. It is less frequently consumed by 12- to 19-year-olds, non-Hispanic Black Americans, Americans with lower incomes, but more energy is obtained in lower income groups at breakfast relative to other race/ethnic groups.

And Hispanic Americans get more nutrients at breakfast than other race/ethnic groups. This should be interpreted with a little bit of caution because the Spanish language

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equivalence for different meals may influence how breakfast was categorized.

Moving on to lunch, 81 percent report lunch generally between 12:00 and 1:00 p.m. It provides about a quarter of energy. It's most frequently consumed by Hispanic and non-Hispanic Blacks and lower poverty to income ratio groups, especially among children two to 11, and low poverty to income ratio groups consume less energy and nutrients at lunch than other race/ethnic groups.

And the last box on the right, 93 percent of Americans report dinner, generally between 6:00 and 8:00 p.m. Around 32 to 36 percent of energy intakes are obtained at dinner. Most protein and energy consumed is at dinner, and it's most frequently consumed by 12- to 19-year-olds, Hispanic and non-Hispanic Blacks, and low-income children have higher energy intakes but not necessarily nutrient intakes at dinner.

Down on the bottom there is some other data about things that are labeled extended consumption. Those tend to happen between 6:00

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to 11 a.m., and we have talked about that as potentially being, you know, drinking of coffee or tea slowly over time. That tends to be what we think of as extended consumption, but of course it's not limited to that.

So most Americans snack, and snacking tends to occur most frequently between lunch and dinner, so between 2:00 to 5:00 or after dinner, so 8:00 to 10:00. And then alcoholic drinks tend to occur between 8:00 and 10:00 p.m. So our draft conclusion statements -- and I do want to show you all of this data, because I can't show you all of the data we have or we'd be here for a month.

Various eating patterns exist in America, and this includes the frequency and timing, and they are shaped by age, race, ethnicity, and income. So we didn't see many sex or gender differences in the broad brush strokes that I showed you in the last slide.

As I mentioned, snacking is ubiquitous; 93 percent of Americans snack. It provides about 22 to 23 percent of total energy, and usually two

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to three snacks are reported per day. In terms of those late-night eating events that we talked about, so after 8:00 p.m. but before midnight, really associated with alcohol intake in adults and intakes of added sugar, sodium, saturated fats, in both adolescents and adults. So about 25 to 30 percent of those food components are consumed in those later hours.

When we compare individuals who report two meals versus three meals, those who report three meals have a higher HEI than those who report two meals, and I think those are transposed on this slide, but it tends to be about five points higher.

And then from this, we really -- it's hard to say a lot with the type of data that we have, but that every eating occasion is a chance to make nutrient-dense food choices. So shifts in childhood and adulthood snacks and adolescent eating frequency and timing could help with achieving recommendations.

And then, finally, the last question we'll cover today is what is the relationship

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between beverage intakes and achieving food and nutrient recommendations? And this is just to go over the definitions that we have talked about before, but just a reminder of the types of data that we're looking at.

The analytical framework -- again, looking at food group and dietary components per eight-ounce of discrete beverage type, beverage contribution is a percent of energy, nutrients are food components, food groups and calories, as well as the consumption of prevalence of fortified beverages and cow's milk and milk substitutes, and the focus mainly, though, on this top part of the slide here with the box around it.

So, in this slide, you'll see the percent of infants and toddlers consuming different beverage types, at least once on the first 24-hour recall in what we eat in America, in NHANES 2007 through 2016.

So 27 percent of children six to 11 months report consuming human milk on any given day, and that's how you can interpret these numbers.

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And so this first column is for six to 11 months, and the second column is 12 to 23 months.

You can see things by type of milk, and then other beverages, even including water here on this slide.

In this slide, we're looking at the mean daily energy intake and selected nutrients from beverages among toddlers and infants. So you can see the orange line there represents older group in the B24, so 12 to 24 months, whereas the blue bar is six to less than 12 months.

So we were able to look at food category sources of nutrients in plain milk in this age group is the primary source of potassium, calcium, and vitamin D, whereas sweetened beverages are the primary source of added sugars.

We looked at this slide in at least one other meeting, so this is looking at children from NHANES 2015/16, and those are subdivided by age groups, two to five, six to 11, and 12 to 19, and you can see the percent of energy and certain dietary components that are being consumed from

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beverages.

So added sugars are primarily from soft drinks and fruit drinks and represents about 15 to 28 percent. And, again, plain milk capturing primary source of calcium, potassium, and vitamin D in these age groups.

This is looking at adults. This slide is keeping all age groups together here for adults, but it's looking at the differences between males in blue and females in green, and, again, the percent of energy in different food components being provided from beverage.

I'd say the chief difference here in adults is that the primary source of potassium is coffee, which is something we didn't see in children in B24, and this is because coffee is not really the best source of potassium, but it's so frequently consumed that it is a top source of potassium from beverages.

And so our draft conclusion statements are beverages are diverse. And the contribution to food groups and dietary components, selection

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of beverage choice, can contribute positively to food groups that are below recommendations, and nutrients that are under consumed, as well as dietary components that exceed recommendations.

So plain milk, calcium-fortified soy beverage, and 100 percent juice contribute to meeting food and nutrient recommendations without contributing calories from added sugars. And coffee, without addition of sugar, is a good source or a notable source of potassium among adults.

And then this is just the last part of these conclusion statements. So beverages contribute to added sugars, and this is increased from about 30 percent in young children to 50 percent in adolescents. And among adults, beverages contribute to nearly 60 percent of added sugars intake.

The top sources of added sugars are sweetened beverages other than milk and milk substitutes, fruit drinks, sports and energy drinks, smoothies, and coffee and tea, which of course are not naturally sweetened, but that is

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included of sugars that are added to those beverage types.

And then alcohol. So this will be the last question, but is more or less a different part of beverage. So it has its own protocol due to the unique elements of this question. So our analytic framework includes looking at the prevalence of alcohol use, binge drinking and frequent binge drinking, as well as the contribution of alcohol to energy, caffeine, and added sugars.

We also examined alcoholic beverages and their contributions to total energy, added sugars, and caffeine, and beverage calories.

I'm getting a warning. It's coming up on my computer. Is anyone else seeing that? Okay.

I clicked it. Can everybody still see the slides?

Thank you, guys. It's like a lone mic.

I'm on an island out here.

Okay. So in terms of alcohol use, in 2017, the per capita consumption of alcohol was 2.34 gallons on average per person for Americans

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age 14 and older. And just to give some context around that, the Healthy People 2020 objective is 2.1 gallons.

So we're above that recommendation, and 41 states exceed the Healthy People 2020 objective.

And it really varies by where you are in the country in terms of per\_capita consumption of alcohol.

So 70 percent of adults in ages 21 to 26, and 55 percent of adults 26 and older, have used alcohol in the last month. About half of alcohol drinkers report binge drinking, so just as a refresher, binge drinking is defined for men as five or more and for women four or more drinks on one occasion in the last month.

So alcohol use is lower among older adults, whereas binge drinking tends to be highest among those 21 to 25. Important to note is we are gearing up here for spring break I guess.

In terms of some more results, alcohol is reported more frequently between -- or, excuse me, for men than for women on any given day. And a significantly larger proportion of total beverage

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calories comes from alcohol.

Alcoholic beverages contribute about four to five percent of total energy intakes. And then you can see at the bottom of this slide the percent of adults who reported this alcoholic beverage by specific type, whether that's beer, wine, or spirits, and then on the right-hand side you can see the amounts.

So men tend to drink beer more often than women and tend to do so in a higher volume, whereas women have slightly more wine than men, both in terms of amount and percent reporting. And then for mixed drinks you can see the data here, and so just -- I ask the question, this is the total amount of a mixed drink.

So this could be something, you know, a vodka soda, that would be the total volume, not necessarily 14 ounces of a vodka or other spirit.

So our draft conclusions around this data are that per capita consumption has gone up.

Most adults report consuming alcohol. Almost half of drinkers report binge drinking. Alcohol

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use tends to decrease with age. And reported intake of alcoholic beverages differ by age and by sex. And beyond contributing to energy intakes, alcoholic beverages contribute little toward meeting food or -- food group or nutrient recommendations.

I thought that was the last question.

I'm so sorry. We're going to go on to the last question now -- the relationship between added sugar intake and achieving food and nutrient recommendations.

So we looked at this in terms of usual distribution of added sugars, the percent of a population consuming less than 10 percent, the current recommendations from energy, and then food category source.

So mean intakes of added sugars have decreased significantly over time across all age groups. So when earlier years of NHANES are compared to more recent, we see that there is a big decrease from 21 teaspoon equivalents to 16\_teaspoon equivalents over time.

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Mean intakes of added sugars are lowest for non-Hispanic Asians, but similar across other race/ethnic groups. And you can see the mean intakes of added sugars in teaspoon equivalents by race and ethnicity here. So when I mentioned that non-Hispanic Asians, there are about 9.6 teaspoon equivalents compared to other race/ethnic groups, which are more similar.

Mean intake of added sugar is similar across income groups. So hovering around 16\_percent.

This slide shows you that nearly 70 percent of added sugars come from five food categories. And we have talked about this before, but just by way of refresher those top five categories are sweetened beverages, desserts and sweet snacks, coffee and tea, because of their additions, candy and sugar, and breakfast and cereal bars.

And so the top are the actual percent of total added sugars by age group, and then it's also provided here that we've looked at this as

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a life stage approach in some of our previous meetings, so you can see the blue bar is sugar sweetened beverages, that these tend to increase and are highest in these age groups, and then tend to decrease again. So you can look at those five categories in terms of how they shift with different age groups.

So our draft conclusion statements are that mean added sugars have significantly decreased over time but still remain quite high across all population segments. And we talked about the source of added sugars in that, that most added sugars are coming from five food categories specifically.

And while breakfast cereals and bars are a top source of whole grains, they also contribute to added sugar. Similarly, with coffee, it seems to be a good source of potassium among adults, but with the additions is also contributing added sugar.

So choices with no or low amounts of added sugar could be made within these categories

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to still help consumers meet the recommendations for those food groups and nutrients that we know are low.

And I think it stands to reason that added sugar intake could be greatly reduced by decreasing those certain food groups that we talked about that contribute the most, so sweetened beverages, desserts, and sweet snacks and candies.

And then by potentially having lower sugar options for coffee and teas and breakfast cereals and bars.

And now I promise I'm done. So this is just a slide showing the members of this committee, which is a great privilege of mine to work with these amazing people, both the members of the group as well as the support staff. So thank you.

And since I'm the first person, I have no idea how to take questions. I'm happy to take questions.

CHAIR SCHNEEMAN: So, yeah, thank you very much, Regan. That was a very thorough presentation, lots of data to look at and consider.

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So I'm going to just sort of have people chime in if they have questions. You can always alert me, send me a note, if you're having trouble getting a question raised, but also remind you please be sure to state your name, since we won't have your picture on the screen.

So we're open.

MEMBER MATTES: This is Rick Mattes.

Regan, I have a question. In the data on formula and mixed feeding diets, if I remember correctly, you said that those in that category had about 100 kcal greater energy intake per day. They also had higher protein, iron, and zinc.

Is the contribution of protein, iron, and zinc in proportion to that 100 kcals or disproportionate? I'm trying to sort of gauge whether smart decisions are being made there or poor decisions are being made there.

MEMBER BAILEY: You know, that's really something that we should follow up on. It seems to be that they are consuming more of everything, so I don't know if it's relative to

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those specific nutrients or food components, but we can certainly look at that.

MEMBER DEWEY: This is Kay. Can I -- can you hear me?

MEMBER BAILEY: Yes.

MEMBER DEWEY: Oh, good. I just wanted to comment that the main reason for the difference in iron and zinc intake, and potentially some of the protein, is that those estimates are total intakes, including the formula, and the formula is fortified with iron and zinc.

So it's not necessarily coming from the complementary foods portion, and I think what was presented there, the 100-calorie difference, was just the amount coming from complementary foods and beverages and not from the predominant milk source.

Is that right, Regan?

MEMBER BAILEY: Yeah, yeah. And I think he was asking specifically about those complementary foods. So within those complementary foods, what are the relative

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contributions to zinc and iron and protein? Which we haven't looked at those.

MEMBER DEWEY: Right. But you also showed that the kind of quality issues of those complementary foods and beverages were, if anything, a little lower in the formula and mixed-fed infants than in the human milk-fed infants.

MEMBER BAILEY: Yes.

MEMBER DEWEY: They are probably not richer in most nutrients. So that probably does not account for those differences in total iron, zinc, and protein.

MEMBER BAILEY: Yes.

MEMBER MATTES: Yeah. So if that's the case, then this is another example of smarter choices could be made for those complementary foods --

MEMBER BAILEY: Absolutely.

MEMBER MATTES: -- with diet quality.

MEMBER DEWEY: Right. But most of that issue will be in the human milk-fed infants

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who have much higher risk of inadequate iron and zinc, and to some extent protein. So that was shown in the slide, and that's one of the things that we'll be addressing in the Birth to 24 Months committee.

MEMBER BAILEY: Yeah. And how to make the most nutrient-dense choices in complementary foods and beverages. And this data we showed were not inclusive of dietary supplements, but supplement use, particularly for iron and zinc, for example, are really low. So that's another option for obtaining those nutrients for those who may be at risk.

MEMBER DEWEY: While we're on that subject, Regan, I wonder if you could show again the slide that shows the food groups for birth to 24 or from six to 12 months in particular, which was subdivided by human milk fed and mixed fed.

MEMBER BAILEY: Yeah, I'm trying to do that. Actually, you know, you have the power to do that, too. Is this the slide you mean?

MEMBER DEWEY: No, that's the

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nutrients. I'm thinking of the foods.

MEMBER BAILEY: So this --

MEMBER DEWEY: At least the one where you pointed out -- the one before that I believe. Yeah, there we go.

Okay. So if you look at the meat line, beef, veal , pork, et cetera, for all infants were only 14 percent report that on a given day. For the human milk-fed group, it's even lower. It's seven percent. And then it's 15 percent for the formula and mixed-fed groups.

So, you know, we have to think hard about the recommended complementary foods that would meet things like iron and zinc needs, particularly in the human milk-fed group.

MEMBER BAILEY: Yeah. Without exceeding that of the formula-fed group. We know from some of the data that we worked on for FITS that baby food meat and iron-fortified infant cereals have gone down over time. But iron-rich sources are particularly -- and zinc particularly for the human milk infants.

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MEMBER DEWEY: Right.

MEMBER MATTES: This is Rick Mattes again. Can I shift -- oh, go ahead. Finish, Kay.

MEMBER DEWEY: Oh, no. I'm done.

MEMBER MATTES: Oh, okay. I was going to change topics to the alcohol data. And you made the point that alcohol can contribute a substantial amount of energy and doesn't itself contribute many nutrients. But can you comment on the degree to which alcohol consumption is associated with other food patterns, and as a result, you know, looking at the diet sort of in totality, pose a different level of risk.

For example, I have no idea, but does alcohol drinking promote the choice of foods that are high in sodium? And so even though it's not a source of sodium, it's actually associated with a higher sodium diet? That's just a guess. I don't know.

MEMBER BAILEY: Yeah. And, Tim, you're on the line, if what I say is wrong, or if you have anything to add. We haven't looked at

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that specifically, but you're right. We know that 25 to 30 percent of sodium and added sugars are being consumed at the same -- in the same time intervals from eight to 12.

Now we can't make any causal statements that people who are drinking alcohol are -- that's when they're consuming their sodium or added sugar.

But it seems like most of those things are occurring at the same time. So we haven't specifically looked at it, but can kind of skirt around it a little bit.

MEMBER NAIMI: Yeah. And I would just chime in. I agree with Regan. We didn't really -- we didn't really look at that. I think there is also a lot of differences in the consumption patterns of people who consume different beverage types, but we don't think that that's to my knowledge is not -- that's just an association and not causally related.

MEMBER ARD: This is Jamy. So, Rick, I mean, this brings up another point that I think we could pick up on in the dietary patterns

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discussion, because we had a lot of conversation about that in the subcommittee yesterday regarding, you know, what we see associated with alcohol intake, especially in dietary patterns.

It may call out the use or inclusion of a moderate amount of alcohol versus not including that in certain dietary patterns and, you know, the implications of that.

So I don't -- I don't know that we came to a clear sort of conclusion, but it's something that I think will come up again in the discussion later on around dietary patterns.

CHAIR SCHNEEMAN: So, Regan, this is Barbara. And I'm going to go back to the sort of patterns over the life stage. And I appreciate your caveat that we don't really have a way to look at a change in the individual; namely, the data give us information at the population level.

But it seems like the data that we have could suggest that if a pattern is established early that it -- At a population level anyway it may be carrying over into later life stages. Is that fair

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to say?

MEMBER BAILEY: Yeah. I think with those caveats it's pretty fair to say. So when we look at the top contributors to energy, and different things, so, you know, if this was the energy slide, they are pretty stable at two and above. And I think what will be interesting is to see how these patterns emerge in that one to two years of age, because that is really where it seems patterns are established and are pretty dynamic. So I agree.

Are there any other questions?

MEMBER VAN HORN: Am I not on? Can you hear me?

