

MAASAI	Population Cohort	Methods	Dietary Findings	BM	Pre-transition	Lifestyle	Major outcomes	Dietary Findings	BM	Post-transition	Lifestyle	Major outcomes
Christensen DL, Eto J, Hansen AM, et al. Obesity and regional distribution in Kenyan populations: impact of ethnicity and urbanization. <i>Ann Hum Biol</i> . 2008 Mar-Apr;35(2):230-49. doi:10.1080/03014480701649870	Pre-transition: 172 Males and 163 Females Maasai in rural Kenya, lived in villages (manyattas) in 2005-2006 Post-transition: 7 Males Maasai in urban Kenya (Nairobi) in 2005-2006	Observational study. Data were collected from anthropometric measures, BM, arm fat area (AFA), and arm muscle area (AMA).		Males: 21.0 ± 4.7 Females: 22.3 ± 4.7	-	-	-		Males: 23.3 ± 4.4	-	-	-
Christensen DL, Furlong-Jones D, Boli MK, et al. Contemporary trends and physical activity in the Maasai and Maasai of rural Kenya. <i>Am J Hum Biol</i> . 2012 Nov-Dec 2012;24(8):723-9. doi:10.1002/ajhb.22303	Pre-transition: 163 Males and 178 Females Maasai in rural Kenya in 2005 Post-transition: N/A	Observational study. Data were collected on physical activity energy expenditure (PASE) and cardio-respiratory fitness (CRF) by administering a 6-min test, monitoring heart rate data, and performing a blood test.		Males: 21 (95% CI 20.0-21.8) Females: 22.7 (95% CI 22.1-23.4)	-	Males: physical activity energy expenditure (PASE): 78.0 kJ/kg (95% CI 74.8-81.7); cardio-respiratory fitness (CRF): 43.1 mL O <sub>2</sub> /kg (95% CI 42.1-44.1) Females: PASE: 74.5 kJ/kg (95% CI 70.1-78.9); CRF: 38.9 mL O <sub>2</sub> /kg (95% CI 37.8-39.8) Physical activity levels among rural Maasai (and Kamba) were the highest in the group.				-	-	-
Christensen DL, Fitis H, Mwambi DL, et al. Prevalence of glucose intolerance and associated risk factors in rural and urban populations of different ethnic groups in Kenya. <i>Diabetes Res Clin Pract</i> . Jan 2009;84(3):303-10. doi:10.1016/j.diabetes.2009.03.007	Pre-transition: 172 Males and 193 Females rural Maasai in 2005-2006 Post-transition: 7 Males in urban Maasai in 2005-2006	Observational study. Data were collected from anthropometric measures, blood pressure measurements, physical activity and fitness measurements, and questionnaire data.	Subsets on mainly animal husbandry and maize had a relatively lower dietary glycaemic load compared to the other groups		Had the highest fat accumulation expressed as BMI, visceral and abdominal subcutaneous fat thickness, WC and AFA with increasing age compared to the Luo and Kamba (no quantitative data)				Males: 5.2% with Glucose intolerance (diabetes + IGT) Females: 7.8% with Glucose intolerance (diabetes + IGT)	-	-	-
Day J, Bailey A, Robinson D. Biological variations associated with change in Bantus among the pastoral and nomadic tribes of East Africa. <i>Ann Hum Biol</i> . 1979 Jan-Feb 1979;6(1):29-39. doi:10.1080/03014487900000234	Pre-transition: 39 tribal Maasai living in Tsimto Gato, studied in August 1977 Post-transition: 22 non-tribal Maasai living Keekorok Game Lodge, studied in August 1977	Observational study. Data were collected from anthropometric measures, blood pressure measurements, physical activity estimations, cholesterol, and triglyceride levels.	Milk, supplemented with oil and meat, and hence is rich in cholesterol.	Males: Height: 174.78 ± 6.0 cm; weight: 58 ± 6.1 kg	-	More active than "non-tribal" members	Males: SBP: 108.95 ± 10.91 mmHg; DBP: 70.26 ± 6.22 mmHg; Cholesterol: 193.42 ± 55.25 mg/dL; Triglyceride: 125.66 ± 54.08 mg/dL; Fibrinogen: 12.25 ± 5.27 mg/dL	Cholesterol replaced with carbohydrates.	Males: Height: 172.51 ± 5.0 cm; weight: 58.55 ± 4.88 kg	-	Less active than "tribal" members, but considerably very active by Western standards	Males: SBP: 117.50 ± 5.96 mmHg; DBP: 72.75 ± 7.89 mmHg; Cholesterol: 187.25 ± 55.25 mg/dL; Triglyceride: 123.15 ± 52.94 mg/dL; Fibrinogen: 15.03 ± 7.55 mg/dL
