

## 2020 DIETARY GUIDELINES ADVISORY COMMITTEE

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## MEETING ON DRAFT ADVISORY REPORT

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WEDNESDAY  
JUNE 17, 2020

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The Dietary Guidelines Advisory Committee met via webinar at 11:00 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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## CONTENTS

Call to Order .....	4
Chair Remarks and Overview .....	7
Updates on Committee's NESR Systematic Reviews..	12
Human milk and/or infant formula and overweight and/or obesity.....	12
Seafood during pregnancy and neurocognitive development.....	23
Seafood during childhood and adolescence and neurocognitive development .....	24
Dietary fats and cardiovascular disease .....	26
Maternal diet and child food allergies and atopic allergic disease .....	37
Omega-3 fatty acid supplements during pregnancy and lactation and neurocognitive development.....	40
Dietary patterns and bone health and neurocognitive health.....	44
Diets based on macronutrient distribution: Growth, size, body composition, and risk of overweight and obesity; type 2 diabetes; cardiovascular disease; and sarcopenia.....	45
Alcohol and all-cause mortality .....	292
Outline of the Committee's Report .....	57
Discussion: Committee's Evidence-Based Advice to the Departments .....	60
Current Dietary Intakes Through the Life Course Regan Bailey, PhD, MPH, RD Chapter 1: Current Intakes of Foods, Beverages, and Nutrients .....	60

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Diet and Health Relationships: Pregnancy and Lactation	
Sharon Donovan, PhD, RD	
Chapter 2: Food, Beverage, and Nutrient Consumption During Pregnancy .....	80
Chapter 3: Food, Beverage, and Nutrient Consumption During Lactation .....	104
Diet and Health Relationships: Birth to Age 24 Months	
Kay Dewey, PhD	
Chapter 4: Duration, Frequency, and Volume of Exclusive Human Milk and/or Infant Formula Feeding .....	118
Chapter 5: Food and Beverages Consumed During Infancy and Toddlerhood.....	129
Chapter 6: Nutrients from Dietary Supplements During Infancy and Toddlerhood.....	145
Chapter 7: USDA Food Patterns for Children Younger than Age 24 Months.....	151
Diet and Health Relationships: Individuals Ages 2 Years and Older	
Carol Boushey, PhD, MPH, RD; Linda Snetselaar, PhD, RD; Regan Bailey, PhD, MPH, RD; Elizabeth Mayer-Davis, PhD, MSPH, RD; Timothy Naimi, MD, MPH; Steven Heymsfield, MD	
Chapter 8: Dietary Patterns .....	194
Chapter 9: Dietary Fats and Seafood .....	223
Chapter 14: USDA Food Patterns for Individuals Ages 2 Years and Older.....	238
Chapter 10: Beverages .....	256
Chapter 12: Added Sugars .....	266
Chapter 11: Alcoholic Beverages .....	300
Chapter 13: Frequency of Eating .....	323
Integrating Evidence and Future Directions ..	329
Next Steps and Closing .....	343

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

(11:04 a.m.)

OPERATOR: Good day everyone and welcome to the USDA 2020 Dietary Guidelines Advisory Committee Draft Report meeting. At this time, I would like to turn the conference over to Eve Stody. Please go ahead.

DR. STODY: Good morning. Yes, this is Eve Stody and I'm the Designated Federal Officer to the 2020 Dietary Guidelines Advisory Committee.

Welcome to the final meeting of the 2020 Committee.

Today's meeting will include discussion on the Committee's draft scientific report that they will finalize after this meeting and submit to the secretaries of USDA and HHS at the end of this month.

Similar to the Committee's last meeting in March, this meeting is being held by webcast and members of the public are joining in listen only mode. I do want to note though that if you any technology issues, please let us know using the box on the left of your screen, and our tech

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support will be monitoring the question box.

All 20 members are able to join us remotely for this meeting. I do want to note that Dr. Jamy Ard, Dr. Tim Naimi, and Dr. Jamie Stang will have periods of time where they are not available.

But they will join the discussion as much as possible. As always, we start the meeting by stating the charge to the Committee.

This Committee was established to examine the evidence for questions on diet and health identified by the Departments of Agriculture and Health and Human Services to develop a report that outlines their science-based review and advice to the departments.

And to submit the report to the secretaries of USDA and HHS for consideration as the departments develop the next addition of the Dietary Guidelines. This meeting was originally scheduled for May 11th with the Committee's report requested by the end of May.

We announced in April that the

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Committee's schedule was extended by one month in consideration of new demands due to COVID-19. We do want to note that we really appreciate the Committee's flexibility as well as the support team in extending the timeline of this process an extra month.

This meeting will be held today from 11 a.m. to 7 p.m. Eastern Time. I do want to note that there is a different webcast link for the session that starts today at 1:30 -- or excuse me, 3:30.

So we'll stay here where we are in this webcast link all the way up until about 3 p.m., and then we'll hop off for a break. And when you come back for that afternoon session starting 3:30, you'll be joining using a different link.

Now you should have received that link when you registered for the meeting but if you don't have it, you can also find it at [DietaryGuidelines.gov](http://DietaryGuidelines.gov). Dr. Schneeman will provide an overview of the agenda in her remarks that is also available on our website.

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We have members joining us today from across the country, from Boston, Mass to Honolulu, Hawaii. We also have over 1,000 people who have registered to attend the meeting.

Thanks for your flexibility in the timing of the meeting today. We shifted the meeting a little later in the day to try to accommodate our members on the West Coast and in Hawaii.

And in Hawaii, the current time is 5 a.m. But again, they're in Hawaii. So good morning to you from wherever you are joining us, and I'm now going to turn the meeting over to the Chair of the Committee, Dr. Barbara Schneeman.

CHAIR SCHNEEMAN: Great. Thank you, Dr. Stody. And let me add my welcome to this report meeting for the 2020 Dietary Guidelines Advisory Committee. The purpose of this meeting is to bring work to the full Committee for discussion and decision.

The meeting will begin with, this morning with updates on the Committee NESR

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systematic reviews. Most of these systematic reviews have been presented previously. We're providing an update from our last public meeting on these particular systematic reviews.

Most of our time today will be spent discussing our draft advisory report. The Committee will also discuss findings from food pattern modeling analysis in the context of the relevant chapters when discussing the report.

The Committee will finalize our advisory report using the discussion at this meeting and submit our final report to the secretaries of USDA and HHS at the end of the month.

As a reminder, over the past 15 months of our work, the Committee has been reviewing evidence to answer questions on diet and health using one of three approaches: data analysis, food pattern modeling and the NESR systematic reviews.

This slide includes a brief description of each of these approaches and we thought that would be helpful to review and to set the stage for today's discussion. The data analysis is a

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collection of analyses that use national datasets to help us understand the current health and dietary intake of Americans.

These data help make our advice practical, relevant, and achievable. Food pattern modeling, this analysis helps us understand how changes to the amounts or the types of foods and beverage in a dietary pattern might impact meeting nutrient needs across the U.S. population.

And the NESR systematic reviews are research projects that answer questions on diet and health by searching for, evaluating, and synthesizing all relevant peer reviewed studies.

And more information is available.

More information on these approaches was presented at previous meetings and is available at the [DietaryGuidelines.gov](http://DietaryGuidelines.gov) website. I should note that conclusions were made from each method that is used, but the advice is based on our approach with all three methods.

So the Committee made, in using these methods, the Committee made decisions, all

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decisions required on to develop the protocols that guided how each approach would be used to examine the evidence for each question, including establishing inclusion and exclusion criteria for the systematic reviews.

And outlining the request for food pattern modeling activity. USDA and HH staff provided invaluable support for implementing these approaches. But the conclusions reached are those of the Committee.

The final protocols and draft conclusion statements were posted in May at [DietaryGuidelines.gov](http://DietaryGuidelines.gov) where they remain available.

Please note that all of these conclusion statements are considered drafts until the Committee's final report is submitted.

So at Meeting 5, the Committee provided an update on our work including the NESR systematic reviews. Following Meeting 5, the subcommittees continued to work on their reviews and the NESR systematic reviews completed peer review, a very valuable addition throughout the process.

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And today we will provide updates on questions with new conclusion statements or when grade of a conclusion has been changed and allow for discussion by the members.

And the members are aware that they've had access to the draft conclusion statements and are currently reviewing the draft report. So as such, these updates will be kept brief on each question.

And that will be provided, well, we will provide an opportunity for questions or comments from the Committee members. So these are the topics that we will be going through for the NESR systematic review.

I'm not going to read through this whole list. Just know that these are the topics. And we'll highlight which topics are associated with which each presenter as we go through the updates from each subcommittee.

So the first presentation will be given by Dr. Kay Dewey on looking at the, using the Birth to 24 Month subcommittee review. And to focus on

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human milk and/or infant formula and overweight and obesity.

So Dr. Dewey?

MEMBER DEWEY: Thank you very much, Barbara. We presented a description of the approach we would use to synthesize this evidence at Meeting 5. So today we will briefly review that information and present our draft conclusion statement.

Given the abundance of evidence, we examined the most salient public health outcome, which is overweight or obesity. And we examined outcomes starting at two years of age due to uncertainty about how to interpret earlier outcomes.

We augmented our review of the most recent evidence between January 2011 and September 2019, with a review of, within family, sibling analyses from January 1980 to September 2019.

And these sibling studies helped to overcome residual confounding, which is pervasive in observational research. And it helps to do this

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because the siblings share genetic and environmental factors.

But to our knowledge, this is a novel contribution to the field. We specified six exposures of interest that align with some of the first feeding decisions that caregivers make.

Almost all of the evidence that met the inclusion criteria pertain to the first two exposures, forever versus never consuming human milk there were 30 articles that presented evidence from 21 independent cohorts including four studies with within family analyses of siblings.

For the duration of any human milk consumption among infants fed human milk, there were 21 articles that presented evidence from one cluster randomize control trial and 18 independent cohorts including four studies with within family analyses of siblings.

For the remaining exposures numbered three through six, there was little or no evidence.

And on the next slide, I'll present our conclusion statements for those exposures with the rest of

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the presentation devoted to the first two exposures.

In these conclusion statements, the exposures with scant or no evidence are shown in bold. For the first there was insufficient evidence and for the others there was no evidence thus all of these received a grade of grade not assignable.

Now I'll give a summary of the evidence synthesis for the first exposure ever versus never consuming human milk. The evidence had strong consistency, 14 of the 21 studies found significant associations.

And all of them indicated that ever compared with never consuming human milk is associated with a lower risk of overweight or obesity at ages 2 years and older. One study showed a marginal association in the same direction, and some of the remaining studies were under powered.

In five of seven studies that compared different durations of ever with never consuming human milk, for example, less than six months versus

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never or greater than or equal to six months versus never, longer durations were associated with significantly lower risk of overweight and/or obesity, but shorter durations were not. This suggests that longer durations of human milk consumption, for example more than six months are particularly important.

When we looked at those four key studies that conducted within family analyses of siblings, we found that one study reported a significant association in those analysis between ever versus never consuming human milk and the lower odds of overweight or obesity at 9 to 19 years of age.

The other three studies did not report significant associations and rather they tended to find that the significant associations found in the poll sample analyses were no longer significant.

This may be due in part to the much smaller sample size available for the within family analyses. However, in two studies it was clear that there was an attenuation of the estimated

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association that had been seen in the full sample analyses.

And this suggests that some of the association between never versus ever consuming breast milk and the lower risk of overweight and/or obesity is explained by confounding.

The evidence also had strong precision.

Most of the studies were sufficiently powered. I already mentioned that one study reported a margin association in the same direction and some of the remaining studies were likely under powered.

The studies were generally directly aimed at examining this relationship. And there was moderate generalizability, 11 of the 21 studies were conducted in the U.S., and these included samples that were nationally representative, had racial and ethnic diversity and included children from families with low income.

The remaining evidence, which was mostly from Europe may be less generalizable, because the U.S. may have a higher risk of overweight and obesity. In addition, most of the

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evidence was in children with fewer studies examining outcomes in adolescents and adults.

I've already discussed risk of bias with respect to the four studies that conducted within family analyses of siblings to reduce bias from confounding. However these studies were prone to other risks of bias.

For example, two of them asked mothers to recall how they fed their offspring during infancy when those offspring were between 4 and 18 years of age. And in two studies height and weight were self-reported by some participants or the outcome assessment methods were not described.

None of the remaining 17 studies controlled for all of the key confounders we identified in our analytical framework. In particular a few studies controlled for complementary feeding or childhood diet.

Because infant feeding can be strongly socially patterned, this raises a concern about confounding in this body of observational studies.

Our draft conclusion statement is that

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moderate evidence from observational studies indicates that ever compared with never consuming human milk is associated with a lower risk of overweight and obesity at two years of age and older, particularly if the duration of human milk consumption is six months or longer.

And now I'll go on to the evidence synthesis for the second exposure, the duration of any human milk consumption among infants fed human milk. And this evidence was inconsistent.

Five studies reported significant inverse associations and three studies reported significant positive associations. One study reported a significant association in the opposite direction at two and then at six years of age.

The remaining ten studies reported no significant associations with outcomes measured between 2 and 62 years of age. Four of the five studies reported significant inverse associations between duration and overweight and obesity.

And they were conducted in the U.S. And all three studies reporting significant

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positive associations were conducted in Europe. And this may explain some of the inconsistencies in the evidence.

It's possible that the association between the duration of any human milk consumption and overweight and/or obesity differs between the U.S. and Europe. For the within family analyses of siblings none of the four studies reported significant associations between duration of human milk consumption and this outcome.

A key study was the large cluster randomized controlled trial called PROBIT, which was conducted in Belarus and randomized hospital to an intervention to promote breastfeeding duration and exclusivity or to standard of care.

Infants in the intervention group had significantly higher rates of any human milk consumption than infants in the controlled group at 3, 6, 9, and 12 months of age.

However, the intention to treat analyses found a higher risk of overweight and/or obesity in the intervention group compared to the

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control group at 11.6 and 16 years.

So this highly inconsistent evidence also lacked precision. These studies did tend to be direct for generalizability, 7 of 19 studies were conducted in the U.S. and the rest in Europe including the cluster randomized trial.

Differences in obesity prevalence across these countries could limit generalizability. Most of the evidence was for outcomes in children. And for risk of bias there were similar strengths and weaknesses as mentioned for the exposure of ever versus never fed human milk.

So our draft conclusion statement for this exposure is that insufficient evidence is available to determine the relationship between the duration of any human milk consumption among infants fed human milk and overweight and obesity at two years of age and older.

And the available evidence was inconsistent therefore the grade was not assignable. And that's all.

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VICE CHAIR KLEINMAN: Thanks very much, Kay. This is Ron Kleinman and Barbara and I are going to tag team the questions on each of these areas. So the table is now open for a discussion. Are there any questions of Kay about what she's presented?

Okay. I see nothing in the chat, and I hear no questions. So shall we move on?

CHAIR SCHNEEMAN: Any comments? Any comments from anyone?

MEMBER MATTES: Actually, this is, this is Rick. I'd like to ask one. Is there any thought to why the European and the U.S. studies would vary?

MEMBER DEWEY: One possibility is that there may be a lower risk of overweight and obesity in Europe, so, you know, it's really hard doing the kind of analysis that we did to tease these differences apart.

And I think further work would be needed to try to understand if that might be the case.

VICE CHAIR KLEINMAN: Any other

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comments or questions? Okay.

MEMBER NOVOTNY: This is Rachel. And, can you hear me? This is Rachel Novotny.

VICE CHAIR KLEINMAN: Yes. Yes. Go ahead.

MEMBER NOVOTNY: I'm not real familiar with Belarus. Would you think that the children might have had a little baseline underweight status in Belarus? Or do you think that -- or was that well controlled for?

MEMBER DEWEY: Well, first of all, the --

MEMBER NOVOTNY: In other words was it more important to healthy growth there than it might be in some of our other countries.

MEMBER DEWEY: Well their actual metric status was fairly normal in Belarus. There was not a lot of underweight. But on that, with that said, there's probably a lot less overweight at the time the study was conducted than we experience today in the U.S.

But it's a, it was a relatively healthy

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population. The rates for example of diarrhea and other types of illness were quite low so that was not a constraint on growth in that setting.

MEMBER NOVOTNY: Okay. Thank you.

VICE CHAIR KLEINMAN: Any further comments or questions? Okay.

CHAIR SCHNEEMAN: Great. So I think we can move to the next presentation by Dr. Snetselaar on, from the Dietary Fats and Seafood subcommittee and topics include seafood, pregnancy in neurocognitive development.

Seafood during childhood lessons in neurocognitive development and then the dietary fat in cardiovascular disease. So Dr. Snetselaar?

MEMBER SNETSELAAR: Yes. Thank you, Barbara. This initial question was discussed during previous public meetings. We presented evidence and draft conclusion statements for three seafood reviews, each with multiple conclusion statements.

Since Meeting 5, we updated one conclusion statement related to the question what

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is the relationship between seafood consumption during pregnancy and/or lactation and neurocognitive development of the child?

The conclusion statement presented in March is shown above and the revised conclusion statement with red text indicating the changes is below.

The revised conclusion statement for the cognitive development domain is moderate evidence indicates that seafood intake during pregnancy is associated favorably with measures of cognitive development in young children and the grade here is moderate.

The revision narrows the focus of a conclusion to young children and changes the draft grade from limited to moderate because the evidence in young children was more consistently beneficial and is more approximately linked with maternal seafood intake during pregnancy.

We also revised two conclusion statements related to the question, what is the relationship between seafood consumption during

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childhood and adolescence up to 18 years of age and neurocognitive development.

In this and the next slide, the conclusion statement presented in March is shown above and the modified conclusion statement with red text indicating revisions is below.

The revised conclusion statement for the cognitive development domain is insufficient evidence is available to determine whether there is a favorable relationship between seafood intake during childhood and adolescence and measures of cognitive development in children and adolescent groups.

However, no unfavorable relationships were found between seafood consumption during childhood and adolescence and measures of cognitive development. And the grade here is not assignable.

Because the Committee's question did not focus on safety, the subcommittee chose to eliminate conclusions specific to detrimental effects and the word association was changed to relationship since results were derived from those

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randomized control trials and prospective cohort studies.

A similar revision was made in the conclusion statement focused on language and communication development.

And the revised conclusion is insufficient evidence is available to determine whether there is a favorable relationship between seafood intake during childhood and adolescence and measures of language and communication development in children and adolescent groups.

However, no unfavorable relationships were found between seafood consumption during childhood and adolescence and measures of language and communication development.

And the grade here is not assignable.

And again I want to emphasize the systematic review did not specifically focus on safety. Since Meeting 5, we added four conclusion statements related to the question, what is the relationship between types of dietary fat consumed and risk of cardiovascular disease.

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Here the focus was on -- excuse me. Here the focus was on endpoint outcomes and the characteristics of the body of evidence were described at Meeting 5.

There were a total of 94 articles, 90 from 47 different prospective cohort studies, four from three nested case control studies that examined types of dietary fat intake during adulthood and CVD endpoint outcomes.

Sixteen articles examined omega-6, polyunsaturated fatty acids. In these studies, associations between total omega-6 polyunsaturated fatty acid intake in adults and CVD were predominantly null.

In few articles that specifically assessed linoleic acid and arachidonic acid separately, beneficial associations were more often observed where linoleic acid compared to arachidonic acid in adults.

Eleven articles examined dietary cholesterol. Few articles with inconsistent results assessed the independent relationship

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between dietary cholesterol intake in adults and CVD endpoint outcomes, thereby further confounding meaningful conclusions.

Due to the co-occurrence of dietary cholesterol and saturated fat in animal sourced foods, disentangling independent associations between dietary cholesterol in adults and CVD endpoint outcomes in these observational studies is challenging.

The subcommittee's systematic review on dietary cholesterol found evidence consistent with current Dietary Guidelines. More details about these studies are provided in Chapter 9 of our report.

Draft conclusion statements regarding omega-6 polyunsaturated fatty acids and dietary cholesterol are as follows. Limited evidence suggests the intake of linoleic acid but not of arachidonic acid during adulthood may be associated with lower risk of cardiovascular disease, including cardiovascular disease mortality and the grade here is limited.

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Insufficient evidence is available from randomized controlled trials to quantify an independent relationship between dietary cholesterol intake in adults and overall risk of cardiovascular disease.

The grade here is not assignable. For evidence regarding types of dietary fat consumed during adulthood and CVD intermediate outcomes, there were a total of 97 articles of which 47 were from parallel randomized controlled trials

Forty-six were from crossover randomized controlled trials and five were from non-randomized controlled trials.

It's important to note here that one crossover designed randomized controlled trial was also analyzed as a parallel design randomized controlled trial. Studies were conducted primarily in the U.S. and a variety of countries across Europe.

Participants were predominately middle aged or older adults with overweight or obesity.

Studies examined the effects of types of dietary

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fat by providing foods that varied in fatty acid content. Twenty-eight percent of these studies were controlled feeding trials.

Regarding replacement of saturated fat, over half of articles pertaining to replacement of saturated fat with monounsaturated fat in adults reported a beneficial effect of monounsaturated fat intake on total and LDL cholesterol.

Most articles reported null effects on HDL cholesterol and triglycerides. Over half of articles pertaining to replacement of saturated fat with polyunsaturated fat in adults reported a beneficial effect of polyunsaturated fat intake on total and LDL cholesterol.

Most articles reported null effects on HDL cholesterol and triglycerides. Only two articles examined replacement of saturated fat with carbohydrates in adults and effects on blood lipids were mixed.

One study replaced saturated fat with refined carbohydrate whereas the type and source

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of carbohydrate in the other study was not reported.

This systematic review builds and expands on work from the 2015 Dietary Guidelines for Americans Committee.

And was broadly consistent with conclusions drawn by the 2015 Dietary Guidelines for Americans Committee. The 2020 Dietary Guidelines for Americans Committee concurred with and updated these conclusions regarding replacement of saturated fat with monounsaturated fat, polyunsaturated fat, or carbohydrates.

The conclusion statement for types of dietary fat during adulthood and CVD intermediate outcomes is strong and consistent evidence from randomized controlled trials demonstrates that replacing saturated fatty acids with unsaturated fats especially polyunsaturated fatty acids in adults significantly reduces total and LDL cholesterol.

Replacing saturated fats with carbohydrates, source not defined, also reduces total and low-density lipoprotein cholesterol

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but significantly increases triglycerides and reduced high density lipoprotein cholesterol.

Since the 2015 Dietary Guidelines Advisory Committee review, evidence remains inadequate to differentiate among sources of carbohydrates and their impact on blood lipids, and here the grade is strong.

Nine articles examined dietary cholesterol in adults and blood lipids. Most articles recorded null effects of dietary cholesterol on adults and specifically focusing on blood lipids.

Among the few articles that found significant results, higher intakes of dietary cholesterol significantly increased or reduced in higher levels total in LDL cholesterol.

In several studies it was not possible to isolate independent effects of dietary cholesterol and blood lipids due to simultaneous changes in the amount of fat or proportion of different types of fatty acids in the study diet.

And finally the conclusion statement

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for dietary cholesterol during adulthood and CVD intermediate outcomes is limited evidence suggests that lower intake of dietary cholesterol in adults may reduce total and LDL cholesterol. The grade here is limited and that concludes my update.

CHAIR SCHNEEMAN: Great. Thank you so much Linda. And so it's, we want to see if there's some questions or comments from Committee members on the updated NESR reviews? Any questions? Comments?

VICE CHAIR KLEINMAN: Yes. This is Ron Kleinman. In the, could we just go back to the previous slide? So here it says that most articles reported null effects and that there were only a few articles that found significant results.

So I'm wondering why you concluded that, in the following slide what you did. So flip to the next slide now.

MEMBER SNETSELAAR: And which slides are you referring to, please?

VICE CHAIR KLEINMAN: Yeah. So, yeah, so this conclusion with limited evidence suggests

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that lower intake of dietary cholesterol in adults may reduce total and LDL cholesterol.

But in the previous slide, you say that most of the studies actually don't show or reported null effects of dietary cholesterol. So I was just trying to reconcile the conclusion with which slide of the evidence.

MEMBER SNETSELAAR: Okay. And your concern is the term limited?

VICE CHAIR KLEINMAN: Yeah. Yeah.

MEMBER SNETSELAAR: Okay.

VICE CHAIR KLEINMAN: If there -- right.

MEMBER SNETSELAAR: Yeah

VICE CHAIR KLEINMAN: It seems as if, is it probably due that there was little to no effect or at least an inconsistent effect and so limited evidence that there is an effect is inconsistent.

But maybe I'm not following it the right way.

MEMBER SNETSELAAR: No. No. And I think in the slides that I will be doing this afternoon we go into much more detail in terms of

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the evidence. And we actually will be including some information from a study that was done, a longitudinal study that was done for 7.5 years.

And we'll be reporting a bit more evidence from that particular study. And I think that hopefully will answer your question as well.

CHAIR SCHNEEMAN: And Dr. Bailey, did you want to comment also?

MEMBER BAILEY: We also, Ron, this is Regan Bailey. We also built upon the 2015 Dietary Guidelines Advisory Committee which had a lot more than nine studies available.

So we were building from what had been done previously. And I think that you're right, Linda, when you present all of that totality together, it might make more sense.

VICE CHAIR KLEINMAN: Right.

MEMBER VAN HORN: And this is Linda Van Horn. Can you hear me?

CHAIR SCHNEEMAN: Yes.

MEMBER SNETSELAAR: Yes.

VICE CHAIR KLEINMAN: Yep.

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MEMBER VAN HORN: Hi. Just to offer one additional comment on this particular topic, and Linda's absolutely right. We're, you know, going to deal with that more directly later.

But I think, you know, it's probably relevant across all of our different chapters that there is variability across studies. And sometimes a study or a paper is especially meaningful because of its magnitude and its sample size and the power calculations that are available.

And as Linda pointed out, it was actually 17.5 years of longitudinal follow up across six different cohorts that provided new data that had yet to be evaluated that was published just recently in 2019. So not only were we building upon the 2015 review.

But this additional work that was just recently completed, thankfully during the time of our review, provided this additional, very strong research that offered additional detail that had not previously been evaluated.

So we'll go back into that later but

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it just, you know, I think all of our different subcommittees would agree that there are some papers, some studies, you know, that simply present the detail and the power calculations that sort of are worthy of additional consideration because of their size.

VICE CHAIR KLEINMAN: Yeah. That's very helpful. Thank you.

MEMBER SNETSELAAR: Thank you Regan and Linda.

MEMBER VAN HORN: Sure.

CHAIR SCHNEEMAN: All right. Any other questions or comments? Ron, do you want to --

VICE CHAIR KLEINMAN: Oh sure. So our next up is Sharon Donovan and she's going to address the question on maternal diet and food allergies and atopic allergic diseases. Sharon?

MEMBER DONOVAN: Thank you, Ron. And good morning everyone. So we presented the search results, evidence, and draft conclusion statements for maternal diet and atopic dermatitis, food

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allergies, allergic rhinitis and asthma at Meeting 5.

But we did not present all of the evidence and draft conclusion statements for asthma. Today we will briefly present the remaining evidence and draft conclusions for maternal diet and asthma.

Twenty articles from two RCTs and nine prospective cohort studies examined the relationship between maternal diet and risk of asthma in the child between 2 and 18 years of age.

Eight prospective cohort studies involving 16 articles examined diet during pregnancy, two RCTs and three articles examined diet during both pregnancy and lactation and one perspective cohort study, one article examined diet during lactation alone.

The studies examined maternal dietary patterns and avoidance and/or consumption of cow milk products, eggs, fish, soybean, peanuts, tree nuts, soy, so I see soybean is there twice, wheat and other foods not commonly considered as

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allergens.

This slide summarizes the evidence synthesis for asthma. So as you can see across the top are the different timing of exposures, so pregnancy alone, pregnancy and lactation, and lactation only.

And in the first column are the various food products. And as you can see there was, were only three foods in which we could generate conclusion statements and they were all limited, egg and fish were presented at Meeting 5 and today I'll be presenting on cow milk products.

Some of the reasons that we weren't able to grade were because of no or insufficient evidence. And some of the reasons for insufficient evidence were the very small body of evidence, usually two studies or less, heterogeneity in findings.

Serious flaws in the design and conduct of the study, limited generalizability of the findings to the U.S. populations. And the full conclusion statements can be found on

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So the conclusion statement for maternal cow milk products consumption during pregnancy and asthma is a limited evidence suggests that a lower consumption of cow milk products during pregnancy does not reduce the risk of asthma in the child.

So these findings are consistent with those of the American Academy of Pediatrics and other authoritative bodies that state that current evidence does not support a rule for maternal dietary restriction during pregnancy or lactation to reduce the risk of atopic diseases in the child.