MEMBER BAILEY: Oh, yes. Hi, Linda.

MEMBER VAN HORN: Hi. Sorry, it's hard to know who can hear what. And, again, thank you for an excellent and thorough review.

And I'm also kind of going back to what Barbara was saying. With the interest in racial/ethnic differences in breastfeeding behavior, and thinking about one of the slides that

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you were showing some of those differences -- initiation and duration -- and seeing especially that the Asian population continues to have exclusive breastfeeding pretty much longer than anyone else, and also thinking back about the questions that were related to introduction of complementary foods before four months, one of the things that is sort of interesting when you start to think about this is we're looking at these data without recognizing perhaps the contributions to growth and development and weight gain and things of that sort.

And, you know, with those children that introduce -- that are introduced to complementary foods earlier, the potential tendency to eat more calories is potentially, you know, initiated at that point that those extra 100 calories, you know, could in fact be excessive in some cases at that early age.

So it will be interesting to follow or figure out, you know, over time whether those recommendations that have been made, you know,

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historically to continue breastfeeding as long as possible do in fact ultimately impact growth and development of the child and prevention or advance of pediatric obesity.

MEMBER BAILEY: Yeah. That's a really good point.

MEMBER VAN HORN: Just to continue that for a second, I was struck with the topic of protein foods and human milk versus formula-fed infants and looking at that category in particular and wondering, again, you know, is that bad, or is that -- you know, certainly, they are undereating what is recommended, but in the long run we don't know at that point the size or the, you know, stage of that child, and whether in fact for a smaller infant that could be -- you know, partly what is contributing to this.

MEMBER BAILEY: Yeah. That's a good point.

MEMBER DEWEY: This is Kay Dewey again. I thought I would jump in just to say that the difference in energy intake between human milk fed

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and formula or mixed-fed infants is not only in the portion coming from complementary goods and beverages, but there also tend to be differences in intake from the milk source. So tend to be higher intakes again in the formula fed infants.

So the difference in total energy intake between those two groups --

MEMBER VAN HORN: It's both.

MEMBER DEWEY: -- Is actually quite large. Yeah, it's both. And there is some debate about whether the protein content of infant formula may be partly driving that. So there is a lot of sort of physiological/biological reasons why it might be driving appetite. So, yeah, there's a lot of uncertainty, but that's one of the factors that is being studied.

MEMBER VAN HORN: That's wonderful. I think that's what is especially exciting about initiating this round of the Dietary Guidelines, starting at birth, because we'll finally have a chance to look over the life course of diet intake

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and how early introduction of food, et\_cetera, you know, really makes a difference ultimately with data to document that. That's great.

MEMBER DEWEY: Yeah. And I wanted to point out also that in the previous meeting we reported on some of the results regarding the review of timing of introduction of complementary foods.

There is some evidence that introduction before four months may be related to a higher risk of overweight later.

MEMBER VAN HORN: Yeah. Right.

MEMBER BAILEY: And I was surprised to see -- this is Regan -- that 30 percent were receiving foods before four months of age.

MEMBER VAN HORN: Yeah. That's a little troubling.

CHAIR SCHNEEMAN: Okay. So any other comments or questions at this point? Okay. I'm going to suggest we take a brief break now, about 15 minutes. And I just would remind all of our Committee members, do not exit from the webinar, and it's probably preferable if you keep your phone

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on mute. We do not want to lose you.

So, please, let's -- let's go ahead and take a break until about 20 'til, and then we'll get started back again. Okay?

Thank you again, Regan.

(Whereupon, the above-entitled matter went off the record at 10:27 a.m. and resumed at 10:42 a.m.)

CHAIR SCHNEEMAN: Hello. This is Barbara, and I hope everyone is back on the call.

Always hard to say. If you're not there, please let us know.

MEMBER BAILEY: This is Regan. I'm here.

CHAIR SCHNEEMAN: Okay, okay, great. So we're ready to move to our next subcommittee report which is going to be the birth to 24 months subcommittee report. Dr. Dewey, okay, are you ready to go?

MEMBER DEWEY: Yes, I am. Thanks, Barbara. So everyone should be able to see the slides, and I'd like to begin by thanking the

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members of the subcommittee who are here and also all of the staff who have been doing an amazing job at helping us through the many systematic reviews that we've been conducting.

At the last public meeting, we presented eight different topics and conclusion statements which was a marathon. We won't have quite so many today, so you can rest easy. And I won't be repeating those.

So today, we'll be discussing three questions that are listed here, nutrients from supplements or fortified foods and growth, size, and body composition, nutrients from supplements or fortified foods and bone health, and human milk and infant formula and growth size and body composition.

The first systematic review that I'll present today is addressing the question, what is the relationship between specific nutrients from supplements and/or fortified foods consumed during infancy and toddlerhood and growth, size, and body composition?

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At the last public meeting, we explained that the specific nutrient we chose for this particular question was iron and that we would focus on iron from supplements, not from fortified foods because iron supplements are recommended for breastfed infants in the U.S. by the AAP.

We did not address iron from fortified foods within this systematic review because the systematic reviews on complementary foods which we presented at the last meeting included iron fortified foods.

Therefore, the refined question that we addressed is: what is the relationship between iron from supplements consumed during infancy and toddlerhood and growth, size, and body composition?

This is an important question. Some infants actually become iron deficient before six months of age. That is related to their body stores of iron at birth, and that tends to be related to their gestational age, birth weight, and whether delayed cord clamping occurred.

And because there's a risk of iron

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deficiency even before six months, the current statement from the American Academy of Pediatrics is to provide iron supplements to breastfed infants at four months of age until appropriate iron containing complementary foods are introduced into the diet.

But iron is one of those nutrients that's a double edged sword. If you need it, it's important to have enough. If you are iron replete, excess iron may actually be harmful. So it is important to understand what are the consequences of giving iron supplements to breastfed infants.

Now here's the analytical framework for the refined question. We were interested consumption of iron from supplements during the first 24 months of life compared to consumption of iron at a different dosage or frequency from supplements or compared to iron from fortified foods. And on the right are the outcomes of interest, which included measures of growth, size, and body composition at any age.

This is the flowchart for this search.

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You can see the numbers of titles screened and abstracts and full text screened. That ended up resulting in eight articles from the electronic search and another two from the manual search. So in total, there were 10 articles that we were able to look at.

Those 10 articles were published between 2002 and 2016, and they were mostly randomized controlled trials. Most of the evidence was in infants. There was only one study in toddlers. And the studies focused on infants fed human milk.

The interventions and comparators fell into three categories. Iron from supplements compared to no iron, and that included studies that had a control group given nothing or given a placebo.

Number two was iron from supplements compared with a different amount of iron from supplements, and that included studies that gave iron at a different dosage or for a different duration.

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And the third was iron from supplements compared with iron from iron fortified foods. And the outcomes fell into two categories -- sorry, I did not mean to do that -- growth or attain size at the time of follow up.

Now I want to note that before summarizing the synthesis of the evidence, there were a few studies that reported attained size at follow up between groups that differed in size at baseline or that didn't report or didn't control for baseline size. And because of that, we did not think about those studies very much further than that in our synthesis because we were not able to interpret their results.

So when you examine the evidence comparing iron from supplements with no iron, the evidence was consistent in that no studies reported greater growth in infants given iron supplements.

Three of the five studies reported significantly slower growth in infants given iron supplements.

And two studies did not report a significant difference.

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And we noted some possible explanations for these inconsistencies. First, the population examined by one study in particular which was conducted in rural China seemed to have a higher risk of iron deficiency based on a comparison of the average hemoglobin and serum ferritin concentrations of the control or placebo groups at the end of the study. And this study found no significant differences in growth.

Secondly, the studies differed in the extent to which the infants were supplemented with iron fortified infant formula or iron rich foods which may have obscured any effects of iron supplementation on growth.

And lastly, the timing of the iron supplementation differed among studies of the three studies that began iron supplementation by six weeks of age. Two of the three did not report significant differences in growth between intervention groups. And the third reported significant differences among female but not male infants.

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On the other hand, both of the studies that began iron supplementation at about four months of age showed significant group differences in growth. And that was slower in the group given iron supplements.

So this is the next set of questions with different comparisons. The first one is iron from supplements versus different dosages of iron from supplements. And there were three studies in this particular comparison.

We couldn't compare them because of heterogeneity in design. One of them reported significantly slower growth and has since given iron supplements for a longer duration versus a shorter duration.

One study did not report differences in growth between infants given iron supplements at different dosages. And one study, which is the only one in toddlers, did not report significant differences in attained size between toddlers given iron with different dosages.

And then for the bottom section, which

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was the comparison of iron from supplements versus iron from fortified foods, there were two studies.

And again, there was a lot of heterogeneity, so we couldn't directly compare them.

One study reported significantly greater growth in infants given the same dosage of iron from supplements compared with iron fortified infant formula. And one study did not report significant differences in growth or attained size in infants given similar dosages of iron from supplements compared with iron fortified infant cereal.

So our evidence synthesis resulted in this first conclusions statement. Moderate evidence indicates that human milk-fed infants who are supplemented with iron do not have greater growth and may have slower growth than human milk-fed infants not supplemented with iron. And we graded the evidence underlying this conclusion statement as moderate.

The second part of the conclusion statement reflects the gaps in the evidence for

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the other comparisons. There was insufficient evidence available to determine the relationship between iron from supplements consumed during infancy and body composition during infancy.

Or in the second bullet, any measure of growth size or body composition after 12 months of age. And then the third bullet, the effect of iron supplementation after 12 months of age on the outcomes of interest. And so the grade was not assignable for these particular questions.

The second systematic review that I'll present today is: what is the relationship between specific nutrients from supplements and/or fortified foods consumed during infancy and toddlerhood and bone health? At the last public meeting, we explained that the specific nutrient we chose for this question was vitamin D, and that we would focus on vitamin D from supplements due to the current U.S. recommendations for vitamin D supplementation for breastfed infants.

We did not address vitamin D from fortified foods within this systematic review again

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because the systematic reviews on complementary foods which we presented at the last meeting included fortified foods.

So the refined question for this review was: what is the relationship between vitamin D from supplements consumed during infancy and toddlerhood and bone health?

This is the analytical framework for our refined question. We were interested in consumption of vitamin D from supplements during the first 24 months of life compared to consumption of vitamin D at a different dosage or frequency from supplements or compared to vitamin D from fortified foods.

And on the right, the outcomes of interest were measures of bone mass, biomarkers of bone metabolism, rickets, and fracture through adolescence.

So this is the flow chart for this search. Quite a number of titles were screened.

That resulted in 453 abstracts and 39 full texts screened. But most of those were excluded for a

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number of reasons. And we ended with five articles from the electronic database search and one from a manual search for a total of six articles.

Those six articles were published between 2010-2018. They were all randomized control trials. There were five studies in total because two articles were from the same randomized control trial. And all of these focused on infants fed human milk.

The interventions and comparators fell into three categories, 400 international units per day versus higher dosages, 400 international units per day versus a lower dosage, and 200 IU per day for different durations compared to placebo.

So please note that 400 international units per day is the RDA for infants from birth to 12 months. And the AAP recommends that infants who are breastfed or partially breastfed should receive a supplement at that dose unless the lactating mother is taking supplements in the amount of about 6,000 IU per day. The outcomes for this review fell into three categories, bone

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mass, biomarkers of bone metabolism, and rickets.

So for the first comparator, 400 international units per day compared to higher dosages, there was inconsistent evidence regarding bone mass.

One of the four studies reported a positive relationship between the dose of vitamin D and bone mass outcomes. But one of the four studies reported significant inverse relationships between vitamin D dose and bone mass outcomes. And the other two studies did not report significant relationships between the vitamin D dose and bone mass outcomes.

On the bottom, we have the evidence regarding the biomarkers of bone metabolism, and that evidence was consistent. There were three studies, and all three did not report any significant relationships between vitamin D dosage and biomarkers of bone metabolism.

The next contrast was 400 international units per day compared to lower dosages. And in this case, there was only one study. And that study

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did not report a significant relationship between vitamin D dose and either bone mass or the biomarkers of bone metabolism.

And the last comparison was 200 IU per day for different durations compared to placebo.

And there was only one study. This did not report any relationship between the duration of vitamin D supplementation compared with placebo and the biomarkers of bone metabolism or rickets.

So the conclusion statement from the first part of this review was that limited evidence suggests that there is no relationship between consumption of 400 IU per day of vitamin D under 12 months of age compared with higher dosages of up 1,600 IU per day, and biomarkers of bone metabolism followed up to 36 months of age. And we graded this evidence as limited.

I'd like to note that the literature search date range began in the year 2000. So evidence related to the recommendation underlying 400 international units per day may pre-date our search. So this statement only refers to comparing

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400 to higher dosages.

The other note is that high doses of vitamin D in lactating mothers and whether that's related to bone health in their infants was outside of the scope of our systematic review.

For the other comparisons that I mentioned, the conclusion statement is that insufficient evidence is available to determine the relationship between 400 IU per day of vitamin D from supplements compared with higher dosages and bone mass, rickets, or fracture.

And also for 400 IU per day of vitamin D from supplements compared with no vitamin D from supplements, or lower dosages of vitamin D from supplements or vitamin D from fortified foods, and bone mass, biomarkers of bone metabolism, rickets, or fracture. So the grade was not assignable for these two conclusions.

And the same caveats apply here in terms of the literature search date range and the fact that dosing mothers with vitamin D was outside of the scope of our review.

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So the last systematic review that I'll discuss today is: what is the relationship between the duration, frequency, and volume of exclusive human milk and/or infant formula consumption and growth size and body composition?

At the last public meeting, we explained that difference in growth and size between infants fed human milk and infant formula are already well established, but that the associations between infant feeding and body composition including obesity are less clear.

So we refined our question which is shown here to say: what is the relationship between the duration, frequency, and volume of exclusive human milk and/or infant formula consumption and body composition including obesity?

Here is our refined analytical framework. We divided the duration, frequency, and volume of exclusive human milk and/or infant formula consumption into a series of six comparisons that align with the first feeding decisions that caregivers make. And that includes

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whether or not to feed human milk. And then for caregivers who decide to feed human milk, how long to feed human milk at all, and then how long to feed human milk exclusively.

You'll note that we examined exclusive human milk consumption prior to the introduction of infant formula only, and that was to avoid overlap with the other review presented at the last public meeting that examined the timing of introduction of complementary foods and beverages.

And then for caregivers who decide to supplement human milk with infant formula, we wanted to examine the intensity or proportion or amount of human milk that is fed and whether caregivers are feeding one or both substances during a single feeding session, with the thought that feeding both human milk and infant formula during one feeding session may be topping off and may represent overfeeding.

And finally for caregivers feeding human milk at the breast and by bottle, we wanted to examine the intensity or proportion or amount

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of human milk fed at the breast versus at the bottle.

And on the right, you can see that our refined list of outcomes includes an intermediate outcome which is rapid weight gain from birth to 24 months as well as the endpoint outcomes related to body composition, BMI, BMI z-score, weight-for-length, overweight, and obesity at any age.

Now in looking at all of the papers that were screened for that review and given the time frame for completing our review, we have some updated criteria for what we will be able to examine.

And the first of those is that we've decided to examine the most recent evidence from our literature search, which is from the years 2011 up to September of 2019. And we've also decided to examine within family analyses of siblings from the entire literature search date range of January 1980 to the present.

And what that means is that these studies are able to compare siblings within the

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same family who were fed differently, either mostly breastfed or not, for example, or siblings with different outcomes.

In other words, they became overweight or not. And then the study looks back at how they were fed as infants. And this is a very useful strategy to control for confounding by many different potential variables. If someone is typing, so if you could please mute, that would be helpful. Thanks.

This flowchart shows the literature search and the screening results. We used two different literature searches which are noted with the letters A and B in the flowchart. Literature search A was from the pregnancy and birth to 24 months project, which used a search date range of January 1980 to March 2016. And that literature search was very large because it was intended to find studies for several questions related to human milk and infant formula. So you can see that there were 31,335 abstracts screened for that.

Literature search B was smaller because

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it was intended to capture just the literature published in the last three years. And that was around 2,000 abstracts. You can see that ultimately down at the bottom, 81 articles were identified that met the inclusion criteria for the question about human milk and infant formula and body composition including obesity.

So this slide gives you a snapshot of the evidence available. On the left column, you can see the six exposures that I described on the analytical framework. And across the top, you can see the age groupings based on the outcome measurement. So between birth and 24 months, 2 to 5 years, 6 to 11 years, 12 to 19, and then 20-plus. And those are age groupings used in the NHANES.

So you can see that the majority of the evidence addressed, ever versus never consuming human milk or the duration of any human milk, with the outcomes that we are interested in over those age intervals.

For the remaining topics down below, you can see very, very few studies. So they will

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not be the focus of our evidence synthesis. And clearly, those will be research recommendations that we will be sure to include to address these gaps in the evidence.

Now almost all of the evidence for this question was observational studies. And that's not surprising given that ethically it's very difficult to do a randomized trial in which you randomly assign infants to be fed human milk or not.

