Table 4-A-II-1 Summary of Findings

Dietary patterns identified using factor analysis (FA) or cluster analysis (CA) and association with body weight status and obesity

Author, Year, Quality Rating, Study Design, Cohort	Sample Size, Location, Duration, Dietary Assessment, Methodology / No. Patterns	Age (Year), Percent Female, Race / Ethnicity, Outcome, Comparison	Dietary Patterns Associated with Lower Risk of Obesity	Dietary Patterns with No Significant Association with Obesity	Dietary Patterns Associated with Higher Risk of Obesity
Dietary Pattern Analyses Conducted with Women and Men Combined					
Duffey et al, 2012 Neutral Prospective cohort CARDIA study	N=4,161 United States 20 years Diet history questionnaire CA, two patterns	18 years to 30 years 53% 53% African American Waist circumference (WC), "Prudent diet" vs. "Western diet"		Waist Circumference • *Prudent diet:* Low-fat whole grains, fruit, yogurt, cheese, nuts/seeds, milk. • *Western diet:* Meats/poultry, low-fat refined grains, high-fat refined grains, fats, condiments, fat food, regular soda	
Hosseini-Esfahani et al, 2011 Positive Prospective cohort Tehran Lipid and Glucose Study (TLGS)	N=206 Iran Six years 168-item FFQ FA, three patterns	42 years 60% Not reported WC, BMI, WHR; Q4 vs. Q1	WHR *Healthful:* High intake of fruit, vegetables, dairy, oil, whole grains, poultry, and fish. (β=-0.77 R^2=0.43, P<0.01).	BMI , WC, WHR *Mix:* High-fat red meats, legumes, nuts and seeds, sweets, tea and coffee. WHR *Western:* High intake of processed meats, fat, salty snacks, fatty sauces and sweet beverages	Change in BMI • *Western:* High intake of processed meats, fat, salty snacks, fatty sauces and sweet beverages • *All:* β=0.30, R^2=0.21, P<0.05) • *Overweight/obese:* (β=0.41. R^2=0.22, P<0.01 WC • *Western:* β=0.24, R^2=0.18, P<0.05); Normal weight subjects (β=0.49, R^2=0.21, P<0.01)

Source: Nutrition Evidence Library. *A series of systematic reviews on the relationship between dietary patterns and health outcomes.* Alexandria, VA: U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, March 2014.

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Newby et al, 2003 Positive Prospective cohort Baltimore Longitudinal Study of Aging (same cohort as Newby et al, 2003, but CA results)	N=459 United States One year Seven-day dietary record CA, five patterns	30 years to 80 years 48% White: *Men:* 96% *Women:* 94% African American: *Men:* 3.8% *Women:* 5.9% WC and BMI change *Comparison:* Healthy pattern	BMI change: "Healthy" vs. "Meat and potatoes" *Healthy:* Reduced-fat dairy, fruit, high-fiber cereal		**BMI (regression coefficient β and 95% CI)** Compared to "Healthy pattern" • *Meat and potatoes:* High-fat dairy, meat, fruit, white bread or refined grains), β=0.25 (0.07, 0.43), P<0.05 • WC (regression coefficient β and 95% CI); compared to "Healthy pattern" • *White bread:* High-fat dairy, meat, poultry, white bread or refined grains. • WC annual change (β=0.90cm; 95% CI: 0.12, 1.68; P<0.05
Newby et al, 2004 Positive Prospective cohort Baltimore Longitudinal Study of Aging (same cohort as Newby et al, 2003, but FA results)	N=459 United States One year Seven-day dietary record FA, six patterns	30 years to 80 years 48% White: *Men:* 96% *Women:* 94% African American: *Men:* 3.8% *Women:* 5.9% WC and BMI change; Regression Q5 vs. Q1 food patterns predicting change	BMI (regression coefficient **β and 95% CI)** *Women only:* *Factor 1:* Reduced-fat dairy products, fruit and fiber (reduced-fat dairy products, ready-to-eat cereal, fruit), β=-0.51 (-0.82, -0.20); P_{trend} <0.05; P_{trend}<0.01 WC (regression coefficient **β and 95% CI)** *Both sexes:* *Factor 1:* Reduced-fat dairy products, fruit and fiber (reduced-fat dairy products, ready-to-eat cereal, fruit), β=-1.06cm (-1.88, -0.24cm);	BMI and WC • *Factor 4:* Vegetable fats and vegetables (margarine, vegetable oils, starchy vegetables) • *Factor 5:* Fatty meats (liver and organ meat, non-white bread) • *Factor 6:* Eggs, bread and soup" (eggs, white bread and refined grains, misc. fats, soups and chowders) WC Only *Factor 2:* Protein and alcohol (seafood, poultry, vegetables)	**WC (regression coefficient β and SE)** *Factor 3:* Sweets (sweetened juices, dairy desserts, fast food), β=0.94cm (0.39cm); P<0.05; P_{trend}<0.04 BMI *Factor 2:* Protein and alcohol (seafood, poultry, vegetables) (β=0.20; 95% CI: 0.04, 0.36; P<0.05); test for trend was P=0.05