So next I will present the second conclusion statement for today. So this is related to omega-3 fatty acids from supplements consumed before and during pregnancy and lactation in developmental milestones including neurocognitive development in the child.

So this is the description of the evidence. There were, as you can see, we looked at a number of outcomes. So for cognitive

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development there were 18 articles, five of the eight randomized control studies found a favorable effect of supplementation of omega-3 fatty acids during pregnancy on at least one outcome measure.

For language there were 11 articles, motor eight articles, visual five articles and socioemotional development 11 articles from nine RCTs. For this body of evidence, the findings were inconsistent.

All studies reported no effect on at least one measure, and the number and direction of statistically significant findings varied across the body of evidence. For academic performance, there was one RCT for attention deficit disorder and hyperactivity.

There were two articles from one RCT and for autism spectrum disorder there were two articles, one RCT and one prospective cohort study.

This summarizes the studies for exposures during pregnancy and lactation, and lactation alone.

So for pregnancy and lactation, you can see there were five articles for cognitive, one

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for language, three for motor -- whoops. I think I need to forward. And one for socioemotional development and these were from three RCTs.

So again there were few studies and inconsistent findings and although studies reported no effect on at least one measure, we found that the number and the direction of the findings varied across the body of evidence.

And for exposure to omega-3 study as a supplement during lactation, there was one RCT, it publishes two articles that combine cognitive language, motor, and visual development.

So this slide summarizes the evidence.

Again exposures across the top and the outcomes in the first column, and as you can see, the Committee was only able to grade one conclusion statement, which was related to omega-3 fatty acid supplements during pregnancy on cognitive development in the child.

So the conclusion is on limited evidence suggests that omega-3 fatty acid supplements consumed during pregnancy may result

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in favorable cognitive development in the child.

I can note that these conclusions are similar to that of a recent Cochrane review and meta-analysis by Middleton and Colleagues, which stated that very few differences between antenatal omega-3 LC-PUFA supplementation and no omega-3 were observed in cognition, IQ, vision, and other neuro developmental and growth outcomes.

We're not, basically we do believe that adequate omega-3 is important for brain development in utero. That's not disputed. However, you know, more studies are needed that are adequately powered.

But also take into account more of the maternal diet in respect to the HA and its precursors along with the inherent synthetic capacity to generate LC-PUFAs from their precursors.

So I believe that is the last statement on that and I'd be happy to take any questions.

VICE CHAIR KLEINMAN: Thanks very much, Sharon. Are there any comments or questions about either of the discussion points that Sharon

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presented? No other comments? Okay.

MEMBER DONOVAN: Okay. Thank you.

CHAIR SCHNEEMAN: Okay. So we -- great. Thanks, Sharon. We can move to the Dietary Patterns subcommittee and Dr. Boushey will talk about dietary patterns and bone health, diets based on macronutrient distribution, several outcomes will be looked at with that. So Dr. Boushey?

MEMBER BOUSHEY: Hi. Thank you, Barbara. So at Meeting 5 a draft conclusion statement and grade was presented for dietary patterns in children and bone health. Today we present a draft conclusion statement for the evidence related to bone health in adults.

I have to get use to the clicker. This systematic review update included seven population cohort studies published between January 2014 and November 2019 that examined dietary patterns in adults and bone health.

All studies examined risk of fractures, mainly hip in older adults. The evidence consistently showed that healthier dietary

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patterns were associated with reduced risk of hip fractures.

The studies were generalizable, had few risks of bias and had large analytical sample sizes with a sufficient number of hip fracture cases. So, the conclusion statement dietary patterns, adults:

Moderate evidence suggests that a dietary pattern higher in vegetables, fruits, legumes, nuts, low fat dairy, whole grains and fish, and lower in processed meats, added sugar and sugar-sweetened beverages is associated with favorable bone health outcomes in adults, primarily decreased risk of hip fracture.

And the grade for adults, moderate. Status relative to existing review, this update builds upon the conclusion drawn by the 2015 Committee which determined that limited evidence suggests a relationship between dietary patterns and bone health in adults.

Also at Meeting 5, we did not fully report diets based on macronutrient distributions.

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And so that is what we will now provide an update on. This systematic review included 47 articles that examined diets based on macronutrient distribution in adults.

Most enrolled participants were overweight or obese or had features of metabolic syndrome. The majority of randomized controlled trials reported no significant effects of macronutrient distributions on intermediate cardiovascular disease outcomes, for example, blood pressure.

Many of the prospective cohort studies reported no significant associations between macronutrient distributions compared and risks of cardiovascular disease. Of those reporting significant associations, the macronutrient distributions compared and the direction of findings on CVD outcomes varied.

Limitations include inconsistent magnitude of the effects reported, risk of bias, macronutrient distributions that associated with favorable CVD outcomes typically came from diets

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with higher relative to poor diet quality overall were reported.

So, our draft conclusion statement, diets based on macronutrient distribution, children:

No evidence was available to determine a relationship between diets based on macronutrient distribution consumed in childhood and concurrent or future development of cardiovascular disease.

Diets based on macronutrient distribution adults: Limited evidence suggests non-energy-restricted diets based solely on macronutrient distribution with either carbohydrate, fat, and/or protein proportions outside of the acceptable macronutrient distribution range are neither beneficial nor detrimental regarding risk of cardiovascular disease in adults primarily among those at high risk such as those with overweight, obesity, or features of metabolic syndrome. So the grade was limited; and for children the grade was not assignable.

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At Meeting 5, the draft conclusion statement for dietary patterns consumed in risk of type 2 diabetes was not presented in children -- or was not presented. And so today we'll go over that evidence.

This systematic review included 23 articles that examined diets based on macronutrient distribution in adults. Although foods or food groups consumed were not reported consistently.

Studies that did provide that context tended to examine diets with higher amounts of saturated fats, trans fats, and/or animal-based sources of protein and fat, such as processed meat, red meat, butter and cheese.

As well as refined grain, sugar-sweetened beverages, lower fiber cereals and bread. Limitations include studies rarely compared a different distribution of macronutrients within the context of a constant dietary pattern.

Studies made several risks of, had risks of bias. Macronutrient differences between

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exposure groups were limited in magnitude in a similar direction, for example, all arms below that AMDR modestly different from the AMDR were only relevant for a subset of the population.

So our conclusion statement, diets based on macronutrient distribution, children:

No evidence is available to determine a relationship between diets based on macronutrient distribution consumed during childhood and risk of type 2 diabetes.

Diets based on macronutrient distribution, adults:

Insufficient evidence is available to determine the relationship between macronutrient distributions with proportions of energy falling outside of the acceptable macronutrient distribution range for at least one macronutrient, and risk of type 2 diabetes due to methodological limitations and inconsistent results.

So for children, the grade was not assignable. For adults, the grade was not assignable.

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Next, what is the relationship between dietary patterns consumed and growth, size, body composition and risk of overweight and obesity? Again, a conclusion statement that we hadn't completely finished during, at Meeting 5.

This systematic review included 31 articles that examined diets based on macronutrient distribution in adults. Several studies included participants with and without overweight, obesity, or features of metabolic syndrome.

Most of the articles compared macronutrient distributions that generally compared poor quality diets to higher quality alternatives. Limitations were studies rarely compared different macronutrient distributions within the context of a constant dietary pattern.

Most of the clinical trials compared diets to a different dietary pattern, either prescribed as a study intervention or as usual intake. Studies had several risks of bias.

The difference in macronutrient proportions between exposure groups were either

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limited in magnitude of a similar direction relative to the acceptable macronutrient distribution range only moderately different from the acceptable macronutrient distribution range, or only relevant with a limited subset of the study population.

For our conclusion, our draft conclusion statement, diets based on macronutrient distribution children.

No evidence is available to determine a relationship between diets based on macronutrient distribution consumed during childhood and growth size, body composition, and risk of overweight or obesity.

Diets based on macronutrient distribution adults. Insufficient evidence is available to determine the relationship between macronutrient distributions with proportions of energy falling outside of the acceptable macronutrient distribution range for at least one macronutrient and growth size, body composition, and risk of overweight or obesity due to

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methodological limitations and inconsistent results.

So the grade for children, grade not assignable. For adults, grade not assignable. And now for the next, for the next parts of this report, I'm going to change over to Dr. Steven Heymsfield.

And he'll cover the remaining areas of the dietary patterns update. So is everything good with the switching over?

MEMBER HEYMFIELD: Sure.

MEMBER BOUSHEY: Steve?

MEMBER HEYMFIELD: Yeah. Thanks very much, Dr. Boushey. This review will discuss the macronutrient distributions and risk of sarcopenia.

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

And the previous review included four

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prospective cohort studies. This specific presentation on macronutrient distributions will focus on two of those four prospective cohort studies.

In both of these studies, the percent of energy from fat was reported as above the AMDR.

And these studies included a number of limitations. The same sizes were relatively small and had very few cases of sarcopenia.

There were also several risks of bias such as the lack of adjustment for all potential confounders and potential for selection bias due to enrolled participants likely representing healthier individuals.

The studies were also inconsistent in how dietary intake was assessed and the results were, that were reported.

And that brings us to our conclusion statement that diets based on macronutrient distribution, there's insufficient evidence available to determine the relationship between diets based on macronutrient distribution and

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sarcopenia.

And therefore, we concluded that grade was not assignable. I'll move on to the next report then, which is dietary patterns in neurocognitive health. And just as a reminder, at Meeting 5, a description of the evidence was presented for this question.

The slides that I'm about to show you present a summary of evidence in draft conclusion statement for dietary patterns and neurocognitive health.

This is an update to an existing systematic review and includes 26 articles including randomized controlled trials, cohort studies, and nested case control studies.

Dietary patterns were examined using various methods, for example indices or scores factor, a cluster analysis, and a variety of other methods and include articles examining dementia, cognitive decline, cognitive impairment, and cognitive function.

The majority of significant findings

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reported healthier dietary patterns consumed during adulthood were protective in either improving measures of cognitive impairment and/or reducing the risk of cognitive impairment or dementia.

Studies with non-significant or mixed associations suggest these healthy dietary patterns did not worsen cognition. Now there were a number of limitations identified as shown including a general lack of randomized control trials, risk of bias.

And considerable variation across the body of evidence particularly in the methods used to test and report cognitive impairment.

And that brings us to our conclusion statement that limited evidence suggests that dietary patterns containing vegetables, fruits, unsaturated vegetable oils and/or nuts, legumes, and fish or seafood consumed during adulthood are associated with lower risk of age-related cognitive impairment and/or dementia.

And we assigned this grade limited.

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Just as a reminder, this update concurs and builds upon the conclusion drawn by the 2015 Committee, which conducted a systematic review that identified 30 articles from a wide range of study designs using different methods to measure neurocognitive outcomes but reduced relatively consistent findings.

Okay. Thanks very much. Happy to take any questions.

CHAIR SCHNEEMAN: Great. So if there are any questions for Dr. Boushey and Dr. Heymsfield or comments? Any questions or comments? Okay.

MEMBER BOUSHEY: Well thank you very much.

CHAIR SCHNEEMAN: Thank you to both of you for the presentations and the work of the subcommittee.

MEMBER HEYMFIELD: Thank you, Barbara.

CHAIR SCHNEEMAN: And is Dr. Naimi available? I know we had a bit of a time juggle, so I just wanted to check if he's available.

OPERATOR: We do not have Dr. Naimi.

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CHAIR SCHNEEMAN: Great. Okay. So what we'll do with Dr. Naimi's subcommittee report, it's an important update on alcohol and all-cause mortality, we'll just move that into the afternoon so that there will be the opportunity to get that update before we go into those specific chapter reviews.

So I just want to check and make sure, at this point are there any other comments or questions or things that Committee members would like the subcommittees to expand upon or provide more information on based on these updates? Okay.

Everyone's good to go. Great. So my next is to introduce the outline for the Committee's report to set up for the review of the chapters that we'll be spending the rest of our time going through.

And just to remind you all, this is organization of the Committee's report, which was discussed at Meeting 5 and remains the same.

In today's discussion, we'll be focusing on two sections, which contain the

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Committee's advice to the departments on the, for the Dietary Guidelines, Part B, Integrating the Evidence and Part D, the Evidence on Diet and Health.

And this section, Part D, contains 14 chapters. The first chapter discusses dietary intake through the life course including discussion about the nutrients of public health concern.

And the remaining chapters are organized by life stage, pregnancy and lactation versus 24 months, and individuals 2 years and older.

So for today's discussion, we'll provide an overview of each chapter and this is the template for the chapters, with the discussion really focusing on the Committee's evidence-based advice to the departments, which is generally found in the summary section of the respective chapter.

I think it's important to note that the speakers are going to be provide a summary of their chapters. And as you can imagine there will be many more details in the Committee's report.

But the presentations will summarize

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the Committee's advice for our discussion today.

So informing this advice, it's important to understand that the committees have looked across all of the conclusion statements.

I noted earlier that each method results in a conclusion statement but now we're looking at the totality of the scientific evidence to develop advice based on the evidence for USDA and HHS to consider as the Departments develop the 2020-2025 Dietary Guidelines.

So the chapters are the opportunity to integrate the evidence across these three methods.

So today's discussion will include presentations for each of the 14 science-based chapters.

We'll plan to take some brief breaks between life stages and we're aiming for a break around 1 p.m. and one around 3 p.m. But those times may be adjusted based on the presentations.

And of course we plan to adjourn at 7 p.m. Please note that we will need to move to a new webcast link at 3:30. So one way or another, we will have a break in that time period.

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Otherwise, all the times are tentative, and we'll just keep adjusting to allow for Committee presentation and Committee discussions. So with that we will start with the first presentation on current dietary intakes through the life course.

Dr. Regan Bailey will be giving that for Chapter 1. Great.

MEMBER BAILEY: Are you ready for me? Okay. Hi, everyone. Can you hear me okay?

CHAIR SCHNEEMAN: Yes.

MEMBER BAILEY: Great. So this is subcommittee 7, Data Analysis and Food Pattern Modeling. And we had five questions, which we've reviewed at each of our meetings. So today I'm just going to provide a really high-level overview of our findings and recommendations.

So unlike the other subcommittees where the number of papers reviewed can be counted, our work differed in many ways. We have several draft conclusion statements for each of the five questions.

We examined more than 150 reports and

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results from requested data analysis from multiple Federal monitoring and surveillance systems.

The dietary data we analyzed or -- we didn't analyze it, but we reviewed it, reflects the most current ending cycles available but for certain population subgroups multiple cycles had to be combined.

And this was especially true with the birth-to-24 population subgroup, as well as women who are pregnant and lactating. All of the data we had available to us were cross-sectional in nature and also observation.

So it limits our ability to infer causality, but does provide a rich description of the American dietary landscape. And again, unlike other subcommittees, while we provide conclusion statements for our questions and our responses, these conclusion statements are not graded.

But we do take into consideration the strength and limitations of the analysis when making the conclusion statements. So as Dr. Schneeman already introduced, the one portion of

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this group is data analysis.

And I will be summarizing those for you today. Most American's have one or more chronic health conditions that are related to the dietary intake across the life course.

Including overweight and obesity, heart disease, stroke, type 2 diabetes, hypertension, liver disease, certain types of cancer, dental caries, and metabolic syndrome.

In many instances, overweight and obesity may be the earlier manifestation of energy and balance and poor nutritional status. In many of the chronic conditions that we examined, developed as a consequence of overweight and obesity.

Given that most Americans are overweight or obese this is obviously quite concerning. In general, chronic health conditions have become more prevalent over time and are highest among older adult populations, racial and ethnic minority groups, and those with lower income levels.

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Racial variation exists for almost all health conditions this Committee examined including during pregnancy. I'll provide just a few quick examples.

While Asian Americans have a lower prevalence of most chronic health conditions examined in general, pregnant Asian women had the highest prevalence of gestational diabetes.

Lower birth weight is highest among non-Hispanic blacks and it is the highest level in more than 25 years. Chronic liver disease is highest in American Indians and Alaskan natives and continues to increase over time.

The American dietary landscape has not or changed appreciably over the last decade. Patterns of food group intake across the life course contribute to higher than recommended intakes of added sugar, sodium, and saturated fat.

Whole grain intakes remain extremely low across the population. Intakes of fruits and vegetables are lower than current recommendations with most Americans consuming less than one cup

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of whole fruit per day.

Less than half of vegetables are consumed alone or as a distinct raw or cooked portion, meaning that they are largely being consumed when incorporated into another type of food, like snack foods or as a part of a mixed dish.

In terms of the life stage approach that our group took, I'll first present data on pregnancy and lactation. While the HEI scores of women who are pregnant or lactating is higher than women of similar ages, many dietary deficits were noted.

Very limited biomarker data that is national in scope is available to adequately describe the nutritional status of pregnant and especially lactating American women.

Biomarker data suggests that iron and iodine are of concern during pregnancy and given the severity of narrow tube defects, we must remain vigilant on folic acid intakes among reproductive aged females, especially prior to conception and during the first trimester.

Looking now at older infants, we

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examined food behaviors, as well as dietary intakes and we did this stratified by primary mode of feeding.

The American Academy of Pediatrics recommends introduction of complementary foods and beverages at about six months of age when infants are developmentally ready. Our national data suggests that most infants are introduced to complementary foods and beverages prior to six months of age.

The mode of feeding is also related to the timing of introduction, in that infants receiving infant formula are introduced earlier to complementary foods and beverages as well as the types and amounts of foods that are reported as we have discussed at a previous meeting.

So in terms of identifying nutrients or food components of public health concern, iron has been identified in infants who are human milk fed.

While protein and zinc are also low relative to referenced standards in human milk fed

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infants, the estimates are not supported by biochemical, clinical or health consequences to date, but should continue to be monitored.

These are the three food components for which we have an EAR value in this life stage. Relative to the adequate intake, older infants have low intakes of potassium, vitamin D, and choline.

And those could be enhanced by the inclusion of fruits, vegetables, cheese, yogurt, eggs, and legumes during the transition from milk-based to table food feedings for all infants.

And for infants who are primarily fed infant formula or mixed fed, some infants had dietary intakes of zinc and retinol that were above the upper tolerable intake recommendations.

So moving on to toddlers, so during the ages of 12 to 24 months, a rapid devolution occurs in terms of meeting recommendations. This is generally when a child is exposed to foods consumed by parents and caregivers.

During the time between infancy and toddlerhood, large increases in added sugars and

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saturated fats are observed. Patterns of food group intakes and sources of food groups among toddlers are similar to that of the U.S. population, two years and older.

This is one of the critical life stage periods that our work has identified. In terms of nutrients of public health concerns for this age, low intakes of potassium, fiber, and vitamin D are of concern, as well as high intakes of sodium and added sugar.

Nutrients for which special challenges were identified include choline and linoleic acid.

These nutrients are under consumed and are found in foods including eggs, nuts, seeds, and meat that are generally not consumed in high amounts by many toddlers.

Choline and linoleic acid were low relative to the AI, but we lack biomarker or clinical data to know if these food components should be evaluated for public health concern.

So moving on now to the data that we examined for all Americans, two and older, which

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has been the focus of the Dietary Guidelines for Americans since their inception. Here are the data to support my previous statement that the dietary intakes of Americans have not changed much over the previous decade.

There's been a change from 56 to 59 in terms of the HEI score. So not currently nor have Americans ever had dietary intakes that are aligned with the Dietary Guidelines.

So many of the same food components of public health concern that have been identified in previous Committees remain, including vitamin D, calcium, fiber and potassium, sodium, saturated fat, and added sugar.

We also noted in addition to those food components on the previous slide that the pre-teen and adolescent age group had a low intake across many different nutrients. So while those nutrients themselves may not be a public health concern individually.

It's the constellation of low intakes across many nutrients in this age group that is

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of concern. While older adults have a higher HEI score relative to other age groups, additional concerns were observed including low protein and low intakes of B12 and B6.

Given that osteoporosis and sarcopenia are so prevalent, developing nutritional strategies to mitigate risk is especially salient especially among women. In the next few slides I will mention research needs and data gaps that we identified in our work.

First while we took this life stage approach, life stage is not clearly defined at the Federal level and national survey data have different sampling age groups than the dietary reference intake age groups.

And terms like child, adolescent, adult, and older adult are inconsistently defined.

For birth to 24 months age group given that this is the first Committee to address this life stage, there will need to be a Healthy Eating Index or other metric to evaluate if, dietary exposures.

Additionally for the existing HEI, and

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we'll need an additional method to examine some of the questions. So for example, one of the questions we were looking at was how much added sugar could be accommodated in the diet.

We couldn't look at the Health Eating Index scores of people who had high or low added sugar and compare the HEI scores because added sugars is of course a component of that calculation.

Next, we know what most Americans are not doing. They're not following the Dietary Guidelines, but we don't know what their patterns are. So NHANES data used to collect information on self-selected dietary patterns such as vegetarianism, but that is no longer being conducted.

So we largely do not know what patterns current exist. Data from the IFIC food and health survey suggest that 43 percent of Americans follow a specific diet or eating pattern in the last year.

So as I've alluded to ad nauseam throughout this process, the last point I want to make is the absolutely lack of data available for

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certain population subgroups, including birth to 24 months, pregnancy and lactation, and among some race, ethnic groups.

Biomarker data that are current and national in scope are needed to adequately describe the nutritional status of Americans, particularly those who are underrepresented.

At some time our Committee had to utilize biomarker data from NHANES 2003 through 2006 in making some of our decisions. Changing gears completely, but still complaining, certain issues have been included sporadically in the Dietary Guidelines and while not covered by this Committee, should be represented in public health messaging.

In some cases these topics may reflect links related, links to related areas that are relevant to the diet and nutrition, things like food safety, oral health or physical activity, or other cases may reflect nutritional issues that remain of public health importance.

But don't need additional input from

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the Advisory Committee because of existing current input from other authoritative sources, so things like trans fat and reducing sodium intake.

Identifying such a process would maintain the integrity of the Dietary Guidelines while enabling the Advisory Committee to focus this attention on novel topics of the highest priority for scientific review.

I think Dr. Dewey will mention, and we've talked about this before, but we need a database of human milk that is updated. So currently we have a human milk database that is in legacy status.

Some of the values in that database are derived from a small number of hyperproducers of human milk, while others are estimated from cow's milk. I think that we could argue that most lactating women are neither hyperproducers nor cows so it stands to reason that, that should be of highest priority.

And that's a complicated ask because the composition of human milk changes for some

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nutrients in response to maternal diet and is also variable depending on the age of the infant.

So it's not an easy challenge to overcome. And then finally, we really need update Dietary Reference Intake values especially for infants and young children to best characterize potential risk for dietary inadequacy and excess.

And as I mentioned for some infants, or the age of infants, there are only three EARs available to make conclusion of whether or not there is dietary risk. And then finally, many Americans may need support and tools and strategies to help manage weight, analyze and plan their diets.

USDA historically provided SuperTracker, which was used by both the lay public and the research communities, but it has been discontinued. So technology that aid behavior change and menu planning are likely needed to help individuals follow the Dietary Guidelines.

So finally to summarize, diet is a modifiable factor that is critical related to the primary and secondary prevention of most

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noncommunicable diseases and the leading cause of disability and death affecting Americans.

Dietary intake is an important determinant of body weight and risk of overweight and obesity. Overweight and obesity begin early in life and remain public health problems in all age groups.

So we know that the diet is quite complex and has implications for the risk of disease, both in the moment and later in life, but this is quite difficult to quantify.

So in order to both encourage and facilitate healthier diets, the focus should not only be what Americans are eating, but also the social economic and environmental context that determine our dietary patterns.

These contexts also drive diet and health disparities that exist in the United States.

In addition to establishing optimal dietary patterns early in life, efforts should continue to ensure energy balance early in life and maintenance of that energy balance over the life

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course.

We still lack an apparent understanding about how food security status relates to dietary intakes, as was first mentioned by the 2015 Dietary Guidelines Advisory Committee, but still remains largely unknown.

Future committees may wish to examine optimal nutritional strategies for the prevention of cognitive decline in older adults as well as osteoporosis and sarcopenia, which I previously mentioned.

And finally, the how of it all. We know what we think Americans should do, what they should eat, how they should exercise, but how do we get people to engage and how do we encourage them to do it?

We need help from behavioral experts and multi-factorial approaches to solve the complex issue of poor diet quality in America. Americans need to make shifts in their diet that do not add calories.

But make substitutions with more

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nutrient-dense foods and beverages for the most part. The Committee also recommends that the next iteration of the Dietary Guidelines provide very specific messaging to consumers around beverage intake with a focus on sweetened beverages and alcohol.

So I'd like to thank the subcommittee members, as well as the outstanding Federal staff who supported this work. Chapter 1 culminated to a 98-page document that further expounds on this very high-level presentation that I gave today.

So thank you very much for your time and attention.

CHAIR SCHNEEMAN: Great. Thank you very much, Regan. So are there questions or comments from the Committee members?

MEMBER MATTES: This is Rick. Regan, could you comment? The analysis that was done was very much nutrient or food component oriented, but there are other patterns that one could consider, cultural patterns, temporal patterns and so on.

Can you comment on the level of priority

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you think future committees should place on other dimensions of patterns?

MEMBER BAILEY: Yeah. I think from some of the work on your Frequency of Eating committee, there's, there's not a lot that is known in terms of when people are eating, intermittent fasting, time restricted eating.

The way that the data are captured in a 24-hour recall, we can't always make such inferences. So I think we might have to build new tools into a 24-hour recall to get at some of those kinds of issues.

I think a primary focus really needs to be behavioral, I think and structural. There's, there's a lot of barriers and I think the focus has to be on how to support and enable people to make better choices or, and often times they're not choices.

They're just issues of access. So I'm not sure that I answered your question exactly but --

MEMBER MATTES: No. I think that's

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relevant, very relevant. Thanks.

CHAIR SCHNEEMAN: Others have questions or comments?

MEMBER BOUSHEY: Hi, Regan, this is Carol Boushey speaking. And I really appreciate this insert that your group did with SuperTracker.

Interestingly enough, it's one of the, a big feedback that I've received from a number of people.

And, you know, we don't, and what happens that, you know, because it was from the government, you know, people really thought that it was, you know, for them, and that they, you know, used it as a really credible source.

So that was, I appreciate that you brought that up in your group.

MEMBER BAILEY: Thanks. Can I --

MEMBER VAN HORN: This is Linda Van Horn. Oh, sorry. Go ahead.

MEMBER BAILEY: No. Please go.

MEMBER VAN HORN: I would just like to echo what Carol said. I too have had many people express some disappointment of not having access

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to a simple diet assessment tracking tool.

And I think, you know, especially even starting as young as childhood, the ability for Americans to truly have the chance to monitor what they're eating and we're all aware of apps that exist now that try to do that.

But if there was a, you know, universally available, simple tracking tool that would help people to adhere to the recommendations that we're making, and also, you know, provide potentially additional data to help monitor what people are eating.

That could go a long way as far as improving adherence to the recommendations in a manner that was more standardizable and consistent to allow future Dietary Guidelines committees to, you know, look at both sides of these questions.

MEMBER BAILEY: Yeah. I agree.  
Thank you.

CHAIR SCHNEEMAN: So I'm going to go ahead and, I think we have one more presentation that we'd like to do before the, before the break.

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But do we have Sharon Donovan's slides?

MEMBER DONOVAN: Yes. I'm ready.

CHAIR SCHNEEMAN: Okay. Great.

MEMBER DONOVAN: I'll do --

CHAIR SCHNEEMAN: I think if we can do that before the break, it'll help with the timing.

So --

MEMBER DONOVAN: Okay. Perfect. Okay. Well thank you very much. It's my pleasure.

I'll be presenting two chapters which are new to the Dietary Guidelines process.

The first will be pregnancy and then I'll be presenting on lactation as well. This is the subcommittee members for the pregnancy and lactation committee, but the evidence that I'll be summarizing today was generated by pregnancy and lactation beverages and added sugars, dietary fats and seafood, and frequency of eating.

So I just want to set a little bit of the stage and a comment that we have in the report is that we often times think about pregnancy as a 40 week, you know, distinct period of time.

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But I think if we look at a lifespan approach to Dietary Guidelines, it's becoming quite clear that a woman's nutritional and health status prior to pregnancy influences outcomes, how well that pregnancy proceeds influences not only as a child's health but lactation and subsequent pregnancies and longer term health.

So I think the concept of pregnancy and lactation should really be considered within a lifespan and we should really be considering the health of the mother prior to, during and after pregnancy.

So the other thing to keep in mind is that pregnancy induces physiological metabolic changes and that these can predispose some women to developing life threatening conditions such as gestational diabetes and hypertensive disorders.