The notable exception is the trial called the PROBIT trial, Promotion of Breastfeeding Intervention Trial, which is a cluster randomized trial of an intervention to promote the duration and exclusivity of human milk consumption. So not a randomized control trial of breastfeeding per se but of an intervention to promote breastfeeding.

Now there were 24 articles from 17 independent U.S. cohorts as well as studies from several other countries that we identified in this search. And the outcomes fell into four major categories, overweight and obesity, BMI, BMI

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z-score, and weight-for-length as continuous measures, trajectories -- for example, rapid infant weight gain or BMI trajectories -- and body composition.

Now it's quite a lot of evidence to cope with for this. And given the abundance of evidence, we decided to start with the most salient public health outcome of that list which is overweight and obesity. And we are still in the middle of reviewing that evidence.

We're starting with examining outcomes that are from two years of age and older because of uncertainty about how to interpret earlier outcomes. We know that in the first two years of life, the infant's overweight status or body composition is very dynamic and not necessarily predictive of overweight risk later in life. But after two years of age, that is more predictive.

In addition to looking at these studies in the way that we've described, as I mentioned, we will augment our review of this most recent evidence with a review of the within-family sibling

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analyses over the entire search range.

And these studies, as I said, helped to overcome residual confounding which is pervasive in the observational research on this question because of siblings' shared genetic and environmental factors.

And to our knowledge, this will be a novel contribution to the field. So we're quite enthusiastic about tackling the question this way.

And that is the end of my formal presentation. Again, I'd like to thank all of the members of the subcommittee and the fantastic support staff for their assistance. So I'm available for questions.

MEMBER BAILEY: Kay, this is Regan. Do you know what the doses of iron supplements were?

MEMBER DEWEY: Yes. I can quickly tell you that they varied. For example, one of the U.S. studies gave 7.5 milligrams of iron from four to nine months of age. Another one gave 1 milligram per kilogram of body weight per day from four to nine months. And the one in rural China

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gave 1 milligram per kilogram of body weight per day. So those are the types of dosages for the most part.

MEMBER BAILEY: Thanks.

MEMBER DEWEY: Sure.

VICE CHAIRMAN KLEINMAN: Kay, it might be worth just commenting again with these iron studies on the actual weights of these infants. Because I think they didn't fall outside of reference standards. So they were lower but still within normal reference standards. Is that right?

MEMBER DEWEY: The average weights and lengths of the infants would have, yes, fallen within reference ranges. I can't say that each individual baby would have done that. So we're looking at the averages.

And in terms of the -- yeah, the magnitude of the differences varied from study to study. And these generally were pretty short intervals. For example, a five-month study period. So they need to be interpreted in terms of what that might or might not mean. It's just

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hard to say.

VICE CHAIRMAN KLEINMAN: Thank you.

MEMBER DEWEY: Sure.

CHAIR SCHNEEMAN: Do we have other comments or questions from the group? Thank you, Kay, for a really great presentation of where your subcommittee is. And I know there's going to be a lot of interest in the work that you're finishing up now. And if there's no additional questions for Kay and the subgroup, we could move to our next subcommittee report.

MEMBER DONOVAN: I can -- I'm happy to do that if we're ready.

CHAIR SCHNEEMAN: So why don't we go ahead, and then there may be more questions evolving as the discussion goes on. Thanks, Sharon. So the next --

MEMBER DONOVAN: Okay.

CHAIR SCHNEEMAN:  
-- presentation -- let me just say the next presentation then will be Sharon Donovan. The subcommittee is Pregnancy and Lactation.

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MEMBER DONOVAN: Okay. Well good morning, everyone. This is Sharon Donovan, and I'm happy to present on behalf of our committee. And today I'll be discussing the evidence, synthesis, grading and conclusion statements for four reviews and the summary of the evidence from one review.

This slide and the next slide summarize the questions that the Pregnancy and Lactation subcommittee will be addressing, the font that is grayed out for ones that were presented in the January meeting.

And today, I'll be discussing the relationship between dietary patterns, gestational weight gain, postpartum weight loss, and neurocognitive development of the infant. We will also discuss the relationship between maternal diets and food allergies and atopic diseases in the offspring.

Lastly, I will -- this slide is separate. This summarizes the questions related to nutrients from supplements and fortified foods.

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Again, the questions in gray were presented in January and October. And today, we will be presenting just the evidence for omega-3 and neurocognitive development of the offspring. And we still need to grade those final statements.

So moving to the first question which was, what is the relationship between the dietary patterns consumed during pregnancy and gestational weight gain?

This shows the analytical framework.

Again, we've followed the intervention and exposure, and comparator of similar questions related to dietary patterns. The population was women during pregnancy, healthy or at risk for chronic disease.

We defined gestational weight gain as the change in maternal body weight from baseline which could be before or during pregnancy, depending on the study, to a later time point during pregnancy and/or right before delivery.

Weight gain was also assessed in relationship to weight gain recommendations based

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on pre-pregnancy BMI. And again, the population was women during pregnancy. And our key confounders are summarized below, and those are fairly consistent with the -- actually this should've been updated. This key confounder we noticed was not correct. So I'm sorry that didn't get posted.

The key confounders that we have are age, race/ethnicity, socioeconomic status, physical activity, pre-pregnancy BMI, smoking, history or diagnosis of gestational diabetes or gestational hypertension, and parity. And those will be corrected on the final slide that will be posted. Again, I apologize for that.

This shows the flow diagram for the literature search and the screening results. I will note that we did a combined search for the impact of dietary patterns consumed during pregnancy and lactation on both gestational weight gain and postpartum weight loss, which I will present next.

For gestational weight gain, we started

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with a little over 11,000 articles and ended up with 25 that met our inclusion criteria. Of those 4 for RCTs and there were 9 prospective cohort studies which contributed 21 total articles.

This slide gives an overview of the evidence. And as you can see, there was a wide range in the numbers of participants per study from a low of 35 to a little over 66,000. Studies were conducted across the world and included eight in the U.S.

Most of the participants were between the ages of 18 and 45. The majority were white or the race/ethnicity was not reported. And most were mid to high socioeconomic status.

There was also a lot of different ways the dietary patterns were assessed based on indices or scores, factor analysis or principal component analysis, interventions with experimental diets, reduced rank regression, and macronutrient proportions.

And I will note that because of when this search was done, we did include macronutrient

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proportions rather than just looking at other known dietary patterns or reported dietary patterns.

As noted, there were several different ways that gestational weight gain was reported. So adequacy, total gestational weight gain, the rate of gestational weight gain, gestational weight gain for a specified time period or a trimester.

So as you can see, it's a very complicated data set.

There were three. So this is a summary of the data for the RCTs. Three RCTs assessed the effect of the Mediterranean diet. Two of the three showed that the intervention group had a significantly lower gestational weight gain compared to the control group.

The third RCT showed that women assigned to a Mediterranean diet with extra virgin olive oil tended to have lower weight gain until the second trimester but not for the full duration of the pregnancy, not total gestational weight gain.

Some of the limitations were

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researchers were not blinded. In some cases, the outcome assessment methods were unclear, deviations from intended interventions, no pre-registration data analysis plan, and limited consistency, directness, precision, and generalizability.

For the prospective cohort studies, 13 of 19 showed an association between maternal dietary patterns and gestational weight gain. We categorized the results in several different ways.

Greater adherence to a dietary pattern identified as beneficial by the study was associated with lower gestational weight gain for six studies.

Greater adherence to a dietary pattern identified as detrimental by the study was associated with a higher gestational weight gain.

The third, greater adherence to a beneficial dietary pattern which could include DASH or DASH OMNI or Mediterranean Diet or Health Eating Index was associated with a higher gestational weight gain.

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And the last, greater adherence to dietary patterns arrived by reduced rank regression was associated with higher gestational weight gain.

Again, these were prospective cohort studies. We identified a number of limitations in these studies. Therefore, our draft conclusion statement for this body of evidence is that limited evidence suggests that certain dietary patterns during pregnancy are associated with a lower risk of excessive gestational weight gain during pregnancy.

These patterns are higher in vegetables, fruits, nuts, legumes, and fish, lower in added sugar and red and processed meats. We also wanted to note that there were -- we also looked at whole grains and dairy. But the results were mixed. And therefore, we removed that from our conclusion statement. And overall, we considered the -- we graded this as limited.

I want to note that not all of these foods were part of the same patterns. This was generally a conclusion of food that were commonly

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found in patterns that were associated with lower gestational weight gain.

So the next question that we addressed was, what was the relationship between dietary patterns consumed during lactation and postpartum weight loss?

Again, our analytical framework, similar intervention comparators are population. And for both the intervention and the end points are now women during lactation.

Again, we looked at change in weight from baseline postpartum to a later time there in the postpartum period. And we also have the postpartum weight retention if gestational weight gain is controlled for.

So this is the key confounders for this search. So we looked also -- keeping in mind pre-pregnancy BMI and gestational weight gain and breastfeeding practices in both duration and exclusivity.

Again, as I noted, this was a combined search. And we only found one paper that addressed

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the question of, what is the relationship between dietary patterns consumed during lactation and postpartum weight loss? This was a randomized control trial.

The study was conducted in the U.S. with 129 participants. They were all lactating, mean age of 30. Okay. Somebody needs to mute themselves who's coughing. They were predominantly non-Hispanic white and well educated.

The interventions were the Mediterranean diet versus the USDA's MyPyramid diet. It was initiated around 17 and a half weeks postpartum, and the duration was four months. And they reported postpartum weight loss as the weight changed from baseline to four months, so at the beginning of the initiation.

So the summary of this evidence is basically there were no statistically significant differences in postpartum weight loss between the two groups. So the group on the Mediterranean-style diet versus the MyPyramid

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diet.

And some notable limitations, obviously lack of blinding of participants and investigators. There was a relatively high attrition rate. There were some issues of implementing the intervention and concerns about adherence.

Therefore, we concluded that there currently is insufficient evidence available to determine the relationship between dietary patterns consumed during pregnancy and lactation and postpartum weight loss. And we did not assign a grade.

So the next question was: what was the relationship between dietary patterns consumed during lactation by the mother and developmental milestones, including neurocognitive development of the offspring?

So our analytical framework is shown here. Again, we were looking at adherence to a dietary pattern versus a different dietary pattern or level. The outcomes were consistent with what

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we had used in previous searches, looking at developmental outcomes. So these included milestones of achievement in cognitive language, motor/movement/physical, socio-emotional.

We also assess whether studies reported academic performance, ADD, ADHD, anxiety, depression, and autism. So the population was birth through 2 to 18 years of age.

Again, some of the standard key confounders, when we were assessing neurocognitive outcomes, they've been consistently including maternal substance abuse, family history or diagnosis of neurocognitive disorders, and also complementary feeding as other factors to be considered.

So this shows the flow. So you see there were well over 3,000 titles screened of which no articles met the inclusion criteria.

Therefore, we concluded that no evidence was available to determine the relationship between maternal dietary patterns consumed during lactation and developmental

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outcomes on neurocognitive development and were unable then to assign a grade.

So now I'm going to launch into the largest part of our presentation today which is: what is the relationship between maternal dietary intake during pregnancy and lactation and the risk of infant and child food allergies and atopic allergic diseases?

So again, we were looking at dietary intake of foods or food groups compared to no food or a different amount of dietary intake of the same food or food groups, women during pregnancy or the population for the comparator and intervention.

So we looked at food allergies, food sensitization, allergic rhinitis, atopic dermatitis in basically from birth to 18 years of age. For the outcome of asthma, we focused on just children and adolescents 2 to 18 years of age since it's difficult to diagnose asthma under 2 years of age.

So some of the -- okay. Somebody needs to mute their phone. There's a lot of background.

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So in terms of the key confounders, we included family history of atopic allergic diseases, a mode of delivery on breastfeeding practices, timing of introduction of complementary foods and beverages, types of complementary foods and beverages. Also urban/rural environments.

So these are factors that have been associated with increasing the risk of food allergies and atopic allergic diseases and other studies. We also included, sorry, animals/pets/farming exposure. And again, other factors to consider such as indoor/outdoor environment.

So we did one combined search for all of the outcomes which resulted in 39 papers that met our criteria. And I'm still hearing somebody turning papers or something, so please verify that your phone is muted.

Of those 39 articles, there were six RCTs providing eight articles, one non-randomized control trial and 14 prospective cohort studies providing 31 articles.

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So this is a description of the evidence overall. The studies range from 62 to nearly 62,000. They were conducted across the world, Japan, UK, the U.S., Denmark, et cetera. These maternal mothers' average age was approximately 30 years of age, majority white and/or race/ethnicity not reported, mid to high socioeconomic status.

For the various interventions where food or beverage consumption levels predominately from the prospective cohorts, avoidance diets, dietary pattern adherence.

These are the outcomes, and we reviewed the evidence for each of these outcomes separately, and therefore have a number of statements or draft conclusions that we reviewed and graded. So I will be going through each of these separately.

So the next few slides will review the evidence for atopic dermatitis. So we divided this up by pregnancy, pregnancy and lactation, or lactation alone as the period of the time for the maternal diet. And then within that, we separated

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it out by category.

So the first category showed that there was no association found between consumption or restriction and the risk of atopic dermatitis or eczema. So this was observed for cow's milk products in six or seven studies, egg in all four studies, peanuts for all studies, soybeans and dietary patterns.

We also found some studies which reported a higher consumption of food was associated with a reduced risk of atopic dermatitis. And this was, again, you can see, not quite as consistent as this category. But we observed that for studies investigating yogurt, fish, wheat, vegetables, and fruits.

And finally, there was one study showing a higher consumption was associated with increased risk. And this was shown for one of four prospective cohorts for meat.

For pregnancy and -- for exposures during pregnancy and lactation, there was no relationship between restriction of cow's milk

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products and eggs in the risk of atopic dermatitis.

For one non-randomized control trial in two RCTs showed that restriction of cow's milk products reduced the risk of atopic dermatitis and eczema.

And there was one RCT looking at restriction during lactation alone, and found that for cow's milk products, restriction reduced the risk of atopic dermatitis and eczema.

So now I'm going to go through a number of draft conclusion statements and grades for relationships between various foods or food products and atopic dermatitis. So moderate evidence suggests that lower or restricted consumption of cow's milk products during pregnancy does not reduce the risk of atopic dermatitis in the offspring. And we graded this as moderate.

We felt there that insufficient evidence is available to determine the relationship between restricted consumption of cow's milk products during both pregnancy and lactation or lactation alone on the risk of atopic dermatitis and eczema mainly due to the low numbers of studies.

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And so grade is not assignable.

Next, for egg, our draft conclusion is that moderate evidence suggests that lower or restricted consumption of egg during pregnancy, or during both pregnancy and lactation, does not reduce the risk of atopic dermatitis and eczema in the offspring, a moderate grade.

For fish, limited evidence suggests that maternal fish consumption during pregnancy does not increase the risk of atopic dermatitis in the offspring, limited grade.

For tree nuts and seeds, there was no evidence available to determine the relationship between maternal tree nut and seed consumption during pregnancy and the risk of atopic dermatitis/eczema in the offspring, grade not assignable.

In terms of dietary patterns, there's limited evidence suggesting that dietary patterns during pregnancy are not associated with the risk of atopic dermatitis and eczema. And there were six studies in this, and none of them showed a

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relationship. But again, they were concerns about the quality of the studies which resulted in a limited conclusion and grade.

So this is -- basically, it's a conclusion statement that's summarizing a number of foods. So insufficient evidence is available to determine the relationship between maternal consumption of peanuts, soybeans, wheat and cereal, meats, vegetables, fruit, yogurt and probiotic milk products during pregnancy and the risk of atopic dermatitis and eczema, grade not assignable.

This is during lactation. So we found no evidence was available to determine the relationship between eggs, fish, peanuts, tree nuts and seeds, soybeans, wheat/cereal, meat, vegetables, fruit, dietary patterns, yogurt and probiotic milk products during lactation and the risk of atopic dermatitis, grade not assignable.

So now we're turning to the next outcome which is food allergy. And let me just look at my notes. Unfortunately, we don't get to see our notes when we're doing this. So for food allergy,

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we have a total of seven studies that met our inclusion criteria. They were conducted either during pregnancy or pregnancy and lactation. There were no studies conducted during lactation alone.

So for pregnancy, there was no association between consumption and risk of food allergies for cow's milk products, egg, soy, and wheat. Higher consumption of peanuts was associated with a reduced risk of food allergy. And again, no association between restriction of cow's milk products and risk of food allergy in the offspring.

So our draft conclusion statements for maternal soybean consumption and food allergy, limited evidence suggests no relationship between maternal soybean consumption during pregnancy and the risk of food allergy with a grade of limited.

For cow milk products, insufficient evidence is available to determine the relationship between lower or restricted consumption of cow milk during pregnancy alone, or during both pregnancy

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and lactation, and the risk of food allergy, so grade not assignable.

This is a category that we're calling foods not commonly considered to be allergens but were evaluated in some studies. So for the first, we found that no evidence is available to determine the relationship between maternal consumption of foods not commonly considered allergens during pregnancy and the risk of food allergy in the offspring.

And there's insufficient evidence available to determine the relationship between maternal consumption of these foods during lactation and food allergies. So for both of these draft conclusion statements, grade not assignable.