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Author, Year, Quality Rating, Study Design, Cohort	Sample Size, Location, Duration, Dietary Assessment, Methodology / No. Patterns	Age (Year), Percent Female, Race / Ethnicity, Outcome, Comparison	Dietary Patterns Associated with Lower Risk of Obesity	Dietary Patterns with No Significant Association with Obesity	Dietary Patterns Associated with Higher Risk of Obesity
			$P<0.05$; $P_{trend}<0.04$	BMI Only • *Factor 3:* Sweets (sweetened juices, dairy desserts, fast food) • *Factor 1:* Reduced-fat dairy products, fruit and fiber (men only)	
Dietary Pattern Analyses Conducted with Women					
Boggs et al, 2011 Positive Prospective cohort Black Women's Health Study	N=41,351 United States 14 years 68-item FFQ (1995) and 85-item FFQ (2001) Principal component analysis, two patterns	21 years to 54 years 100% 100% African American Changes in body weight, Q5 vs. Q1	Mean Weight Gain • *Sub-sample:* N=12,736 who maintained the same dietary pattern over time • *Vegetables and fruit:* Non-cruciferous and cruciferous vegs, fruit; 10.88kg and 11.94kg, respectively; $P_{trend}=0.003$	Mean Weight Gain *All:* • *Vegetables and fruit:* Non-cruciferous vegetables, cruciferous vegetables, fruit • *Meat and fried foods:* Red and processed meat, regular mayonnaise/ salad dressing, French fries, fried chicken.	Mean Weight Gain • *Sub-sample:* N=12,736 who maintained the same dietary pattern over time • *Meat and fried foods:* Red meat, processed meat, regular mayonnaise/salad dressing, French fries, fried chicken; 12.02kg and 10.15kg, respectively; $P_{trend}<0.001$
McNaughton et al, 2007 Positive Prospective cohort Medical Research Council (MRC) National Survey of Health and	N=1,265 Women: N=696 United Kingdom 17 years Five-day food diary FA, three patterns for	53 years 55% Not reported BMI and WC, longitudinal analysis	Women, Pattern Association with BMI and WC *Fruit, vegs, and dairy:* Soya milk, meat alternatives, low/reduced fat cheese, dried fruit BMI, P<0.004;WC, P=0.0007	Women, Pattern Association with BMI and WC • *Ethnic foods and alcohol:* Red wine, avocados and olives, white wine, other vegetables, fried Indian and Chinese foods, rice dishes • *Meat, potatoes and sweet foods:* Fried potatoes and potato products, sauces	

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Dietary patterns identified using factor analysis (FA) or cluster analysis (CA) and association with body weight status and obesity