And that these can also then predispose our mother to developing diabetes and hypertension later in life. We also know that excessive gestational weight gain, so outside of the IOM recommendations is relatively common particularly

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in women with a high pre-pregnancy BMI.

And that the retention of that excess body weight postpartum places that woman at higher risk for chronic diseases and subsequent pregnancies in later in life.

So from the infant perspective, you know, putting this within these, that first 1,000 days or developmental origins, we now know that those in utero and early life exposures are critically important for developing metabolic, risk in metabolic diseases and their degenerative disorders.

So really focusing on the mother's health beginning at conception, continuing through the second year of life is critical to ensuring this optimal physical, social, and psycho motor growth and development.

And again as Barbara mentioned at the beginning, this is really the first addition the Dietary Guidelines that's taking that lifespan approach and with the pregnancy and lactation and then the B to 24, we're really encompassing those

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first 1,000 days of life.

So the previous, the 2015 Dietary Guidelines Committee included some discussion of nutrients, the public health concern, the pregnant, lactating women were considered in the over age two.

But this is really the first time that we're really taking a deeper dive into specific relationships between food and beverage patterns and micronutrients during pregnancy.

And both maternal and fetal outcomes that affect large groups of women and their children. So we had 11 questions that we addressed. And as I mentioned, these were addressed by several different subcommittees.

So consistent with the Dietary Guidelines there was a large focus on dietary patterns. So we looked at dietary patterns and through pregnancy and the risk of gestational diabetes, hypertensive disorders during pregnancy, gestational weight gain.

We also look at frequency of eating on

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gestational weight gain and dietary patterns on gestational age at birth. We then also looked at the relationship between dietary patterns consumed during pregnancy on birth weight, beverage consumption on birth weight.

And then looking at maternal diet during pregnancy and the child's risk of food allergies and atopic diseases including atopic dermatitis, allergic rhinitis, and asthma. We examined seafood consumption and neurocognitive development in the child, which was presented earlier today.

And then we also looked at omega-3 fatty acids from supplements on neurodevelopmental outcomes in the child.

And then we were able to examine also folic acid from supplements on a number of different outcomes including maternal micronutrient status, gestational diabetes, hypertensive disorders, human milk composition, and neurocognitive development in the child.

So I would like to mention that four

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of the systematic reviews included in this body of evidence, which examined the impact of dietary patterns during pregnancy on maternal and birth outcomes were undertaken by the USDA and HHS as part of the Pregnancy and B-24 project.

These were published in the American Journal of Clinical Nutrition in 2019 and were adopted by the 2020 Guidelines Committee. We also then, the remaining questions were answered by new systematic reviews.

So we generated 65 draft conclusions across the 11 questions. There were over 160 articles representing 110 studies in the new systematic reviews and 51 articles representing 38 studies and existing reviews.

We were able to make conclusion statements graded from strong to grade not assignable. But I want to point out that we were unable to grade the evidence for most. So almost 70 percent of the conclusion statements were due to insufficient evidence.

And I will give you a heads up that this

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is even worse for lactation. So I think as Regan mentioned about not having good surveillance data in pregnant and lactating and B-24.

The evidence space for us to draft robust conclusions was also, requires much additional research and we've noted those gaps and made suggestions in the report. So since we had so many questions, I just wanted to quickly over the next three sides, just remind you of what the questions were and what were our summary conclusions.

So for dietary patterns and GDM, we were able to have a grade of limited for dietary patterns before pregnancy and risk of GDM. We looked at dietary patterns in hypertensive disorders.

We were able to have a grade of limited for diet before and during pregnancy but only in healthy White women, not in other races and ethnicities. And for dietary patterns during pregnancy and gestation weight gain, there was a grade of limited for during pregnancy.

I wanted to point out for question 4,

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which was the frequency of eating, there was no evidence available for dietary patterns before and during pregnancy and gestational age at birth, during pregnancy there was limited data for improvement.

And then looking at these last two, so dietary patterns and birth weight, we were unable to make a conclusion. And beverage consumption, there was insufficient evidence for any of the beverages.

So this basically are all of the atopic outcomes that we looked at maternal diet. And you can review the various, or dietary patterns as well as milk products. But what I want to mention is that for all of these, all of the evidence showed no relationship or no reduction in risk.

So there was no evidence to suggest that maternal consumption of any of these dietary components increased the risk of these atopic diseases in the offspring.

So as I mentioned earlier, this is consistent with American Academy of Pediatrics and

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other bodies which suggest that women who are pregnant consume healthy varied diets and not restrict their intake of specific foods.

In terms of seafood consumption, there was favorable for, during pregnancy for cognitive development. And also language and communication, this was moderate, and this was limited.

Omega-3 supplements during pregnancy, again favorable for cognitive development with a limited. And then among the four outcomes we looked at for folic acid supplementation, this was really our only strong conclusion.

That maternal folate supplementation improved maternal folate status which as Regan mentioned, may be important for prevention of neural tube defects.

And that for hypertensive disorders we found limited evidence that if the folic acid supplement is consumed early in pregnancy by high risk women that it would reduce the risk. There was no benefit for low risk women.

So turning to summarizing the data, we

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found that certain dietary patterns were associated with a modest risk reduction for excessive gestational weight gain, gestational diabetes, hypertensive disorders, and preterm birth.

So again, these are all very important outcomes for maternal and child health. It's also important to note that the components of these dietary patterns align with dietary patterns associated with lower overall chronic risk in women who are not pregnant and lactating.

So again, looking at this life cycle approach that potentially the recommendation were making women of reproductive age would be consistent during pregnancy as well.

So this shows the dietary, the foods that higher consumption of these foods within the dietary patterns reduced the risk. And these are the foods that lower consumption of these within the dietary patterns reduced the risk.

So again, if you're consuming higher levels of these, they're not beneficial. So really the take home message is if you look across, there's

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quite a bit of consistency with fruit and vegetable consumptions, whole grains, nuts, legumes and seeds, fish and then also pretty good consistency here.

So I think that within a dietary pattern approach we can think about advice that could potentially reduce the risk of many very serious, adverse outcomes of pregnancy. I just wanted to mention frequency of eating because that is something where there was no evidence.

But we know that frequency of eating is an important component of dietary patterns. And there is some guidance from the IOM recommending that pregnant women eat three meals and two or more snacks a day, again to try to ensure that they're consuming extra nutrients, but also by minimizing gastrointestinal complaints.

Also some existing literature suggests that eating patterns do change during pregnancy, moving from meal, main meal focus patterns, to more snack dominant patterns by the third trimester.

But we really need more evidence to

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determine what are, what's the impact of these changes in frequency of eating and meal patterns on outcomes. And then we also would add beverages as well because there was, there was insufficient evidence to determine that.

But we know that beverages are also an important component of dietary patterns. So we, another summary that the evidence reviewed reinforces the importance of nutrition for women of reproductive age and women who are pregnant for optimal maternal and fetal outcomes.

And looking at Chapter 14, so the food pattern modeling, with basically each of the three patterns that are described in that chapter, the Healthy U.S.-Style, Healthy Vegetarian or Healthy Mediterranean-Style is expected to meet the nutrient needs of women who are pregnant with the possible exception of choline, iron, vitamin D, and vitamin E.

And again you can see that choline, vitamin D and vitamin E are kind of often times identified across the lifespan as of nutrients that

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are being under consumed. Again during pregnancy, the RDA for iron increases from 9 to 27 milligrams per day.

So women really need to make very careful choices or may require iron supplementation to meet the iron needs. But we believe that with education that much of the iron needs during pregnancy could be met with diet.

Also the folic acid supplementation, our systematic review confirmed that, that improves maternal folate status and may reduce the risk of hypertensive disorders in at-risk women.

But as noted by Regan, that really a lot of the protection for neuro tube defects and hypertensive disorders was early in pregnancy. And the neuro tube poses within the first 28 days of gestation prior to the time that many women don't even know that they're pregnant.

So looking at a life cycle approach, we would really recommend that women of reproductive age who are planning to become pregnant ensure that their folic status, folic acid

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status is sufficient.

So moving on to the draft strategy, so we've done this in two ways. The first seven are strategies for women of reproductive age and then we have several strategies directed to the agencies.

So the first is to encourage women to achieve a healthy weight before pregnancy and strive for gestation weight gain within the 2009 IOM recommendations. And that increased energy needs during pregnancy can best be met by consumption of a varied nutrient-dense diet.

Encouraging women before and during pregnancy to choose dietary patterns that are higher in the foods that we were able to show, or lower in the foods that we showed through systematic reviews were associated with reduced risk of gestational diabetes and hypertension, excessive gestational weight gain, and preterm birth.

Again encouraging women to consume foods and beverages that are good sources of potential shortfall nutrients identified in

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Chapter 1 as Regan just presented. So that, you know, education of women who are pregnant to follow healthier dietary patterns can help to meet many of these nutrient gaps.

Also encouraging women to not avoid potentially allergen foods during pregnancy unless it's medically warranted to protect the mother's health. And also encouraging women who are pregnant to consume seafood in accordance with recommendations of the 2015-2020 Dietary Guidelines.

So we found that seafood was part of a healthy dietary pattern and so we are encouraging or supporting the recommendation. And this recommendation is at least 8 to up to 12 ounces of a variety of seafood per week, but choices that are low in methylmercury.

We also encourage women who are or may become pregnant to follow the 2015-2020 Dietary Guidelines to avoid alcohol during pregnancy, particularly during the first few months could result in negative behavior and neurological

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consequences.

No safe level of alcohol consumption during pregnancy has been established. And also encouraging women who are pregnant to select foods in accordance with food safety recommendations outlined in previous reports in the Dietary Guidelines.

This would include avoiding unpasteurized milk and soft cheeses, undercooked meats, and limiting processed meats. Many of these are to avoid exposure to listeria. So now we have a couple of recommendations for the Federal programs.

The first is, we support the efforts by Federal programs, particularly the WIC program, supplemental nutrition program for women, infants and children. And encourage pregnant women to take advantage of available nutrition counseling services.

As noted by Regan, we support further development of surveillance systems and databases that report dietary beverage, dietary and beverage

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intakes. But, you know, also consider the context in which people are eating, which is important across the lifespan.

But as I noted, because we know that women during pregnancy due change their patterns that we should collect data that rich in terms of not only when, but all of the eating occasions that are going on.

So that is the end of the recommendations that we have from this report. So I'd be happy to take any questions.

MEMBER MATTES: Hey Sharon, this is Rick. I have a question. Could you add some clarity on how refined grains were defined?

You know, it's a diverse group and it has some staple foods like breads and pastas, which frequently are enriched and so could contribute to nutrients of concern. But it also, as my understanding is that it includes things like donuts and cakes and cookies --

MEMBER DONOVAN: Right.

MEMBER MATTES: -- and so on. Do you

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think that there is a need to differentiate within that group when looking for associations with health outcomes or are you comfortable lumping all of those kinds of foods, so sort of staple foods and the indulgent foods together?

MEMBER DONOVAN: No. That's a really excellent point and so the, that came from one of the preexisting reviews.

And I think that it would really be warranted to separate those because there are a lot of fortified grains that are actually really important for helping pregnant and lactating women to meet folate requirements.

So I think that somehow getting a handle on, you know, refined flour that may be fortified, and I know that this can be captured through the surveillance systems, but I can't speak to specifically.

And, you know, we know the categories of foods that are considered whole grains versus refined grains, but that was a systematic review that we adopted that was a prior from the pregnancy

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B-24.

But I think that your point is very well taken.

MEMBER STANG: Sharon, can you hear me?

MEMBER DONOVAN: Yes.

MEMBER STANG: This is Jamie Stang and I was on that TEC committee. And what I would say is I totally agree that it would, that there's a need to differentiate between the different types of refined grains.

In that case what happened is we, whatever was reported in the literature and they generally just reported refined grains as a category, most of the, if any of the studies actually included what was in there, gave specifics.

So we kind of had to go with what was reported by the research. But I think that's an important point that when people publish research, it's really important to define what they're considering a refined grain, because otherwise we're just using a term that could mean a lot of

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different things.

MEMBER DONOVAN: I think that's come out in other discussions as well. But good point.

MEMBER BOUSHEY: This is Carol Boushey.

MEMBER DONOVAN: Yes.

MEMBER BOUSHEY: And fantastic, a fantastic presentation. Thank you so much. And it's, I, there's part of it that should follow up with Regan's and, you know, the disparity and access to food.

And I realize, you know, we do have these scheduled programs, you know, that allow access to some high-quality food, the SNAP program and the WIC program.

And so we, I, we really want to make sure that we, you know, support these programs and even, you know, they're not enough even. But that's, you know, that's one mechanism that we have and want to make, you know, ensure that, that mechanism stays in strong shape to help with these issues about diet --

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MEMBER DONOVAN: Right.

MEMBER BOUSHEY: -- quality diets.

MEMBER DONOVAN: Right. So we need to have accessibility and affordability, but I think in looking at the evidence it's quite clear that I think we can develop educational messages to women about components of a healthy diet.

But actually can affect a number of outcomes that we really are trying to reduce the incidents in the U.S. of during pregnancy. So and I think that part is hopeful that it, we don't have to have a lot of special different types.

But there's many components that are protective across many of the outcomes we looked at.

CHAIR SCHNEEMAN: Other comments.

MEMBER VAN HORN: Hi. Oh, just one more. This is Linda Van Horn and I agree, this is just so exciting to introduce this whole topic into the, this set of Dietary Guidelines. And with great expectations for things to come.

And one of those that I hope we would

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address in the future because I think as we have tackled this idea about diet over the life course beginning potentially at the time of conception, these questions that were addressed of course are primarily related to pregnancy, lactation, et cetera.

But as we begin to recognize that some of these dietary patterns, especially as they relate to adverse pregnancy outcomes such as gestational diabetes or gestational hypertension, et cetera, are now becoming clearly associated with future risk for cardiovascular disease in that woman, in that mother.

And so that further contributes the thought that, you know, if we are able to identify dietary patterns that would reduce these risks during pregnancy, they could have ultimate benefit for long term health across, you know, the life course for certainly for women.

And so, you know, going forward, being able to identify and connect these dietary patterns during pregnancy with adverse pregnancy outcomes

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and future risk and ways to offer preventive strategies I think will become increasingly interesting and potentially useful for long term prevention.

MEMBER DONOVAN: Yeah. I agree there's a lot of evidence that's accumulating out there of even, like you mentioned, you know, starting at conception. But we certainly know that pre-conceptual health --

MEMBER VAN HORN: Right.

MEMBER DONOVAN: -- and dietary intake and even in some of our systematic reviews, so there's a number of interventions now that are aiming at trying to improve maternal health and body weight prior to conception.

And so I do think that this is really an exciting research area and I hope that by the next edition that we'll have a lot of new exciting evidence that we can examine that show that the lengths really across the lifespan.

MEMBER VAN HORN: Right. Right. Agree.

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VICE CHAIR KLEINMAN: So should we take a break here or --

CHAIR SCHNEEMAN: Yes. I think --

VICE CHAIR KLEINMAN: -- go on?

CHAIR SCHNEEMAN: I think we can go ahead and take a break here between, and maybe come back at around 1:30 to give people a chance to refresh their tea or coffee or whatever time zone they're in.

VICE CHAIR KLEINMAN: Sounds great. Sharon, that was a perfect report. You really did a beautiful job with that.

MEMBER DONOVAN: Thank you.

(Whereupon, the above-entitled matter went off the record at 1:04 p.m. and resumed at 1:37 p.m.)

OPERATOR: And you are live.

VICE CHAIR KLEINMAN: That's great. Thank you very much. And Sharon Donovan is going to continue now discussing diet and health relationships, and now she's going to focus on food, beverage and nutrient composition during

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lactation. Sharon?

MEMBER DONOVAN: Thank you, Ron. So, again, this was undertaken by the Pregnancy and Lactation subcommittee with some questions also being examined by Dietary Fats and Seafood in the Frequency of Eating subcommittee.

So just as with pregnancy, when we consider nutrition during lactation, we're considering both the health of the mother and the child.

And nutrient requirements during lactation are intended to support the nutritional needs of the mother, but also to provide additional amounts of energy and nutrients associated with the increased metabolic demand for milk synthesis, as well as the secretion of nutrients into human milk.

For many nutrients, the requirements during lactation differ from those during pregnancy. They're very distinct physiological states, so women who are lactating should adapt their dietary choices and supplement use to meet

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the needs of lactation.

It's important to note that about 70 percent of women who are lactating use dietary supplements, which is higher than non-pregnant, non-lactating women get. And about 50 percent of them continue to use prenatal supplements during lactation, so that's something we'll address later on.

Also, you think about pregnancy, there's changes that are made during pregnancy to prepare for lactation, and one of that is the deposition of a body fats. And so energy requirements for lactation take into account mobilization of some of those maternal fat stores, which could then potentially assist women in postpartum weight loss.

Also, concentrations of some of the micronutrients, but not all, and even milk are correlated with the maternal nutrient status. And so, they can be also affected by diet and supplement use.

And when we think about human milk,

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though, and Kay will touch on this as well, but human milk not only contains the nutrients that the infant requires, but many bioactive substances that can support optimal growth, development, but also influence neurocognitive and immune development in the risk of atopic diseases.

So, again, for the first time, the 2025 Dietary Guidelines -- 2020 to 2025 Dietary Guidelines are specifically focusing on guidelines for women who are lactating. Previous committees have provided some guidance and we reexamined questions related to seafood consumption and omega-3 fatty acid supplements which were addressed by previous committees, but really focused on a lot of new relationships with a focus, again, on dietary patterns during lactation.

So we had a total of eight questions.

And this was the first four. So we looked at dietary patterns, postpartum weight loss, frequency of eating and postpartum weight loss, dietary patterns and human milk composition and quantity. And we found no evidence on quantities

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so focused on composition.

We also looked at the relationship between maternal diet during lactation and child food allergies and atopic outcomes. Then we had three questions that focused on various exposures and neurodevelopment in the child. So the first was dietary patterns consumed by the mother during lactation, seafood consumption during lactation and omega-3 fatty acid supplements during lactation.

We also examine folic acid supplements on three outcomes: maternal micronutrient status, human milk composition and the child neurodevelopmental outcomes. So all of these questions were answered by new NESR systematic reviews. So more than 30 articles representing 25 studies were included in six of the eight NESR reviews, so no studies were identified that met the inclusion criteria for Questions 5 and 6, which were dietary patterns and neurocognitive development and seafood consumption and neurocognitive development.

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It's really important to note, though, that the subcommittee -- we were only able to grade 30 that -- we were unable to grade 33 of the 37 conclusion statements. So 89 percent of our conclusions statements were insufficient or no evidence. So there are clearly notable gaps. And we really encourage an active body of research to help to inform some of these gaps and to guide future Dietary Guidelines.

So, to just quickly review the key science, we really were only able to grade evidence for two questions. So the first was the relationship between dietary patterns consumed during lactation and human milk composition and quantity. We were only able to grade evidence related to fats, so limited evidence suggests that maternal consumption of diets higher in fat of greater than 35 percent and lower in carbohydrates during lactation as it relates to higher total fat content of milk collected in the more maternal postprandial periods.

So this was very specific to the timing

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of milk collection. There's also limited evidence to suggest that certain maternal dietary patterns during lactation, including diets based on macronutrient distributions, are related to relative proportions of saturated fat and monounsaturated fats and human milk and polyunsaturated fats in human milk collected in the postprandial period.

And then part of these differences in these fatty acids are related to the difference between which fatty acids are actually synthesized within the mammary gland, which are the saturated monounsaturated versus the polyunsaturated, which more closely reflect maternal diet. So then the other question that we were able to form conclusion statements was related to folic acid supplements and fortified foods. So, again, we found no evidence for fortified foods. So we were only able to have conclusions with supplements.

We were able to conclude that moderate evidence indicates folic acid supplements consumed during lactation are positively associated with

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red blood cell folate and may be positively associated with serum and plasma folate. So again, this is consistent with what we found during pregnancy for folic acid supplementation and maternal status. Moderate evidence indicates that folic acid supplements consumed during lactation do not influence folate fully levels in human milk.

And again, this is consistent with the evidence. Although folate is a water soluble vitamin, the levels in the maternal diet do not seem to influence the concentrations in human milk.

So we were unable to draw conclusions regarding maternal dietary patterns or frequency of eating during lactation and postpartum weight loss. With also no conclusions regarding maternal dietary patterns and human milk composition other than total fat and fatty acids and no conclusions regarding maternal dietary pattern, seafood, omega-3, or folic acid supplementation on neurocognitive outcomes in the child could be drawn due to lack of evidence.

So the quandary here, so we did find

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with pregnancy, that certain dietary patterns were protective. We also found that many of those components aligned with dietary patterns, subsequent lower overall chronic disease in women who are not pregnant or lactating.

So these, again, supports relatively consistent dietary patterns associated with healthy outcomes and women of reproductive age. Therefore, and as shown in Chapter 14, that these, the three food patterns; a Healthy U.S., Healthy Vegetarian, or Healthy Mediterranean-Style will -- are expected to meet the nutrient needs for women who are lactating with the possible exception of the vitamin A, choline, D, and E. So if you were here during the pregnancy, choline, vitamin D, and vitamin E are consistent during pregnancy. It was -- iron was not met by the dietary patterns, and for lactating women, it's vitamin A.

So while we were unable to show, through systematic reviews, relationships, we believe that it's still prudent to recommend that women who are lactating continue to consume healthy dietary

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patterns consistent with benefits during pregnancy and for non-pregnant and non-lactating women, which should meet most of their nutrient needs.

Again, despite the lack of evidence to determine the relationship between seafood consumption during lactation and neurocognitive outcomes in the child, we believe the seafood choices are still important components of the healthy dietary pattern for women who are not pregnant and lactating, as well as those who are pregnant. Additionally, seafood may increase the DHA contents of human milk and provide some potential other shortfall nutrients for women who are lactating.

So that leads us to our recommendations, so we have strategies for women who are lactating and then several for the agencies.

So the first is basically to encourage women who are lactating to consume a wide variety of foods that are consistent with dietary patterns described in Chapter 14, encourage consumption of

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foods and beverages that are a good source of potential shortfall in nutrients identified in Chapter 1, as well as those that I just mentioned that may not meet the requirements from these three U.S. -- the three patterns described in Chapter 14.

So, for example, choline was both a shortfall nutrient as well as may not be met by these dietary patterns for lactating women. Therefore, we believe that they should follow the dietary patterns, but may need some selective education, nutritional education on different food sources to emphasize, to meet some of these shortfall nutrients.

We encourage women to discontinue the use of prenatal supplements during lactation unless they're medically indicated. These supplements are usually formalized -- formulated to meet the high iron requirements of pregnant women.

As I mentioned before, pregnant women have an iron requirement of 27 milligrams per day versus 9 for non-pregnant women, and the iron

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requirement during lactation drops back down. So if they continue to take the prenatal supplements, they're at risk of exceeding the upper limit for iron intake during lactation.

We encourage women not to avoid potential allergenic foods. There's no evidence that that reduced atopic outcomes in the infants, again, unless medically indicated for the mother's health. For example, if she has an existing food allergy, then obviously it's prudent for her to avoid those foods.

And then these are basically recommendations where we're continuing to recommend from the 2015 Dietary Guidelines, which is that women who are breastfeeding should consult their health provider regarding alcohol consumption and also to consult health care providers of about advice concerning caffeine consumption. We did not specifically review this evidence, but we think it's prudent to carry those over.

Again, we encourage women who are

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breastfeeding to consume seafood in accordance with the recommendations of the 2015-2020 Guidelines, which again is 8 to 12 ounces of variety seafood per week with choices that are lower in methylmercury.

And the last is really kind of going back to this life cycle approach in terms of body weight, and so encouraging women to maintain a healthy pre-pregnancy weight, achieve appropriate weight gain during pregnancy, initiate and maintain breastfeeding throughout the child's infancy, which can potentially help with postpartum weight loss and then to return to a healthy weight during the postpartum period, if possible.

Again, we did not review evidence regarding relationships between maternal BMI or gestational weight gain for lactation success. However, there's other evidence in the literature that shows a high pre-pregnancy BMI are excess gestational weight gain are risk factors for suboptimal breastfeeding outcomes.

So we have now three recommendations

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to support. We support, I should say, the recommendation for Federal programs. Again, going back to WIC, just as in pregnancy, we encourage women who are lactating to take advantage of available nutritional counseling services. We also have some recommendations are on policy systems and environmental change strategies and competitive pricing of healthy food and beverage choices so that women of all economic strata can afford them, again, looking at healthy foods and beverages in pantries and other food assistance programs.

So I think this touches on what we were discussing previously in terms of access. Given the documented health benefits to the mother and the infant, we support broad implementation of Federal programs that promote, protect and support breastfeeding.

And we also, just as with pregnancy, support the development of surveillance systems and databases to report food and beverage intakes and this should represent diverse subgroups of

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women, include effects of food security and economic status, and include food and beverage consumption and supplemental data to show how fortified foods and supplemental sources of nutrients contribute. As I mentioned, in all of our searches on fortified foods and supplements, there was no evidence for fortified foods. So, and I think as Rick brought up, there are many components of the food supply that are fortified with micronutrients that are important for pregnant lactating women.

So just a final point that, again, despite the importance of the questions examined in this chapter, the available evidence for most questions was insufficient. So 89 percent of our 37 conclusion statements were no or insufficient evidence. So many questions remain to be answered.

Content and pattern of the diet of women during lactation, the influence of postpartum weight loss, human milk composition and quantity and child outcomes are just a few, as well as other questions, that the Committee was not asked to address. And

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these will be outlined in the report. So, thank you.

VICE CHAIR KLEINMAN: That was amazing. Thank you very much for going through all of that so quickly. And we will hold on questions and move on to Kay's presentation, and then we can have questions at the end of that.

So with that, Kay Dewey is going to talk about diet and health relationships, birth to age 24 months. And she has four chapters to go through.

Kay?

MEMBER DEWEY: Thanks, Ron. And thanks, Sharon. Yeah, this is a bit of a marathon here, so I hope everybody can hang in there. I'm going to go pretty quickly through Chapters 4, 5 and 6, because those conclusion statements have been presented previously. And I'll spend more time on Chapter 7, which is new. But I do want to thank all the members of the subcommittee. We've worked very hard at creating what I'm about to show you and, as well, all of the staff involved.

So for the first chapter, I'll talk

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about Chapter 4, we had four outcome domains that we examined with respect to the duration, frequency and volume of exclusive human milk or infant formula consumption.

And those were overweight and obesity, long term health outcomes, nutrient status, and food allergies and atopic allergic diseases. So even though there's only those four questions, there were many, many more sub-questions because there were six different human milk grades for formula exposures that are lined up on that left-hand column in terms of ever versus never; the duration of any human milk, the duration of exclusive human milk consumption, the intensity of human milk feeding in mixed feeding, breast versus bottle feeding in those that feed human milk, and a question about topping up within a feed or within a feeding episode.

So the blue dots, which -- of which there are 58, represent the topics that we examined for these questions, these exposures and all of the different sub-outcomes that were included.

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The questions on overweight and obesity and nutrient status were answered using new NESR systematic reviews. And just earlier this morning, I talked about the conclusion statements for overweight and obesity.

The questions on long-term health and food allergies and atopic diseases were answered using existing NESR assessment systematic reviews from the Pregnancy and Birth to 24 Months project which was published in 2019. And actually the purpose of that project was to conduct these reviews that would contribute to the evidence base going in to these new Dietary Guidelines.

So in terms of what we covered, over 200 articles were included in the NESR systematic reviews and over 150 from the existing reviews and over 60 from the new reviews. The conclusion statements were graded from moderate to grade not assignable, and most of the evidence compared infants who ever consumed human milk with infants who never did so, or infants who consumed human milk for different durations.

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Most of the evidence measured outcomes during childhood. Most of it was observational studies. But there was that one exception of a cluster randomized controlled trial, the promotion of breastfeeding intervention trial, that provided evidence for overweight and obesity, atopic disease, and long-term health outcome.

And in a nutshell, human milk consumption was sometimes associated with a beneficial outcome for overweight and obesity, asthma and type 1 diabetes, and were sometimes not associated with an outcome, for example, atopic dermatitis. But in no case was consuming human milk associated with an adverse outcome.

So, instead of going through all the conclusion statements again, I'm going to just summarize our key findings here. And to show you that, for every versus never being fed human milk, that was related to a lower risk of overweight or obesity, type 1 diabetes and asthma. A longer duration of human milk feeding was related to a lower risk of type 1 diabetes and asthma. And a

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lower duration of exclusive human milk feeding was related to a lower risk of type 1 diabetes.

Most of these were graded as moderate, the exceptions being type 1 diabetes for ever versus never being fed human milk, which was graded as limited and for the duration of exclusive human milk feeding with type 1 diabetes.