And the conclusion statement for these specific foods, insufficient evidence is available to determine the relationship between maternal consumption of peanuts, eggs, wheat during pregnancy and the risk of food allergy.

And again, although there was one study with peanuts, it was a single study. Therefore,

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we felt there was insufficient evidence and grade not assignable.

There was no evidence available to determine the relationship of maternal consumption of fish or tree nuts and seeds during pregnancy or during lactation on food allergy in the offspring. And no evidence to determine the relationship between maternal consumption of cow milk products, eggs, peanuts, soybeans, and wheat during lactation on risk of food allergy.

So basically, there's kind of a dearth of studies looking at maternal food consumption or avoidance during lactation on the offspring and a fact sheet consistent with this recommendation.

But it doesn't provide evidence for us to be able to evaluate.

So now we're turning to the topic of allergic rhinitis. We had a total of 17 studies that met the inclusion criteria. There was studies conducted during pregnancy and pregnancy in lactation.

During pregnancy, there was no

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association between the consumption or restriction of the following foods and the risk allergic rhinitis in the child. So these are cow milk products, both fermented or non-fermented, egg, tree nut, soybean, wheat, or overall dietary patterns, so no association.

There were some studies, one of two prospective cohorts in each of these categories that showed higher consumption of either fish or peanuts was associated with reduced risk of food -- I'm sorry, this should say allergic rhinitis, not food allergy, in the offspring. And then for pregnancy and lactation, there was no association between the restriction of cow milk products and risk of allergic rhinitis.

So the draft conclusion statement for cow milk products and allergic rhinitis is that there's insufficient evidence available to determine the relationship between consumption of cow's milk products, fermented or non-fermented, during pregnancy alone, or during both pregnancy and lactation, and risk of allergic rhinitis, so

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grade not assignable.

For egg, there's moderate evidence to suggest that lower or restricted consumption of egg during pregnancy does not reduce the risk of allergic rhinitis with a grade of moderate.

For seeds, there was no evidence available to determine the relationship between maternal seed consumption during pregnancy or during lactation and the risk of allergic rhinitis, grade not assignable.

In terms of dietary patterns, there was limited evidence to suggest that dietary patterns during pregnancy are not associated with the risk of allergic rhinitis in the offspring with a grade of limited.

And this is a statement that encompasses a number of foods where there was insufficient evidence to determine the relationship between maternal consumption of fish, peanuts, tree nuts, soybean, wheat, and foods not commonly considered to be allergens during pregnancy and the risk of allergic rhinitis, grade

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not assignable.

And for lactation, again, no evidence is available to determine the relationship between maternal consumption of these foods as well as dietary patterns during lactation and the risk of allergic rhinitis in the offspring, so grade not assignable.

So now turning to asthma, we found that there were -- recall these to be only children age 2 and above. And we found a total of 21 studies that met the inclusion criteria.

Currently we only have draft conclusion statements and gradings for two of these, and the rest we have draft conclusion statements. But we have not yet finished grading those. So those will not be presented today.

So during pregnancy, there was no association between consumption/restriction of egg and the risk of asthma. And for fish, higher consumption was associated with a reduced risk for asthma in one of three prospective cohort studies.

So the draft conclusion statements,

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limited evidence suggests no relationship with maternal consumption of egg during pregnancy and the risk of asthma in the offspring with a grade of limited. And no evidence is available to determine the relationship between maternal egg consumption during lactation and the risk of asthma in the offspring, grade not assignable.

And for fish, again, limited evidence suggests no relationship between maternal fish consumption during pregnancy and risk of asthma in the offspring, grade of limited. And no evidence was available to determine the relationship between maternal fish consumption during lactation and risk of asthma, so grade not assignable.

So that summarizes all of where we are to date with looking at the relationship between maternal dietary consumption during pregnancy and/or lactation on the allergen atopic outcomes in the offspring.

So the last question that I'm going to be presenting today, which I'll just be presenting

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the evidence. We are in the process of drafting the conclusion statements. But this question was: what is the relationship between omega-3 fatty acids from supplements and/or fortified foods consumed before and during pregnancy and lactation and neuro-developmental milestones, including neurocognitive development in the offspring?

And I will note that when the subcommittee met in Houston, we discussed this. And we decided to focus our efforts and our search on looking at omega-3 fatty acids from supplements because the Fats and Seafood committee had evaluated the effect of omega-3s from fish from the diet on these outcomes in the infants.

And we also felt that with a larger body of evidence that supplements and that the risk for overconsumption of omega-3 fatty acids were more likely from supplements.

So this shows the analytical framework.

So again, we're looking at exposure to omega-3 fatty acids from dietary supplements, which could include multi-nutrient supplements. And then the

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dietary -- the comparator was a different level of supplement.

So here we looked at women who could be considered this before pregnancy but also during pregnancy and/or during lactation. They could be healthy or at risk for chronic disease. And again, our outcomes were the same as we've seen previously for developmental milestones and neurocognitive development. And we looked from birth to 18 years of age.

So some of the key factors included as confounders, we included fish and other seafood consumption, breastfeeding practices, gestational age, child sex, parity, et cetera. We put under other factors to consider, maternal substance use, family history and diagnosis of neurocognitive disorders, and complementary feeding.

This shows the flowchart. So the initial titles screened were nearly 1,400. We ended up with 34 articles that met the inclusion criteria. So these 34 articles came from 14 randomized control trials which produced 33 of the

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articles and one prospective cohort. Therefore, we feel that this is actually a fairly strong data set because it's predominantly including RCTs.

So of these articles, many were conducted in Australia but also the U.S., Mexico, Denmark, Norway, Germany, Hungary, Spain, the Netherlands, Canada, and Iran.

The RCTs considered the omega-3 supplement versus placebo. The prospective cohort study, the average supplemental omega-3 dose was 100 milligrams per day. There was various timing of the interventions. During pregnancy, the eight RCTs, the one prospective cohort, during lactation or during pregnancy and lactation.

And so we are just evaluating this evidence. Our goal is to complete this within the next week. But there is quite a bit of evidence here for us to evaluate grade and produce draft conclusion statements.

We also have a number of outcomes. So cognitive, visual, language, motor, social-emotional, ADHD, and ASD.

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So our next steps, to finish off our charge for this committee, is to -- we need to grade the remaining draft conclusion statements on maternal diet and asthma. Initially we've only done egg and fish right now. And to draft the conclusion statements and grade the evidence for omega-3 supplementation during lactation and neurocognitive development.

I think that was my last slide. So again, really thanking the subcommittee members for all of their hard work and particularly the support staff.

From the time between our meeting in Houston and this meeting was exceedingly short. And there was, as you can see, a lot of evidence for us to get through. So I'm just very thankful for everybody putting in long days and pulling this evidence together. So I'm happy to take questions.

CHAIR SCHNEEMAN: Thank you so much, Sharon. I think my mind was starting to spin when I start thinking of all the papers that have been collected and screened and looked at. It's a

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tremendous amount of work to go into our report.

I had a couple of questions, and I'll let others join in as well. I noticed you used -- when you talked about dietary patterns, you used that in sort of a generic way where you had draft conclusion statements.

So was there a specific type of dietary pattern that was looked at, or is there a way of characterizing, or will you be able to characterize it in the report?

MEMBER DONOVAN: Yes. The only place that we really looked at the dietary patterns was with the gestational weight gain. And the way that -- I don't think there was really sufficient evidence for us to say a DASH diet or a specific diet or a proportion. So I was going to go back.

As you can see, we basically made a general statement with those points about the dietary patterns or patterns of consumption that focus on these. Let me see, very close to here.

Higher in vegetables, fruits, nuts, legumes, and fish.

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So as I stated, there wasn't one study necessarily that looks at all of these things. But as we looked at the study that may have been focusing on a specific food or pattern, that these were the ones that came out as being associated with a lower risk of excessive gestational weight gain.

And patterns that had more sugar and red and processed meats were more associated with a higher risk of excessive gestational weight gain.

CHAIR SCHNEEMAN: So I thought you referred to dietary patterns when you were talking about the food allergy and --

MEMBER DONOVAN: Yeah.

CHAIR SCHNEEMAN: -- atopic dermatitis. And that's where it seemed -- basically you were saying you didn't really find that there was one specific pattern you could pull out.

MEMBER DONOVAN: Yeah. So like I said, there were six studies I'm looking at -- atopic dermatitis which is really the main

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one that we were able to look at dietary patterns.

I have in my notes the different patterns.

But they were -- most of this was from prospective cohort studies where they gathered information about dietary intake, sometimes different frequencies or interviews. And then they assigned a dietary pattern which could be very different in a Japanese diet versus a Chinese diet.

But the bottom line is none of them showed any association. So based on the fact that these were sort of retrospective, they weren't in RCT studies, and that they were consistent in not showing an association I think is why we didn't go into more depth about that. But that's something that we can certainly consider in writing the report.

CHAIR SCHNEEMAN: Okay, yeah. Just to make it clear what was looked at. And then I also had a question where you're looking at the omega-3 where you're including multiple nutrient supplements. Now are you looking for ones where it could be multi-nutrient but you still have some

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control as to with or without omega-3?

MEMBER DONOVAN: Or a different level.

CHAIR SCHNEEMAN: Okay. So you're still trying to control for the omega-3 content?

MEMBER DONOVAN: Yes.

CHAIR SCHNEEMAN: Okay.

MEMBER DONOVAN: Right. So -- right.

So there would be a different level. So maybe no omega-3s, but they're receiving other multi-nutrient supplements, or they may be exposed to a different level of supplement.

CHAIR SCHNEEMAN: Okay.

MEMBER DONOVAN: I'll try to recall the details of these studies, but there's so many of them that I may not be able to remember all the details of the studies. I will not be able to remember all the details of the studies.

CHAIR SCHNEEMAN: Yeah, it's a lot to be looking at. So other questions or comments before we break for lunch?

MEMBER MATTES: This is Rick. Just to ask a general question. You know, I'm trying to

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identify a relationship between any kind of specific food or even food group and an outcome seems problematic because any one food contributes so little to the total diet. What is your sense of just that approach to trying to answer questions here?

MEMBER DONOVAN: Well that's a good point, and I'll also open up to other Committee members to comment. I mean basically the literature that we to evaluate was in general trying to focus on a specific food group.

And I should've mentioned before that most of the RCTs were also conducted in higher risk groups. And so we will be incorporating that into the report. So a lot of the RCTs may have been a family where there was a sibling or a parent that had a history of atopic diseases. And so that's why they were specifically going in and intervening with the avoidance of a food.

And so I get your point. But I think the mechanism here with the allergies is not that, oh well eggs are only providing 2 percent of our

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calories, as much as for somebody who's sensitive, even a very small exposure could be important.

So again, we have the evidence that we have which in many cases, we're looking at specific RCTs where they were avoiding that food for the specific purpose of trying to reduce the risk of that offspring developing it, or they were in a prospective cohort looking at the relationship between that child getting a cow milk allergy and their overall food intake. So did that kind of answer your question?

MEMBER MATTES: Yeah, yeah. I think good point, that in this instance where it may be very small exposures can have more marked effects makes this different from other outcomes where it's more a factor of quantity consumed that may be playing a role. Yeah, I get it, yeah.

CHAIR SCHNEEMAN: Other questions or comments? So at this point, we can go to our break that we have scheduled for lunch. Sorry, it's lunch east coast time. What can I say. Hey, I've lived in California for many years. I know what

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happens.

And I would remind you that for the afternoon, you will have a different login, and that's true for people both signing into the webinar as well as our Committee members. And so be sure you're using that Thursday p.m. or Thursday afternoon login when we come back.

And we will reconvene at 1:00 p.m. So that's when we're scheduled to start again. And we'll I guess virtually see all of you at that point.

(Whereupon, the above-entitled matter went off the record at 12:03 p.m. and resumed at 1:01 p.m.)

CHAIR SCHNEEMAN: Okay. Great. This is Barbara Schneeman. This is the afternoon session for the 2020 Dietary Guidelines Advisory Committee meeting.

And I'll say "good afternoon" to those of you who are in the afternoon and "good morning" to those of you who are still in the morning.

So, before the lunch break, we finished the Cross-Cutting working group, the Birth to 24

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Months subcommittee, and the Pregnancy and Lactation subcommittee.

Before I move to the next subcommittee reports, I just wanted to check and see if there were any additional questions or comments that people wanted to bring up before we move into the Dietary Patterns subcommittee.

So, hearing none, I know from teaching experience you have to live through those awkward pauses before someone will speak up.

(Laughter.)

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

MEMBER BOUSHEY: Yes, I am ready, and it appears that so are the slides.

CHAIR SCHNEEMAN: Yes, ready to go.

And I'll remind the Committee members, while Carol is giving the report, please be sure you're on mute, and then, we will have the opportunity for discussion.

MEMBER BOUSHEY: Yes. Thank you so much.

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It's great to have this opportunity to share the work of the Dietary Patterns subcommittee. We're all listed on this first slide.

So, the topics, the questions, dietary patterns and all-cause mortality were discussed at the last meeting. Today, we will cover the evidence for the questions on dietary patterns and sarcopenia, cancer, cardiovascular disease, growth, size, body composition, risk of overweight and obesity, type 2 diabetes, bone health, and neurocognitive health.

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

We reached consensus on the inclusion and exclusion criteria for evaluating dietary patterns. They're listed here as:

Studies examining consumption of

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and/or adherence to a dietary pattern will be considered.

Dietary patterns may be measured or derived using a variety of approaches, as specified in the inclusion criteria.

Studies must describe the dietary pattern being tested or examined and the description of the foods and beverages comprising the pattern.

Studies not providing a description of the dietary pattern have been excluded, as well as studies labeling a dietary pattern, but not describing the foods and beverages in the pattern or base the pattern solely on nutrients.

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

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The second criteria on this slide applies to these studies, which may include low carbohydrate or high fat diets.

The updated inclusion criteria on the bottom left specifies studies examining consumption of and/or adherence to diets varying by macronutrient proportions be included if the level of a macronutrient is outside of the AMDR. For example, any study in which carbohydrate intake is above or below the AMDR -- and that's greater than 65 percent of total energy or below 45 percent of energy -- and also meets the inclusion/exclusion criteria provided in the protocol, would be examined to answer these questions.

The updated exclusion criteria proposes studies not providing a description of the macronutrient proportion examined or do not examine macronutrient proportions outside of the AMDR would be excluded, pending all other criteria.

Additionally, studies not providing a description of the macronutrient breakdown or all the macronutrients will be excluded, or were excluded.

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We're on both ends now.

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

I'm going to shout a little caution right now just as a heads-up. For some reason, I am getting a note that says it's time for my computer to get updated. And if that happens, I will be disconnected, and someone will need to continue the presentation. And I did give it to Barbara. Because, unfortunately, our IT person who said they were going to be in there early today didn't make it. And so, I am not clear how to turn that little thing off while also talking. Anyway, so just a heads-up on my giving a shout to say, "Barbara, finish up." Thank you, Barbara.

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So, starting with the questions now, what is the relationship between dietary patterns consumed and sarcopenia? The analytical framework for this review question is shown here. And by now, we're all pretty used to this framework.

The subcommittee operationalized the definition of sarcopenia, as shown on this slide, by consulting consensus statements of several working groups. Sarcopenia is a progressive and generalized loss of skeletal muscle mass alone or in conjunction with either or both low muscle strength and low muscle performance. Given the outcome is sarcopenia -- that is, it's really age-related muscle loss -- the population of interest for this outcome includes adults and older adults only.

As noted in the last meeting, the subcommittee decided to streamline this question to only focus on the end-point outcomes of sarcopenia and severe sarcopenia.

The flowchart, which we have seen, too, demonstrates the literature search and screening

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results for articles examining dietary patterns and sarcopenia, ranging from January 2000 to June 2019. The results of the electronic database searches, as you can see, after removal of duplicates, were screened independently by two NESR analysts using a stepwise process by reviewing titles, abstracts, and full text to determine which articles met the inclusion criteria. And those steps are true for all of the reviews that we'll be going through.

We went from 7,314 articles to 624 screened and ended up with four remaining articles for the systematic review. All articles happened to be a prospective cohort study design which examined the relationship between dietary patterns and sarcopenia.

For the exposures, multiple approaches were used to create the dietary patterns, including factor analysis, cluster analysis, and/or indices or scores. Six different indices or scores were used in the three included manuscripts.

The four articles applied similar

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definitions of sarcopenia, which were low muscle mass with low muscle strength, based on hand grip strength, and/or low muscle performance, based on walking speed.

One study used the Asian working group for sarcopenia algorithm -- that's the Chan study -- and the other three used the European working group on sarcopenia criteria.

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

Studies adjusted for a number of potential confounders, but not all key confounders, such as race/ethnicity or physical disability. None of the studies accounted for missing data, either due to lost to follow-up or criteria used when selecting individuals into the analysis.

For the evidence regarding dietary patterns in sarcopenia, we reached the following conclusion statement: "Insufficient evidence is available to determine the relationship between

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dietary patterns and sarcopenia in older adults.

Therefore, a grade was not assignable."