Author, Year, Quality Rating, Study Design, Cohort	Sample Size, Location, Duration, Dietary Assessment, Methodology / No. Patterns	Age (Year), Percent Female, Race / Ethnicity, Outcome, Comparison	Dietary Patterns Associated with Lower Risk of Obesity	Dietary Patterns with No Significant Association with Obesity	Dietary Patterns Associated with Higher Risk of Obesity
Development (NSHD)—1946 British Birth Cohort	women; two for men			and dressings, red meat and game	
Newby et al, 2006 Positive Prospective cohort Swedish Mammography Cohort in 1987 and 1997	N=33,840 Sweden Nine years 67-item FFQ (1987) and 97-item FFQ (1997) Confirmatory FA, four patterns	Mean 52.5 years 100% Not reported BMI BMI, linear regression, for change in food pattern score and change in BMI stratified by baseline BMI	BMI (regression coefficient and 95% CI) *Healthy:* Vegs, fruit, whole grains, fruit juice, cereals). Obese women with an increased factor score had larger decreases in BMI, β=-0.18kg/m² for a one-unit increase in SD score, CI (0.26, -0.10), P<0.0001. Normal-weight and overweight women who raised their "Healthy" pattern score showed a smaller rise in BMI (-0.05kg/m² and -0.11kg/m², respectively; P<0.05 for both.	BMI **(regression coefficient β and 95% CI)** • *Alcohol:* Wine, spirits, snacks, beer, chocolate; all groups • *Western/Swedish:* Meat, processed meat, liver, potatoes, refined grains); normal and obese • *Sweets:* Sugary foods, sweet baked goods, soda, chocolate, fruit mix (soup), refined grains, dairy desserts; normal and overweight	**BMI (regression coefficient β and 95% CI)** *Sweets:* Sugary foods, sweet baked goods, soda, chocolate, fruit mix (soup), refined grains, dairy desserts Obese subjects who raised their factor score had the smallest drop in BMI (β=0.17kg/m² for a unit higher in SD score; CI: 0.07 to 0.26; P=0.0008); compared with a 0.04kg/m² (P<0.005) higher in BMI for overweight women and NS difference for normal-weight women. • *Western/Swedish:* Meat, processed meat, liver, potatoes, refined grains • *Overweight:* 0.05 (0.01, 0.09), P<0.05
Quatromoni et al, 2002 Positive Prospective cohort Framingham Offspring-Spouse study	N=737 United States 12 years 145-item FFQ Ward's cluster method, five patterns,	30 years to 89 years 100% Not reported *Overweight incidence, comparator:* Heart healthy	Overweight Compared with "Empty-calorie" pattern *Heart healthy:* Other low-fat foods, fruits and low-fat milk, vegetables, refined grains, soft margarine and oils)	Overweight • *Light eating:* Diet beverages and firm vegetables fats, refined grains, soft margarine/oils, other low-fat foods, vegs • *Wine and moderate:* Diet beverages and firm vegetables fats, vegs, refined grains, soft margarine/oils, fruits and low-fat milk • *High fat:* Sweet and animal fats, diet beverages and firm vegs fats, refined	Overweight *Empty-calorie:* Diet beverage and firm vegs fats, refined grains, soft margarine and oils, vegs vs. "Heart healthy" (other low-fat foods, fruits and low-fat milk, vegs, refined grains, soft margarine and oils). RR=1.4, 95% CI (0.9, 2.2)

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Dietary patterns identified using factor analysis (FA) or cluster analysis (CA) and association with body weight status and obesity

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				grains, soft margarine/oils, vegetables	
Schulze et al, 2006 Positive Prospective cohort Nurse's Health Study II	N=51,670 United States Eight years 133-item (semi-quantitative) FFQ Principal component analysis, two patterns	26 years to 46 years 100% Not reported Weight change Low vs. high; high vs. low pattern score	Average Weight Gain *Prudent pattern:* Higher intakes of fruits, vegetables, whole grains, fish, poultry, and salad dressing. Women who had a higher "Prudent" pattern score had less weight gain (multivariate adjusted means, 1.93kg for 1991 to 1995 and 0.66kg for 1995 to 1999) than women who lowered their "Prudent" scores (4.83kg and 3.35kg for the two time periods, respectively), P<0.001		Average Weight Gain *Western pattern:* Higher intake of red and processed meats, refined grains, sweets and desserts, and potatoes) Women who had a higher pattern score had higher weight gain (multivariate adjusted means, 4.55kg for 1991 to 1995 and 2.86kg for 1995 to 1999) than women who lowered their "Western" pattern scores (2.70kg and 1.37kg for the two time periods, respectively), P<0.001
Togo et al, 2003 Positive Prospective cohort MONICA study	N=2,436 Women: 1,693 Denmark Five years and 11 years 26-item FFQ FA, two patterns for women; three for men	30 years to 60 years 49% Not reported BMI change, obesity; association between food factor scores; five-year and 11-year change in BMI and obesity		BMI Change *Women*: • *Green:* Wheat bread with whole grains or bran, raw vegetables, rye bread with whole grains or bran, boiled vegetables • *Obesity:* Baseline and change in "Traditional," "Green," "Sweet," "Sweet-traditional," and "Green," and "Sweet-traditional" (all) pattern scores at five years and 11 years	BMI **Increase β (95% CI)** • *Women:* Five-year BMI change and baseline factor score • *Sweet-traditional:* Cake, biscuits or other baked goods, candy or chocolate, soft drinks or ice cream, jam/marmalade or honey) • *Five-year:* β=-0.33 (-0.54, -0.13) P<0.01 (11-year NS)