Now we talked this morning about the evidence for the relationship between ever versus never and risk of child overweight and obesity. But what I want to go through now is a little discussion about how difficult it is to actually draw conclusions from that in terms of causality.

And this is because of the risk of confounding of observational studies and the limitations of the sibling pair studies. But I can say that other systematic reviews in that analyses have generally come to similar conclusions.

There was an umbrella review, for example, in 2016 that estimated a reduction of about 13 percent from the high quality studies. But even then, they couldn't completely rule out residual

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confounding.

And in terms of the duration of breastfeeding, they did indicate that a very short duration seems to be having a lesser protective effect than breastfeeding of longer duration with respect to overweight and obesity. Now, there are a number of potential biological mechanisms that could underlie this relationship. For example, rapid weight gain during infancy is consistently related to subsequent risk of overweight or obesity.

And it's well-documented that rapid weight gain is more likely among formula-fed infants. This may be partly due to a difference, in infant self-regulation of energy intake, which may differ between breast and formula-fed infants for a variety of reasons.

One thing that's been examined is the protein intake among formula-fed infants, which is regulated to drive hormonal differences that may stimulate greater weight gain and fat deposition.

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And there are some randomized controlled trials of reduced protein formulas that have demonstrated less rapid infant weight gain and reduced obesity at school age, although the precise mechanisms for this are not yet clear.

In addition, the concentrations of free amino acids in human milk compared to formula also may be important. We know that free glutamate is high in human milk and it is a key signal for satiation. One experimental study looked at this question and actually found a significant difference in early rapid weight gain when glutamate content was higher.

In addition, there's the possibility of overfeeding formula fed infants. We know that feeding by bottle may make it more difficult for the infant to communicate satiety signals. And the caregiver may urge the infant to finish the bottle so as to avoid wastage. These sometimes differences in the dyadic approach of caregivers in infants during feeding may have longer term implications for programing appetite regulation.

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So moving on to type 1 diabetes, the prevalence of this is relatively low, but small increases in the risk for this outcome may have important public health implications. The autoimmune destruction of insulin-producing beta cells in the pancreas that results in type 1 diabetes occurs in genetically susceptible individuals, but it is likely triggered by environmental agents early in life.

So that's why it's possible that infant feeding could be playing a role and the potential biological mechanisms for a protective effect of breastfeeding are probably linked to differences in composition of human milk compared to infant formula. There are numerous biologically active components in human milk, and they may play a role in reducing gut permeability and early enterovirus infections and in promoting a healthier infant gut microbiota.

For asthma, the conclusion we reached, that human milk is related to reduced risk of asthma, is supported by previous meta-analyses.

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I won't go through all the numbers shown here. I just want to point out that, in children with an atopic first degree relative, the odds ratio was quite dramatic -- 0.52, whereas in those without a family history, it was not significant.

So for this outcome, potential biological mechanisms are that breastfeeding is associated with a reduced number of respiratory tract infections in infancy, exclusive breastfeeding may be beneficial for lung function. There's some good evidence on that front. And breastfeeding may mediate these effects through protecting the lungs from viral infections or by promoting maturation of the infant immune system and microbiome.

So in terms of what kinds of evidence we were able to look at, our reviews were limited to selected outcomes, as you've seen here. And we were not asked to review some other types of outcomes. For example, we did not include child infectious diseases, cancer, mortality or development, nor any of the maternal outcomes that

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may be related to the initiation or duration of lactation, including a reduced risk of breast, ovarian and endometrial cancers, hypertension and cardiovascular disease, nonalcoholic fatty liver disease, and type 2 diabetes.

So the feeding recommendations that are developed should ideally take all of these into account. With that said, the evidence that we did review is consistent with existing recommendations for breastfeeding in the U.S. and globally, including many other high income countries which generally advise exclusive breastfeeding until about age six months with continued breastfeeding thereafter, together with appropriate complementary feeding, until at least 12 months or 24 months of age.

However, the current breastfeeding rates in the U.S. indicate considerable room for improvement. This slide illustrates how the breastfeeding rates currently compare to the 2020 Healthy People goals. And the good news is that the rates generally have achieved those goals.

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Initiation of breastfeeding is almost 84 percent, which is up from 76.7 percent in 2010 and exceeds the 2020 goal by six months.

Thirty-seven -- excuse me, 57 percent are breastfeeding, which is up from about 47 percent in 2010 and slightly below the 2020 goal of 60.6 percent. And by 12 months, 36 percent are breastfeeding, which is up from about 25 percent in 2010 and slightly above the 2020 goal of 34 percent.

Exclusive breastfeeding rates at three and six month are very close to the goals, with about half exclusively breastfed at three months, which is up from 37 percent in 2010 and 25 percent at six months, up from 17 percent in 2010. However, this still means that 75 percent of infants in the U.S. are not exclusively breastfed or exclusively fed human milk during the first six months as recommended. And the prevalence of mixed breast and formula feeding, which is not shown here, is quite high.

At six months, for example, 32 percent

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of infants receive human milk supplemented with infant formula, and 43 percent receive no human milk at all. Therefore, the Committee supports two recommendations. The first is to encourage exclusive breastfeeding, ideally for the first six months of life with continued breastfeeding through the first year of life or longer as desired by the mother and infant, and to encourage the broader implementation of policies and programs that promote, protect and support breastfeeding to benefit both the health of the mother and the infant.

And with that, I'd like to, again, thank the support staff for this and ask if there are any short questions on this chapter before I move on to Chapter 5. Is anybody there?

VICE CHAIR KLEINMAN: Yes.

MEMBER DEWEY: Okay, thank you. All right. Well, I'll take silence says affirmative. Okay. So just in order to move along and get through this as quickly as possible, I'll get started with Chapter 5, and this dealt with

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complementary feeding or foods and beverages consumed during infancy and toddlerhood.

And for this set of questions, we had both the timing and the type of complementary feeding with respect to five types of outcomes: growth, size, and body composition, development, nutrient status, bone health, and food allergies and atopic allergic disease.

The first five questions were answered using existing NESR systematic reviews from the Pregnancy and Birth to 24 Months project published in 2019, as we already mentioned. Question 6 was the relationship between added sugars consumption and risk of cardiovascular disease. Number 7 was types of dietary fats and cardiovascular disease.

And Number 8 was seafood consumption and risk of cardiovascular disease and neurocognitive development.

Those three questions were part of the new NESR systematic reviews conducted by other subcommittees, beverages and Added Sugar subcommittee and the Dietary Fats and Seafood

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subcommittee.

For these reviews, over 230 articles were included. And the conclusion statements were graded from strong to grade not assignable. Most of the articles were from the 10 existing NESR systematic reviews that examine the timing of introduction and/or the types and amounts of complementary foods and beverages consumed and various health outcomes.

In the new systematic reviews, there was one article on added sugars and cardiovascular disease, three on types of dietary fats and cardiovascular disease, and no studies on seafood consumption and either cardiovascular disease or neurocognitive development, so we had very little evidence on those. Most of the evidence measured outcomes during childhood. And most of it was from observational studies, although many reviews also included some randomized controlled trials.

I'll start with the issue of timing of complementary food and beverage introduction, and the evidence suggests that complementary foods and

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beverages should not be introduced to infants before four months of age. This is consistent with the recent meta-analysis indicating that introducing such foods before four months was associated with an increased rate of overweight and obesity at two to 12 years.

Complementary food and beverage introduction at age four to five months versus six months does not offer long-term advantages or disadvantages with regard to growth, size, body composition, overweight or obesity, iron status or risk of food allergy, atopic dermatitis, eczema, or asthma during childhood.

And formula-fed infants may be at particular risk of excess energy intake when complementary foods and beverages are introduced early as they appear to exhibit less self-regulation of energy intake than is observed among breastfed infants.

With regard to the types and amounts of complementary foods and beverages and growth, size, and body composition, we found that these

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outcomes were generally unrelated to intakes of meat, cereals, or foods that differed in fat content or composition. And this is consistent with the conclusions of a recent umbrella review that did not find an association between certain types of complementary foods and subsequent growth or body composition outcomes.

That review also found no relationship between total fat or polyunsaturated fatty acid intake and these outcomes. However, the consumption of sugar-sweetened beverages does appear to be related to an increased risk of obesity in childhood, although the evidence for that is quite limited.

And juice intake appears to be positively associated with infant weight-for-length and child BMI z-scores. But again, the evidence is limited and most studies did not specify the type or percentage of fruit in the juice.

With regard to iron status, this was our strong conclusion statement showing that iron

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rich or iron fortified complementary foods and beverages, for example, meats and iron fortified cereals, can help maintain adequate iron stores or prevent iron deficiency during the first year of life among infants with insufficient iron stores or breastfed infants who are not receiving adequate iron from another source that, for example, might be fortified.

The benefit of those types of iron rich or iron fortified foods for infants to have sufficient iron stores, for those -- for example, those that are consuming iron fortified infant formula would be less evident. And these conclusions are consistent with the recommendations of numerous authoritative organizations regarding the need for an adequate source of dietary iron after six months when iron source at birth may become depleted.

And that's quite critical because iron is particularly important for normal neurological development and immune function. For zinc status, there is some evidence that complementary foods

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and beverages with substantial zinc can support zinc status during the first year of life, particularly among breastfed infants who are not receiving adequate zinc from another source.

And again, the benefit is less evident for infants who are consuming a fortified infant formula. The reason for this is that zinc constitution in human milk declines sharply during lactation and by six months, zinc intake from human milk is a very small proportion of the estimated requirements. For that reason, both iron and zinc are considered problem nutrients, and this is true globally for breastfed infants at 6 to 12 months.

For example, the nutrient density per hundred calories of food required for breastfed infants at 6 to 9 months of age are nine times higher for iron and four times higher for zinc, compared to the nutrient density required for an adult male.

In terms of fatty acid status, we found moderate evidence indicating that complementary foods and beverages with differing fatty acid profiles, particularly the long chain

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polyunsaturated fatty acids, can influence the child's status. So particular attention to the fat content and composition of such food is needed because polyunsaturated fatty acids are key nutrients for brain development, which is most rapid from conception to age 24 months.

In terms of food allergies and atopic allergic diseases, atopic diseases are actually relatively common in the U.S. and infancy may be a critical period for development of tolerance to food antigens. There's strong evidence that introducing peanut in the first year of life may reduce the risk of food allergy to peanuts. The evidence is strongest, for instance, with highest risk, but also applicable to others.

And these conclusions are consistent with other reviews. For example, a meta-analysis indicated that introducing peanuts in the first year of life is associated with a 71 percent reduced risk of peanut allergy. And for that reason, the AAP now endorses introduction to peanuts in the first year of life.

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In addition, introducing egg in the first year of life may be beneficial. There's less strong evidence on early introduction of other foods that contain common dietary antigens and prevention of allergies or atopic diseases. However, the AAP states that there's no evidence that delaying the introduction of such foods, for example, eggs and fish beyond four to six months prevents atopic disease.

So in terms of our advice, we have a recommendation around timing of introduction that states that complementary foods and beverages should not be introduced to infants before four months of age and introduction at age four to five months as compared to six months, does not offer long-term advantages or disadvantages with regard to the outcomes that we reviewed.

Now for infant feeding guidelines from other sources, for example, in high income countries, they are consistent with this. They generally recommend that such foods should be introduced at about or around six months, although

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some recommend an age range of four to six months.

And these types of recommendations should ideally take into account the benefits and risks related to all relevant outcomes. And our reviews did not include some of those outcomes, for example, infant infectious diseases and maternal outcomes that may be related to the duration of exclusive breastfeeding and, for that reason, the age of introduction of complementary foods and beverages.

With regard to the types and amounts of complementary foods and beverages, we recommend to provide foods that are rich in iron and zinc, either intrinsically such as meats or due to fortification, particularly during the second six months of life among breastfed infants.

And secondly, to provide complementary foods and beverages that contain adequate amounts of polyunsaturated fatty acids, given their critical role in brain development and the link between dietary intake and the child's fatty acid status.

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Although human milk is an important source of key fatty acids, milk concentrations are influenced by maternal dietary intake. Thus, both the mother and the child should consume diets that are adequate in these nutrients.

With respect to consistency, guidelines from several high income countries also emphasized the need for foods rich in iron and zinc with some recommending that these be the first complementary foods introduced. And Canadian authorities emphasized that higher fat complementary foods and beverages that are nutrient rich are key complements of a healthy diet under two years of age.

With regard to food allergy and atopic diseases, the recommendation is to introduce peanut and egg in the first year of life after complementary foods and beverages are introduced.

And for other types of food allergy, the evidence for protective effects is less clear, but we found no evidence that avoiding such foods in the first year of life is beneficial with regard to preventing

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food allergies or other atopic allergic diseases.

And recent guidelines from high income countries are generally consistent in recommending that introduction of such foods should not be delayed beyond the first year of life.

In addition, we recommend to avoid consumption of sugar-sweetened beverages by children younger than age two years. The evidence for avoiding or limiting juice intake under age two years is less clear. The consensus is really quite widespread among authoritative bodies in high income countries that sugar-sweetened beverages should not be consumed by children under two for several reasons. First is that the energy from such beverages may displace energy from nutritious, complementary foods and beverages leading to nutrient gaps.

The second is that their consumption is related to the risk of child overweight. And thirdly, the intake of such beverages in early life may set the stage for greater intake of sugar-sweetened beverages later on. I'd like to

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mention that there was a consensus statement quite recently from four organizations in the U.S. recommending that juice not be given in the first year of life and that no more than four ounces per day of 100 percent fruit juice should be consumed at ages one to three years.

Although we didn't have enough evidence to reach that conclusion, I wanted to let you know about that statement. In terms of future DGAC topics, we want to stress that our Committee was asked to address several questions related to what to feed infants and young children.

And these represent only a portion of all the feeding questions that are relevant for infants and toddlers. So questions of how to feed were not among the topics selected to be addressed by our Committee, but they are of critical importance with regard to building healthy eating habits that can be maintained throughout life.

So these key issues should be taken up by the next DGAC. And again, thanks to the staff who were fantastic in helping put this all together,

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and I think there's time for a few questions, if there are any. Yes --

MEMBER MATTES: This is Rick. I have two questions, one for Sharon and one for you, Kay.

Sharon, you identified three specific diets that were consistent with meeting nutrient goals, and I have no issue with that except recognizing that food availability is an issue and that cultural food patterns are important to recognize if we want people to actually follow a diet.

Are you concerned that by labeling diets, we elevate them to a point that people think they have to follow that specific diet when, in fact, their local foods could just as well meet goals just by different combinations? So rather than listing diets by names, we list the characteristics that should be emulated. So that's my question for Sharon.

And then for Kay, you were very clear that you didn't answer all relevant questions for all the nutrients. And I'm wondering about the

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iron recommendation. As you pointed out, know, there is a literature on iron supplementation and risk of infection. Does that cause you to be a little more tempered in the recommendation for iron fortification when we didn't examine that question?

MEMBER DEWEY: If I could answer that one first, just real quick, we did examine that question, and that's in the next Chapter 6 report that I'm getting to.

MEMBER MATTES: Oh, sorry. Okay, okay.

MEMBER DONOVAN: Yes, so then in terms of the diets, those are basically the names of the diets that are just dietary patterns, I should say, described in Chapter 14 of the report. So I did not name those. Those were part of the modeling with -- or to show, if you follow those components, then you would be able to meet nearly -- so we don't need a special diet for pregnant or lactating women.

They should be able to eat a similar diet as non-pregnant, non-lactating women. They just need to -- they need to make maybe some

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different food choices that are higher. And so maybe I don't know, Regan, if you want to comment on that?

MEMBER BAILEY: Yeah, I think these are more just used to describe the combinations of the food groups. And, you know, we'll have a whole presentation on the USDA Food Patterns, but there's a Healthy U.S.-Style, a Vegetarian-Style and a Mediterranean-Style.

And that's exactly what they are. They are styles. They are words that describe these various combinations, but they are not prescriptive in nature. And I'm uncertain, and I'd love to hear your ideas, for how we would refer to these to the lay public, if not to describe them in this way.

MEMBER MATTES: Well, that would take me a little time to think about it, but what you're describing is what I would hope the outcome would be, that they are just exemplars of patterns of food combinations that work, rather than being specific, sort of prescriptive ways. And listing only three of them, gives the impression that these

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are the ways you have. These are your options. So as long as we're real clear is that they're just examples, I'm feeling better about it.

MEMBER BAILEY: Yeah, we only provide the examples really at the main food group level. Individuals can customize. Like, for example, vegetables, there's a recommendation for a specific cup equivalent of a vegetable, but that can be met through any combination of different categories of vegetables.

CHAIR SCHNEEMAN: Well --

MEMBER BAILEY: I have a whole bunch of questions on that too.

CHAIR SCHNEEMAN: Yeah. I'm going to suggest -- yeah, I'm going to suggest we hold that discussion to Chapter 14. And maybe, if there are any other questions for Kay, let her proceed with the two other chapters.

MEMBER DEWEY: Okay, thanks very much. Okay, can someone put Chapter 6 up? All right, great. This was, I've been told, the shortest chapter in the report, but it doesn't mean it was

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not a lot of work.

So we examined nutrients from dietary supplements during infancy and toddlerhood, but we focused on just two questions: the relationship between iron from supplements and growth, size and body composition, and the relationship between vitamin D from supplements and bone health.

And both of these were answered using new reviews. There were 16 articles altogether.

We graded the conclusion statements from moderate to grade not assignable, and most of the evidence here was actually randomized controlled trials.

For the iron question, all the evidence focused on growth or size, not body composition, and it was in infants and toddlers and not older ages.

For vitamin D, most of the evidence focused on bone mass and biomarkers or bone metabolism, not rickets or fracture, and it was in infants and toddlers and not older ages.

Just by way of some background, the AAP in 2010 recommended iron supplementation for

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breastfed infants from four months until iron containing complementary foods are introduced.

However, other authoritative organizations since then have recommended against routine supplementation of breastfed infants and instead recommend supplementation for high risk groups or those with a diagnosis of iron deficiency.

And some also note the importance of delayed umbilical cord clamping, which can have a strong effect on the iron stores shortly after birth. Iron is one of those nutrients that can be considered a double-edged sword.

It's very important to prevent anemia and support development, and supplementation can be highly beneficial for iron deficient infants.

However, excess intake, among iron replete infants, may be harmful.

In our review, we found no positive effects and possibly negative effects on growth when iron supplements were given to breastfed infants younger than age nine months compared with infants not given iron or given a placebo.

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And these potentially adverse effects of iron supplements on growth under two years of age are consistent with other findings. For example, a meta-analysis of children from 4 to 24 months from both high income and lower income countries in which infants and children randomized to receive iron supplements had less length gain and weight gain than those who did not receive iron.

And there are several potential mechanisms by which iron may adversely affect growth among iron replete children, including increased gastrointestinal illness, impaired zinc or copper status, pro-oxidative or pro-inflammatory effects and disturbances in the gut microbiota.

One important finding is that before six months of age, iron homeostasis appears to be either absent or limited such that supplemental iron is likely to be absorbed even if the infant is iron replete. After six months, infants appear to be able to downregulate iron absorption appropriately.

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So our summary is that routine iron supplementation of all breastfed infants may not be advisable. An alternative could be to screen for iron deficiency among higher risk infants under six months and provide iron supplements only to those with iron deficiency.

After six months, other sources of iron can be provided, such as iron rich or iron fortified, complementary foods. So iron supplementation is generally not needed.

Moving along to vitamin D deficiency, this is most likely in those living at high latitudes with dark skin and/or with inadequate sunlight exposure. The adequate intake for infants is 400 international units per day, and at one-plus years, it's 600.

The average human milk vitamin D concentration is only 20 international units. So it's much lower than the AI. Well, maternal high dose vitamin D supplementation may increase human milk concentration, but the risks and benefits of that approach have not been fully evaluated.

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And it's in large part, for that reason, that the AAP recommends vitamin D supplements for breastfed infants. And I have the full quote here.

I won't read it, just to say that they do mention the possibility that a lactating woman taking high dose vitamin D has higher milk levels.

But for breastfed and partially breastfed infants, they do recommend 400 international units of vitamin D per day.

So in our review, we looked at studies that were conducted since 2000, and the existing recommendations regarding vitamin D supplementation during infancy are based on the evidence compiled largely before 2000.

But what we did review indicated that doses higher than 400 international units per day do not seem to result in any differences in biomarkers of bone metabolism compared to 400 international units per day.

So we concluded that, at this time, the evidence does not provide a basis for recommending vitamin D supplementation above 400 international

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units.

And that is all I have for Chapter 6.

If there aren't burning questions, I can move right on to Chapter 7, which is -- has a lot more for everyone to digest. All right.

Now, I think everyone involved in Chapter 7 can testify to the challenges that we encountered in attempting, for the very first time, to develop food-based dietary food patterns for this age group.

So I'm going to go into a fair bit of explanation of what we did and what we learned from that process. The questions were, can USDA Food Patterns be established based on the relationships identified in the systematic reviews? And if so, how well do these variations meet nutrient recommendations for infants and toddlers?

And if nutrient needs are not met, is there evidence to support supplementations and or consumption of fortified foods to meet nutrient adequacy?

I'd like to start by mentioning that

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this period from birth to 24 months is characterized by major changes in feeding patterns and dietary intake.

Exclusive breastfeeding is recommended for about six months and for infants not fed human milk or mixed fed, commercial infant formula is generally recommended until 12 months. Around six months of age is the transition from sole consumption of human milk and/or infant formula to a varied diet that includes nutrient rich complementary foods and beverages.

So based on those assumptions, the Committee decided that USDA Food Patterns are not necessary for infants younger than aged six months.

And we began the food pattern modeling work at age six months.

One important consideration in looking at possible food patterns is the primary milk source consumed by the infant. And that's because human milk differs from infant formula in nutrient composition, bioavailability of nutrients, and the presence of bioactive substances.

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In addition, the composition of human milk changes over time and in response to maternal diet. So the energy and the nutrients that are needed from complementary foods and beverages vary by infant milk source.

We'll start with how we approach the age range from six to 12 months. And our first goal was to find combinations of complementary foods and beverages to meet nutrient needs of infants whose milk source is human milk. In other words, no infant formula.

We made that as the first goal because infant formula is fortified. So the intakes of certain key nutrients are considerably higher than is the case for human milk fed infants.

But then we went ahead and estimated the expected nutrient intake of infants fed infant formula, if they were to consume the same types and combinations of complementary foods and beverages.

Now, I want to note that the provision of key nutrients is only one of the ways in which

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human milk influences infant health and development. There are many health benefits of breastfeeding for the mother as well as the child, as we have mentioned.

The food pattern modeling results that we'll show you, for instance, should not be interpreted as an evaluation of the value of human milk compared to infant formula. They are intended to demonstrate the ways that nutritional goals can be met through these foods that take into account the milk source in the child's diet.

For 12 to 24 months, the food pattern modeling was conducted separately from what we had done at six to 12 months. And that's because there are RDA values for most nutrients for ages 12 months and older, but only for three at six to 12 months.

Infant formula is not recommended after 12 months, and most infants in the U.S. no longer receive human milk after age 12 months. This is -- so the situation is quite different than it is at six to 12 months.

Now, I want to say a word about the role

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of complementary feeding, because it's not just a source of nutrients. Complementary feeding is important for many other things.

For example, introducing food types and textures can be beneficial for developing manual dexterity and other aspects of motor development, supporting the development of appropriate feeding and eating behaviors, and reducing the risk of food allergies.

And furthermore, implementing response and feeding practices and the modeling of healthy eating behaviors and bonding through food and mealtimes are very important aspects of complementary feeding. Food pattern modeling focuses on nutrient intake, and it is not designed to address these other important aspects of complementary feeding.

The methods for this were all based on the food pattern modeling approach and the analytical framework and food modeling process, in general, was presented at the March meeting. I'm going to briefly go through the steps for this

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age range, because there are few differences.

The first step for establishing energy levels, we relied on the DRI formulas for estimated energy requirements that take into account the energy deposition for the growing child.

Then we determined the appropriate energy levels for each age-sex group. And we chose five energy levels from 600 to a thousand calories at 100-calorie step intervals to cover the energy needs for the majority of infants and toddlers.

The second step is to establish nutritional goals. This is done based on the age-sex groups and for the nutrients that are shown here. Other goals could include potential recommendations of the 2020 Committee, as you'll hear in a few minutes.

The third step is to establish the food groupings and the food group amounts. And this is informed by the existing food groups and subgroups in the USDA Food Patterns for ages two years and older. What we did was to create options with different proportions of energy from human

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milk or infant formula and, thereby, calculate the remaining energy for complementary many foods and beverages.

To do this, energy from human milk was model at three levels, at low, average, and high based on empirical data and applied to each of three age intervals. The energy from infant formula was also modeled at three levels, but only applied to two of those age intervals.

This table shows the energy from human milk at those three levels, high, average, and low, at each time period, and the consequent amount of energy available for complementary foods and beverages.

So just to illustrate, at 600 calories in total, human milk may range from a high of 600, meaning all of that, in the earliest age range and at high intake levels, down to 240 calories at the lower human milk level at nine to 12 months.

And as a result, the calories available for complementary foods and beverages range from none to 360. And just illustrate, at 800 calories

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of the amount coming from human milk could be all of it down to a low of 160 calories from human milk.

And the amount for complementary foods and beverages ranges from zero up to 640.

So this is just to illustrate to you that we had a very wide range of calories within which we were attempting to fit the foods and beverages that would meet all nutrient needs. And I will tell you, that is quite a task.

We started by taking the 1,000-calorie level pattern established in the existing pattern, and then when total energy was to be less than that amount, the amounts of each food group were decreased such that the food group density in the pattern remained similar to the food group density of the 1,000-calorie pattern -- so basically extrapolating downward, but keeping things proportional.

And then we had to modify the combinations of complementary foods and beverages in order to reach all or most of the specified nutrient goals. In order --

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(Temporary audio interruption.)

CHAIR SCHNEEMAN: Okay, this all sounds very logical. It's complicated. I know it is. I was on that those discussions. So you're doing a great job at communicating it.

MEMBER DEWEY: Yeah, I think I finally understand --

(Audio interference.)

MEMBER DEWEY: It helps to write the chapter and make the flags to get it all in your head.

OPERATOR: Okay, you're back and live. You're back and live.

CHAIR SCHNEEMAN: Great.

MEMBER DEWEY: All right, I'm going to go back. Is this the right place to start over?

CHAIRMAN SCHNEEMAN: Go back one slide.

MEMBER DEWEY: Okay.

CHAIRMAN SCHNEEMAN: Yeah, go back, yeah.

MEMBER DEWEY: Okay, so this is just

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to say we evaluated the nutrient level in each exercise against the goals, which were generally at least 90 percent of the RDA or the AI. And then if those goals were not met, we re-evaluated and adjusted to the best of our ability.

So this slide illustrates some of the steps we took in the modeling, for instance, and human milk from six to 12 months. And as I was saying, in the first step with food group amounts in proportion to the amounts in the 1,000-calorie pattern, there were many nutrient gaps.

They were low in iron, as we expected, but also many other nutrients. The iron content of this first step was far below the RDA at 11 milligrams and the zinc content also tended to be below the RDA.

So in the second step, we replaced 56 calories of greens with an equivalent amount from fortified infant cereal, which is half an ounce equivalent per day. And that allowed us to increase the iron content to about 8 to 9 milligrams, six to nine months and 8 to 11 at nine

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to 12.

This was still lower than our goal for most energy levels and human milk proportion options, but it was much closer and the zinc content was adequate.

So the third step was then to examine how much energy remained for other complementary foods and beverages after including the fortified infant cereal. And this slide illustrates how much that represents.

I'm not going to go through all the details, but it has three levels of human milk intake. We have the energy from all complementary foods and beverages. And then we subtract the infant cereal to give us the remaining amount, which is shown in the red bar. And that is shown to be between zero at six to nine, up to 224, and then from 124 to 484 at nine to 12 months. And then from about 300 up to 740 at the second year of life. So again, a huge range in calories to work with for the other complementary foods and beverages.

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So in the final step, we examined how those calories could be allocated across the food groups and subgroups to move closer to adequacy for several nutrients in particular: iron, zinc, potassium, and choline.

So one of the other things that we did was to set up a minimum amount of seafood, eggs, and nuts at this age, in accordance with the recommendations to introduce these foods during this age period.

We also set a maximum for dairy, given that infants at this age are receiving human milk or infant formula. And then the remaining nutrient gaps were filled to the extent possible by prioritizing protein foods, particularly meat, because of the relatively high content and bioavailability of iron and zinc in red meats, in particular.