The next question that I'll share for the Committee is the relationship between dietary patterns consumed and certain types of cancer. This is the analytical framework for dietary patterns in cancer. The cancer outcomes were streamlined to focus on four types of cancers with the highest prevalence: breast, prostate, lung, and colorectal cancers. These were also examined in the 2015 review. Given the timeline, the next Advisory Committee may be well-suited to explore additional cancers for which new evidence has begun to emerge.

This is the literature search for this particular question, the cancer systematic review.

And the papers range from December 2013 to January 2020 and does build upon the existing systematic review conducted in 2015, DGAC.

And as with the others, NESR did the screening and went from 4,095 articles to 709, to 112 articles, to reviewing 52 articles split

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between 25 for breast cancer; 26, colorectal cancer; 8 for lung cancer, and 8 for prostate.

The included articles were published between January 2014 and January of 2020. And I have already given you the numbers of the articles.

This review updates, again, as previously said, the reviews conducted by the previous Dietary Guidelines Committee.

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

Though the direction and magnitude of effects across the body of evidence was inconsistent, most studies reported no significant association between adherence to dietary patterns

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and risk of prostate cancer. Most studies had large analytical sample size with a sufficient number of prostate cancer cases occurring over follow-up to examine associations. However, the width of the confidence intervals indicate some degree of imprecision within the body of evidence.

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

So, with this as being an update to the previous Dietary Guidelines and changes the conclusion drawn by the 2015 Dietary Guidelines Committee which did not draw a conclusion regarding the relationship between dietary patterns and the risk of prostate cancer due to limited evidence from a small number of studies with wide variation in study design, dietary assessment methodology, and prostate cancer outcome ascertainment; therefore, the 2020 Dietary Guidelines Advisory

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Committee determined that, based on the eight additional studies in this update, there is now limited evidence to suggest no relationship between dietary patterns and risk of prostate cancer.

The next is the systematic update, including seven prospective cohort studies and one nested case-control study -- sorry, let me see here.

I've got to make sure. I think I'm not quite in the right place here. Yes. Okay. No, this is lungs -- they match up -- and risk of lung cancer.

All studies examined adherence to dietary patterns using different indices or scores.

Most studies reported significant associations.

Significant associations were primarily evident in former and current smokers.

Studies had some risk of bias, potential for confounding, assessment of diet once at baseline. The analytical sample sizes ranged from 4,336 to 460,700, with sufficient number of cases over follow-up of a range of 4 to 20 years.

Therefore, the studies were direct and generalizable and applicable to the U.S.

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population.

The draft conclusion statement for the dietary patterns and lung cancer reviews states, "Limited evidence suggests that dietary patterns containing more frequent servings of vegetables, fruits, seafood, grains, cereals, legumes and lean versus higher fat meats and lower fat or non-fat dairy products may be associated with lower risk of lung cancer, primarily among former smokers and current smokers."

The grade is limited.

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

This systematic review next here for looking at dietary patterns and breast cancer includes three articles from two randomized controlled trials, 21 prospective cohort studies, and two nested case-control studies. Two articles from the same RCT examined a low-fat diet with increased vegetables, fruit, and grains, and the other RCT tested Mediterranean diets with extra

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virgin olive oil or nuts and a low-fat diet.

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

Many studies reported significant associations. Significant associations were primarily evident for postmenopausal breast cancer risk. Fewer studies examined premenopausal breast cancer. Studies had some risks of bias, potential for confounding, assessment of diet once at baseline.

The analytical samples were large, ranging from about 2,500 to 330,766, with sufficient number of cases over follow-up, a range of 4 years to 23 years. And the studies were direct and generalizable; therefore, applicable to the U.S. population.

The draft conclusion statement for dietary patterns in breast cancer reviews states,

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"Moderate evidence indicates an inverse association between dietary patterns rich in vegetables, fruit and whole grains, and lower in animal products and refined carbohydrates, are associated with reduced risk of postmenopausal breast cancer. The data regarding this dietary pattern and premenopausal breast cancer risk point in the same direction, but the evidence is limited due to fewer studies."

The grade is moderate, postmenopausal breast cancer; risk is limited, premenopausal breast cancer risk.

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

And, Barbara, I just lost the picture.

So, if you don't mind, you can either -- do you have the slides?

CHAIR SCHNEEMAN: Well, if you're willing to keep going through your slides, we can change it in here on the website.

MEMBER BOUSHEY: Okay.

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

MEMBER BOUSHEY: That's great. That's great, because I have little pictures of every single one of them.

And the other thing is, when that happened, you know, you can't log back in.

CHAIR SCHNEEMAN: Yes.

MEMBER BOUSHEY: Okay.

CHAIR SCHNEEMAN: Just if nothing else, tell us "Next slide," and then, we'll just keep track with you.

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

CHAIR SCHNEEMAN: Great.

MEMBER BOUSHEY: So, are you there?

CHAIR SCHNEEMAN: Yes, yes.

MEMBER BOUSHEY: Okay. Thank you.

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This really works out well that we had all this backup. I am glad we thought of all of this.

CHAIR SCHNEEMAN: Yes. You can talk because we can still hear you.

MEMBER BOUSHEY: Yes.

CHAIR SCHNEEMAN: The telephone connection is fine.

MEMBER BOUSHEY: Yes. Great.

Okay. This systematic review includes two articles from the same RCT, 22 prospective cohort studies, and one nested case-control study.

The RCT examined a low-fat diet with increased vegetables, fruits, and grains. Eighteen studies examined adherence to a dietary pattern using indices and scores. Three studies identified dietary patterns using factor or cluster analysis.

One study identified dietary patterns using reduced rank regression. One study examined variations of vegetarian diets.

Many studies reported significant associations. Now four dietary patterns -- and

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this probably should have been said sooner really -- four dietary patterns emphasizing more healthful foods; for example, DASH, the HEI. The results, higher scores reflect reductions in risk.

Whereas, dietary patterns emphasizing low nutrition quality, the results, higher scores will be associated with higher risk.

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

And then, study participant characteristics varied a lot, but either they were men and women, all men, or women. Studies had some risk of bias, potential for confounding, assessment of diet once at baseline.

Analytical sample sizes were large, ranging from 8,050 to 471,495, with sufficient number of cases over follow-up and a range of 4 years to 20 years. And the studies were direct and generalizable, and therefore, applicable to the U.S. population.

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So, next slide. It should say, "Draft Conclusion Statement: Dietary Patterns and Colorectal Cancer".

CHAIR SCHNEEMAN: Got it.

MEMBER BOUSHEY: Super.

The draft conclusion statement for the dietary patterns in colorectal cancer review states, "Moderate evidence suggests dietary patterns that are higher in vegetables, fruits, legumes, whole grains, lean meats and seafood, low-fat dairy, and moderate alcohol; lower in saturated fat and sodas and sweets, and low or no intake of red and processed meats relative to other dietary patterns are associated with reduced risk of colon and rectal cancer. Moderate evidence also suggests dietary patterns that are higher in red and processed meat, French fries and potatoes, and sources of sugars, such as sodas, sweets and dessert foods, are associated with a greater colon and rectal cancer risk."

The grade is moderate.

And this systematic review updates and

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builds upon and concurs with the conclusion drawn by the 2015 Dietary Guidelines Advisory Committee.

Next slide.

So, questions: What is the relationship -- is that what's up on the slide?

CHAIR SCHNEEMAN: Yes.

MEMBER BOUSHEY: What is the relationship between dietary patterns consumed and risk of cardiovascular disease? What is the relationship between dietary patterns consumed and growth, size, body composition, and risk of overweight or obesity? And what is the relationship between dietary patterns consumed and risk of type 2 diabetes?

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

So, next slide.

And these are all still sort of a

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work-in-progress, too.

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

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

For duration, a minimum of 12 weeks for an intervention was included. Those less than 12 weeks were excluded.

The size of study groups, a minimum of 30 participants per arm or a power calculation for interventions were needed to be included. And samples of at least 1,000 participants were

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included for epidemiology-type studies.

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

For this reason, the subcommittee applied criteria that excludes interventions designed to induce weight loss or treat overweight and obesity through energy restriction hypocaloric diets for the purpose of treating additional or other medical conditions. This criteria would allow the subcommittee to better articulate the direct relationship between dietary patterns and risk of these diseases, in particular.

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Next slide.

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

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

And this review resulted in 299 included articles that examined dietary patterns among the three separate questions. Note that many articles overlapped each question reporting multiple outcomes.

Next slide for the analytical framework.

This analytical framework provides the foundation for the question examining the relationship between dietary patterns and risk of cardiovascular disease. It builds off an existing

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review from the previous Advisory Committee.

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

Next slide.

One hundred eighty-five articles were identified for the relationship between dietary patterns and risk of cardiovascular disease. Four articles were from studies conducted in children, which add new evidence to the existing review. And 181 articles were from studies conducted in adults.

Dietary patterns in adults were examined using various methods in 147 articles, which updates the evidence included prior to 2013 in the existing review. Diets based on macronutrient distribution were examined in 45 articles from 19 RCTs and 26 articles from prospective cohort studies, which adds new evidence

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to the existing review.

Next slide. So, the "Dietary Patterns and Cardiovascular Disease - Children".

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

Associations were reported in the four articles showing limited evidence of protective dietary patterns and improved intermediate CVD outcomes.

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

The magnitude of effects were relatively inconsistent. And analytical sample

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size ranged from about 1400 to 4,112, with follow-up ranging from age 10 years to 17 years.

So, that one never showed, that's correct, that one never showed the actual. Yes. Okay.

So now, the next slide should be the "Dietary Patterns and Cardiovascular Disease," is that right, what's coming up?

CHAIR SCHNEEMAN: Yes, that's what we have on the screen now.

MEMBER BOUSHEY: Okay. Good. It's kind of funny not seeing them, but, yes, you're right, this is crazy. Okay.

So, for adults, 45 articles examined the relationship between diets based on macronutrient distribution and CVD outcomes, where at least one proportion of macronutrient fell outside the AMDR. These studies reported both intermediate and end-point CVD outcomes.

Among these studies, the proportion outside the AMDR ranged between exposure groups as follows:

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Carbohydrates below ranged from 25.3 percent to 44.9 percent. Carbohydrate above ranged from 66 percent to 72.7 percent. No studies meeting inclusion criteria examined carbohydrate distribution below 25.3 percent.

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

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

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

Significant associations reported in the majority of these studies:

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

Other end-point outcomes, lower risk of incident coronary heart disease, as well as intermediate outcomes, such as lower blood

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pressure.

The magnitude of effects were relatively inconsistent outcomes.

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

The magnitude of effects were relatively inconsistent.

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

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

MEMBER BOUSHEY: The one that I'm on, it says, "Summary of the Evidence Synthesis: Dietary Patterns and Cardiovascular Disease - Adults," and it's 28.

CHAIR SCHNEEMAN: Okay.

MEMBER BOUSHEY: Are we there?

CHAIR SCHNEEMAN: Yes.

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MEMBER BOUSHEY: Okay. And let's see, now let me get back on track. Yes. Yes, yes, yes, that's right. Okay.

There were generalizability concerns related to studies conducted in other countries where it is more common for carbohydrate proportions to be above the AMDR.

Grades for these conclusion statements are as follows:

Limited for dietary patterns in children.

Strong for dietary patterns in adults.

For diets based on macronutrient distribution, in this outcome, the full body of evidence is still under review.

Now, to the next slide, which should read, "Analytical Framework: Dietary Patterns and Growth, Size, Body Composition, and Risk of Overweight or Obesity". Is that right, Barbara?

CHAIR SCHNEEMAN: Yes, that's right.

MEMBER BOUSHEY: Good, good.

CHAIR SCHNEEMAN: Yes, that's where we

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are.

MEMBER BOUSHEY: So, it's amazing we've stayed on track.

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

So, next slide.

First, we're going to cover obesity, even though it's a different order with the way we list it. But you should have "Description of the Evidence: Dietary Patterns and Obesity".

CHAIR SCHNEEMAN: Yes, that's where we are.

MEMBER BOUSHEY: Good.

Eighty-eight articles were identified that examined the relationship between dietary patterns and growth, size, body composition, and risk of overweight or obesity in that inclusion criteria for the systematic review.

Among the included articles, 12 were prospective cohort studies conducted in children.

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Seventy-six articles examined the relationship between dietary patterns in adults and body composition and risk of overweight and obesity.

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

Diets based on macronutrient distribution were examined in 31 of the included articles from 22 RCTs and nine prospective cohort studies, which add new evidence to the existing review.

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

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

Significant associations were reported in these articles, but the direction of the results

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were mixed, with small and inconsistent magnitude.

No significant associations were also reported, depending on the dietary pattern or a specific outcome examined within studies. There was no clear pattern of null findings across the studies.

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

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

And now, to the next slide, which is "Summary of the Evidence Synthesis: Dietary Patterns and Obesity - Adults".

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

Carbohydrates below the AMDR ranged from 25.3 percent to 44.9 percent.

And I realized we've shared these

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earlier, but it was over the global group, not by specific, like this one being specific for obesity in adults.

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

Carbohydrate above ranged from 66 to 77.5 percent.

Fat above the AMDR ranged from 35.2 to 47 percent. Fat below the AMDR ranged from 9.9 to 19.3 percent.

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

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

Results were mixed among included studies. The direction and magnitude of effects were inconsistent.

Studies adjusted for many potential confounders, but not all key confounders,

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specifically race/ethnicity.

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

Many studies emphasized one particular macronutrient of interest, such as low carbohydrate, but the proportion reported for that macronutrient was not necessarily below the AMDR.

Therefore, confidence in the reported proportions falling outside of the AMDR is limited due to variation in nutrient intake methods or estimation between studies.

So, next slide. This is a "Draft Conclusion Statement: Dietary Patterns and Obesity". This is draft.

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

"For dietary patterns in children:

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

For dietary patterns in adults, we agree with the existing conclusion statement of:

Moderate evidence indicates dietary patterns emphasizing vegetables, fruits, and whole grains; seafood and legumes; moderate in dairy products (particularly low and non-fat dairy) and alcohol; lower in meats (including red and processed meats), and low in sugar-sweetened foods and beverages, and refined grains are associated with favorable outcomes related to body weight, (including lower BMI, waist circumference, or percent body fat) or risk of obesity. Components of the dietary patterns associated with these favorable outcomes include higher intakes of unsaturated fats and lower intakes of saturated fats, cholesterol, and

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sodium."

Grades for these conclusion statements are as follows:

Limited for dietary patterns in children.

Moderate for dietary patterns in adults.

For diets based on macronutrient distribution and this outcome, the full body of evidence is still under review. And again, though, these are draft.

So, next slide. This is dietary patterns for type 2 diabetes.

This is a streamlined analytical framework which will provide the foundation for the question examining the relationship between dietary patterns and risk of type 2 diabetes.

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

In addition to the streamlined inclusion/exclusion criteria, intermediate outcomes were included only in intervention studies

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in adults or all study designs in children.

So, next slide. And that should be "Description of the Evidence: Dietary Patterns and Type 2 Diabetes".

Seventy-three articles were identified that examined the relationship between dietary patterns and risk of type 2 diabetes and met inclusion criteria for this systematic review. One prospective cohort study was conducted in children, which is new to the existing review. Seventy-two articles were from studies conducted in adults.

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

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

Next slide, which is the "Summary of

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Evidence Synthesis: Dietary Patterns and Type 2 Diabetes".

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

Carbohydrates below the AMDR ranged from 29.6 and 44.8. No studies identified that inclusion criteria examined carbohydrate distributions below 29.6 percent.

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

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

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

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

Significant associations were reported

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in the majority of these included articles, 19 of 23, that were consistent in direction.

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

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

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

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

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

So, next slide, which should read,

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"Draft Conclusion Statement: Dietary Patterns and Type 2 Diabetes".

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

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

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

Grades for these conclusion statements

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are as follows:

Grade not assignable for dietary patterns in children and type 2 diabetes.

Moderate for dietary patterns in adults.

For diets based on macronutrient distribution and this outcome, the full body of evidence is still under review.

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

This should be, then, to the next slide for the "Analytical Framework: Dietary Patterns and Bone Health".

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

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

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

So, next slide to see the screening results, the "Literature Search and Screening Results: Dietary Patterns and Bone Health".

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

So, the standard review and removal was done to update this existing review. 3,248 articles were title screened, 512 articles were abstract screened, and 167 articles were screened at the full text level.

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

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

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

Two studies were conducted in children/adolescents, and seven studies were conducted in adults.

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

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

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

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

In addition, diet was

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commonly assessed once at baseline. So, possible changes in dietary intake over follow-up and dietary patterns early in life were not accounted for.

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

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

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

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

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So, next slide should be our "Draft Conclusion Statement for Dietary Patterns and Bone Health".

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

The evidence in adults is still under review.

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

So, if you go to the next slide, then, Barbara, it should be the "Analytical Framework for the Dietary Patterns and Neurocognitive Health".

So here, the analytical framework shown here provides the streamlined scope of the question examining the relationship between dietary patterns and neurocognitive health.

This review updates an existing review

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from the previous Advisory Committee.

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

The key confounders are also listed on this slide.

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

Twenty-eight articles were identified that met inclusion criteria and examined the relationship between dietary patterns and these outcomes. Four were randomized controlled trials, 24 were from prospective cohort studies.