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Ritchie et al, 2007 Positive Prospective cohort National Heart, Lung, and Blood Institute Growth and Health Study (NGHS)	N=2,371 United States 10 years Three-day dietary record CA, four patterns for White girls and four patterns for Black girls; Comparator: *Healthy:* White girls *Snack-type foods:* Black girls	Nine years to 10 years 100% *African American:* 51% *White:* 49% BMI, percentage body fat and WC	WC Change "Healthy" vs. "Sweets and snack-type foods" White girls: *Healthy:* Sweetened drinks, juice, plain milk, fruit, other soups, mixed dishes, cereal, other vegetables; P=0.037	BMI, WC and Percentage Body Fat *Black girls:* • *Customary:* Sweetened drinks, juice, plain milk, cereal, fruit, mixed dishes, processed meats and sandwiches • *Snack-type foods:* Sweetened drinks, juice, plain milk, cereal, mixed dishes, other soup, ice cream • *Milk-type foods:* Sweetened drinks, juice, plain milk, cereal, processed meats and sandwiches, other vegetables, red meat • *Sweets and cheese pattern:* Sweetened drinks, juice, plain milk, cereal, mixed dishes, processed meats and sandwiches, ice cream BMI, Percentage Body Fat *White girls:* • *Convenience:* Sweetened drinks, juice, plain milk, cereal, mixed dishes, fruit • *Sweets and snack-type foods:* Sweetened drinks, juice, plain milk, fruit, mixed dishes, cheese and spread sandwiches • *Fast-food pattern:* Sweetened drinks, juice, plain milk, flavored milk, cereal, mixed dishes, fruit, other soups • *Healthy:* Sweetened drinks, juice, plain milk, fruit, other soups, mixed dishes, cereal, other vegetables	

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				WC: "Fast-food pattern" and "Convenience" patterns	
Dietary Pattern Analyses Conducted with Men					
McNaughton et al, 2007 Positive Prospective cohort Medical Research Council (MRC) National Survey of Health and Development (NSHD) 1946 British Birth Cohort	N=1,265 *Men:* N=569 United Kingdom 17 years Five-day food diary FA, three patterns for women; two for men	53 years 55% Not reported BMI and WC, longitudinal analysis (three repeat measures of dietary pattern scores)	Men, Pattern Association with WC *Mixed:* Soya milk, other vegetables, fruit juice, skim milk beverages, sweet biscuits; P=0.02	Men, Pattern Association with BMI and WC *Ethnic foods and alcohol:* Red wine, other legumes, avocados and olives, mineral water, white wine, fried Indian and Chinese foods, spinach, rice dishes, pasta/noodles Pattern Association with BMI *Mixed:* Soya milk, other vegetables, fruit juice, skim milk beverages, sweet biscuits; P=0.02	
Togo et al, 2003 Positive Prospective cohort MONICA study	N=2,436 *Men:* N=1,792 Denmark Five years and 11 years 26-item FFQ FA, two patterns for women; three for men	30 years to 60 years 49% Not reported BMI change, obesity; Association between food factor scores, five-year and 11-year change in BMI and obesity		BMI change (five-year and 11-year) Men • *Green:* Wheat bread with whole grains or bran, raw vegetables, rye bread with whole grains or bran, fruit, boiled vegetables • *Sweet:* Cake, biscuits or other baked goods, candy or chocolate, soft drinks or ice cream, jam/marmalade or honey	BMI increase (11 years) β (95% CI) Men • *Traditional:* Meat, paté and meat for bread, potatoes, white (wheat) bread • *11-year:* β=-0.40 (-0.78, 0.01), P<0.05 (five-year NS)

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