So this table illustrates the approximate amount of the food groups and subgroups in example combinations of complementary foods and beverages for ages six to 12 months.

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You'll notice that it is not called a USDA Food Pattern, and that's because we don't think it is quite ready for that label. This is simply some examples that came pretty close to meeting the nutrient goals.

And you'll see, if you look at the amounts, that they're pretty small because at six to nine months, babies are just not eating very much. But it does include the fortified infant cereal, as I mentioned. And it include some protein foods and fruits, vegetables, and a very small amount of dairy.

The weekly amounts are also shown here in ranges, just to illustrate what we think can fit into the calories. At nine to 12 months, it's still a fairly small amount of food, but slightly larger for all of these food groups than it is at six to nine months.

What I can tell you is that there still were some gaps in the nutrients in these example combinations. So, for example, potassium falls short, which is true for many other age groups,

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and, therefore, choosing potassium rich fruits and vegetables as well as whole grain products, which are generally higher in both potassium and iron than refined grains, is a good idea.

There's no energy remaining for added sugars at all, and very, very few calories available for oils or solid fats.

So in terms of what the infants fed, infant formula would then be consuming, we replaced them in the combinations I just showed you, we replaced human milk with infant formula. And because they -- these models included both fortified cereal as well as infant formula, there were very few shortfall nutrients except for vitamin D and omega-3 fatty acids at some energy levels.

However, there is the potential for excess intake for certain nutrients, in particular iron, which reaches almost two times the RDA at nine to 12 months, although none of the estimates exceeded the UL of 40, and for zinc, which was generally somewhere between 200 and 340 percent

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of the RDA, and all of those for zinc exceed the UL, which is only 5 milligrams.

Although I should say that UL has been challenged as being too low. But I can say that formula fed infants don't need the extra iron and zinc from fortified infant cereal if their formula intake is above a certain level and, therefore, they could substitute other grain products, preferably whole grain, for the 5.5 ounces equivalent of fortified infant cereal.

So these are the draft conclusion statements based on the six to 12 month modeling work. We were not able to establish a recommended food pattern at this age because of uncertainty about nutrient requirements and challenges in meeting the RDA for iron, in particular, through complementary foods and beverages.

However, examples of potential combinations of complementary foods and beverages that come close to meeting almost all energy recommendations are described for a variety of scenarios, but differ in the proportion of energy

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coming from human milk or infant formula.

The example combinations that I just showed you support the consumption of fortified infant foods to meet nutrition adequacy for infants whose milk source is human milk. And formula fed infants who also consume infant -- iron fortified infant cereals may consume pretty high levels for iron at this age, as I mentioned already.

So further work is needed to determine the feasibility of meeting all nutrient recommendations for infants fed human milk at six to 12 months from diets that do not include any fortified foods.

With the exception of vitamin D, supplementation should not be necessary if fortified foods with appropriate levels of fortification are included for infants whose milk source is human milk.

And I already went over to the vitamin D supplementation guidance that's already present for infants.

So moving on to 12 to 24 months, we

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started with toddlers that were fed neither human milk nor infant formula. And the first step again was to set up a model that included the food group amounts in proportion to the amount in the 1,000-calorie pattern for older children.

And the subsequent steps were designed to fill the nutrient gaps that were evident in those first step models, for example, for iron and calcium. And again, we set seafood at a certain minimum per week, and we also increased whole grains to achieve potassium and oils to achieve omega-3 and omega-6 fatty acids.

This table shows the amounts in the food groups and subgroups in the Healthy U.S.-Style pattern that we developed for these toddlers. So I'm going to briefly run through what it shows.

We have, with a thousand calories on the left and 700 at the right, somewhere between a half and one cup equivalent of fruit; 0.65 to one cup of vegetables with a variety of different types of vegetables. Should note that the numbers in that portion are per week, not per day.

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For grains, it ranges from 1.75 to 3-ounce equivalents per day, with the vast majority coming from whole grains. We really had to pump that up in order to achieve some of the nutrients we were aiming for.

And the protein foods, as a whole, are two-ounce equivalents per day and distributed in the month, per week, with a pretty strong emphasis on meat and poultry. Again, for the iron and zinc content with some eggs, from seafood, nuts, seeds, and soy and 1.66 to two cups per day of dairy and nine to 13 grams per day of oil.

Now, for that pattern, I can show you the nutrient levels and how they compare to the AI or RDA. I'll just highlight a few. The percent of calories from protein ranged from 18 to 23 percent, which is fairly high and fat range from 32 to 35 percent.

There were some nutrients that fell short of 90 percent of the AI or RDA that are shown here in red. This was mostly at the 700 calorie level where the amount of energy for complementary

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foods and beverages is very small. And they were all between 84 and 88 percent. But for potassium, vitamin E, and vitamin D, we had shortfalls across most of the energy levels.

Next, I'll turn my attention to toddlers fed human milk in the second year of life. We started with the same first step and had to make adjustments to the protein foods similar to what we had done, for instance, at nine to 12 months to increase both iron and calcium.

We also had to make adjustments to the vegetable subgroups in order to try to get as much of those nutrients into the pattern as possible.

And this resulted in a decrease in the starchy vegetables compared to other patterns.

And we refined -- reduced the refined grains to about a quarter cup per day, quarter cup equivalent and adjusted dairy to allow for some energy for oils. Despite all of those steps, we still had nutrient shortfalls for several nutrients. But I will still show you what we came up with.

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And again, these are example combinations because we do not feel ready to label these as actual formal food patterns, given how far we were able to get. But what you can see is that, at 12 to 24 months.

Can people still hear me? I heard a funny sound come through.

CHAIR SCHNEEMAN: Yes.

VICE CHAIR KLEINMAN: Yes.

MEMBER DONOVAN: I can hear you, yes.

MEMBER DEWEY: Okay, good. All right.

So you can see that the amounts of fruits, somewhere between a third and two quarters of a cup, two thirds of a cup of vegetables, changes in the weekly -- sorry, distribution across the subgroups of vegetables for the weekly amounts, total grains of about one and a quarter to two and a quarter and pretty high levels of total protein foods with a distribution across all of those subgroups, a wide range in dairy because of the differences in calories available, and then two to eleven grams of fat.

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So moving on, the next thing we tackled was a vegetarian diet for toddlers, and I need to emphasize that this is a lacto-ovo vegetarian diet.

And this is for toddlers fed neither human milk nor infant formula.

We started with the healthy vegetarian style pattern at the 1,000-calorie level for older groups, and there were several nutrient shortfalls when we had that first step. So we then went on to adjust it. We included three eggs per week to achieve choline. We shifted the grains to emphasize whole grains.

And we ended up with the pattern shown here. Again, I'll run through it pretty quickly.

It's similar in terms of fruits and vegetables to the Healthy U.S.-Style pattern for non-vegetarians. And again, with a distribution across those subgroups of vegetables, but it has more legumes than the other pattern.

For grains, very similar in terms of total grains with a very strong emphasis on whole grain in order to move the nutrients needs and

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protein food in terms of one-ounce equivalent per day, and that's provided by eggs, nuts, seeds, and soy and dairy. And then a small amount of oils.

For this pattern, it's similar in many ways to the healthy lifestyle, but it's a little bit lower in proteins, 16 to 18 percent. Calories from fat ranges from 33 to 36 percent.

And there are, again, a few shortfall notes here for the 700-calorie level in particular and for potassium, vitamin E, and vitamin D again.

So the draft conclusion statements for this age group are that for toddlers fed neither human milk nor infant formula, we developed a food pattern that is consistent with the proportions of food groups and subgroups recommended for children two years and older.

It requires careful choices of food and beverages, but does not require inclusion of fortified products specifically formulated for infants or toddlers to meet the nutrition recommendations.

For toddlers who received at least 20

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percent of total energy coming from human milk, we were not able to establish a recommended food pattern because of uncertainty about nutrient acquirement for this age range and challenges in meeting the RDA.

However, we do show examples of potential combinations that come close to meeting all nutrient recommendations. For toddlers fed a lacto-ovo vegetarian diet, and fed neither human milk nor infant formula, we developed a Healthy Vegetarian Pattern that includes regular consumption of eggs, dairy products and soy, and nuts and seeds in addition to the other food groups.

This also requires very careful choices of foods and beverages, but does not require inclusion of fortified products.

For both of the age intervals from six all the way to 24 months, we have another conclusion statement regarding added sugars. And that is that the combinations of food needed to achieve recommended intake of key nutrients leave virtually no remaining dietary energy for added sugars, apart

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from the very small amounts already inherent in the foods used in modeling.

I just want to say a few more things to discuss what we learned. The first is that it is very challenging to develop recommended food patterns for this age group because the nutrient needs are high relative to energy requirements and the amounts of food consumed are very low, especially at the younger ages.

We opted to start with modeling the contributions of the food groups in proportion to the 1,000-calorie pattern for the older groups with adaptations to correspond to the nutrient needs of this age range.

And this has the advantage of developing patterns that are feasible with respect to the types of foods consumed in the U.S. and that become consistent with the patterns recommended for older age groups by the time they reach 24 months.

However, the results do not necessarily represent the optimal combinations of foods and beverages for meeting nutritional goals, which

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actually required a different modeling approach.

And there are pros and cons for doing it different ways. The strength of the approach we took is that it modeled various scenarios regarding potential contributions from human milk or infant formula.

And in general, the USDA Food Patterns provide examples of the amounts of food groups and subgroups to consume, but they don't dictate the specific types of foods. So, this flexibility allows for foods to be tailored to an individual's needs and preferences, the cultural preferences, and cost considerations.

There are some limitations of what he had to work with. There is uncertainty regarding the nutrient composition of human milk, as was already mentioned, and the nutritional goals in the models for six to 12 months are based mainly on adequate intake values because the RDAs are available only for protein, iron, and zinc.

I want to say a few words about iron

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because it is a key nutrient at six to 12 months, and it was the most limiting nutrient for the infants fed human milk. It couldn't meet the RDA without including our iron fortified infant foods.

I should mention that those sorts of foods have been an important strategy for reducing iron deficiency in the U.S. for several decades.

But fortified infant foods are not necessarily the only way for infants fed human milk to achieve the RDA for iron.

Red meat is a good source of iron and hemeiron is better absorbed. But obtaining the required amount solely from red meat, if you don't count liver, may not be feasible. If liver is in the equation, you can get there, but it's not that widely consumed.

So further work is needed to estimate the quantities of animal-source foods that would be needed by infants fed human milk to support adequate iron status without fortified foods.

On the other side, infants fed infant

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formula have the potential for excessive levels of iron, as I have mentioned, and this is because the iron content of formulas that are most commonly used in the U.S. is relatively high, and it's about 40 times the iron content of human milk. So there is a huge difference.

I'd like to say a couple words about potassium. It was challenging to meet the AI for potassium in all of the models. We should say there are uncertainties regarding the AI of this, but nonetheless chooses potassium rich foods is important at these ages.

And for iodine, we could not predict iodine intakes because the food composition data are not available. But in situations in which neither the mother nor the infant consumes iodized salt, but consumes adequate iodine from other sources, the iodine intake for these infants could be deficient.

And this is important because the under-consumption of iodine during infancy has some important potential consequences for brain

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development, especially if maternal intake was also low during pregnancy.

So we have some conclusions. I won't read all of these because I've already mentioned that for instance, age six to 12 months, we were not able to come up with a recommended food pattern, so we do think additional work is needed. Tools such as linear programming and taking into account differences in iron, bioavailability from different sources would be very helpful.

We did learn of the importance of prioritizing certain food groups. For example, certain animal-source foods are very important sources of key shortfall nutrients, not just iron and zinc, but choline and long chain polyunsaturated fatty acids.

But fortified infant cereals can contribute a substantial amount of some of these nutrients, but we still need to pay attention to some of these other food sources to provide all the critical nutrients.

By contrast, the dairy products are

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probably less crucial at this age than other types of animal-source foods at six to 12 months because infants are still receiving human milk or infant formula and dairy products tend to have low amounts of iron.

Prioritizing fruits and vegetables is another key element. They're very important not only for the nutrients they provide, but also to foster acceptance of such healthy foods.

And in addition, the introduction of peanut products and egg in the first year of life is advised to build tolerance, to feed antigens and to provide good sources of fatty acids and choline.

Moving on to 12 to 24 months, we were able to establish a food pattern for toddlers fed neither human milk nor infant formula. And this has a wide variety of different sources of foods.

Again, the key aspects include emphasizing potassium rich fruits and vegetables, iron as in seafood, making whole grains the predominant type, and choosing oils over solid

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fats.

In these patterns, energy from oils is fairly minimal and there's no energy remaining for added sugars.

This figure illustrates the amounts in the recommended intake in that pattern for the toddlers, which is in the black bars that have the headers and footers on them and then the fifth to 95th percentile of the intakes that we actually have from intake data for this age range from 12 to 24 months.

And what this illustrates is that for some of the food groups, like fruits and vegetables, the intakes are not that far away from the recommended intakes. In the case of fruit, it's actually fine.

For vegetables, the recommendations are at the high end. But for -- and for total grains, the intakes are quite high. But for whole grains, the intakes are below the entire range of recommended intakes for both males and females. Whereas the refined grain intakes are well above

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the recommended intake.

So that shift is a critical one. Total protein foods are actually within the intake range, and the recommendation for dairy foods also are there. So we do think that there is a certain amount of feasibility in the patterns that you were able to develop through toddlers.

For toddlers fed human milk at 12 to 24 months, we had a much harder time, but we are able to provide some example potential combinations of foods and recommend additional work.

And this needs to take into account mineral bioavailability, not just for iron, but for the other minerals like calcium under various conditions.

And again, as I mentioned, we did come up with a pattern for a lacto-ovo vegetarian diet.

And we do want to emphasize, however, that because of concerns about iron bioavailability in the vegetarian pattern, we recommend further modeling work that takes that into account.

And again, very careful choices are

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needed within the Vegetarian Pattern. It is not a vegan diet. It includes substantial amounts of egg and dairy. And without supplements or fortified products, it is not possible to meet all nutrient goal with a vegan diet at this age.

We want to emphasize that these findings are not intended to provide a combination of complementary foods and beverages or a food pattern that's right for every infant or toddler because children develop at different rates and many different circumstances influence their feeding needs and decisions.

So toddlers who have relatively low energy intakes may actually benefit from food combinations that resemble those for the older infants and then with a gradual shift to the pattern that we've just presented for 12 to 24 months.

The general principle is to view this period as a continuous transition from diets that are appropriate for infants to diets that resemble family food patterns. And we have a beautiful slide, thanks to TusaRebecca, that illustrates the

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kinds of transitions that we are coming up with.

These are based on the Healthy U.S. Pattern for the toddlers that are not fed human milk or infant formula, just illustrating what happens with the different calorie levels. It's a basically relative amounts of these food groups as children eat more and get older.

So we start with relatively small amounts of fruits and vegetables and then expand over time. The same is true for grains, but what you'll notice is that the whole grains are much larger proportion of the total in those lower calorie levels, and finally, when you get to two years and beyond, then there's a greater flexibility.

For protein foods, you'll notice a pretty wide band for the meats and poultry, that purple band. It's actually not small, as the youngest or the smallest calorie level. It's pretty substantial. It's pretty stable in terms of total protein foods until two years. And then it goes up a bit.

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Dairy foods are pretty sizable, all the way through, expanding a bit and then a very small amount of oil is possible and getting higher as calorie level goes up.

And we're going to do a little more work on this, but this is our attempt at visualizing this transition. So in terms of recommendations, we have several advice for caregivers.

Provide a variety of animal source foods, fruits and vegetables, nuts and seeds, and whole grain products beginning at six to 12 months and continuing thereafter to provide key nutrients, foster acceptance of a variety of nutritious foods and build healthy dietary habits.

For infants fed human milk at six to 12 months, consider providing iron fortified and some cereals or similar products to ensure adequate iron intake; provide good sources of omega-3 and omega-6 fatty acids such as seafood beginning in infancy with the standard advice about trying to choose types of seafood that limit exposure to methylmercury; introduce peanut products and egg

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between six and 12 months, again, using forms of peanut that don't present a choking risk.

The evidence regarding the other potentially allergenic foods in the first year of life is limited, but there is no reason to avoid them. For toddlers 12 to 24 months, whose diets do not include meat, poultry, or seafood, provide eggs and dairy products on a regular basis along with the other food groups; avoid foods and beverages with added sugars during the first two years of life. And for several reasons which I have already explained and I won't read to you again, but very important to emphasize that this is a period when food preferences and patterns are beginning to form. And so limiting the consumption of foods that contain added sugars while encouraging nutrient-dense foods is a really critical step at this age.

We have a couple of recommendations for the Federal agencies. One is to develop communication and dissemination strategies that effectively address common misconceptions about

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diet for infants and children in this age group.

The importance of carefully choosing these foods may not be fully appreciated by the public. For example, there's a rhyme that says food but for one is just for fun. And that implies that the only goal during infancy is fostering pleasant, soothing eating experiences, but the nutritional contribution of such food is not critical. That's really not true.

And so a more appropriate message is that every bite counts, which emphasizes the nutrients of concern while also conveying the need to make eating enjoyable and the importance of responsive feeding practices.

We also recommend considering strategies to assist caregivers and program managers to use the information about the combinations and patterns described in this chapter, in particular, how to operationalize providing the amounts that are listed.

This information is provided by energy level, where the energy intake of an infant or a

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toddler is generally unknown by caregivers.

And with that, I have finished explaining to you how we came up with food patterns for this age group. But I very much welcome your questions and discussions.

MEMBER BAILEY: I think we need a round of applause, Kay. That was really tremendous. Thank you.

MEMBER DEWEY: Yay. Are we are we doing discussion now or are we taking a break first?

CHAIR SCHNEEMAN: Yes. Yes, let's go ahead and do that discussion before we take the break, because we have a little bit of time till 3:30 that we can still use the bridge that we're on.

MEMBER NOVOTNY: This is Rachel Novotny. Great to have this piece on the Dietary Guidelines. Thanks to all participants.

I have a very specific question. I wondered, Kay, if you or your group was able to quantify in any way the contribution of potential at least contribution of sunlight to the vitamin

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D needs. Is that something you could speak to?

MEMBER DEWEY: No, we didn't really do that. It's my understanding that the DRIs make a certain assumption about sunlight exposure, but I don't know what that is for this age group.

And so I think further work might be needed on that. First of all, making sure that it would be a safe level of exposure and then understanding what that might mean, certainly at the lower latitudes, like Hawaii, where you live.

MEMBER NOVOTNY: Right. All right, thank you.

MEMBER SABATÉ: Joan Sabaté here. I went to congratulate you, Kay, and your group for such a meticulous and comprehensive work. I think that is excellent.

I'm not a specialist in this area or in this age group, but I'm a little bit confused by, I would say, contradictory viewpoints or arguments on the website.

I mean, the excessive intake of iron may not be the best. On the other side, I mean,

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the original schematic way of meeting the demands, I mean, and that, in some situations, especially when there's too much red meat. I mean, we've been having up to 200 percent of the requirement.

I don't know if this is the best way to approach it or there are other ways, as you presented, in subsequent slides, that reducing the amount of red meat or not even including it, I mean, it probably overall better.

MEMBER DEWEY: So let me just respond by saying, first of all, that the -- there may be a difference in how iron from supplements is handled compared to iron coming from a food source.

And the caution that we raised in Chapter 6 about iron supplements was specific to that form and, in particular, was of concern for infants younger than six months who were not yet regulating absorption of iron.

So that's where I think I am personally the most concerned. In terms of after six months, what we showed is that formula fed infants who are already getting substantial iron from formula, who

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then receive an iron fortified cereal, might be reaching up to two times the RDA.

And for that reason, we actually don't recommend that they get a fortified cereal on top of the formula. But if you just give them some meat and not fortified cereal, they wouldn't be anywhere close to 200 percent of the RDA. So that would not worry me.

For the human milk fed infants and toddlers, that red meat is actually a very important source of iron because it's absorbed much better.

And even if you stack the deck as high as possible on the red meat, you're nowhere near exceeding the iron RDA at either six to 12 months or 12 to 24 months.

So I think, although older individuals may be more worried about too much iron, and particularly males, who are not menstruating, I don't think this is the same kind of things that we're worried about for children under two.

MEMBER SABATÉ: Okay, thank you.

MEMBER VAN HORN: Just out of curiosity

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-- this is Linda Van Horn -- I know that in vegetarians, I believe, iron absorption is greater than in omnivores, depending on the source.

And I'm just curious if you came across any data suggesting that children of vegetarians likewise have an added or, you know, accelerated absorption or enhanced absorption of any exposure to dietary iron?

I know that was an interesting question of research, but I don't know where that it has gone and if there are further data to support, either way, what happens?

MEMBER DEWEY: Well, I would expect that if vegetarians are absorbing more iron, it might be because they're slightly iron deficient or their iron stores are depleted. And that would up-regulate iron absorption. We know that that happens.

MEMBER VAN HORN: Right.

MEMBER DEWEY: So I don't think it's inherent in what they're eating. It's inherent in what their body is sensing in terms of iron

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adequacy.

The same would be true for an infant or a toddler who is becoming iron deficient. Their iron absorption would be up-regulated. And so that's why we often have so much uncertainty about how to model iron requirements, iron absorption, and risk of inadequacy.

For example, just the iron absorption from human milk has been estimated to range between, let's say, 16 percent, up to 56 percent. And that's probably because the infants themselves differ so much in their own iron status. Yes, so it's a very complicated scenario.

MEMBER VAN HORN: Yes, but also, you know, of interest in terms of, you know, maternal-fetal relationships, in terms of diet and absorption and nutrient adequacy, et cetera, to be continued. Thank you.

MEMBER DEWEY: That's right. Yes, yes.

CHAIR SCHNEEMAN: Are there other questions or comments? And keep in mind that we

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have Chapters 4, 5, 6, and 7, although certainly the work done on Chapter 7 is huge.

CHAIRMAN SCHNEEMAN: Well, I think if there are no more questions or comments, just checking to see. If there aren't any more questions or comments, now might say a good time to break so that we can switch to the new webcast link.

Is that -- that's it.

MEMBER BAILEY: So, what time do you want to restart? So, like 3:30?

CHAIR SCHNEEMAN: Well, I think we need to have -- well, can we take a 20-minute break? Would that work for folks?

MEMBER VAN HORN: Sure.

MEMBER REGAN: Yes, that works.

MEMBER DEWEY: Yes, that sounds good.

CHAIR SCHNEEMAN: Okay, so at 3:40. And so, when we come back, we'll start with Chapter 8, at 3:40.

MEMBER VAN HORNY: And now, are we supposed to sign off and re-enter or is that later?

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MEMBER SABATÉ: Yes.

MEMBER NOVOTNY: Is that on this line?

MEMBER NOVOTNY: This line or just a new web line?

(Whereupon, the above-entitled matter went off the record at 3:21 p.m. and resumed at 3:44 p.m.)

CHAIR SCHNEEMAN: Thank you. So the first presentation we're going to hear is from Dr. Boushey, on Chapter 8, on Dietary Patterns. Carol?

MEMBER BOUSHEY: Hi. Thank you so much, Barbara. I'd like to give a shout out to all Committee members listed here on the slide. And we divided up the work and depended heavily on support staff, but everyone pulled their weight, and then some.

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

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And that was a special technical expert collaborative report with NESR. So next slide.

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

The 2020 Committee also examined studies adopting a new exposure: macronutrient distribution, defined as consuming at least one macronutrient outside of the acceptable macronutrient distribution range.

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

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slide.

All questions discussed in the chapter were answered using systematic reviews conducted with support from USDA's Nutrition Evidence Systematic Review, NESR, team. NESR's systematic review methodology provided a rigorous, consistent, and transparent process for the Committee to search for, evaluate, analyze, and synthesize evidence.

The Committee's work includes 23 graphs -- drafts, I keep saying graph, but it's draft -- 23 draft conclusion statements across the eight questions. Nearly 500 articles were included in the NESR systematic reviews.

For dietary patterns, most conclusions revealed consistency across questions, and were graded with strong to limited. The majority were graded moderate.

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

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conclusion was limited, while the rest were grade not assignable.

Most evidence was found for middle-aged adults, than other age groups. This is likely a function of endpoint outcomes of interests presenting later in life. For example, sarcopenia, all-cause mortality, cardiovascular disease.

More evidence was generalizable to the U.S. population, including those at higher risk of overweight or obesity. Many studies examined were prospective cohort studies and randomized control studies -- trials, and these were included in most of the reviews. Next slide.

The dietary patterns approach captures the relationship between the overall diet and its constituent foods, beverages, and nutrients in relationship to health outcomes of interest. The evidence base for associations between dietary patterns and specific health outcomes has grown since the previous review by the 2015 Committee.

For example, compared to the 2015 NESR

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systematic review on dietary patterns and cognitive impairment, dementia, and Alzheimer's disease, the current review included about the same number of articles, and that's about 26, for a six-year period, as the previous review, 30, included from 1980 to 2014.

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

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

So I'm on slide 6. For adults, evidence was considered moderate or strong for the

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association between dietary patterns and all health outcomes, except for neurocognitive health and cancers of the prostate and lung, where the evidence was limited.

Insufficient evidence was available to evaluate dietary patterns and sarcopenia outcomes.

Next slide.

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

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

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drinks and refined grains, those were lower, and I'll be showing those on the next slide.

Although vegetables and fruits were consistently identified in every conclusion statement across the health outcomes, whole grains were identified in all except one of the health outcomes examined. Low or non-fat dairy, seafood, legumes, and nuts were identified as beneficial components of the diet for many, but not all outcomes.

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

And so this blue graph here, it represents a summary of the data, so if something isn't filled in, it doesn't necessarily mean it

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wasn't -- you know, isn't important, but it wasn't noted as much.

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

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

Overall, the evidence was limited for overweight and obesity, and CVD risk factors. The characteristic of dietary patterns associated with overweight and obesity, and cardiovascular disease risk factors were similar to adults, including dietary patterns that are higher in fruits and vegetables, whole grains, and low-fat dairy, and lower in added sugars, for example, sugar-sweetened beverages and processed meats.

Type 2 diabetes and bone health were

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both classified as grade not assignable, indicating that insufficient evidence was available. Next slide.

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

In an attempt to address this issue, the Committee reviewed studies where at least one macronutrient was outside the acceptable macronutrient distribution range established by the National Academy of Sciences.

As a reminder, articles needed to describe the entire macronutrient distribution of the diet by reporting the proportion of energy from carbohydrate, fat, and protein. The Committee established this criteria in order to examine the entire distribution of macronutrients in the diet, and not just one macronutrient in isolation.

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These criteria allowed the Committee to both consider the relationships with health outcomes of consuming a diet with one macronutrient outside of the AMDR, and also how consumption of that macronutrient displaces or replaces intake of other macronutrients within the distribution.

The Committee did not label the diets examined as low or high, because no standard definition is currently available for low-carbohydrate or high-fat diets. Instead, the Committee focused on whether, and the extent to which, the proportions of the macronutrients were below or above the acceptable macronutrient distribution range, AMDR.

The AMDR, as set by the National Academies of Sciences, has a range for adults: protein, 10 to 35 percent; fats, 20 to 35 percent; and carbohydrates, 45 to 65 percent of total energy intake.

Of note, the Committee was not charged with evaluating the evidence for dietary patterns to treat disease, and the Committee excluded

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interventions designed to induce weight loss or treat overweight and obesity through energy restriction, hypercaloric diets for the purposes of treating additional or other medical conditions.

Its review is limited to consideration of macronutrient distribution in relation to reducing risk of overweight, obesity, and related health outcomes. Next slide.

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

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

In many instances, these qualifiers

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were labeling macronutrient distributions that were within the AMDR. Studies assessed macronutrient distributions using various statistical methods. In several instances, all of the macronutrients of interest were outside of the AMDR, providing inadequate comparators, offering the variability in macronutrient proportions within and between distributions was limited and included only smaller deviations from the AMDR, providing insufficient contrast of diet comparisons.

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

This made directness difficult to assess across the body evidence. Ideally, to adequately address the question of how a difference in macronutrient distribution affects key health

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outcomes, studies should be designed to isolate the effects of macronutrients within the context of a constant dietary pattern.

For example, it would be possible to compare the effect of a low-carbohydrate, example, less than 25 percent of energy, to a moderate carbohydrate within the AMDR, Mediterranean dietary pattern with specified foods and amounts in an isocaloric design.

Overall, particularly given the level of public interest, future research is essential to further the understanding of the effect of altering macronutrient distribution outside of the current AMDR, beyond diets currently used to treat CVD, obesity, or type 2 diabetes.

Next slide. The 2020 Committee examined dietary patterns and macronutrient linkages as a means of answering eight specific questions related to the broad areas of growth, development, and the risk of chronic metabolic structural neoplastic and neurocognitive diseases.