The dietary patterns examined were various patterns, indices or scores, factor/cluster analysis, and other methods. It included articles that examined dementia,

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cognitive decline, cognitive impairment, and cognitive function.

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

So, if you go to the next slide, that's outlined clearly, that "Draft Conclusion Statement: Dietary Patterns and Neurocognitive Health".

Under review and status relative to the conclusion reached: this systematic review updates and builds upon the conclusion drawn by the 2015 Dietary Guidelines Committee. And individuals are still working through that.

So, next slide, Barbara. Because that --- the next slide has our next steps. I think I used the word next more than any other word today.

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

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

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

And prepare a report chapter based on the conclusion statements reached.

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

And with that, I believe we are done with an update of the Dietary Patterns subcommittee for this meeting.

CHAIR SCHNEEMAN: A tremendous amount of work by the subcommittee. Thank you, Carol. And thank you for -- we stayed right on track with your slides. So let's --

MEMBER BOUSHEY: Yes, that was great. It really shows how well we do work together.

MEMBER BOUSHEY: Yes. And --- right. So, we can open it up to questions.

And I --- we talked as a group. We talked

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as a group, and so I might -- we agreed that we can push questions onto one another. Of course, no one knows who I'm going to push it onto -- but, no, the people who reviewed them.

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

MEMBER ARD: So, Carol, this is Jamy.

Great presentation. Thank you for doing that for the group.

I think we -- there's a clarification for the draft conclusion related to cardiovascular health in children and dietary patterns. I think we may not have had the full edit of that draft statement. So, I just want to call that out. Yes, so it's -- I think we wanted to change the wording of this because, right now, on slide 29, it reads:

Limited evidence suggests dietary patterns in childhood or adolescence that are higher in added sugars, refined grains, fried potatoes, and processed meats while being lower in fruits, vegetables, whole grain, and low-fat dairy are associated with improved blood pressure

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and triglyceride levels in children and in adolescents.

And I think that's not what we intended.

I think it's actually the opposite of that, right?

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

MEMBER BOUSHEY: Oh, okay. Yes. I don't know if that was a typo or what. And I should have caught it. I should have caught it while I was looking -- saying it. It's probably why I stumbled over it.

CHAIR SCHNEEMAN: Yes, I think it's --

MEMBER BOUSHEY: Okay. So, we'll swap that out.

CHAIR SCHNEEMAN: Yes, we were trying to make some of the slides parallel in the way they were worded. And so, as it's structured now, it would be associated with higher blood pressure and

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triglyceride levels. Or if we switched the order of the food groups, it would be consistent. But just to make it clear that it was an editing error and it will be corrected.

MEMBER BOUSHEY: Yes. Right, right.

So, don't let this current document go out --

CHAIR SCHNEEMAN: Yes.

MEMBER BOUSHEY: -- if anything. But, yes. Good. Thanks, Jamy, for noticing that. That was really good.

MEMBER ARD: Yes.

MEMBER VAN HORN: Hi, Carol. This is Linda Van --

MEMBER BOUSHEY: You've been awake longer.

Yes, Linda?

MEMBER VAN HORN: Hi. I would just like to follow up what Jamy was pointing out because I do remember our discussion about this. And recognizing that, indeed, that probably was a typo, and how we also paused to recognize it when we were looking at the dietary patterns in obesity in

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children.

We were also recognizing that that type of dietary pattern, i.e. -- and this is, I think, slide 34 -- showing limited evidence, but definitely recognizing that same type of dietary pattern in childhood and adolescence that are higher in added sugars, refined grains, et cetera --- the same list -- and lower in fruits and vegetables, are associated with increased fat-mass index and BMI later in adolescence.

And I think where we have yet to go with this is, again, the recognition that in children -- at least on the basis of the studies, limited as they may be, that we currently have available to us -- there is recognition that in childhood, rapid or excessive weight gain in childhood triggers increased risk later in life for those very cardiovascular risk factors that we were examining. And, of course, in childhood we are not talking about cardiovascular mortality.

So, I think what we are recognizing -- thanks to the opportunity to look

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at life course issues related to diet over the life course and risk later in life -- we're recognizing that that dietary pattern that we're recommending for adults in terms of reduced risk of both obesity and cardiovascular disease certainly applies to earlier initiation from the context of primary prevention of cardiovascular disease.

So, I think that's what we're still in the process of exploring. And so, additional attention will be paid to our conclusion regarding this topic, I believe, as we are able to continue with some of the work, given the volume of papers that we've been reviewing.

MEMBER BOUSHEY: Yes. In fact, actually, I really apologize because we clearly -- on our last call, I didn't catch this at all. And I apologize because we had actually wanted these, all of them, to not be -- you know, to make sure that we marked them as being not final.

I think that's what we had on our last phone call, but not all of them got that marking, yes, that these are just -- these are not final conclusions.

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But I see that wasn't clear in all of them.

And so, I'm glad you noticed that because I think we need to -- I don't know how should we deal with this situation --- you know, this is done as a discussion amongst ourselves and we have these slides. We'll share them with everyone. So, I think we should edit them and have these be updated slides. Because all the members would have copies, isn't that right?

MEMBER ARD: Yes.

MEMBER BOUSHEY: Yes. So, I'm glad.

Thank you.

CHAIR SCHNEEMAN: And the header for each of these refers to draft conclusion statements.

And, Carol, I think I mentioned, just to remind everyone -- and it may have been too early in Hawaii -- that everything is draft until our report is submitted.

MEMBER BOUSHEY: Oh, okay. That's really good. And I -- Barb, I'm really sorry, I did miss your -- well, part of it was a little glitch

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that happened, that I knew I wasn't going to be able to get on until 4:00 a.m., which happened, yes. 3:00 a.m. was just asking too much.

(Laughter.)

CHAIR SCHNEEMAN: Let's open this to the Committee as a whole for discussion --

MEMBER BOUSHEY: Yes.

CHAIR SCHNEEMAN: -- and other questions.

MEMBER MATTES: This is Rick Mattes.

Committee, can you comment --- we received a fair amount of public testimony about the health benefits of very high-fat diets and I guess high protein as well. Is the evidence base sufficient to address that question? Were the diets that you examined extreme enough to be able to draw conclusions about the value of that pattern? Or is there just not an evidence base to speak to that?

MEMBER ARD: Carol, I can --

MEMBER BOUSHEY: Jamy --- yes, I was going to say, Jamy and Linda can probably do better.

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But I -- go ahead, Jamy. Yes, go ahead.

MEMBER ARD: Yes. So, this is Jamy.

I think there are a couple of things to think about in regards to how we interpret the literature relative to that question. So, the first thing, as Carol had pointed out, is that the range of diet -- or the range of macronutrients outside of the sort of standard AMDR, the distribution range, was fairly limited. And I think in regards to things like high fat intakes, there were rarely studies that had fat intakes above 40 percent of calories, let alone in the range that you might see with a typical type of ketogenic or other sort of, quote-unquote, high-fat diet. So, there's definitely a difference in the literature that we have versus what people colloquially think of as a high fat intake. So, that's number 1.

Number 2, I think a lot of times when people are in the sort of common vernacular talking about a high-fat diet, it's often in the context of a prescribed or intentional weight loss effort.

It may not be 100 percent of the time, but most

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people are engaging in that type of intake because they are actually trying to modify their weight.

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

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

So, I think, in sum, the body of evidence that we have is probably not going to be sufficient to fully address what people think of as a, quote-unquote, high fat intake or, on the other hand, a very low carbohydrate intake. The lowest carbohydrate intake we saw was 29 percent.

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

And then, I think the third point is,

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

So, when the fat intake goes up, carbohydrate intake goes down, and vice versa. And so, if you call something a high-fat diet, it's also likely a low carbohydrate intake. Or, if it's a high carbohydrate intake, it's also a very low fat intake. And I think those things are probably in the eye of the beholder in terms of how they might want to characterize the particular dietary intake.

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

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beneficial overall?

So that it nullifies what you might think of as a potentially healthful strategy, and it may not be a wise type of sort of area to focus in on in terms of just saying, hey, I've reduced my carbohydrate intake or I've increased my fat intake, or those types of things. Simply saying those things alone doesn't mean that you're leading to a healthier dietary pattern.

MEMBER VAN HORN: Yes. And, Carol, this is Linda again, just jumping in.

Jamy covered most of it, but just for the record, these are delineated on slides 28, 33, and 37, giving further details regarding how we looked at some of these. It might be of interest to some to also realize there was only one study that was claiming to be a high-protein diet. So, there's that in the mix as well. And, of course, if you increase any of the macronutrients, it's going to alter the other two.

The other thing our committee had an opportunity to discuss -- and Jamy was pointing

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out that, you know, if this is intended for weight loss, that's a different set of criteria than looking at overall, you know, either -- any of the other cardiovascular or diabetes or obesity relationships.

And one of the things that we also quickly identified is that there are cross-cultural differences that we're recognizing; that in a study among certain ethnic groups where BMI -- average BMI is 20 or 21, a high-carbohydrate diet is the norm and is associated within that culture with better outcomes. Whereas, in cultures or countries where the average BMI -- such as in the United States -- is well above that -- you know, we have an overweight concern, an obesity problem here -- those kinds of studies are typically addressing something like overweight or obesity.

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

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So, I think those are further identified on some of the slides. And again, I'm sure we'll address all of this more specifically in the final conclusions statement.

MEMBER BOUSHEY: Thank you, Rick, for bringing that up, because that actually was a salient piece of those messages to our group, too.

MEMBER MATTES: Yes, I think it would be valuable to incorporate it into the discussion of this section.

MEMBER BOUSHEY: Yes, yes. Thank you.  
Yes.

MEMBER MAYER-DAVIS: And this is Beth -- just jumping in too, Beth Mayer-Davis.

We have opportunity, ultimately, when we write the report, to indicate areas that we think would be useful in terms of future research. And it is interesting, throughout this process, how often we've actually identified areas where we certainly would like to have had a lot more studies of good quality available to us.

And this is, obviously, an area where

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many people are very interested in certainly lower carbohydrate intakes than were represented in the studies that we had. And so, this and a number of other areas could be things that we could think about in terms of identifying areas for future research.

CHAIRMAN SCHNEEMAN: Right.

MEMBER BOUSHEY: And I will tell you -- being on this committee, because of this, myself, I have the acceptable macronutrient distribution ranges. I have them everywhere. It's become my new favorite table.

CHAIR SCHNEEMAN: So, comments or questions from other Committee members? Or the members of the subcommittee may want to amplify on something?

MEMBER DEWEY: This is Kay Dewey.

I have a general question regarding the outcomes where there were some randomized controlled trials, as well as the prospective cohort studies. Can you comment on whether the results of the randomized trials were generally

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in strong agreement with the rest of the body of evidence or were there discrepancies? And I think this is relevant to breast and colorectal cancer, cardiovascular disease, and diabetes.

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

MEMBER BOUSHEY: Well, you're absolutely right, they were not always aligned, in that the results from the randomized trials were not as -- what we would say as positive as coming from the cohort studies. But I think that, unless you think otherwise, it would be nice to give feedback on that. We did try to take that into account. We did recognize that we're getting different streams of information. So --- yes.

MEMBER DEWEY: Well, there could be many reasons why they don't align.

MEMBER BOUSHEY: Yes.

MEMBER DEWEY: So, what I think would be useful is in the report to make some comment about that and potential explanations for, you know, if they're not in good alignment, to consider

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what the potential explanations for that might be.

MEMBER BOUSHEY: Yes, and I think the biggest thing is the strength of it. It's not necessarily that -- well, I guess, no, not -- for some of them, it was -- yes, that's right. We have some that we really batted around. But good point. We do need to go into that. That's a really good suggestion.

MEMBER DEWEY: So, then, my follow-up question has to do with the wording of the draft conclusion statement on slide 38. If somebody could put that up?

This is the only one -- this is the one for dietary patterns in adults -- where at the end of the statement it says these diets reduce the risk of developing type 2 diabetes. That's sort of a causal wording. All the other statements say, are associated with reduced risk. And unless you feel really confident in the randomized trial evidence base, I would avoid the wording of reduce the risk.

MEMBER BOUSHEY: Oh, good catch,

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beautiful catch. Fantastic catch. Oh, my goodness. Good eye. Thank you.

MEMBER DEWEY: Thanks.

MEMBER BOUSHEY: No, thank you. I'm glad you're awake. Fantastic.

CHAIR SCHNEEMAN: So, other comments?

MEMBER HEYMSFIELD: Barbara, this is Steve. I have some comments from the current draft of the report. Who should I send it to? Liz?

MEMBER BOUSHEY: Oh, yes, or bring it up at our next call.

MEMBER HEYMSFIELD: Okay.

MEMBER BOUSHEY: Because isn't that Steve Heymsfield?

MEMBER HEYMSFIELD: It is. It is.

MEMBER BOUSHEY: Yes.

MEMBER HEYMSFIELD: And I made a few technical edits to the draft.

MEMBER BOUSHEY: Good. Yes, because we can use this information to help us with writing our report. So, that would be great if you found these various little blips.

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MEMBER HEYMSFIELD: Yes.

MEMBER VAN HORN: Carol, one other thing that I don't think was mentioned yet that we discussed as a group that I think is very timely in regard to the data that we're reviewing, and that is the whole idea of dietary patterns has triggered discussion based on scores of different dietary patterns that are out there. And, of course, it relates to AHEI and the Mediterranean and DASH, et cetera.

And I think we were all agreeing that part of the difficulty in this systematic review of the literature relates to the fact that even the scoring of these different adherence levels vary tremendously. The Mediterranean diet, of course, has a certain recognition currently as being healthy, but in terms of scoring it, even within and across various Mediterranean countries those scores can be very different.

MEMBER BOUSHEY: Yes.

MEMBER VAN HORN: Yeah, what foods are included and the assessment methodology that's

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capable even of scoring a U.S. eating pattern using the Mediterranean diet scoring from a Mediterranean country can vary tremendously because, of course, if we're looking at something as specific as olive oil, the U.S. just doesn't use that as regularly or as a typical dietary fat consumed by the American public.

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

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

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as well as the much more common prospective studies.

MEMBER BOUSHEY: And that might be a really nice way to highlight the NCI-initiated Dietary Patterns Methods Project that harmonized four diet quality patterns.

MEMBER VAN HORN: Right, right.

MEMBER BOUSHEY: And then, indeed, were able to get the exact same -- almost precisely the same results even across the board. So, that would be a nice thing to highlight. And since it's very available, and because it does show that it can be done, and it's something that people can't say, oh, it can't be done. It can be done. So, that's a nice -- that's a good idea.

MEMBER VAN HORN: And you're an expert in that one, which is great.

MEMBER BOUSHEY: Well, it's the only reason I knew about it. No.

(Laughter.)

But, no, it's great. That's a really nice message.

MEMBER NOVOTNY: Sorry, this is Rachel

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Novotny.

Just thinking broadly across the work of the whole Committee, thinking about Regan's presentation and the allergies with the specific foods, and anticipating the beverages, and so on, and this with diet patterns, and if we're going to be able to -- I suppose at least we could have in an appendix our groupings of foods, but whether we can make any methodologic recommendations about food groupings for patterns, you know, for moving into more patterning kind of work.

And of course, you know, ours would be focused on the U.S., but, then, with an eye -- and even in our own review with other countries that use different systems, with the naming of those groups. I'm thinking of -- there's a paper out by Headey where he -- for the purpose of prices, and he's come up with some nice, kind of more global food grouping terms.

But, at any rate, just thinking whether we can collectively come up with any methodologic recommendations about --- for future research on

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food groupings or for future food patterning. I don't know if anybody dares comment on that, but at least the need to do that perhaps. Just a comment.

MEMBER BOUSHEY: Sure. Well, we did -- actually, that's a really nice comment because we are drawing upon these patterns coming from around the world. So, there is something to be said. Maybe Deborah Jo has a committee on that.

MEMBER BOUSHEY: But thanks, Rachel.

MEMBER NOVOTNY: But even just starting, of course --- yes, just starting of course with NHANES data and the persons we're working with, maybe we can do something.

CHAIR SCHNEEMAN: So, Carol, I think Lydia Bazzano was having a little bit of trouble calling in. But she sent in a comment in the presenter chat asking about describing the results of the group for the macronutrient manipulation in the report. I think particularly for the randomized controlled trials, sort of what the thinking is about that. And I don't know if you

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or Jamy might be able to comment.

MEMBER BOUSHEY: Well I'm going to --- yeah, that's --- no, I think we've kind of already sort of went over that, too, with some of the previous questions, that we need to outline that clearly and enumerate it. Because it is --- it's not just --- it's with --- I guess we only looked at it with overweight and obese. Is that right? No, we looked at it for everything. So, it gets complex, but I agree.

MEMBER ARD: So, this is Jamy.

MEMBER BOUSHEY: I'll put her in charge of it. We'll put her in charge of it.

Jamy?

