that 25% of survey respondents were not engaging in any regular exercise and another 25% engaged in suboptimal levels of exercise.[95] Notably, individuals whose oncology providers discussed the importance of exercise or a healthy diet as a part of cancer care reported a greater likelihood of making changes in lifestyle behaviors after cancer diagnosis, and another recent study in individuals with colon cancer in the United Kingdom found that patients who reported that their oncology providers addressed exercise during oncology visits were more likely to engage in physical activity (51% in the advice group *v* 42% in the no advice group; OR 1.74; 95% CI, 1.60 to 1.90; $P < .001$), and more likely to meet physical activity guidelines (25% *v* 20%; OR 1.70; 95% CI, 1.54 to 1.88; $P < .001$).[96] This work highlights the importance of oncology provider engagement in encouraging regular physical activity in their patients receiving cancer treatment.

Notably, the appropriate referral for exercise in patients undergoing treatment for cancer may depend on several factors, such as comorbidities, treatment toxicities, and the patient's physical activity level. Many patients can safely perform unsupervised exercise, whereas others may need supervised cancer-specific exercise, clinically supervised exercise, or to participate in a cancer rehabilitation program before undertaking exercise on their own. National efforts are focusing on building algorithms and decision-support tools to point to the most safe, feasible, and effective intervention for a given patient.[97,98]

Clinical Question 2

Does consuming a particular dietary pattern or food(s) during cancer treatment safely improve outcomes related to QoL, treatment toxicity, or cancer control?

Recommendation 2.1. There is currently insufficient evidence to recommend for or against dietary interventions such as ketogenic or low-carbohydrate diets, low-fat diets, functional foods, or fasting to improve outcomes related to QoL, treatment toxicity, or cancer control.

Literature review and analysis. Systematic reviews have evaluated a broad range of dietary interventions in patients during cancer treatment, including changes in timing of food intake (eg, intermittent fasting), dietary patterns, macronutrient composition (eg, low-fat or low-carbohydrate diets), and intake or omission of particular foods.[56,58-60,62,64] The majority of randomized trials conducted in patients undergoing active treatment have focused on patient-reported outcomes or on biomarkers (see the section on biomarkers in discussion), with little or no information regarding the impact of dietary change during treatment on cancer outcomes. Additionally, most of these trials have been small, enrolling fewer than 100 patients, often with different cancer types and stages. The results have generally failed to show consistent effects of dietary change during treatment on patient-reported or other outcomes in patients with cancer.[56,58-60]

A 2019 meta-analysis broadly evaluated the impact of dietary interventions on patient-reported outcomes. The analysis included 15 trials and 1,290 patients, although trial populations included patients both during and after cancer treatment and dietary interventions were varied, including plant-based diets, weight loss diets, and healthy diets.[56] There was no effect of most dietary interventions in aggregate on fatigue (SMD 0.18; 95% CI, –0.02 to 0.39) or QoL (SMD 0.07; 95% CI, –0.10 to 0.24), but potentially an effect of a plant-based dietary pattern on fatigue (SMD 0.62; 95% CI, 0.10 to 1.15). In another analysis evaluating a broad range of dietary interventions on patient-reported outcomes, a Cochrane review evaluated the impact of dietary interventions during pelvic radiotherapy on GI symptoms. Low-certainty evidence, on the basis of small numbers of patients, suggested that protein supplements, dietary counseling, and probiotics may reduce the risk of acute, grade 2 or worse diarrhea.[60] Also, with low certainty of evidence, one study in 108 patients showed that a high-fiber diet led to improvements in GI symptoms and QoL at one year postradiotherapy.[99] Significant work remains to be done, as detailed in the research gaps section below.

Recommendation 2.2. Neutropenic diets (specifically diets that exclude raw fruits and vegetables) are not recommended to prevent infection in patients with cancer during active treatment (Type: evidence based, harms likely to outweigh benefits; Evidence quality: low; Strength of recommendation: weak).

Literature review and analysis. There is no standard definition of a neutropenic diet. Diets included in this review focused on food safety practices that were more restrictive than those endorsed by the US Food and Drug Administration[100] or the Centers for Disease Control and Prevention[101] for the general population and/or recommended the avoidance of foods such as raw fruits and vegetables with the intent of decreasing exposure to microbes and bacteria. Three systematic reviews of neutropenic diets were included in the current review[57,61,63] In a meta-analysis that included studies of children and adults, infection was noted in 53.7% of the patients randomly assigned to a neutropenic diet and 50.0% of the patients assigned to an unrestricted diet (relative risk 1.13; 95% CI, 0.98 to 1.30; five studies, 388 patients).[57] Of the three RCTs conducted in adults, only one enrolled more than 50 patients: Gardner et al enrolled 153 patients (age range, 17-88 years) who were receiving induction chemotherapy for acute myeloid leukemia.[102] Patients were randomly assigned to a diet containing no raw fruits or vegetables (cooked diet) or to a diet containing fresh fruit and fresh vegetables (raw diet). A major infection occurred in 29% of patients in the cooked arms and 35% of patients in the raw arm ($P = .60$). There was no significant difference in survival between the two arms ($P = .36$).