The Committee also examined, for the

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first time, the association between dietary pattern and all-cause mortality. A consistent dietary pattern associated with beneficial outcomes was present across all seven of the reviewed questions, for which grades of variable strength were assignable.

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

Dietary patterns associated with adverse or detrimental outcomes included higher intake of red and processed meats, sugar-sweetened fruits and beverages, and refined grains. Next slide.

The Committee developed this figure to conceptualize the importance of dietary patterns and the influence of diet quality on health outcomes. This figure depicts the connection

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between dietary patterns and its component parts.

It demonstrates how foods, beverages, food groups, macronutrients, micronutrients, or components of dietary patterns, as well as bioactive compounds.

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

The figure also recognizes that social determinates of health, such as food access, food security, settings, and environments can play a role in influencing diet quality of a dietary pattern. Additionally, individual factors also impact health outcomes. Next slide.

The Committee's review supports the use of recommending dietary patterns to the U.S. population. Collectively, these observations have major implications for recommending dietary patterns to the U.S. population.

Although the patterns identified in the

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Committee's reviews represent different named diets, such as DASH or Mediterranean, the Committee's review conveys a public health message reflecting key foods across studies that, in common, comprise a healthy diet that promotes optimum growth and development, while minimizing risk factors underlining the onset of chronic diseases.

These public health messages are vital, especially in an era of undergoing an epidemic of non-communicable diseases, including obesity, type 2 diabetes, cardiovascular disease, cancer, sarcopenia, and dementia.

And that poses potential further immunological risks associated with infectious diseases as well. These chronic diseases often have their origins early in life, as we just heard, highlighting the importance of initiating and maintaining a healthy diet across the life course.

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

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you.

CHAIR SCHNEEMAN: Okay. Thank you very much, Carol. And so the presentation is now open for discussion or comment from the Committee.

Are there questions for Carol or the Dietary Patterns subcommittee?

MEMBER DAVIS: Hello, Carol. This is Teresa Davis.

CHAIR SCHNEEMAN: Teresa, go ahead.

MEMBER DAVIS: Yes. So in the studies where you were looking at the effects of red and processed meats, were the red and processed meats lumped together or were they separate studies looking at red meat and separate studies looking at processed meat?

Because, you know, we know that the consumption of red and processed meats are generally associated with, you know, reduced exercise, reduced fruit and vegetable intake, increased refined grains, and so forth, so there's certain other dietary patterns that are generally associated with the red and processed meats, and

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also, certain behaviors.

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

MEMBER BOUSHEY: That's a very good question, because with a review such as this, you really are -- you know, what is dictated was how the study was put together, and what I think that our table shows, if we go back up to that, that you'll find that red meat is actually in the positive group, you know, positively associated with a healthful diet and outcomes, and it's also in the negative.

So it's a case of -- you know, and so it's either a case of what meat was used to describe the pattern, or other foods that were along with it, but that's one of those that will go both ways.

You see lean meat is in -- thank you for going back to that, so lean meat comes up as being in the healthful patterns, and then if we go down, as you had noted, then -- and you see that we're bound by how the studies described and

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separated them out, but then red meat also occurs in -- as being a negative component, along with processed meats.

And you can even see, then, this single one, because they used, also, high-fat meat. And, you know, so this is part of the constraints that you have because when you're collecting all this, you have a lot of data that you get, but we are bound by what food was -- what food or food group was identified by the study.

The meat is one that's definitely a crossover component.

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

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

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it that something that actually could be added for clarification?

MEMBER BOUSHEY: And we can go back and look at that, but what really is the driver of this is how it was described in this -- how it was most frequently described in the studies. We're, you know --

(Simultaneous speaking.)

MEMBER DAVIS: So this is Teresa Davis, so does that mean that we need to recommend that studies be able to separate out the two of the red meat from the processed meat, or the red meat and the lean meat?

MEMBER BOUSHEY: Well, that's an idea to put forward to somehow -- when different patterns are put together, that if they want to distinguish different, you know, foods separately, then perhaps be more finite.

And one of the complexities that exists, I mean, what most of these patterns consist of, maybe, are 5 to 20 different components, and it might even be a statistical issue as to, you know,

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how many can you bear, but these are -- I think all of this is -- I think all of this would be excellent for -- you know, to examine.

I think these are good ideas as to how best to suggest, what can we pull out to better separate these foods that crossover? Because the message, we have several crossover foods, but the --

Rick, was that you?

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

MEMBER BOUSHEY: Right. That's absolutely right, Tim, as to that, indeed, that could actually represent a broader spectrum of meats.

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

MEMBER BOUSHEY: Yes.

MEMBER NAIMI: -- to differentiate those three classes, probably would be useful.

MEMBER BOUSHEY: The other one that, too, is dairy. Dairy is another one that likely could have several locations, too. So we do have documented, so -- I'm sorry, you're the king of this, is that we do have all of these foods documented in final -- but Joan, you're the one that waded through them the most.

MEMBER SABATÉ: Yes, I would like to add to the comments here. The names in this table are the ones that come directly from the conclusion statements, for each one of these self-outcomes.

And the conclusion statements were taken as

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literally as possible, although not 100 percent, but the majority of the times, based on the names on the actual published papers.

As you know, dietary patterns can be put into the analysis in different ways, and the researchers in different centers and in different countries, they use different names. And I agree with the idea that has been presented, that lean meats sometimes means lean red meat, but in other occasions, or for other studies, that is basically to say that it's fish and poultry.

Nevertheless, I mean, these names are taken from the conclusion statements and that is what it represents.

MEMBER BOUSHEY: Yes. And it does bring up an interesting idea about how do we harmonize these words? And we have an evolving food supply, so where, you know, it's -- these are difficult questions, but we do at least have a fairly good method and results that the more helpful choices do come -- have a lot of benefits.

CHAIR SCHNEEMAN: Right, but it sounds

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like something that could be used to go back through the chapter and just, where it hasn't been explained further, point that out as our limitation, or something that needs further work.

MEMBER BOUSHEY: Good idea.

MEMBER LEIDY: This is Heather, because if I remember correctly, some of the summary statements, I don't know if it's in the discussion or the conclusion, have, like, parentheses saying that it's including whatever food. And I remember one, I can't remember the outcome, I apologize, it said, including red meat.

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

I think it's those types of things. It could just be misleading or just confusing to people, because of the fact that it is in both categories, but the fact that red meat actually isn't listed as part of the lean meat category here,

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it might just be something to consider.

MEMBER BOUSHEY: Right.

MEMBER LEIDY: And then just one unrelated topic, but we've had previous discussions, and I think I had mentioned this in our last in-person meeting, I just wanted to follow-up another comment on that, you know, with this subcommittee's decision, as well as others, you know, sometimes strong evidence has been promoted when the majority of studies are prospective cohort studies.

And I know, you know, with all-cause mortality, that has been one of the main ones where it's primarily driven by prospective cohort studies. So, Carol, can you just comment on why the Committee's decision was to include that as strong evidence versus moderate, and it could be my interpretation. I think as strong evidence -- in some of our other subcommittees we talked about this, if something's really strong, it kind of suggests that additional research isn't needed, but the sense that there really aren't any

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randomized controlled trials that are tackling some of these topics, it's hard when you're hitting the ceiling of our range for, you know, limited know, which is strong, and we're at strong with just prospective cohort studies, so can you just comment on that?

MEMBER BOUSHEY: I think that the number of studies were so many. I mean, it was, you know, in the -- I hope I'm not too exaggerating, but, you know, it was in the double digits, hundreds -- well, that might be an exaggeration, but the numbers that consistently had the same result, and I'm a bit loathe to recommend that someone do a randomized trial with death as an outcome.

And so one of the ways that we can monitor this, is take advantage of these studies that have monitored people, they've taken measures of them, and they follow them over time.

And so when they die it's, you know, the natural death by what they -- you know, based on what their lifestyle was. And, you know, I'm not sure, I haven't tried this yet, to sign people

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up for studies and say, by the way, our endpoint is your death, you know, and we're randomizing you.

So I think it's just something we might need to, sort of, maybe have an ethicist working with us to kind of deal with this, but --

MEMBER LEIDY: So just to be clear, I'm not, obviously -- I'm not suggesting that we have randomized controlled trials with that as an endpoint. I think the concern that I just have is that it's just hard to go -- you know, it's strong based on observational evidence and I guess another question, and I apologize, I don't know the -- I forget the methodology with this, you know, if there were multiple time points where dietary intake was collected, you know, over -- you know, with multiple times, that might be more informative along with just, maybe, having one point in time.

(Simultaneous speaking.)

MEMBER BOUSHEY: And some of them had multiple, but not -- the majority do not, but some did have multiple. So then, if they didn't, what they're addressing is dietary intake at a certain

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time, but they still somehow separate it out.

CHAIR SCHNEEMAN: So, Carol, if I could comment.

MEMBER BOUSHEY: Yes.

CHAIR SCHNEEMAN: One thing I recall when the all-cause mortality was presented at the public meeting, one of the things they talked about is that, particularly because you have the indices and the scores, where you get almost a dose response effect. You start to see that the more you adhere to the dietary pattern -- the better outcome in terms of all-cause mortality.

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

MEMBER BOUSHEY: Right. Yes, that's a good -- that is so -- that's a really -- I'm glad you remembered that.

(Simultaneous speaking.)

MEMBER BOUSHEY: Joan?

MEMBER SABATÉ: If I can jump in on

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that, Heather's question, yes, I concur that, I mean, clinical trials, I mean, probably is considered the highest evidence. However, the -- I mean, it's impractical to do a clinical trial with total mortality, and the strong conclusion was based on several factors.

One is the large number of studies, that is over 100. Two, the remarkable, I would say, coincidence in the results of those; there were no studies going in the opposite direction, out of the many studies. Also, the dose response effect.

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

MEMBER LEIDY: Thanks. That was really helpful. Appreciate it.

CHAIR SCHNEEMAN: All right. I think we need to move to the next presentation, this is a good discussion, but again, there's still opportunity for comments from the Committee as they

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keep progressing.

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

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

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

Our subcommittee's review of evidence focused on the following questions included in Chapter 9. What is the relationship between types of dietary fat consumed, and risk of cardiovascular disease? And then the second question, what is the relationship between seafood consumption during childhood and adolescence, up to 18 years of age, and risk of cardiovascular disease?

And third then, what is the relationship between seafood consumption during childhood and

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adolescence, up to age 18 years of age, and neurocognitive development?

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

The question on dietary fats and cardiovascular disease was answered using a new NESR systematic review, conducted to build on evidence reviewed by the 2015 Committee. The questions on seafood were answered using new NESR systematic reviews.

Our subcommittee developed 23 draft conclusion statements across the three questions that I just mentioned. For the first question on dietary fats and CVD outcomes, our review included 228 articles from 164 different studies.

About 60 percent of the studies examined were randomized control trials. This review built upon the 2015 Advisory Committee's review of

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saturated fats. The conclusion statements were graded from strong to insufficient, but there was consistency in the findings across age groups and outcomes.

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

Thirteen articles from nine different studies reported on neurocognitive outcomes, one-third of these studies were randomized control trials. The majority of studies addressed developmental domain outcomes. There was insufficient evidence or no evidence to determine the relationship for all outcomes.

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

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LDL cholesterol.

And we noted that this was particularly true in boys. Two prominent sources of evidence for our review were the STRIP study and the DISC study. Our subcommittee determined there is a need for more longitudinal randomized control trials involving dietary intervention among growing children, to better understand how puberty, sex hormones, and male/female differences modify the effect of dietary fats on blood lipids and other CVD risk factors.

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

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

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cardiovascular disease risk.

The 2015 review considered evidence prior to January 2010, and included landmark studies that dated back to the 1960s. The 2015 conclusion statements were starting points as we reviewed and synthesized the evidence from the 191 articles in adults, which were included in our own research, and that included 97 articles from randomized control trials, and 94 from prospective cohort studies.

Our review determined that this more current evidence was consistent with the findings from the 2015 Committee. As I mentioned earlier in this meeting, we concluded that replacing saturated fats with unsaturated fats, especially polyunsaturated fats, had beneficial effects on total and LDL cholesterol.

New evidence remains inadequate to differentiate among, first, as a carbohydrate and their impact on blood lipids. Our Committee discussed at length, the importance of specifying the type of source and carbohydrate, whether it

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was simple or complex, and that was used as a replacement. However, few studies reported this information.

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

Our review of dietary fats also included dietary cholesterol, which is important due to its co-occurrence with the saturated fats in many animal-source foods. There were only a few articles included in the review which discussed the relationship between dietary cholesterol intake and blood lipids.

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

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

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mortality.

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

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

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

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mortality.

We recognize that the co-occurrence of dietary cholesterol and saturated fat in animal-source foods adds complexity to determining independent associations between dietary cholesterol and CVD endpoint outcomes.

More research is needed, including feeding trials, to better isolate the effect of dietary cholesterol on blood lipids and risk of cardiovascular disease. It's important to note that controlling for other cardiovascular disease risk factors, such as baseline blood cholesterol levels and BMI, would be a value to the existing literature.

Our subcommittee also conducted two systematic reviews focused on seafood intake during childhood and adolescence. One examined risk of developing CVD, and the other examined neurocognitive development and health.

We found insufficient evidence was available to accurately describe these relationships. This is distinct from the

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conclusions we made in regard to evidence reviewed in the relationship between seafood consumption during pregnancy, and neurocognitive outcomes of the child.

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

Evidence on neurocognitive development was predominantly null or favorable. The Committee's questions did not specifically focus on safety, however, the vast majority of analyses showed no detrimental relationship.

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

Additional research is needed in diverse populations to examine neurocognitive

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health outcomes. Researchers should use valid and reliable methods to assess the amount, the frequency, the type, the source, and cooking method, of seafood consumed by children, and use age-appropriate, objective neurocognitive assessment tools.

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

This recommendation applies to adults and children ages two years and older. We know that approximately 77 percent of Americans consume saturated fat in amounts higher than 10 percent of total energy, based on statistics from NHANES data 2015-2016.

Because of the high incidence of CVD in the U.S. population, the health effects of reducing saturated fat in the diet are of particular public health importance. We recommend that

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

This review focused on types, rather than sources of dietary fats, however, the Committee recognizes the importance of, and growing body of research, on food matrix and sources of fat; specifically, saturated fat. Differences in the effects of specific saturated fats on cardiovascular disease are important to examine in future research.

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

Individuals should eat as little

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dietary cholesterol as possible, while consuming a healthy dietary pattern. We know that population level dietary cholesterol intakes have decreased from the levels they were in 1980, when the Guidelines first recommended lowering cholesterol intake. However, NHANES data shows that mean dietary cholesterol intakes have increased in the recent years, as shown in this particular table.

Currently, the main intake of dietary cholesterol is 282 milligrams per day for the general population, ages two years and older. This represents an increase in mean dietary cholesterol consumption, compared to four years prior when the mean population intake was 267 milligrams per day.

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

For seafood intake in children, we recommend the following, two or more servings of cooked seafood per week are recommended for ages two years and older to ensure intake of key nutrients as a part of an overall healthy diet

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pattern.

Serving size varies depending upon the age of the child. NHANES 2013-2016 data indicates that only approximately 5 percent of U.S. children and adolescents ages 2 to 19 years report consuming seafood at least two times per week, with little variation by age group.

Increased seafood intake with emphasis on species higher in omega-3 polyunsaturated fatty acids, and with low amounts of mercury content, would be advised. The Dietary Guidelines should provide information on types of seafood to consume, as well as those to avoid, based on the methylmercury content.

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

All these recommendations can be achieved within the context of an overall healthy dietary pattern, as described by the Dietary

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Patterns subcommittee.

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

And at this time, that concludes the review of Chapter 9 and I thank you, and would welcome questions, if you have them.

CHAIR SCHNEEMAN: Great. Thank you, Linda. Do we have questions or comments?

I'm not hearing any questions or comments.

MEMBER VAN HORN: Maybe I'll just make one quick comment. This is Linda Van Horn.

And just to point that I think, you know, again, in the spirit of looking at these types of topics over the life course, I think we, as a group, continue to identify opportunities for initiating a healthy dietary pattern intending to reduce risk for cardiovascular disease, starting in childhood.

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If not because of immediate impact on risk for cardiovascular disease, the obvious improvement in lifestyle behavior and the adaptation to a cardiovascularly, you know, beneficial diet starting earlier in life, could, in fact, help in the long run as far as achieving better dietary adherence long-term.

So I'm sure this is true of a variety of different disease endpoints -- including type 2 diabetes, et cetera -- and, you know, discussions that we had repeatedly regarding prevention of overweight and obesity in children as a major focus in order to prevent the trigger that is often what initiates these risk factors that develop over time.

So I think, you know, it seems important here, recognizing that there were, in fact, limited data, especially longitudinal data like the STRIP study -- which, you know, has 20 years of data -- that prohibit us from making a stronger statement, but there certainly seems to be evidence from everything we've reviewed that initiating these

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dietary behaviors early in life is helpful in the long run in terms of both reducing risk for developing overweight and obesity, as well as adapting this type of a dietary pattern and lifestyle for future benefits.

CHAIR SCHNEEMAN: Great. Thanks. Thank you, Linda. Other comments or questions? So I think we can move to the next chapter and that will be done by Regan Bailey for Chapter 14, the USDA Food Pattern for individuals ages two years and older. Regan.

MEMBER BAILEY: Thank you. It's good to be back. So I'm really presenting the work that was led by Dr. Jamy Ard, who is a physician and is in clinic today so couldn't be here, but just really wanted to acknowledge and thank him for all the efforts, as well as all of the subcommittee in terms of working through Chapter 14 and the food pattern modeling.

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

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

So in terms of methods, something new that we worked on, in order to account for the variation in eating patterns across different age groups, the Committee employed this new approach, proportions by life stage were calculated for ages 2 to 3, 4 to 18, 19 to 70, and 71 and older.

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

So the patterns are derived by estimating target energy levels first and then they're built to represent a variety of food groups

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that provide nutrients and fiber at levels recommended by the dietary reference intakes.

So in doing so, they're really at the individual level at this point, so we utilize an RDA to evaluate them when available and an adequate intake if one is not available.

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

So the first question, are changes to the patterns needed based on relationships identified in the systematic review? And the answer was no.

The three existing USDA Food Patterns will still be recommended, including the U.S. Healthy-Style Eating Pattern, the Vegetarian Eating Pattern, and the Mediterranean-Style Pattern.

And so the Healthy U.S. Eating Pattern serves as the basis for the HEI. There were no additional patterns identified in systematic reviews that provided both a clearly defined food

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pattern and were consistently associated with health outcomes across different life stages.

The second question is, how well do these pattern variations meet the nutrient recommendations for each stage of life? Well, they meet the RDA and the AI for most nutrients, with the ability to stay under the UL or the CDRR.

There are four exceptions, those are iron, vitamin D, vitamin E, and choline. And I will show you that data as this presentation continues.

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

So you can see for certain things, like

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whole grains, intakes are well below recommendations and intakes of refined grains are well above recommendations, even for these young children two to three years of age, whereas, fruit intake, in general, is closely approximating recommendations.

We talked previously about how adolescents were a particular life stage that we were concerned about and so utilizing this life course perspective, we just wanted to show how the Healthy U.S. Pattern would be able to help achieve needs in this age group.

But you can see, again, there's some real deviation, whereas, in younger children, intakes of dairy foods more closely approximate recommendations. We see that that really deviates here in 14 to 18 year olds, but a similar story with whole grains and low intakes of vegetables.

And so this is the last slide that I'll show you like this. This is looking at all adults age 19 and older. And again, you'll see a very similar, similar pattern across the life course.

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So this is a really, really busy slide, and I don't expect you to try to read those numbers, but there's a couple of things that we wanted to convey. First, you can see that there's multiple calorie levels that are provided by sex as well as age group.

Those all go into the food pattern modeling exercises to support our life course approach. So don't focus too much on these numbers.

This is just a sample pattern for two years and older, but the DRIs are for one to three, so it's a little tricky. And again, that's one of those life stage things that we talked about, where the DRI is one to three and the Guidelines are two and older.

And so, you know, don't get too bogged down in that, but note that when comparing the proposed patterns, they've utilized the RDA or the AI, which represents the recommendations for almost everyone in a population.

So for many of these, these percentages are likely to be pretty conservative. We chose

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

So this is -- as we've mentioned, these patterns align with the acceptable macronutrient distribution range that's developed by the National Academies of Sciences.

You'll see, just following Linda's presentation, that the Healthy U.S.-Style Pattern also has an estimated saturated fat as a percent energy that hovers around 7 to 8 percent, so they're able to help Americans achieve the previous Dietary Guidelines for less than 10 percent of energy. But it should be noted that other authoritative bodies, like the American Heart Association, recommend even lower intakes of saturated fat to 5 to 6 percent.

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

So this slide presents some calorie

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levels for pregnant women, 19 to 30. One DRI age group, but again, all the other age groups are in the report.

The patterns for the pregnancy macronutrient distribution align with the AMDR, again, just for their supporting their utility.

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

And it's just very difficult to get higher levels. I do want to emphasize, though, that these are just from food sources alone. We know that during pregnancy, 77 percent of women take a prenatal vitamin that has both iron and folic acid in it. So these are likely to be representing an underestimation. But as Sharon mentioned earlier, when a woman is lactating, the iron requirements or recommendations are even much lower.

And so you'll see that even at a given

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calorie level, how that changes the percent these patterns provide. And then again, we've talked about the importance of folate -- particularly in the first trimester -- and that seems to be where the patterns are the lowest, but still achieving 86 percent of the folate RDA.

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

The pattern achieved 30 to 45 percent of the RDA for children for vitamin D and approximately 55 to 70 percent for the rest of the population. Vitamin D has always been tricky because it's not ubiquitously found in a high concentration in a large number of foods, and so it's been very difficult and has been consistently identified as a nutrient of public health concern for that reason.

The patterns provide less than 80 percent of the RDA for vitamin E, except for very young children, but as we talked about in previous

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meetings, vitamin E has been identified as a shortfall nutrient but not a nutrient of public health concern because the low intakes seen from dietary data have not been consistent with the clinical or the biomarker data which suggests very low risk of inadequacy of vitamin E from biomarkers.

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

So transitioning from a more nutrient to a more food-based, kind of, what do these patterns look like? So across the first column we have the main groups, for the most part, and then the Healthy Pattern, the Vegetarian Pattern, and the Mediterranean Pattern. And so these are the recommended servings, either per day, or for some of the protein food subgroups per week.

So I just called out a few of the major differences and again, these are all styles. These are not prescriptive. So the Mediterranean dietary pattern-Style has slightly more fruit, the Vegetarian-Style has more grains, particularly

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whole grains.

You'll see the biggest difference would be around protein foods, particularly in that vegetarian diet has -- is represented by more nuts, seeds, legumes, and eggs. And so again, as Kay noted, the vegetarian is a lacto-ovo vegetarian and that is because when participants at NHANES were asked about what type of vegetarian diet they were following, if they were, the vast majority were lacto-ovo vegetarians.

So this was continued to be assumed, but we have no current data on that. And then the Mediterranean diet would have more seafood in it than, of course, the Vegetarian diet, which has none, and the Healthy U.S. Pattern.

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

So in this slide, I'm back to showing,

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kind of, food component level information across the three patterns. So again, here, just 19 to 30 years for women who are not pregnant, get pregnant, or lactating.

So this is just an example, but we have all of the age sex groups in the report. So the main focus on this slide is macronutrients and selected food components where notable differences are underlined here for comparison.

So you'll see that the Vegetarian Pattern has more fiber. Remember, this pattern, from the previous slide, had higher intakes of whole grains and legumes, which are both good sources of dietary fiber. It is lower in dietary cholesterol, and it provides some -- we should talk about this -- iron estimate, because if you just looked at the numbers, you would say the vegetarian diet provides 91 percent of the RDA for iron, but if you read in the DRI chapter, the RDA is estimated to be 1.8 times higher for vegetarians.

And so if you take that into consideration, it would provide 51 percent of the

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iron. And that's because of the lower assumed intake of heme iron than nonheme iron, as well as higher levels of phytate, which may compromise iron absorption.

And then finally, is there current evidence to support supplementation or consumption of fortified foods to meet nutrient adequacy? And I have nutrient adequacy underlined because we're really looking at this in terms of meeting the Dietary Reference Intake recommendations.

So we do support the use of supplements or fortification, foods that are fortified with iron for females, especially during adolescence and pregnancy. Vitamin D is -- as I mentioned, has been a very difficult nutrient to get through foods alone.

Of course, some UV exposure is assumed for older age groups in consideration of the RDA, but it's difficult to quantify and account for UV exposure here.

And as I described earlier, folic acid should be met before and during the first trimester

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of pregnancy to reduce the risk of neural tube defects.

And so then I have some discussion slides to present to you with this, and given the context that the data presented from Chapter 1, the American diet is not now and has never been aligned with the Dietary Guidelines for Americans.

Most Americans would benefit from making different food and beverage choices. The three patterns here, as I said, are just example patterns to help provide a context, but they are not a prescription for any person.

They can be easily tailored to accommodate personal preferences in an individual context. We, as a Committee, did not address the cost of food and how this can be a barrier to access to healthy food options, but the USDA does have extensive work on this, on the CNPP website, where one can access information on how food plans can be tailored to meet recommendations at four different cost levels.

Energy balance always has to be given

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consideration, given the high prevalence of overweight and obesity in our nation. We consider -- we also have to consider how the food supply -- and thus, the food industry -- plays a role in the production of foods.

We've seen reductions in added sugars over time, as well as slight increases in whole grain. Given the cross-sectional nature of NHANES, we can't know if this is because people are changing behaviors or if it's a concerted effort to produce foods with lower added sugar or more whole grains.

We know that from the trans fat previous history, that reductions in dietary intakes were a result of the removal of trans fat from the food supply.

And so I guess the point that I'm trying to make here is just echoing and amplifying the work of previous Committees that utilized the social ecological model or a system science framework to aid in the promotion of positive dietary behavior changes, engaging multiple

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sectors and settings.

I guess I should have been advancing the slides. I'm just having a good time here in my office talking to myself. Sorry. Okay. So we, as a Committee, recommend that the USDA and HHS and future committees continue to build on the food pattern modeling using this life stage approach that we identified, using different nutritional issues at different ages.

We talked about the transition from toddlerhood, that becomes a critical time, teenage years, we also recognized the structural influences on dietary patterns at transition points, like when a child enters school or when an adult leaves the workforce.

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

So this transition from childhood to adolescence is complicated and more work is needed

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to understand how to support those higher quality diets from early on in life and throughout the life course.

The American dietary pattern, while extraordinarily complicated, is represented by a large proportion of energy coming from a really limited set of foods, so helping consumers shift from energy-dense, nutrient-poor foods and beverages consistent with the work that Carol Boushey presented from the Dietary Pattern subcommittee.

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

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

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

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

So after all nutrient requirements or recommendations have been met, there's still a little bit of room to customize for individuals on how they might want to include or use those calories, if they want to remain weight stable. Of course, if weight loss is a target, those calories may not need to be utilized.

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

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

CHAIR SCHNEEMAN: Great. Thank you,

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Regan. So we'll open it up for questions or comments from Committee members. I think Jamy Ard would be proud of the presentation you gave.

MEMBER BAILEY: I hope so.

CHAIR SCHNEEMAN: Any comments? Well, hearing none, I guess we can move to the next presentation, which will be by Dr. Mayer-Davis on Chapter 10, Beverages, and Chapter 12 for Added Sugars. So, Beth?

MEMBER MAYER-DAVIS: Okay. Can you hear me all right?

CHAIR SCHNEEMAN: Yes.

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

All right. So we're going to jump into beverages and I hope everyone is still awake in this, you know, not quite getting that close to the end time in this webinar.

So these are two questions that we had

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for this chapter that we're going to talk about today, what's the relationship between beverage consumption and achieving nutrient and food group recommendations? -- and we approached this using data analyses -- and then, the second question, what is the relationship between beverage consumption and growth size, body composition, and risk of overweight and obesity?

And that we answered using NESR systematic reviews. So for this first question, as you know, Federal data were reviewed, looking at infancy through older adults, including women, pregnant and lactating, and just recalling that we're focusing here on beverages.

And so analyses did reflect the most current NHANES cycle. We did present this information at a couple of the previous public meetings, but wanted to provide a little bit of a summary here just for context for the rest of what we're going to talk about, because as Barbara mentioned earlier, you know, ultimately, we really do use all three approaches of data analysis, food

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pattern modeling, and the systematic reviews in our work.