MEMBER ARD: Yes, I was just going to say, I think in looking at those studies in some detail -- and we haven't had a chance to fully review all of that -- but, actually, a lot of the randomized controlled trials are consistent with the prospective cohort studies in that they don't necessarily, one, achieve large differences in macronutrient distributions; and two, in some

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instances -- actually, in most instances -- the types of changes that you end up seeing, either they're small or non-significant with regards to things like body weight. So, this is --- I'm speaking specifically about the growth, size, body composition outcomes.

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

So, I think, yes, as you get deeper into those results, you start to see our thoughts about how we characterize these particular diets and the phrasing that we use -- i.e., high or low -- is somewhat relative. And so, I think we just have to be really careful, as we've talked about before, when we describe these results. This is actually what we mean in terms of the percentage of intake.

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Because, just like we said for the Mediterranean diet, there's lots of different Mediterranean diets; there's lots of different things that people call low carbohydrate or high fat or high protein.

MEMBER LEIDY: This is Heather Leidy.

I just have a couple of questions. Can everybody hear me okay? This is the first time I've chimed in.

MEMBER BOUSHEY: Yes. Not only that, it's the first time your voice is back. Very exciting.

MEMBER LEIDY: Yes, thanks.

So, just a clarification, when you look at the macronutrient focus with this subcommittee -- just to make sure I'm understanding it -- most of the articles were the ones from 2013 forward, right? So, when you look at the Dietary Guidelines' previous recommendations, it seemed like the dietary patterning, you're building on existing evidence. But the macronutrient focus wouldn't have been able to do that because that wasn't the focus in the past. Am I understanding

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that correctly, that the 2013 and forward focus was still with macronutrients? And so, it wasn't possible to actually go back and look at the totality of evidence around that, is that correct?

MEMBER BOUSHEY: To my acknowledge, the reason that it was -- and, indeed, it wasn't originally in our task, either.

MEMBER LEIDY: Right.

MEMBER BOUSHEY: It was the first meeting, that we --- at our first public meeting, that this appeared to be a huge interest to the public. So, that's why we put it in. And --

MEMBER ARD: And we have articles --

MEMBER BOUSHEY: Go on, Jamy.

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

MEMBER BOUSHEY: That's right.

MEMBER LEIDY: Oh, okay.

MEMBER BOUSHEY: So, what happens, the ones we truncated were the ones we had papers with already. That one we couldn't truncate. So, any

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of the new ones go back all the way.

MEMBER LEIDY: Got it. Yes. Okay.

MEMBER BOUSHEY: But the ones that we already had, we truncated those.

MEMBER LEIDY: Yes. So then, my second question is really around -- it was a really good discussion with everybody on your committee.

I'm just wondering in terms of higher protein intake --and Jamy, when you had made the example of a higher protein diet is 31 percent, you know, it's -- anything that is still within the AMDR, even though they're on the higher ranges of what most people are consuming, wouldn't actually have been -- in essence, that would be out of scope from what you were setting out to do.

I'm just wondering if those -- the higher ranges of those, whether it's protein or any of the macronutrients, whether that actually would get captured in the dietary patterning approach. And I'm guessing the answer is probably no, because the dietary patterning is more along the lines of -- I don't know -- patterning names

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

MEMBER BOUSHEY: With these topic areas, I think it would have, but we can check with the staff that did the abstractions. So, that would be -- Liz and Laurel are probably online.

MEMBER LEIDY: In answer to --- that was --- I'm not sure if I was clear in what I meant.

MEMBER BOUSHEY: What I think --- of course, it would only be related to the topics that we were examining, but we would have looked at the macronutrient distribution within those topics. But you're right, if there's a topic that's not on here, we wouldn't have gone out and just searched the acceptable macronutrient distribution range

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on its own.

So, if there's a topic -- like let's say you have a topic of pregnant women -- which we didn't have -- and we wouldn't have looked at macronutrient range among that population.

MEMBER LEIDY: Sure.

MEMBER BOUSHEY: So, if that was there, we missed it. Because you're right, it's only within these topics that we had.

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

And so, I think my question is would

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those studies have gotten excluded because they had a macronutrient focus that was outside of your scope, given that they were in the AMDR? Or would they actually have gotten shuttled over to a dietary pattern?

MEMBER BOUSHEY: Right. That's a good question. That we should check with the abstractors to make sure. Because did we keep it within our framework? I would prefer to get confirmation because I don't --

MEMBER ARD: Let me try to --

MEMBER BOUSHEY: -- think we went out of our way to go --

MEMBER ARD: This is Jamy. Let me see if I can try to respond.

I think, if I understand the question, you're saying, well, if a study made an adjustment in a macronutrient but did not have that macronutrient target land outside of the AMDR, was that totally sort of pushed to the side or would it have been captured in something else like dietary pattern and obesity, but not in the macronutrient

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distribution? Is that what you're saying?

MEMBER LEIDY: Yes, correct.

MEMBER ARD: Okay. The nutrient distribution pattern --

MEMBER BOUSHEY: Hello? I can't hear you.

MEMBER ARD: Hello? Hello?

MEMBER BOUSHEY: I think you're blocking out or --

MEMBER ARD: Hello? No?

MEMBER VAN HORN: Now we hear you.

MEMBER ARD: You can hear me now?

CHAIR SCHNEEMAN: Yes.

MEMBER BOUSHEY: Yes.

MEMBER ARD: Okay. I don't know what's going on. I'm on my land line.

So, what I was saying was, the way I understand it is that, for the macronutrient distribution question, the study had to have a macronutrient distribution in one of the treatment arms or groups that was outside of the AMDR. And it could be carbohydrate-fed or protein, as shown

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on the screen.

MEMBER LEIDY: Sure.

MEMBER ARD: So, for that particular question, you had to have a --- meet that inclusion criteria. Otherwise, yes, I think if the study did not have a macronutrient distribution outside of the AMDR, but met the other inclusion criteria in terms of a dietary pattern, then it's likely that it would have been -- or could have been -- part of the other literature around dietary pattern. So, it just needed to describe the dietary pattern and then meet all the other inclusion criteria.

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

And so, in looking at the summaries of a lot of the dietary patterns, they are very food-specific. And so, I think that was just why I brought it up. Because I think a lot of those studies that are within the AMDR but are

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

MEMBER BOUSHEY: Right. And the thing is, you bring up a really good point, but we couldn't think of any place else to put it.

MEMBER LEIDY: Sure.

MEMBER BOUSHEY: You know, because you're right, it doesn't fit into the dietary pattern definition. But we can think of them as patterns of macronutrients.

MEMBER LEIDY: Okay. Thanks for the clarification.

CHAIR SCHNEEMAN: Great. So, are there other comments or questions at this point?

MEMBER ARD: This is Jamy.

I just wanted to circle back to Kay's point, because I knew that there was something about that that I couldn't quite recall at the time that she brought that up.

But that conclusion statement, in

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particular, is one that was carried forward from the previous cycle. So, it's --- that's the exact language from the previous DGAC report. And so, this is one of those things that we have kind of talked about in subcommittees, but I don't know if other subcommittees have had this discussion, around those areas where we're not doing a formal update because we think that, well, the literature substantiates or validates the previous conclusion, even though there may be some differences in the composition of that literature.

So, we didn't have as many randomized controlled trials as they had in the previous review. I think they had -- based on my quick look -- they had eight randomized controlled trials, some of which we had carried over in our review because they had reported some additional outcomes, or something like that, that were relevant.

So, that becomes an area where we need to get guidance or understand exactly what to do, because, yes, I mean, is it reduced because it just

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got carried over from the previous one? Or is it associated with? And that's based on a more definitive evidence review that we're actually going to do, rather than just a carry forward.

CHAIR SCHNEEMAN: Great. Thanks for adding that, Jamy, because it's an important point.

And it is a topic that many of the subcommittees are looking at: how do they carry -- build on the 2015, but also reflect the nature of the literature that they're evaluating?

So, are there other questions or comments?

MEMBER BOUSHEY: You know, and that's really interesting because science evolves on the way we look at exposures, the way we look at outcomes evolve. So, this is something that will always take place. You know, the descriptions might change over time.

CHAIR SCHNEEMAN: So, I'm just waiting to see if there are any more comments coming forward.

So, I'm going to suggest we take our

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break now. We can resume again in about 15 minutes.

So, maybe 5 after 3:00.

MEMBER BOUSHEY: But we can't hang up, though, right? We can't check out because we don't have a way in, is that right?

CHAIR SCHNEEMAN: Do not leave the website. Do not hang up. Just mute.

MEMBER BOUSHEY: Yes. Okay.

CHAIR SCHNEEMAN: Because if you hang up, you may have trouble getting back in.

MEMBER BOUSHEY: Right, right. Okay.

CHAIR SCHNEEMAN: So, stay tuned in, but on mute. And we'll take a quick break and be back around 5 after 3:00 to resume again, 5 after 3:00 Eastern Time.

(Whereupon, the above-entitled matter went off the record at 2:48 p.m. and resumed at 3:05 p.m.)

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

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hearing none right away, we'll go to the Frequency of Eating subcommittee. Dr. Heymsfield, are you ready to present?

MEMBER HEYMSFIELD: I am, can you hear me okay?

CHAIR SCHNEEMAN: Yes, we can hear you, I can hear you.

MEMBER HEYMSFIELD: Okay. I want to start by thanking my committee members, Carol Boushey, Heather Leidy, Rick Mattes, and also Ron Kleinman for his oversight of the committee. And for those of you who don't know, this is the first time this topic, frequency of eating, has come up in the Dietary Guidelines. And so we were treading on new territory here.

And as you'll see from the report, which we actually gave at the fourth public meeting in Houston a couple of months ago I guess at this point, and this is a summary of that summary report.

Just to acknowledge Regan Bailey's earlier presentation today reporting on some aspects of frequency of eating. Her report also

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will be included in some of the topics presented in our official report. And I'll just give you a few examples for frequency of eating.

It's the number of eating events or ingestive events over a 24-hour period, and Regan noted that the average for Americans is 5.7 eating events per day. And that includes snacks. One fifth of our energy intake comes from snacks.

So this is a topic of great interest, not just from the nutritional quality perspective, but also for people interested in physiology, frequency of eating has become a very interesting and important question, including water ingestion, which has a number of nutritional and physiological effects.

Now, to examine this topic, 41,000 articles were screened, and of them 10 were included in our report. And they addressed six topics shown here: frequency of eating and all-cause mortality; eating during pregnancy and gestational weight gain; eating during lactation and postpartum weight loss; eating and growth,

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size, body composition, and risk of overweight and obesity; and frequency of eating and cardiovascular disease; and type 2 diabetes.

And we've heard a number of presentations today that address these topics. This one focuses very specifically on frequency of eating.

One of the most important aspects of our subcommittee's tasks was to define what frequency of eating is. And the frequency of eating in our evaluation is defined as the number of daily eating occasions as an ingestive event.

And that includes preloads, meals, or snacks, beverages or foods. And beverages can be energy- or non-energy yielding.

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

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

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is interventional studies. We developed criteria.

We spent a lot of time developing and refining criteria for both of those types of studies that are included in our screening and in our report.

Okay. So the first question relates to, what is the relationship between frequency of eating and all-cause mortality? And when we screened on this question, we found no papers, no publications that met criteria.

And therefore our conclusion statement is very straightforward, that no evidence is available to determine the relationship between the frequency of eating and all-cause mortality.

And accordingly, no grade is assignable.

A very similar conclusion was for eating during pregnancy and gestational weight gain. Here, no papers came up on frequency of eating that met our criteria. And accordingly, our conclusion is that no evidence is available to draw conclusions about the relationship between the frequency of eating during pregnancy and gestational weight gain. So no grade is assignable

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there.

The third question was what is the relationship between frequency of eating during lactation and postpartum weight loss? Here, we did find one study. And that study was actually done in Sweden. It was a 12-week, a prospective study. And it had very ambiguous, kind of neutral results, nothing that led us to conclude that there were was sufficient evidence to make a firm conclusion.

And therefore we decided to rate this as insufficient evidence available to determine the relationship between the frequency of eating during lactation and postpartum weight loss, and no grade was assignable.

Now, the next topic, what is the relationship between the frequency of eating and growth, size, body composition, and risk of overweight and obesity. The most papers we had fell into this category. There were six of them, one was in children and five were in adults. And they were all prospective cohort studies.

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And a review of these six studies were quite ambiguous. There were a number of issues related to bias. And our conclusion was that there was insufficient evidence available to determine the relationship between the frequency of eating and growth, size, body composition, and the risk of overweight and obesity.

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

And one of these studies related to the intermediate outcome of blood pressure, and the second related directly to the distal outcome of cardiovascular disease, it's a prospective cohort study.

And neither of those shed, you know, emphatic results on this question. And of course, only two publications, and they differed in the outcome variables. So we concluded that insufficient evidence was available to determine the relationship between the frequency of eating

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and cardiovascular disease. And no grade was assigned for it.

And the last question was what is the relationship between the frequency of eating and type 2 diabetes? And here, again, there are two prospective cohort studies that we evaluated, both in the same group, but they had slightly different outcomes that we looked at, different populations, neither of which allowed us to come up with any firm conclusions.

And accordingly, our conclusion is that insufficient evidence was available to determine the relationship between the frequency of eating during lactation and type 2 diabetes. And so no grade was assigned there.

We learned a lot going through the papers that we reviewed and a number of things came up that are relevant. One is that the results were quite inconsistent and insufficient findings were present to draw conclusions about the relationships between frequency of eating and health outcomes.

A topic that came up a lot was water

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consumption. It's rarely quantified in studies, and it's not mentioned and very little information was obtained in the realm of water.

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

The various comparisons were inconsistent across the studies. Both energy-yielding and non-energy yielding beverages were inconsistently accounted for, and I mentioned the water question earlier. And the attrition rates were often high or unknown in a number of the papers we evaluated.

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

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And we had a number of draft research recommendations. We are still pondering those and maybe adding some more, but the ones we have decided on, we feel there's a definite need to conduct more controlled trials, particularly randomized controlled trials.

There's a need to develop a consistent definition of an ingestive event that includes eating and drinking. This is a very important topic for future work. We did the best we could.

We spent a lot of time thinking about our definition. But definitely more work on that is needed.

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

The studies on frequency of eating should report the number of ingestive events across 24 hours, a minimum of three days of ingestive event data, and at least two discrete occasions to allow

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assessment of reliability. This is a fairly high bar in many ways, but it's the one we use. And we have to spend a lot of time, again, thinking about that.

The frequency of water consumption should be reported. Key confounders should also be examined. And finally, studies of food insecurity to allow isolation of voluntary versus involuntary ingestive event effects need to be considered.

So that's our report. We've done a draft document of our chapter, and again, I want to thank everybody for their contributions. And the next step obviously is that these reviews will be peer reviewed.

We have ongoing collaboration, as I mentioned earlier, with the Data Analysis and Food Pattern Modeling working group for the question what is the relationship between the frequency of eating and achieving nutrient and food group recommendations? And Regan Bailey presented some very interesting findings this morning, which will

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definitely enhance our report.

And finally, we need to continue to draft the scientific report of our project. Thanks very much. Okay, Barbara.

CHAIR SCHNEEMAN: Great, yeah, thank you, Steve. So let me just see if there are members of the Committee that have any questions or comments.

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

So I'm wondering if your committee thought about the issue of timing of ingestive behaviors, as how timing relates to frequency of ingestive behaviors and what metrics one can come up with. I mean, I've seen and heard various conversations that can be all over the map in this regard.

And I wonder if as part of the research recommendations there might be some statement about

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the need for some agreement in the field about at least some key metrics. Because once you combine the frequency of eating occasions with anything about timing, you know, you can pretty quickly end up with what you could imagine to be a very confusing and inconsistent literature that would be really hard to compare across studies.

MEMBER HEYMSFIELD: That's a -- Beth, that's a great question, one that we addressed early on. Originally, timing and frequency of eating were coupled together in our criteria. And very early on we uncoupled them and only focused on frequency of eating because the literature was very spotty in terms of timing of meal ingestion in relation to frequency of eating.

And I heard some interesting comments this morning in Regan's presentation where she, you know, looked at both timing and frequency of eating. And I think it's a very interesting and important topic, one perhaps that we should add to the research recommendations which we have.

And I'll ask Rick and Heather to chime

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in on that also if they have any suggestions.

MEMBER MATTES: Well, yes, it's an important topic that's basically unaddressed. The problem was the papers that reported on temporal patterns of eating didn't include the total number of eating occasions in the day. And so knowing a temporal pattern doesn't really give you the answer, because you don't know to what degree they compensated by eating at other times of the day.

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

MEMBER LEIDY: This is Heather, just to follow up with that. We actually have some paragraphs I think drafted where we're emphasizing that issue and why it wasn't included in our scope as well. It's always hard to know where these

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

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

You know, if it was the other way around, there are timing studies, but then, you know, they obviously, the majority of them didn't control for eating frequency. And so those studies just weren't included. That's a really good point.

MEMBER HEYMSFIELD: Yeah, excellent. Thank you.

MEMBER BOUSHEY: And in the recommendations that you had mentioned, you mentioned, Steve, is that we'll be able to, with that recommendation of using technology, and those will capture both. And so that actually is, you know, we can add that in.

MEMBER HEYMSFIELD: That's right, I

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forgot about that, Carol.

MEMBER BOUSHEY: And that will add more accuracy to the timing too.