So the overall findings that we had in this case were that beverages such as 100 percent fruit juice, plain milk, and plain milk substitutes do contribute considerably to some underconsumed food groups and nutrients that are important, but also can contribute a substantial amount of energy and added sugars in a diet.

So, you know, it's a little bit of a two-edged sword here in some cases, and so beverages contribute 13 to 18 percent of total energy across the different age groups, and contribute 32 to 58 percent of added sugars intake across the age groups.

Soda, fruit drinks, sports and energy drinks, and coffee and tea with additions are the top beverage sources of added sugars and sugar-sweetened beverages contribute the highest percent of energy from beverages to the diet of all of those, but obviously, they typically contribute very little towards nutrient or food

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group recommendations.

So that's some context. For infants and toddlers, older infants, the 6 to 12-month group, in terms of their beverage consumption, consume predominantly human milk or infant formula.

About one-third consume 100 percent fruit juice.

For toddlers, they consume a greater variety of beverages, over half consume 100 percent juice, and the majority consume cow milk. 29 percent of toddlers consume sweetened beverages, and those account for about 27 percent of added sugars intake for that group.

For children, the proportion of children consuming milk goes down with age, so about 65 percent for children age two to five, and then down to 34 percent for those age 12 to 19.

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

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sweetened beverages account for about 32 percent of added sugars for kids age two to five, and then 39 percent for 6 to 11, and 49 percent for those age 12 to 19, so that's considerable.

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

About half of adults age 20 to 64 do consume sweetened beverages, compared to about 15 percent of adults who consume diet beverages. Only about 17 percent of adults age 20 to 64 consume milk or milk substitutes, a little bit more for the older adults, age 65-plus.

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

And this was from the systematic review that was done.

And we've presented a lot of this

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information before, but I wanted to, you know, again, provide some context here.

So first, a little bit of detail about the systematic review. For the milk, 100 percent juice, and low and no-calorie sweetened beverages, we did the literature search for the years back to 2000 up through 2019, whereas for sugar-sweetened beverages, we just looked at the years 2012 to 2019, which was because the 2015 Dietary Guidelines Committee reviewed evidence on added sugars in health outcomes through 2012, and the intake of added sugars included added sugars from food as well as sugar-sweetened beverages, finding that those were associated with excess body weight in children and adults.

Now, I'll also note that you'll hear more about sugar-sweetened beverages, as those were considered as well in Chapter 12 on added sugars.

So from one systematic review, there were 12 draft conclusion statements based on 152 unique articles, and these were presented during the last public meeting. But again, just wanted

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to make sure we had the full context today.

And some summary statements here, milk and 100 percent juice were not associated with indices of adiposity, but the strength of the evidence for this conclusion was limited.

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

Among the beverage types examined, only sugar-sweetened beverage intake was associated with greater adiposity and the grade for this was moderate in children and limited in adults, and again, this was presented previously, and this, as a reminder, was from that time period of 2012 to 2019.

The majority of studies did find a significant effect between sugar-sweetened beverage intake and at least one adiposity outcome.

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But results for different outcome measures within a study very often varied, with few studies finding significant associations across all of the various reported outcomes.

So in summary here, in terms of draft evidence-based advice to the agency, when nutrient-rich beverages -- for example, milk and 100 percent juice -- are incorporated into the diet, it'll be important to be mindful of their contribution to total energy intake.

And we recommend a limited intake of sugar-sweetened beverages, and again, we'll be revisiting sugar-sweetened beverages in the next segment from the Chapter 12 work on added sugars.

Although limited evidence, it's important to acknowledge that the no and low calorie sweetened beverages may be a useful aid in weight management in adults, and the role that beverages play in diet quality and energy balance does vary across the lifespan -- and we've just heard a good bit about that -- and so recommendations do need to be tailored appropriately across that lifespan.

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There is a need for additional research related to beverage consumption. We looked at these various particular exposures and we've shared those data. We really wanted to be able to look at beverage patterns, but those could not be examined because of the lack of available literature.

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

Beverage intake behaviors are also important to consider in developing guidelines, and you can think in terms of the time of day of consumption of these various beverages, the frequency of their ingestion, the typical and the range of portion sizes, you can imagine how that varies when you purchase beverages, and whether beverages are consumed alone or whether they're in association with foods.

Future research should also address

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whether the form of the food -- whether it's solid or liquid -- or the mode of ingestion -- whether you're drinking it, whether it's a spoon as a thicker beverage or a thick smoothie or something -- whether that mode of ingestion may be relevant in terms of implications for health.

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

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

So are there any questions about this presentation on beverages?

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

MEMBER MAYER-DAVIS: Yes. Makes sense

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to me. I'm happy to do that. So I will carry on.

Okay. So added sugars. So the questions here are three, that we'll talk about, what is the relationship between added sugars consumption and achieving nutrient and food group recommendations?

And this, we answered using data analyses. And then the second question, what is the relationship between added sugars consumption and risk for cardiovascular disease? And here, we focused on a NESR systematic review.

And then third, how much added sugars can be added or can be accommodated in a healthy diet while still meeting food group and nutrient needs? And those were answered using food pattern modeling.

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

And so here are some of the main

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findings, briefly, and the U.S. population for individuals aged one year and older, that the usual -- excuse me, the mean usual consumption of added sugars was about 13 percent of daily energy intake, and that was for the 2013 to 2016 data.

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

That's progress anyway. Now, thinking about added sugars, nearly 70 percent of added sugars come from five food categories, sweetened beverages, deserts and sweet snacks, coffee and tea with additions to those beverages, candy and sugars, and breakfast cereals and bars.

That's a little bit of background, and now looking at this question of added sugars and cardiovascular disease risk, and a review of the finds, again, we've presented this before, but, you know, the full context of this effort is important, so here, we looked at what is the

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relationship between added sugars consumption and risk for cardiovascular disease.

And this was addressed with a NESR systematic review, so literature published September 2012 through September of 2019, and noting then that the 2015 Dietary Guidelines Committee had examined literature that went back to January of 2000 up to August of 2012, so that's obviously why we picked up with September of 2012.

So for this question, there was 23 articles that met our inclusion criteria, just three articles in children and two in adults, and those represented, actually, 20 studies. And most of these were prospective cohort studies, although, there were a small number of RCTs.

So the conclusions from that review were that there was limited evidence of a relationship between greater consumption of added sugars and increased risk of cardiovascular disease mortality, and that was based on eight studies, most of those were based primarily on sugar-sweetened beverage consumption.

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And there was insufficient evidence in children to answer this question. There were three studies there. And insufficient evidence in adults for CVD verse profiles, ischemic cardiovascular evidence, peripheral arterial disease, and stroke.

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

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

So for this first exercise, the idea here was to estimate the number of calories in the base USDA Food Patterns that can be available for added sugars. So the methods here were to identify the amount of essential calories in the base USDA Food Patterns and to assign any remaining calories exclusive to potential intake of solid fats and

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added sugars.

So there's a couple of things to note here that are actually quite important to understand what was actually done, which, first to say, that for the base USDA Food Patterns, this was constructed using selection or assuming selection of nutrient-dense representative foods that contain low or no saturated fat, added sugars, and sodium.

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

And then it is worth taking a moment to define this term of essential calories, and that is the energy associated with the foods and beverages ingested to meet a nutritional goal through choices that align with the USDA Food Patterns in the forms with the least amounts of saturated fat, added sugars, and sodium.

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

So if you look on the left column of calories, there's a red bar around the 2000 calorie mark and it turns out that when you select the representative foods that's nutrient-dense, in order to, you know, achieve that -- our USDA Food Pattern, you use, essentially, the 1770 calories, and you then have 230 calories that could be used for solid fats and added sugars.

And for those of you with a photographic memory, you actually will recall that you've actually seen that number of 230 on previous slides and earlier presentations.

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

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and that leads to the consumption of 26 grams of added sugar, that's the second-to-last column on the right, and that turns out to be about 5 percent of calories from added sugars that would essentially fit into that 2000-calorie plan.

So with exactly the same layout, you'll notice, focusing on that last column to the right, that we're now seeing 8 percent of calories from added sugars that could be incorporated into this 3200 calorie level diet, and that's the highest calorie level that you see on this slide, and that's also the highest percent of calories from added sugars.

And one more of these slides. There's a block of calorie levels from 2400 up to 3000, and as it turns out for all of those, what can be accommodated in the dietary -- or excuse me, in these food patterns, there's 6 percent of calories from added sugars.

So then summarizing those tables, the energy required to meet food group and nutrient needs, using energy-dense food choices, takes about

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85 percent or more of total energy across most energy levels.

And assuming that the remaining energy is distributed exclusive to solid fats and added sugars, according to population proportional intakes, meaning, no alcohol, that leaves you with less than or equal to 6 percent of additional calories that are available for consumption of added sugars for most energy levels, and less than or equal to 8 percent of additional calories, just for the highest energy level that was analyzed, which was that 3200 calorie level that I showed you.

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

Okay. So then there was a second exercise, and this is about redistributing calories, and specifically, it's redistributing

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calories from those top sources of added sugars to foods and beverages that could, instead, achieve food group and nutrient goals.

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

So the methods here, we calculated -- well, I didn't do any of this work, actually, so the team calculated calories from the top five contributing food and beverage sources of added sugars, and quantified mean intake across five food groups to identify those that were underconsumed, then reassigned calories from the food and beverage sources of added sugars in order to increase intake of underconsumed food groups.

And I'll give you some examples of how this actually played out. So let me take a minute and explain this graphic that I was really excited to see. I thought this was a really cool way that

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the food pattern modeling team put this information together.

So on the graphic, on the figure, what you see is, there's a green diamond that is the actual intakes of the food group, there's fruit, vegetable, dairy, and protein foods, and then there's a blue bar that gives the range of recommended intake.

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

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

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

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protein foods.

And you see that here, there are 217 calories from added sugars that are redistributed, that they're redeployed, and the estimated improvement then, or contribution from those reallocated -- that reallocated energy from added sugars gives you an extra 490 milligrams of calcium, an extra 2 milligrams of iron, 1178 potassium, and an extra 18 grams of protein, so that represents the, basically, benefit to achieving appropriate nutrient intake for those nutrients from this redeployment of calories. And this is for all females age 14 to 18.

And again, there are three of these examples, so this is the same thing, the same exercise, for females age 51 to 70 years of age, looking at fruits, vegetables, and dairy, and here, with the distribution of 150 calories, there's a theoretical benefit of an additional 350 milligrams of calcium, 2 grams of fiber, 480 milligrams of potassium -- whoops, somehow this -- what happened?

Okay. There was ghost. Anyway, a

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gremlin, a slide gremlin, anyway, and then 1 microgram of vitamin B12, so that's the potential benefit of the 150 calories redistributed.

And then the last of these examples is for men age 31 to 50 years of age, redeploing 230 calories through nutrient-dense choices of fruit, vegetables, and dairy to improve calcium intake by 349 milligrams, fiber by 5.3 grams, and potassium by 862 milligrams, so those are some examples of redeploing calories from added sugars to improve food and nutrient intake.

So in conclusion from that exercise, this Exercise Number 2, these five food calories contribute the majority of added sugars in the reworked populations and often, those energy-dense foods, with low amounts of key dietary nutrients, you know, are providing just those added sugars and really not a lot else, and redistributing energy from those sources towards underconsumed food groups and nutrients really can have a very significant positive impact on overall diet quality and nutrient status, such that for each of the age

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sex groups, individuals could better meet food group recommendations, particularly for fruits, vegetables, and dairy, and increase consumption of key nutrients that are contained in those food groups.

And then the last exercise, Exercise 3, has to do with typical choice analysis as opposed to choice of nutrient-dense foods, and this one is really pretty straightforward, in which you can estimate the excess calories coming from added sugars when the USDA Food Patterns are met through selection of typical foods versus selection of nutrient-dense foods.

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

And I just have one figure to show the results here, and let me walk you through this.

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If you look at the lower bar, this is for 2000-calorie level, and that first gray bar that's to the right, you see the 230 calories, and I've highlighted that value before, and that's the number of calories remaining after selection of the appropriate number of servings of these food groups, fruit, vegetable, grains, protein foods, dairy, and oils.

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

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

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

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that's actually made in the U.S.

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

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

Now, there are limitations within the body of evidence that need to be considered, and these are given in some detail in the chapter, there are certainly some challenges in exposure assessment for added sugars, and most studies focused on sugar-sweetened beverages, which is certainly a significant part of, a marker of added sugars, but does not necessarily reflect all of

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added sugars.

And many of the observational studies don't assess change in intake over time or don't properly incorporate that information into the statistical methods that are used, and there are limited number of well-done randomized control trials.

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

So the 2015-2020 Dietary Guidelines for Americans recommends consumption of added sugars be limited to 10 percent or less of total energy intake. You'll recall now about 37 percent of the population meet that goal.

The presence of overweight and obesity is, as you know, very high, and added sugars provide energy and generally don't provide additional

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nutrient content.

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

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

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

CHAIR SCHNEEMAN: Great. Thank you, Beth. Yes, so we can now have some discussion on Chapters 10 and 12, both Beverages and the Added

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Sugars.

MEMBER MAYER-DAVIS: Yes.

CHAIR SCHNEEMAN: Dr. Dewey?

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

MEMBER MAYER-DAVIS: Yes, we actually did that calculation and someone else can chime in, I think it changed it to about 7.6 percent, something like that, so it did make a difference, and that was a really good question, Kay. I'm glad that you asked it.

The reason that we still ended up with the less than 6 percent of calories from added sugars is because this really is a food-based approach. The exercise was designed as a food-based approach, people choose foods, you know,

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and given the food supply in this country, it would be quite an artificial exercise to do the calculation entirely absent of added sugars.

So keeping with the philosophy of a food-based exercise, you know, we just, you know, carried on in that way, and then ended up with the 6 percent, so that was a great observation. It doesn't make very much difference, but we still came back around to the recommendation of less than 6 percent of calories from added sugars.

MEMBER DEWEY: Well, if I could follow-up, I just am wondering how consumers are going to calculate their percent of calories from sugar, added sugar, it's not an easy thing to do, so it seems to me that the recommendation should probably be touched in the terms that are easily translatable into how people can actually achieve that. Maybe that's --

MEMBER MAYER-DAVIS: Yes, we do also -- yes, it is another step. Right. So we were first specifically addressing, you know, the current recommendation, which is less than 10

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percent, and obviously, recommending a change to that.

You know, I think in some applications, say, you know, School Lunch programs, you know, things like that, where you could consider a calculation around the menu and, you know, make the calculations, it's a different question, then, to consider translation in terms of nutrition education, say it's not bad, or, you know, education associated with the WIC program that would also need to be food-based and not percent of calories from added sugar, because you're right, that's just not something that you're going to have people go around and, you know, calculate on the back of a napkin.

Although, you know, there are plenty of apps out there, you know, that actually could do that, but that is a different question in terms of the implementation and dissemination.

MEMBER DEWEY: Right. Thanks.

CHAIR SCHNEEMAN: And part of that, I think, is linking it back to the foods and beverages

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that are the primary sources of the added sugars, especially when those foods are coming with added sugar, but they're not coming with other nutrients, and that's -- I thought that linkage between the beverage discussion and the added sugars is an important dimension.

MEMBER MAYER-DAVIS: Yes, right.

CHAIR SCHNEEMAN: Other questions or comments?

MEMBER DONOVAN: Yes, this is Sharon, and I guess I just wanted some clarification, I'm sorry if I missed it, but the 6 percent of calories begins at what age? Is it above age two, is it prior to that?

MEMBER MAYER-DAVIS: Yes, that -- this exercise was really for two-plus, if I'm recalling --

MEMBER DONOVAN: Two-plus? Okay.

MEMBER MAYER-DAVIS: Yes. We didn't look beyond that or earlier than that.

MEMBER DONOVAN: Yes.

MEMBER MAYER-DAVIS: Yes, because your

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recommendation was basically just keep it low, low, low.

MEMBER DONOVAN: Yes. There was not much room, you know, from case --

MEMBER MAYER-DAVIS: There's very little room.

MEMBER DONOVAN: Yes.

MEMBER MAYER-DAVIS: Correct. Right. Yes, you just have to be so nutrient-dense for the really young kids, yes, so that was different.

MEMBER DONOVAN: Yes. I just was wondering when you state that, if you can somehow be clear that for ages two and above.

MEMBER MAYER-DAVIS: Yes. It's worth, yes, for sure. And actually, it would be as well to, you know, in that statement, you know, to refer back, you know, to the explicit that for younger individuals, you know, the need for a nutrient-dense choice is really -- is still great. That would be different.

CHAIR SCHNEEMAN: Kay, were you going to comment also?

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MEMBER DEWEY: Yes, I just wanted to make one other comment, and I think it was a combination of Chapter 1 and this one that hit me hard, and that is the number of calories from added sugars being consumed by pregnant women.

I think it was something like 300 calories, if I have that right, and I just realized this is an incredible number of calories that could be going towards far more nutritious choices, so it's not just for the whole population, but specifically, the pregnant and lactating women, to make this shift is just so important, given that they need really high dietary quality.

MEMBER MAYER-DAVIS: No, you're right.

288.

VICE CHAIR KLEINMAN: I think you do mention this in the chapter, but you didn't in the slides, you had water as a beverage and hydration as a value of consuming water or even beverages in general, do you make that point someplace?

MEMBER MAYER-DAVIS: Yes, so this is actually a really great point to make, and, you

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know, are subcommittee discussed about this, you know, a few times, it's really difficult in the literature to find studies with accurate assessment of water intake. You know, that is really a challenge.

So, you know, we definitely see hydration is a really critical role in function of consumption of beverages and for water itself, obviously, important for, you know, the same reasons. You know, we weren't able to really look into that literature and our main concern, or at least one of the main concerns, was the difficulty in accuracy/inaccuracy of assessment of water intake.

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

MEMBER MATTES: Yes, I think we do want to be clear that this recommendation was not a recommendation to reduce beverage intake. Meeting hydration needs really is important.

MEMBER MAYER-DAVIS: Right.

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MEMBER MATTES: It's really recommendation about the nature of the beverage that is critical.

VICE CHAIR KLEINMAN: So, Rick made a statement. Maybe that's something that should go into the discussion or into recommendation, that what Rick was just paraphrasing, I think, is really important to include in this document somewhere.

MEMBER MATTES: Oh, it's in there. It's in the discussion, we elaborate on that.

MEMBER MAYER-DAVIS: Yes.

VICE CHAIRMAN KLEINMAN: Yes, I thought I saw it, but I just wanted to --

MEMBER MATTES: Okay.

MEMBER MAYER-DAVIS: Yes. But what we don't have is a specific recommendation about volume of water for various -- you know, to age and sex groups, which, you know, would be wonderful to have, but the concept of hydration and the importance of hydration is definitely in there. Yes.

CHAIR SCHNEEMAN: Other comments?

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So, I'm going to propose we take a 15-minute break right now before we start with Tim Naimi's presentation, because -- and Tim will be going through the update on the NESR review as well as reviewing, then, Chapter 11, the Alcoholic Beverages, so we can reconvene at 6:00 p.m., if that's good for everyone. Okay. So, 15 minutes.

(Whereupon, the above-entitled matter went off the record at 5:45 p.m. and resumed at 6:00 p.m.)

CHAIR SCHNEEMAN: Great. Welcome back, everyone. I do want to point out that we did note that there was an error on one of the slides in the chapter on added sugars, and it's slide number 12 which we're looking at the reallocation of energy from sources of added sugars, the females 51 to 70. And the symbols for the redistributed intake and the mean intake on fruits and vegetables was switched. That slide will be corrected, and obviously, it will be done correctly for the report. So glad we caught that now.

So we'll move to our next chapter which

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is Chapter 11 on Alcoholic Beverages. Tim Naimi will be doing that presentation, but he's going to start out by doing the NESR update which was to be in the morning, but we moved it to this point to accommodate. So, Dr. Naimi.

MEMBER NAIMI: Okay, thank you very much, Barbara. Yeah, so as Barbara mentioned, the first thing we're going to cover in this little two-part session, and thanks to everyone who has managed to hang in there so far. I'm watching the audience numbers drop off. But we're going to talk about the NESR review on alcohol and all-cause mortality. And our approach to answering this question was the NESR systemic review. And again, this is part of the Beverages and Added Sugar subcommittee. We've been talking a lot lately.

So some of this will be review, some of this was presented back in the last meeting. But to kind of finish it off, we'll bring you back up to speed. So for the alcohol and all-cause mortality review, there were 60 studies in total that we assessed. There were 58 prospective cohort

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studies, one retrospective cohort study, and one MR study which for the all-cause outcome was not terribly helpful.

In terms of the population, most studies enrolled a broad range of adult ages, but it's important to note that most of the studies skewed on the high side of age because these are large cohorts that are designed to study chronic disease outcomes. A third of them enrolled only adults over age 50, and most of them, there was some population-based ones, but most of them enrolled people with an age distribution that would be higher than that of adults who drink alcohol of that distribution.

So in terms of our exposure, we were looking at two components of that, one was average consumption per day, drinks per day. And the other one was pattern of consumption, and that was really -- what we mean there is the number of drinks consumed per drinking day or the number of drinks consumed per drinking occasion. And as you'll see, there are a lot more studies of average consumption

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than based on the number of drinks consumed per drinking day.

And we had kind of two comparators. Our primary comparator was we assessed differing average alcohol consumption levels or patterns among those who currently drink alcohol. And our secondary comparison was between those who currently drink alcohol and those who have never consumed alcohol, who those people are sometimes referred to as lifetime abstainers.

Now in terms of the primary comparison, as you'll remember this is the comparison between groups of people who consume alcohol, one difficulty is that the studies often used widely varying definitions of low, and that's in parentheses, or moderate consumption. But it was quite remarkable among the studies that among people who currently drink, the evidence consistently reported that higher average volume of alcohol consumption was significantly associated with a higher risk of all-cause mortality. And that was pretty consistent, again,

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despite how the kind of the low level of consumption was defined. And the other finding which was already presented at a previous meeting is that more frequent binge drinking was significantly associated with high risk of all-cause mortality.

Most of the studies had large samples, however, there were a number of limitations. Again, there was this issue of the generalizability of older cohorts, and that gets into the issue of survival bias which is a type of selection bias.

There was inadequate adjustment for confounders, and there was inconsistency in exposure measurement and definitions.

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

And then our second conclusion

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

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

Among those, 25 studies examined never drinkers or self-reported never drinkers in comparison to low average volumes of consumption. That was the comparison we focused on. Among these studies, roughly half of them reported significantly reduced risk of all-cause mortality for low average consumption compared with never drinking alcohol.

About half of studies showed no significant association between low average consumption versus never consuming, so about half

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were positive in favor of the low average consumption, half showed no significant effect. And two studies showed greater all-cause mortality with low average consumption compared to never drinking alcohol.

So, again, this subset of the evidence that we discussed previously has many of the same limitations. There is an additional limitation around the misclassification of never drinkers, and therefore, sometimes there are people who are former drinkers that may be classified as never drinkers.

That's important because former drinkers are arguably a type of drinker and tend to be very unhealthy. And if you look at studies in the U.S. where you look at people get surveyed every five years or so, you'll find that actually about half of people who report never drinking alcohol reported drinking alcohol on a previous wave. So that is an additional limitation to note.

So our draft conclusion statement and grade for the secondary comparison is that limited

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evidence suggests that low average alcohol consumption particularly without binge drinking is associated with a lower risk of all-cause mortality compared with never drinking alcohol. However, in light of the many scientific and public health issues associated with alcoholic beverages, any conclusions about low average alcohol consumption compared to never drinking require careful consideration. And we have some detail on this in the report, considerable detail. But I'll just discuss that a little bit more here.

And the main kind of caveat, or the main context is that these findings shouldn't be interpreted to mean or don't translate into a recommendation to begin drinking alcohol for better health. And I think the simplest way to summarize it is to say the following. That initiating alcohol consumption obviously involves risk. We have no randomized control trials randomizing those who never drank or who don't currently drink to initiate alcohol consumption for any study looking at any morbidity or mortality outcome.

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And the key point is that compared to those who might begin to drink, for example, because of a public health recommendation, published low volume drinkers enrolled in cohort studies are a very select group. In other words, let's say you started drinking at age 20 and at age 50 you're still kind of a moderate drinker and you have the wherewithal to be enrolled in a cohort study, that group of established moderate drinkers obviously has not died prematurely from an alcohol-related cause. They didn't become a heavy drinker or otherwise they wouldn't be classified as a low-volume drinker to be studied. And they didn't quit drinking and become a former drinker. So there's a big source of selection bias. So again, established moderate drinkers who get into cohort studies are not the same as somebody who might initiate drinking.

And then the other big limitation is that in addition to the differences in alcohol consumption, lifetime abstainers differ in many other ways from established low-volume drinkers.

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They tend to be more likely from immigrant status and religious minority, a variety of other factors.

So that I think is the last slide for this presentation. And I'm happy to pause here and if there are any questions we can address them now, or you can save them until the end of -- until the end of the next presentation. All right. And I don't see anything in the presenter chat. So --

CHAIR SCHNEEMAN: Yes.

MEMBER NAIMI: -- in that case, can we move ahead to the next one?

CHAIR SCHNEEMAN: Yes.

MEMBER NAIMI: Yeah. So now comes the presentation for Chapter 11, 2020 Dietary Guidelines Advisory Committee, our draft of Chapter 11 on Alcoholic Beverages. Here's the other members on our subcommittee listed here. And at the end we're going to list all the fantastic staff who helped. And I'm not sure why they get presented last, but it must be sort of like dessert, we save the best for last. So they'll be coming later on.

So in terms of the overall chapter, we

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had two broad questions. The first was what is the relationship between alcohol consumption and achieving nutrient and food group recommendations?

This was answered using data analysis. And we reviewed Federal data from the National Health and Nutrition Examination Survey and the National Survey on Drug Use and Health for adults of legal drinking age including women who are pregnant or lactating. And we used the most current data cycles that were available. And our second question is what is the relationship between alcohol consumption and all-cause mortality which we just reviewed a few moments ago.

So the first one, question one, was about -- it was a question about alcohol and meeting food and nutrient recommendations. And this was the conclusion statement that was also presented at the public meeting and it reads as follows: alcohol consumption has increased in the United States since 2000 and most states exceed Healthy People 2020 objectives for per capita alcohol consumption. Approximately 60 percent of

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individuals report alcoholic beverage consumption in the past month, and of those, approximately, 40 percent binge drink often multiple times per month in those five-four definitions.

During days when men or women consume alcohol, their consumption also typically exceeds Dietary Guidelines recommendations for Americans, recommended limits of less than or equal to one drink per day for women and two for men under the current Guidelines. Alcohol consumption during pregnancy remains a persistent public health problem, and beyond contributing to energy intake, alcoholic beverages contribute little towards average intakes or food groups or nutrients.

So question two, we're going to turn back to the alcohol and all-cause mortality review of the evidence which was in our chapter. So in terms of the NESR systemic review, we had three draft conclusion statements on alcohol and all-cause mortality from 60 articles. Our primary comparison was different levels of consumption among those who currently drink alcohol, and our

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secondary comparison as we discussed is between those who currently drink alcohol with those who have never consumed alcohol. Most of the studies examined were prospective cohort studies and enrolled a broad range of adults. And our conclusion statements were graded from limited to moderate.

So you've already seen the results, we'll kind of skip ahead to kind of the discussion section. So previous Dietary Guidelines for Americans provided advice for those who drink alcohol, and recommended that individuals do not begin drinking or drink more for any reason particularly on the basis of health considerations.

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

Now in addition, we've prioritized the all-cause mortality review over reviews that were also requested for CVD and cancers as outcomes of the NESR systematic review. And we prioritized

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the alcohol and all-cause mortality because of time constraints, and because alcohol and all-cause mortality has not been reviewed previously by the Dietary Guidelines Advisory Committee. And also alcohol and CVD has been reviewed by the Dietary Guidelines Advisory Committee back in 2010.

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

And then, you know, alcohol in terms of alcohol and cancer, this is a really an emerging area of literature, and we would have liked to be able to review that, but that's been reviewed extensively by other organizations. And, you know, alcohol has been recognized as a human

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carcinogen for 40 or 50 years and is believed to be causally related to at least seven different kinds of cancers.

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

And this thing on the MR studies was sort of a supplement to the main review and actually was not conducted by NESR. But the overview of MR studies is that Mendelian randomization studies assessed genetic variance or genotypes of alcohol metabolism genes that associate with higher or lower alcohol consumption. And then these genotypes are then related to the outcomes of interest. For example, the risk of cardiovascular disease. So for those of you who are familiar with using an, you know, instrumental variable in an

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epidemiological analysis, these genetic variants could be thought of as instrumental variables.

Well, the main, you know, the main problem with the observational studies of alcohol, not only theoretically but in fact, is that there's a lot of confounding. People who drink, you know, particularly low amounts of alcohol regularly tend to be very socially advantaged and so forth. So the idea with Mendelian randomization studies is they greatly reduce confounding. And here the idea is that genes in theory should associate randomly or should be distributed randomly in the population.

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

And then again, there's no exposure

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misclassification because your genotype is generally, you know, invariant over the life course, so, you know, you only have to measure at one point in time. And that's another limitation of the observational studies that we didn't discuss which is that they are typically just measuring alcohol consumption at one point in time.

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

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

And finally, the genetic variant may

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

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

So the bottom line in terms of MR study findings are that the variant genotypes that are associated with lower alcohol consumption find no protective association for coronary heart disease or for ischemic stroke including those with low volumes of consumption when you go back and ascertain that, or when you do genotype-predicted consumption. So the bottom line is when it comes to cardiovascular disease is that the findings from MR studies are inconsistent with observational studies which finds that J-shaped association curve that we discussed earlier.

Now there are fewer studies of Mendelian

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randomization studies in cancer, but the few that have come out so far indicate that alcohol consumption is positively associated with three types of cancers. And this is consistent with all the observational studies of alcohol and particular cancer types.

So now we're going to shift gears a little bit and we're going to move to the summary section, and this, again, is our draft evidence-based advice to USDA and HHS. And so many U.S. adults exceed the 2015 through 2020 Dietary Guidelines for Americans recommended limits for drinking in moderation during days when alcohol is consumed as it is.

Excessive alcohol consumption is the leading behavioral risk factor for a variety of morbidity and mortality outcomes, social harms and economic costs. Apart from energy, ethanol has no nutritional value. And finally, the preponderance of evidence finds that for all-cause mortality risks increase at levels above one drink per day on average for both men and women.

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So then we posed a series of questions based on what, you know, the Dietary Guidelines for Americans has done previous. Among those is should the Dietary Guidelines for Americans continue to recommend against initiating alcohol consumption for health reasons for those who don't currently drink?

And our answer to that is yes, alcohol is a substance that is intoxicating, potentially addictive, 20 percent of people who, you know, who begin drinking will end up with an alcohol use disorder at some point, and a leading preventable cause of death and other harms. The current observational evidence base is insufficient to recommend drinking initiation at any level. And so our kind of conclusion around this is that we agree and that we would continue the advice that non-drinkers or never-drinkers should not begin to drink on the basis of the notion that alcohol would improve their health.

The next question is are current recommended limits of no more than two drinks per

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day for men, and no more than one drink per day for women, i.e., the current two/one consumption limits, are they reasonable? So the two/one consumption limits which have been present since 1990, and Barbara was involved in the committee that wrote them in only three pages back then, were based, you know, somewhat on theoretical basis of, you know, for example, the difference in body mass between men and women. But those two/one cut points also aligned with an early and influential meta-analysis on alcohol and all-cause mortality that was published soon thereafter in 1996.

You know, overall the two-one consumption limits constitute reasonably low risk.

However, more recent evidence justifies tightening the guidelines for men in particular.

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

But basically why is tightening recommended in addition for men and why is it justified? And the most important reason is even based on existing observational evidence that

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consuming two drinks per day among men is associated with a modest but meaningful increase in all-cause mortality risk compared to one drink per day based on existing observational data.

These findings are consistent with findings from our systematic review of alcohol and all-cause mortality, you know? But they are even more specifically supported by studies where you can get kind of finer gradations of consumption.

So these include meta-analyses, survival analyses and modeling studies.

And when I refer to modeling studies, what I'm talking about is it's similar to doing a meta-analysis of all-cause mortality, but a lot of people would say, well, you know, if you're studying, you know, the relationship of drinking to every single death under the sun, you know, there may be sort of a lack of specificity in that approach and that it's being driven by confounding or some causes of death are not known to be alcohol-related either based in theory or based on statistical associations.

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So another approach that people are doing now is basically using -- is kind of aggregating weighted, condition-specific risk curves for the multiple conditions that are associated with alcohol consumption, and then you can kind of determine. So it's kind of like doing a meta-analysis, but it's using more specific risk curves for a variety of conditions. So they are all findings that those studies tend to find, again, meaningful but modest increases risk of men for two versus one.

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

So the second consideration about why guidelines might be tightened for men is kind of an add-on. I think the first one is the most important. But that more recent observational

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studies and meta-analyses that attempt to control for -- better control for confounding and selection finding -- bias, excuse me -- find reduced risk reduction or no risk reduction for low-volume alcohol consumption in comparison to never drinking. And then we also have these MR studies that do not find protective effects for low-volume alcohol consumption on CVD.

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

So in summary, our recommendations about advice to the public in the next Dietary Guidelines, all these pages and words can be boiled

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down to the following three points. The first is do not begin to drink alcohol or purposefully continue to drink because you think it will make you healthier. The second is if you drink alcohol at all levels of consumption, drinking less is generally better for health than drinking more. And finally, for those who drink alcohol, recommended limits for better health are up to one drink per day for both men and women.

We also had some advice on future directions for the alcohol field, and then as I think as you can tell from the earlier discussion, there's a need for more studies with stronger research designs including RCTs, more MR studies which will be coming, and intervention studies with morbidity and mortality outcomes.

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

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

There's also an incomplete understanding of the relationships between various levels of consumption and patterns of consumption, again, with other dietary and beverage consumption characteristics. So we know a fair amount about, you know, people who tend to drink primarily beer versus wine versus spirits and how they think. But there's lots that we don't know about, again, different levels and patterns and how those associated with consumption of other beverages and other foods and that sort of thing.

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

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dynamic across the life course both on the basis of average consumption and patterns of consumption.

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

I think that's the last -- no, this is the most important part, the incredible support staff that have done so much work reviewing all the papers and making slides and offering just great suggestions and doing so much fantastic work. So thank you to everyone on this list.

CHAIR SCHNEEMAN: Great, thank you, Tim. So we now have opportunity for questions or comments from the Committee members.

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

MEMBER NAIMI: Well, you know, that's -- it says compared to what. So if you look at kind of continuous risk curves for most of those studies, the lowest -- the kind of the nadir of

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risk, if you will, for men and women, for both of them, the kind of the low point of risk, this is among people who drink, is at less than a drink per day. So for women, and again, it's not all the studies are exactly the same, but for women it's probably somewhere between, you know, somewhere maybe around a half a drink a day and for men it's somewhere between a half and one drink per day.

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

So this recommendation is not to imply again that people should drink alcohol or that they shouldn't drink perhaps a bit less. But I think it's fair to say that, you know, one drink on days

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when alcohol is consumed constitutes a reasonably low risk.

MEMBER HEYMSFIELD: All right, thank you.

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

MEMBER NAIMI: Thanks for the nice comment.

MEMBER BOUSHEY: Yes. Hi, Tim, this is Carol. And this is, you know, very interesting. And, you know, the interesting thing that I was thinking of is how to implement RCTs when it's one thing to ask a person to eat, you know, Brussels sprouts. It's quite another to ask a person to pick up, you know, drinking alcohol when they don't. So there must --

MEMBER NAIMI: Yeah.

MEMBER BOUSHEY: There must be some

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kind of work going on to address, but this is a difficult group to really, truly randomize I would think.

MEMBER NAIMI: Yeah. Well, you know, there have been randomized studies done. There was a large one that was actually planned and then canceled for other reasons. But again -- so, of course, it would be unethical to, you know, randomize people to a study of binge drinking, or it would be unethical to, you know, randomize a study of -- a study for people to drink an average amount of consumption that was clearly, you know, hazardous.

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

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So you can you say, well, you know, some people, you know, rightly are concerned about making sure that trials are conducted ethically and yet, we end up making recommendations around drinking to the general public based on, you know, observational evidence-base that has a lot of -- but has a lot of issues when it comes to alcohol. So it is a tough question.

MEMBER BOUSHEY: Yeah. Yeah, no, I think -- I really liked the way that you've outlined what, you know, that this is something that will take a lot of attention to adequately address. Very nice.

MEMBER NAIMI: Yeah. And I think, you know, to be clear that, you know, a lot of the harms are obviously coming to, you know, are coming at higher levels of consumption. But I think -- the point is I think the solid point is that for most people, you know, who drink that, you know, drinking less is better for health, and I think the evidence on that is, you know, at least based on what we have, that part is very consistent and very solid.

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CHAIR SCHNEEMAN: Great. Other questions, comments?

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

MEMBER NAIMI: You know, again, not a lot, and that's why it's one of the recommendations for more future studies. So, you know, for example, we know some things. So, for example, we talked about there's sort of -- for drinkers of various beverage types we know a little something.

There have been some studies about what, you know, what their kind of other -- what they eat. We know that people from Europe who consume more of a Mediterranean=Style of diet, you know, tend to be wine drinkers and they tend to drink, you know, they tend to drink more, you know, socially and these types of things. But I think we're really kind of just scratching the surface, and I think for people in the U.S. it can be very

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important because we have -- there's so many -- well, there's so many -- there's, you know, more than 60 different health outcomes related to alcohol and there's probably equally or more than that related to dietary patterns.

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

CHAIR SCHNEEMAN: Great. Thank you so much, Tim, for the presentation on this topic. And, yes, alcohol has been one of those popular topics for a long time in the Dietary Guidelines.

MEMBER NAIMI: Yeah.

CHAIR SCHNEEMAN: So I think we'll move to the next chapter, Chapter 13, the Frequency of Eating, and Dr. Heymsfield will be doing that.

MEMBER HEYMSFIELD: Thank you very much, Barbara. This chapter includes questions

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examined by two subcommittees, the Frequency of Eating subcommittee and the Food Pattern Modeling subcommittee. And I want to thank the members on the Committee: Regan Bailey, Carol Boushey, Heather Leidy, Rick Mattes, and Ron Kleinman who are all very instrumental in working through this chapter.

This is the first time the Dietary Guidelines have included frequency of eating as a topic, and I want to also point out that mention of frequency of eating was made earlier by Regan who talked about some of the complexities of the instruments used to quantify frequency of eating and the timing of eating. But also mentioned by Sharon Donovan in relation to pregnancy, frequency of eating and pregnancy. It's a very interesting topic.

Now the Committee had five questions, so specifically what is the relationship between frequency of eating and achieving nutrient and food group recommendations; between the frequency of eating and growth size, body composition and risk of overweight and obesity; between the frequency

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of eating and all-cause mortality; between the frequency of eating and risk of cardiovascular disease; and finally, on the relationship between the frequency of eating and risk of type 2 diabetes.

Question one was answered by the Food Pattern Modeling subcommittee using data analysis of national databases. And the other questions two, three, four and five were answered using the NESR systematic reviews.

Just as a little bit of a background for those of you who don't do this every day, the Committee spent a lot of time discussing about how to quantify frequency of eating. Frequency of eating is the number of daily eating occasions, and the eating occasion was defined as an ingestive event including preloads, meals or snacks, and beverages or food. And the beverages could be energy or non-energy yielding beverages. The Committee also spent a lot of time discussing the criteria on the number of evaluations needed for establishing the frequency of eating, and the sample sizes for intervention studies.

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To begin with, this is work done by the Food Pattern Modeling group. Eating patterns vary by frequency and timing in the United States, and are shaped by age, race, ethnicity, and income. On average, the U.S. population reports 5.7 eating occasions per day occurring most often at noon or in the evening. Most of the U.S. population reports consuming three meals, 64 percent or roughly two-thirds of the population, or two meals about roughly 28 percent or one-fourth of the population per day. When compared with two meals, Americans who consume three meals per day tend to have approximately five point higher healthy eating index scores.

And as might suspected, snacking is ubiquitous, occurs in 93 percent of the U.S. population. Snacks provide 22 to 23 percent or roughly about one-fourth of total energy consumed.

And two to three snacking events are reported on average per day. Late night eating events often include alcohol intake as we just heard from the previous presentation, and intakes of added sugar,

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sodium and saturated fats in adolescents and adults.

Now moving on to the other specific questions, 11 studies, a very small number of studies, were identified as meeting inclusion criteria for NESR systematic review but provided insufficient evidence for answering questions on frequency of eating and health. Those are the questions I mentioned, questions two to five. So in summary then, the NESR review did not yield specific answers to the questions two to five concerning the relationship between frequency of eating and health outcomes of obesity, all-cause mortality, risk of cardiovascular disease or risk of type 2 diabetes. This was primarily due to the limited availability of high-quality data. And bottom line then, the Committee cannot therefore, make recommendations to the Departments on frequency of eating and health.

The Committee does recommend the scientific community raise the standardization of frequency of eating terms to a high priority and

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ensure adequate data collection to evaluate habitual or usual eating frequency. Our Committee spent a lot of time discussing how to standardize this terminology. It's an important topic for future consideration.

The 2025 Dietary Guidelines Advisory Committee posed three questions examining how the timing of ingestive events influences health. And we also made a number of additional recommendations that will be in our full report. And as a bit of a closing comment, the Frequency of Eating committee confirms that healthy dietary patterns and eating frequencies can be constructed in a variety of ways to suit differing life stages and cultural practices. So some creativity can be involved there.

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

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patterns with dietary guideline recommendations.

So I want to thank the support staff who really did the bulk of the deep dive on this work, an incredible amount of review of literature. And I want to thank them profusely for their contributions. Thanks very much. Okay, Barbara.

CHAIR SCHNEEMAN: Any questions or comments? Great, so I think we can move to the next section to talk about Integrating the Evidence and Future Directions. I would just note knowing sort of a schedule -- we're scheduled to adjourn at seven, but we may need to go a little bit past seven o'clock to finish covering the integration and the other comments to wrap up the report meetings.

So with -- let me see. I've got too many windows open on my computer here. Okay. So Dr. Kleinman and I will talk about the chapter on Integrating the Evidence and Future Directions. And just to remind you that to pull this materials together relies on Part C, setting the stage and integrating the evidence, but also Part D, the

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evidence on diet and health which you've been hearing about.

So just to remind you, the integration chapter purpose is to describe the major themes from the Committee's review of the evidence. And provide an overview of our advice to the Departments for updating the upcoming addition of the Dietary Guidelines. To develop the integration chapter, we had a working group formed and they work with myself and with Dr. Kleinman to draft a chapter.

Those working group members included Jamy Ard, Teresa Davis, Rich Mattes, Jamie Stang, Elsie Taveras, and Linda Van Horn. And we appreciate the many contributions to the draft. The draft has been discussed within the subcommittee to be sure we're reflecting that body of evidence, and it's been shared for full Committee review as well.

So at the last meeting, meeting five, the major themes for the integration chapter were presented, and I'll just summarize some key points about these major themes. First of all, from the public health challenges that draws on the evidence

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that is presented -- that has been presented for Chapter 1 that you heard Dr. Bailey talk about, and we're just presenting a brief summary in the integration chapter.

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

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

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dietary components which, again, support the dietary pattern approach.

So in addition to these major themes from the evidence review, the chapter considers context of the Dietary Guidelines for Americans and important resources so that these Guidelines remain evidence-based. And those topics were discussed at the last public meeting. So I'm not going to go through them again. So, Ron, I'm going to turn it to you to talk about our figure and the first set of suggestions we have.

VICE CHAIR KLEINMAN: Great. Thanks very much, Barbara. So as everyone knows, this edition of the Committee's report is really the first to extensively review the period from birth to age 24 months, and also to fully integrate the evidence reviewed on pregnancy and lactation. And in doing this it enables the departments, the USDA and HHS, to take a full lifespan or life course approach in its dietary recommendations. I should note that in this chapter and throughout the full Committee's report, we used lifespan and life

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course interchangeably.

So the figure in this slide depicts the framework of a lifespan approach, and I should say that it incorporates the dietary patterns figure that Carol showed when she talked about Chapter 8. So it highlights the importance of implementing dietary patterns that are most associated with nutrition adequacy, energy balance, and reduced risk of diet-related chronic health conditions that start at the earliest life stages.

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

So the 2015 -- 2020 Dietary Guidelines for Americans identify five principles as overarching Guidelines. This Committee's analysis reinforces the continuing relevance of these overarching Guidelines and suggests modifications and expansion of these Guidelines to reflect new evidence. These suggestions are

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in the overarching Guidelines. They're in addition to the specific conclusions and advice to the Departments that we've all just heard about in each chapter.

So on the following slide, each of the overarching Guidelines is noted followed by suggestions for ways that they can be updated. These suggestions reflect the Committee's recommendations with the 2020 through 2025 Dietary Guidelines for Americans incorporate a recognition of the special nutrient concerns that exist at each life stage.

Recognizing these concerns are to help Americans improve their dietary practices at that life stage and potentially influence the practice of healthy food choices at the next life stage. Dietary patterns can incorporate foods consistent with culture preferences and socioeconomic factors, but should be structured around the identified, quote, core foods that meet their nutrient needs that are associated with health, and reduce the risk of chronic disease.

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So moving on to the first overarching principle following a healthy eating pattern across the lifespan, the suggested update from the Committee is that this guideline should introduce the importance of a healthy dietary pattern at each life stage and maintaining healthy dietary patterns across each life stage.

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

So then the second is to focus on variety, nutrient density and amount. The Committee's review focused on the core elements of the healthful dietary pattern including the nutritional quality of food choices and

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incorporating variety. And our review also focused on frequency of eating as determined of the amount of food consumed. So with that then, I'm going to turn it back to Barbara to go through the remaining overarching principles.

CHAIR SCHNEEMAN: Great. Thanks, Ron.

So the third overarching principle from 2015 was about limiting calories from added sugars, saturated fats, and reduce sodium intake. And our Committee's review emphasized the importance of identifying the foods to limit or replacing the diet to limit intake of certain food components.

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

So we focused then on limiting the food and beverage choices that are sources of added sugars, saturated fats, alcohols, and salt to reduce intake of these solid fats and sodium, replace foods and beverages that are sources of

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these with more healthful choices. And in the first two years of life, foods such as sugar-sweetened beverages should be avoided.

So the fourth area was to shift to healthier food and beverage choices, and our Committee's review found that this approach is actually linked to achieving the group's guidelines. But in addition, this approach can help individuals understand that it is never too late to start making improvements in their dietary patterns, and to use this approach effectively an individual would need to recognize that food and beverage -- their food and beverage choices that are most important to shift. Making that shift eating patterns to food and beverage choices that have a higher nutrient to energy ratio and shift to higher-quality food and beverage choices at every age to achieve a more healthful dietary pattern.

And then the fifth overarching Guideline has been to support healthy eating patterns for all, and our Committee's discussion

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emphasized the importance of supporting the ability of all Americans at all ages to have access to food choices that enable a healthful dietary pattern.

And to support access to healthful foods and dietary patterns for all Americans, consideration needs to be given to the cultural, ethnic and socioeconomic factors that influence food preferences and access to healthful food choices. And we identified support healthful eating patterns in all food environments for all Americans at all ages and other suggested updates are to promote and support breastfeeding, support healthful eating patterns for all ages where people live, learn, work, play and gather.

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

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So we'll open it up for comments from the Committee or any questions or discussions from the Committee. Kay, do you have a question? So, Kay, did you have a question?

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

CHAIR SCHNEEMAN: Yes.

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

CHAIR SCHNEEMAN: So that's a good question. I think we saw that being connected with the bullet of healthful eating patterns, where people live, learn, work, play and gather, that all of these create different types of food environments.

MEMBER DEWEY: Right. The first bullet on that slide, maybe if you go back to that

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slide, it talked about food environment.

CHAIR SCHNEEMAN: Food environment.

MEMBER DEWEY: Yes.

CHAIR SCHNEEMAN: Yes, so food environment can include where people live, learn, work, play and gather.

VICE CHAIR KLEINMAN: Yeah, I think it's meant to be where food is consumed.

MEMBER DEWEY: So the first bullet and the third bullet are kind of the same thing? I'm sorry, I --

VICE CHAIR KLEINMAN: Good point. No, you're right.

MEMBER DEWEY: Because in the chapter I remember some discussion about access to food that enables a healthy dietary pattern, and to me that signaled something about access both economically and even perhaps physically.

CHAIR SCHNEEMAN: Right. And there is more in the chapter that we went through last time where we talked about those. Those are still part of the chapter. But we figured given the timing,

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we were mainly going to talk about this newer section: best advice to the Departments. But that background information is still there in the integration chapter.

MEMBER DEWEY: Okay, well, I just -- I would perhaps suggest slightly different wording so that the first and third bullets don't seem like they're the same thing on here.

CHAIR SCHNEEMAN: Okay.

MEMBER DEWEY: Yeah.

CHAIR SCHNEEMAN: I'm just taking notes. Yeah. Other comments?

MEMBER NOVOTNY: This is Rachel Novotny, thanks for that. And, you know, I'm trying to think through, I certainly understand that our primary goal is to help people think about diet and food.

I think -- kind of along the line the way that Kay was going, all of those six items are all behavior which -- and they all may be needed, but it would be nice if we looked for an opportunity each one to pull it back a little and think about

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sort of the structure around choices people make that could be called out and kind of help provide guidance to kind of push us along that continuum of supporting and recommending structural changes in our programs and our environments that ultimately help people have better diets. So I know that's a little vague, but my sort of instinct as I was listening to those was that they were very much individual choice versus some other contextual factors.

CHAIR SCHNEEMAN: Great. Thanks. And again, there is more in the chapter that we discussed the last time around the context of the Dietary Guidelines. Any other comments at this point? I know we're moving past the seven o'clock so we'll -- I guess we'll just keep going forward. So, right.

So I wanted to just comment briefly about the Future Directions section of the report, and just to -- the purpose of this section is to highlight research recommendations most needed to complement the Dietary Guidelines, topics to be

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considered in the future Dietary Guideline process, data needs, and more.

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

And in developing the future directions, the Committee hopes that it will be a useful resource to continue to advance nutrition research and support activities to improve public health. So just to check, are there any questions or comments about the Future Directions section? Eve, do you want to move to the --

DR. STOODY: Sure. As we're wrapping up, Barbara, do you want to see if there are any other final comments before -- the next pieces will really be next steps and closing remarks. So I don't know if you want to just pause for one second and see if anybody else had any other comments

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before wrapping it up more broadly on anything from today?

CHAIR SCHNEEMAN: Oh, right. Okay. Yes, anything reflecting back on the day? And normally I would go around and ask each of you, because we're running a little bit on the late side.

I'm just going to hope that you will volunteer a comment if you have one. So, Eve, I think we can move to the closing comments.

DR. STODY: Great, thank you. Okay, so it's hard to believe that we are putting -- the checkmark has been -- I put a checkmark next to each meeting and it's really hard to believe that we just put the checkmark next to the final meeting.

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

So at the previous meetings, meetings one through five, the presentation transcript and recordings are currently available at DietaryGuidelines.gov, and we will work to get

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materials from this meeting posted as quickly as possible. For those who are interested, you can earn free CPE credits for watching the meetings, and you can learn more about that on our website.

Okay. So for next steps, as has been mentioned a few times today, in the coming weeks the Committee will finalize their report based on today's meeting, and they will submit the report to the Secretaries of USDA and HHS at the end of this month. When the Committee submits their report, the Committee will disband. And then USDA and HHS will take the Committee's final report and post it online for public comment. It does take us a little bit of time to prepare it for posting, and we expect to post the final report on or around July 15th.

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

So more information will be posted at [DietaryGuidelines.gov](http://DietaryGuidelines.gov) where you can also sign up

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for email updates.

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

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

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

As you have also heard today, there are a number of staff from USDA and HHS who support this process, particularly across the review of evidence, but also helping to make the information

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available on our website, processing public comments and more. So this slide does include a team who supported this process, kind of at this point in the process, want to give a special thank you to Anne Rodgers, our Science Writer who supported report development.

Thank you also to the leadership at USDA, particularly the USDA Food Nutrition and Consumer Services and the Center for Nutrition Policy and Promotion as well as the USDA Research, Education and Economics Agricultural Research Service. Thank you to HHS and leadership at the Office of the Assistance Secretary for Health and the Office of Disease Prevention and Health Promotion. And finally, a special thank you to Janet De Jesus, Rick Olson, Julie Obbagy, and TusaRebecca Pannucci who helped lead the staff support of this process.

So collectively, just thank you for all the work across the members and the support staff.

You've heard a lot of that today and here are just a few little highlights, rather they're big

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highlights. The draft report is a total of over 500 pages plus online supplements. For the NESR systematic reviews, staff screened over 270,000 citations, and nearly 1,500 articles were included in the new NESR systematic reviews.

As Regan noted, for data analyses over 150 analyses of Federal data sets were reviewed, and for the first time as was discussed today, the food pattern modeling analyses represented from six months to older adulthood. So across the board, this was really an enormous task. We appreciate the work of the members, of the support staff to support this effort. So with that, I'm going to turn it over to Barbara and Ron who also have some closing remarks.

CHAIR SCHNEEMAN: Great, thank you, Eve. And, yes, before going to closing remarks directly from Dr. Kleinman and myself, we do want to acknowledge the public comments that have been received. And the Committee received approximately 62,350 written public comments from March 12, 2019 to June 10th, 2020 when they were

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closed. Amongst those, 4,000 were unique comments.

This is the most comments ever submitted to a Dietary Guidelines Advisory Committee, and in response, the National Academy report on the Dietary Guidelines process, several steps have been taken to make the Committee's process more transparent and inclusive including posting updates on the Committee's work which I believe facilitated comments and public input. Thank you to the public for being a part of this process, and to the staff for summarizing the comments for the Committee's work.

So just in closing comments as we near the end of our work, this has indeed been an incredible journey. I recall the advice I think we all received at our first meeting about the amount of work to accomplish the goals set out by the tasks of the Committee. I think at this point and after hearing Dr. Stoody's summary of what we've worked at, I think we would all agree.

I'm reminded of one of my current

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favorite quotes from Nelson Mandela who stated that always seems impossible until it is done. We are not done yet, but I think we are definitely in the realm of possible for concluding our charge.

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

And I know that all of us on the Committee have been struck by the fact that those most at risk for the most serious outcomes of COVID-19 including hospitalization and death are people afflicted by diet-related chronic diseases, and the apparent synergy between the non-infectious epidemic of obesity and diet-related chronic disease and the infectious epidemic due to COVID-19. This coincidence has highlighted the importance of nutrition and healthful dietary patterns and needs additional examination in future Dietary Guidelines.

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The situation around COVID-19 has also brought to our attention and heightened the implications of food insecurity related to access to foods for a healthful diet as part of the public health strategy to lower disease risk, an issue that we have pointed to as important for USDA and HHS to address in the implementation of the recommendations. This current situation has illustrated the importance of taking steps to improve nutrition for all Americans.

And just some thank-yous to the staff supporting our work. I know that we do not have enough words to express our appreciation and somehow capture the scope and the excellent quality of your work to enable the Committee to accomplish its task. I'd also note that as a committee, we've benefitted from the peer review process organized by the Agricultural Research Service which is a new step in the process and it provided very useful feedback. Thank you to all those scientists involved.

And to my fellow Committee members, you

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have brought a unique and essential expertise to this process. I appreciate your respect for the opinions of fellow Committee members, the evaluation of the public comments, providing constructive suggestions on our drafts, and keeping the focus on the scientific evidence.

So it has been great working with you and learning from each of you, especially as we move into this final stage to finalize our work by the end of the month. So thank you. And thank you especially to Dr. Kleinman as Vice Chair. It has really been great working with you. So, Ron, I will turn it over to you for any final comments.

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

I can only echo the other comments that you made, and so from my personal perspective, this is perhaps the most collegial Committee I've served

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on, and the dedication to getting at the evidence, understanding it, and translating it into advice has been really exceptional.

The staff, I have to say that at the end of the first meeting, my thought was, no way, it just isn't going to work. Way too much to do here, much too little time to do it in. And we're probably going to have to get this up sometime in the next two or three months.

The staff, you made it possible to complete this task and you did it in the most professional, dedicated way I can imagine. So I think so much credit goes to you for your dedication and your skill, experience, and your knowledge of all of these issues. And you've really made it a much easier task for all of us. So I'll end, again, by thanking all of you. You're really an absolutely wonderful group, and I hope we get to work together again in a much more limited way. Thank you.

CHAIR SCHNEEMAN: Great.

VICE CHAIR KLEINMAN: Thank you.

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CHAIR SCHNEEMAN: And so now we turn it back to Eve because she's the one who has to adjourn us.

DR. STOODY: Yes, thank you again, and thanks everyone for joining us. That does adjourn the final meeting of the 2020 Dietary Guidelines Advisory Committee. Stay tuned for updates at DietaryGuidelines.gov. And thank you again.

(Whereupon, the above-entitled matter went off the record at 7:19 p.m.)