MEMBER HEYMSFIELD: Yeah, that's right. Thank you.

MEMBER SABATÉ: Joan Sabaté here. I know that in your topic, you have discussed in previous meetings, I mean the intake of water. But I don't know what conclusions you have reached as far as your particular report.

If just drinking plain water is considered an ingesting occasion, or after the discussions you have just taken as an ingestion when there is any caloric intake associated to whatever food or drink, I mean, is consumed.

MEMBER HEYMSFIELD: Well, we did define an eating occasion as including water ingestion. And so that non-caloric beverages are included in our eating equation. So Rick, do you want to talk about that a bit? Because I know that's an interest of yours.

MEMBER MATTES: Yeah, well, we believe

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that water should be included because when you drink that influences what you eat and may alter how you metabolize what you eat. So it's physiologically relevant. The problem is that we really have no way to capture water intake. It's so easily overlooked in any kind of recall.

And you know, often it is not a planned ingestive event, it's just you're passing by a drinking fountain or whatever. And those kinds of ingestive events are especially difficult to capture. So what we are proposing is that it be an important dimension in studies and that methodologies be developed to quantitatively assess it.

MEMBER SABATÉ: And besides the frequency of water consumption, did you count in your review of the literature that many studies that quantify the volume of water, plain water ingested?

MEMBER MATTES: No, no, the short answer to that is no.

MEMBER HEYMSFIELD: No, right, yeah.

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But to be clear, they had to be coupled to eating frequency, right. So they, you know, the studies that had a number of ingestive events didn't have very clear picture of water ingestion.

MEMBER SABATÉ: Okay, thank you.

MEMBER HEYMSFIELD: Okay, Barbara.

CHAIR SCHNEEMAN: Okay, great. Just double check, any other questions or comments? Okay, well, thank you, Steve, and thank you for the report from the subcommittee. You're clearly leading the way when it comes to report writing.

MEMBER HEYMSFIELD: Well, I wish we had more to write. But it definitely is a very interesting topic and one I'm sure will get more attention in the future.

CHAIR SCHNEEMAN: Yeah, well, I think at the last meeting it was also pointed out that this becomes an example of the way we eat is, provides an interesting information, it's not just what we eat. I think that's come out of your subcommittee discussion, so.

MEMBER HEYMSFIELD: Right.

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CHAIR SCHNEEMAN: So what I would like to do since we have time, I want to just go around, the way we usually do it is go around the table to get comments from the Committee members online.

And obviously I can't see you, so I'm going to just go down the list.

If you don't need to say anything, that's fine. If I don't hear you, I'll assume there's some technical problem. But if you don't mind, I would just like to end the day by collecting those comments, just perspectives, observations you have about where we are right now and what you've been hearing.

So I'll start at the end of the alphabet this time. So Linda Van Horn, do you want to comment?

MEMBER VAN HORN: Oh, thank you, my goodness. Well, I guess really I'm just struck with the amount of work that has gone on across and within each of the subcommittees and just how exciting it really is to both discover what we have and uncover what we're missing as we go forward

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with some of these key questions and introducing some new topic areas.

I am further struck with the opportunity that still lies ahead for us as a total Committee to unite some of our respective key concepts perhaps in the further writing of the overall report.

Because I think, you know, we are both building from what the 2015 group did so well, but also recognizing some areas that I think really would benefit from a further concerted effort, research-wise, to provide some data so that we can be better informed and more systematic about some of the decisions that still lie ahead.

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

And I think all of us recognize that diet plays an important role across that spectrum,

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but it's been not possible really to connect all these dots, and I think we're off to that direction.

So really just thanking everyone and appreciate the opportunity to participate.

CHAIR SCHNEEMAN: Great, thanks, and Elsie, are you on, Elsie?

MEMBER TAVERAS: I am on. I just want to second what Linda said. It's just an incredible and impressive amount of work that was presented today. And also second the, what Linda said about how important the findings that Regan presented this morning about how diet is tracking and how important early life is as an opportunity for change.

I'm hoping tomorrow we might have time to talk about some of the questions that we might not be able to get to and how we might address that in our report. I know that at least in my subcommittees, there are going to be some questions. And so I'll hold that thought till tomorrow.

CHAIR SCHNEEMAN: Okay, great, thanks.

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Jamie Stang.

MEMBER STANG: Hi Barbara, can you hear me?

CHAIR SCHNEEMAN: Yes.

MEMBER STANG: Okay. I would echo what others have said and thank all of the staff.

They have done a tremendous amount of work, and we couldn't be doing these presentations today without all of the expertise that they have and the many, many hours that they've put in.

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

It always seems to come back to the, you know, the fruits, the vegetables, the legumes, the fish, certain components. And I think that that's exciting because it means that we can have

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a consistent set of dietary guidelines that can probably cover many, many conditions and not have to have a lot of disparate recommendations for different conditions and timeframes in life.

CHAIR SCHNEEMAN: Great, thanks.  
Linda Snetselaar.

MEMBER SNETSELAAR: Yes, certainly I agree with everything that has been said. I think that the additions this time of sort of looking at things at earlier ages is incredibly important.

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

And that I think is incredibly important overall because I, for example, see the Dietary Fats and Seafood group also playing into some of what we're seeing with dietary patterns.

And I think in the end we're going to have a very nice kind of overall consensus around what is truly important as we look at the dietary guidelines.

Thank you.

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CHAIR SCHNEEMAN: Great, I'm next, so go to Joan Sabaté.

MEMBER SABATÉ: Okay. I think, agree on most of what has been said, so my comment will be brief. I am happy that in this iteration of the Dietary Guidelines we also pay attention to the dietary patterns. That was kind of a new topic in the previous edition. And, but at the same time I'm overwhelmed by the amount of literature that has been produced in dietary patterns.

And (telephonic interference) this area, because ultimately, I mean, individuals do not eat nutrients or even isolated foods but eat in a group of patterns. And by patterns is not only the constituent foods but also the timing, the frequency and the distribution of the amounts throughout the day.

And I think it's unfortunate that this, there's not much literature on that, and the subcommittee has not been able to capture much information in this respect. But I do think that in future, I mean the amount, distribution, and

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frequencies or absence of relocations during the day will be also very important.

CHAIR SCHNEEMAN: Great, thank you.  
So Rachel Novotny.

MEMBER NOVOTNY: Yeah, thank you.  
Yeah, also still I appreciate what others have said.

So thinking about integration, and in some ways almost redefining food patterns or dietary patterns a bit more broadly to encompass a lot of what we've been saying to include, life course, frequency, food groups, other dimensions of eating.

And just basically how to present that, whether, even whether there might be a graphic that might help us present that.

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

So those are things I'm thinking about.

CHAIR SCHNEEMAN: Great, thanks. Tim  
Naimi.

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MEMBER NAIMI: Yeah, I don't have much to add. I was going to say thank you so much to all of my fellow Committee members and to the staff who put in so much work. And it's fun, you know, now that we're really kind of seeing all the results coming through and thinking about how to integrate that into the broader report, which we'll be discussing tomorrow. So thank you.

CHAIR SCHNEEMAN: Great. Beth.

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

And so we have a number of situations where we have grade not assignable or limited as a result of not having those kinds of studies.

And so I'm just wondering if there could be a process where we have some direct communication

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with societies that really are, and agencies that really do, you know, promote and fund nutrition research. So obviously NIH, American Society for Nutrition, The Obesity Society, there's probably a couple of others.

You know, just so that the research recommendations are actually seen and discussed and made more prominent. Because there's just such a number of questions that I think are really important in public health and of great interest to the public that we really would love to be able to, you know, have the data to work with and make something of.

So that's just a thought, to just really try to, you know, get the field to advance in the way that would really address these questions that are so important in public health.

CHAIR SCHNEEMAN: And that's something maybe we can come back and ask for some comments from our liaison later after we go through. So Rick Mattes. Rick, did we lose you?

MEMBER MATTES: I'm sorry, I was muted

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there. I, too, have dietary patterning envy, that that really I think is the future of trying to understand diet and health. We identified a number of food constituents, alcohol, sweetened beverages, fats, and so on, and we might look at what they contribute to the diet, and that's interesting and that's important.

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

And that brings into the whole equation cultural preferences and so on. So I see this as a progression, and we've just kind of opened the door to what we recognize as a needed next step.

CHAIR SCHNEEMAN: Great, thank you.  
Heather Leidy.

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MEMBER LEIDY: Yeah, hi, I don't have too much to comment on, except for you know, I think this will come out a little bit more tomorrow too with the rest of the subcommittees. I don't want to call it concern, I think for me maybe it's an internal concern, you know, there are obviously criteria that we use in terms of grading, using the NESR grading rubrics for different types of studies.

And I, you know, some of the joking comments that we've said, at least within some of our subcommittees, are well, we're a tough crowd.

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

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

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know what a randomized control, the strengths and limitations with those and cohorts.

But I think the interpretation of that data sometimes can be I think a little more grey in terms of the totality of the evidence. So I think for me it's just this process has just shown that it's just hard because we all have our own taskers within the subcommittees. And I still think there's some grey areas in terms of overall grading of the overall findings.

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

I just think the interpretation of the data, you know, whether we're talking about whether, you know, something is directly causing

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the effects, I feel like all of our summary statements are associative in nature, whether they're relationships or associations. And I think for me that's a point of it's really hard to know how to write those up effectively.

CHAIR SCHNEEMAN: Great. Ron, I assume that you're on the phone, but I'd like to come back to you at the end.

VICE CHAIR KLEINMAN: Okay.

CHAIR SCHNEEMAN: So Steve Heymsfield.

MEMBER HEYMSFIELD: Okay, thanks, Barbara. I guess the first thing that I wanted to say has been said already, which is I think it's critical to have all of these chapters and ideas integrated using the same language and the same consistency of recommendations.

I noticed as I heard some of the presentations today, they differed not in major ways, but in modest ways from some of the things that we've talked about in patterns and frequency meetings. So obviously there will be editing done, but I do think that's really critical.

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

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

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

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

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real meaning. And that's the major thing that I've learned in this whole process, is that there's a lot of weak literature out there. And I think people need to ramp up how they do these kinds of studies. That's my thought.

CHAIR SCHNEEMAN: Great, thanks.  
Sharon Donovan.

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

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

I was also, really enjoyed Regan's presentation this morning to see, you know, what

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we're seeing in terms of the intakes of and patterns of feeding. And that will be very nice to integrate into our systematic reviews and thinking about, you know, how women are eating during pregnancy and lactation and how they're feeding their children.

So again, looking forward to pulling all of the various parts together. I think other people said, we've been fairly siloed in our individual committees, and now we're just beginning to see the data on intakes and also the food pattern modeling, which is going to be very critically important I think to pulling it all together. That's all.

CHAIR SCHNEEMAN: Thanks. Kay.

MEMBER DEWEY: Yeah, thank you. I would like to build a little bit on what Sharon just said and emphasize the need to link what we heard this morning on food intake and nutrient intakes to the other evidence that we've been looking at. And in particular, where are the largest discrepancies between the food intake

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patterns and the desirable dietary patterns that we heard about later in the day, where are the easiest places to target for improvements.

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

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

CHAIR SCHNEEMAN: Great, thanks.  
Carol Boushey.

MEMBER BOUSHEY: I, this is really difficult. Everything that people have said has been fantastic, and I, so the only thing I thought to add a little bit more, and it did come up from Jamie Stang, but I can't thank the staff enough.

I know some of them must not ever go to sleep. And it's really been helpful to us.

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

And I just think we're so lucky that we have individuals such as these folks who, we're just lucky that we have the opportunity to work with them, as well as all of the members of the Committee too. But I'm really grateful for their assistance.

CHAIR SCHNEEMAN: Yeah, I don't think they'll miss us when we're gone. So Teresa Davis.

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

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

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We have a lot of work to do ahead of us, and you know, we're anxious to dive into that and complete the report.

One of the things that stood out to me, particularly from the presentations today, particularly this morning, was that there was data that suggested that, you know, dietary patterns are being established in early life, particularly in the one- to two-year-olds.

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

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

CHAIR SCHNEEMAN: Great, thanks. And Lydia, I know you've been having some telephone

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

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

And I think she also had had a question on collecting data on water consumption, how can that be handled. But I think that's something we can reflect in the feedback to the subcommittee.

So, and hopefully tomorrow we will have you well connected, Lydia.

So Regan.

MEMBER BAILEY: All right, can you hear me? Hello?

CHAIR SCHNEEMAN: Yes.

MEMBER BAILEY: Okay, great. I think

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today highlighted for me the complexity of measuring the diet.

We talked about frequency and timing, amounts, whether meals and snacks, there's compensation, context, motivations like income, whether it's important to look at micronutrients or macronutrients or bioactives or water.

It's just really hard to measure the diet, and we're seeing that in a lot of papers are limited by they're only measuring one aspect and not others. So moving forward, we need to be better as a research community at trying to capture this complexity in our work.

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

And then just thanks to all the Committee members and echoing how wonderful the staff is, but especially extending that to the data

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analysis team that are running all of the numbers that were presented this morning in my presentation. Thanks.

CHAIR SCHNEEMAN: Great, thanks. And  
Jamy Ard.

MEMBER ARD: It's one of the few times in my life I get to go last. Thank you, Barbara.

CHAIR SCHNEEMAN: I did that special for you.

MEMBER ARD: I appreciate that. So I think for me the thing that sort of sticks out now as we are nearing our, you know, impending deadline for producing this report is, you know, what's the take-home message, and trying to be clear as possible for those folks who are creating the policy document and being able to translate the science into Guidelines.

So I want it to be very clear and also, you know, sort of understand, you know, what's the take-home message, what do these data say, what do they not say. And being clear in discussions that we had today about, you know, the limitations

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of the evidence relative to questions that people have around macronutrient intake, for example.

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

CHAIR SCHNEEMAN: Great, thanks. And then Ron, I want to come back to you.

VICE CHAIR KLEINMAN: Thank you. So I want to really reinforce what all of you have said about the staff that we've been working with.

Their work ethic is really incredible, and in particular their flexibility as we pile on even more work every time we meet as a subcommittee.

So really, they've given us the pleasure of being able to examine this extensive evidence base and evaluate it in a way that is really exceptional. So thanks once again.

I do think that when we meet in this way, it's very impressive that while we have very

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

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

If we had a way to link, now putting on my pediatric hat, if we had a way to link what a child in a family consumes to what the adults in the family are consuming, or even the older children, I think that would really help us to understand the continuity of dietary patterns over time. And so I hope that NHANES and other databases can find a way to do that going forward.

And then I guess a last comment, it

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

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

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

So I think that's pretty much all I have to say without repeating what all the rest of you have said, which I completely agree with. So

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thanks to all of you, it's been really a pleasure working with you, and I look forward to tomorrow.

Thanks.

CHAIR SCHNEEMAN: Great, thank you. And I really appreciate everyone's comments and doubly appreciate all of the effort that has gone into the reports that we had today and the further reports that we will have tomorrow.

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

DR. STOODY: I mean we can just, just quickly in relation to Beth, your comment about research recommendations. I think research recommendations is one of the things that I think is so important out of the work that you do, and the last few rounds you've tried to amplify that information.

But it's one of the reasons why we had suggested in the report structure to pull those

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out separately into a separate chapter so that they are all together, rather than sprinkled throughout the report. So I mean, we echo that we do think that's important.

I know a few years ago NIH did create a national research roadmap, and they did look at the Committee's report in forming that roadmap. But you know, there's certainly a lot of other opportunities. I think presentations at public meetings, or publications, you know, I think there are other ways that the Committee could, like I said, amplify the message.

So there are, we try to promote those, but I definitely think there are things in your activities that we could, you know, add -- after you finish the report if you all still want to work with, if you all still have time to do more, you know, there is definitely ways that I think would be great to spread that word.

CHAIR SCHNEEMAN: Janet nodding her head.

Okay, so I guess we're going to give

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people back 30 minutes of their time. And so we will begin again tomorrow morning at 9:00 Eastern time, 9:00 a.m. Eastern time. And we have several more subcommittee reports to go through.

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

And the ongoing public comment period, the general comment period, which opened March 12, 2019, will close at 11:59 p.m. Eastern time on May 1. So specific comments to today's meeting by March 27 to be most useful to the subcommittee, but you still have until May 1 for more general comments.

And then just to remind you that we also will have a meeting on the draft scientific report Monday, May 11. So again, we will convene tomorrow, and we'll be starting with, again, the

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cross-cutting working group. Hear from that working group, Dietary Fats and Seafood, Beverages and Added Sugars, and then have some Committee discussion around the next step and where we're going with the report.

So with that, I think we can adjourn.

Any, I'll just ask if there are any last comments from Committee members that you'd like to add at this point.

MEMBER MAYER-DAVIS: I'm just glad the technology worked, at least for the most part.

CHAIR SCHNEEMAN: For the most part it did, yeah, yeah.

MEMBER BOUSHEY: In the last case, unless something shuts down, you've got a problem, you're right, it works well.

CHAIR SCHNEEMAN: Yeah, okay, so I look forward to virtually seeing you all tomorrow.

(Whereupon, the above-entitled matter went off the record at 4:03 p.m.)

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