Day J, Cammenga M, Bailey A, Robinson D. Anthropometric, physiological and biochemical differences between urban and rural Maasai. <i>Anthropometria</i> . 1976;6(3):176-200;377-381. doi:https://doi.org/10.1007/BF01500130-X	Pre-transition: 27 Males from a rural group in 1975 Post-transition: 24 Males who had been living in cities for at least 10 years in 1975	Observational study. Data were collected from anthropometric measures, blood pressure measurements, cholesterol, triglyceride, and fibrinogen.	Staple food of milk, supplemented with blood and meat, with a cholesterol content similar to American and Western European diets.	Males: Height: 172.27 ± 7.08 cm; weight: 55.47 ± 9.76 kg	-	More active than the urban subjects.	Males: SBP: 114.07 ± 24.89 mmHg; DBP: 65.33 ± 14.82 mmHg; Cholesterol: 160.19 ± 48.30 mg/dL; Triglyceride: 144.04 ± 74.14 mg/dL; Fibrinogen: 208.43 ± 49.99 mg/dL	Consumed more carbohydrates than rural group.	Males: Height: 173.21 ± 7.45 cm; weight: 68.39 ± 8.81 kg	-	Tended to be engaged in sedentary occupations	Males: SBP: 110.96 ± 14.56 mmHg; DBP: 70.00 ± 12.65 mmHg; Cholesterol: 202.88 ± 47.33 mg/dL; Triglyceride: 158.85 ± 68.12 mg/dL; Fibrinogen: 184.39 ± 35.05 mg/dL
Jakob KA, Beaton TA, Boone RB, Burnfield SB. Nutritional Status of Maasai Pastoralists under Change. <i>Hum Ecol</i> . Winter 1991; 20(1):43-61. doi:10.1007/BF00745-015-8749-0	Pre-transition: 219 Males and 315 Females from 0-18-year-old pastoral Maasai, and 96 Males and 130 Females of whom are adults in 2000 Post-transition: N/A	Observational study. Data were collected on anthropometric measures, nutritional data, and dermal data.	A combination of pastoral foods (milk and meat) and non-pastoral foods (tea, beans, sugar, salt, maize meal, fat, rice, beans, potatoes, tomatoes, onions, Sukuma, wheat flour, chicken and combinations thereof)				Males: adults: 4.1% obese, wasted/underweight: 51%, malnourished: 52%, stunted: 3% Females: adults: 4.6% obese, wasted/underweight: 55%, malnourished: 1.5%, stunted: 2.3%					
Hansen AW, Christensen DL, Larsson MW, et al. Dietary patterns, food and macronutrient intake among adults in three ethnic groups in rural Kenya. <i>Public Health Nutr</i> . Sep 2011; 14(9):1671-9. doi:10.1017/S1368837410000792	Pre-transition: 172 Males and 190 Females Maasai from rural Kenya in 2005 Post-transition: N/A	Observational study. Data were collected from 24-hr food intake recalls, anthropometric measures, and socioeconomic surveys.	Milk and milk products were important food items	Males: Total energy: 8400 kJ/d; protein: 71.3 g/d (14.1%), fat: 68.2 g/d (32.2%), carbohydrate: 279 g/d (55.7%) Females: Total energy: 6700 kJ/d; protein: 50.8 g/d (12.9%), fat: 47.0 g/d (28.2%), carbohydrate: 240 g/d (81.2%)	Males: 21.0 (95% CI 20.9-21.7) Females: 22.3 (95% CI 21.6-23)		Males: BMI >= 30 (obese): 4.1%, BMI 25-29.9 (overweight): 9.9%, BMI 18.5-24.9 (normal): 84.9% Females: BMI >= 30 (obese): 10.0%, BMI 25-29.9 (overweight): 7.9%, BMI 18.5-24.9 (normal): 82.2%, BMI < 18.5 (underweight): 1.9%					
Homewood K. Pastoralist production systems and climate change. <i>Climate Change and World Food security: Synthesis</i> . 1996:505-524.	Pre-transition: 1992's Kenyan and Tanzanian Maasai, "pre-development" Post-transition: 1992's Kenyan and Tanzanian Maasai, "post-development"	Comparative study of past/published studies.		Tanzanian 1989: Males: 21.0 Females: Adult: 22.4, 19-30yrs: 22.9			Tanzanian 1981-1983: Milk/milk products: 34% ± 25.3%, meat: 10% ± 7.5%, maize: 33% ± 21.6%, other: 4% Kenyan 1981-1983: Milk/milk products: 48% ± 30.8%, meat: 8% ± 12.0%, maize: 25% ± 35.3%, other: 15%			Tanzanian 1989: Males: 19.7 ± 2.3, 18-20yrs: 18 ± 2.0		
Kroff H, Kuhn K, Kyalo FM, Kiaga-Makau BM, Johnson G. High content of long-chain n-3 polyunsaturated fatty acids in red blood cells of Kenyan Maasai despite low dietary intake. <i>Lipids Health Dis</i> . Aug 2011;10(1):1-11. doi:10.1186/1478-5115-10-141	Pre-transition: N/A Post-transition: 6 Males and 20 Females Maasai Kenya in 2007	Observational study. Data were collected on food intake surveys and blood draws.					Males: energy intake: 9.5 MJ; carbohydrates: 303 g; protein: 73g; fat: 74g Females: energy intake: 7.0 MJ; carbohydrates: 220g; protein: 64g; fat: 50g Overall: energy intake: 7.8 MJ ± 2.1 MJ; carbohydrates: 58.2% ± 8.4%, protein: 13.2% ± 2.0%, fat: 28.9% ± 7.9% Dairy products: 41.1% ± 20.7%, Meat and wheat: 0.9% ± 0.9%, plant-derived foods: 58.2% ± 20.7%		Males: Alcohol: 0g Females: Alcohol: 0g More sedentary, market-orientated lifestyle	Males (n=4 agreed to blood draw): Total cholesterol: 4.3 mmol/L ± 0.5 mmol/L, LDL: 2.8 mmol/L ± 0.4 mmol/L, HDL: 0.9 mmol/L ± 0.1 mmol/L Females (n=4 agreed to blood draw): Total cholesterol: 4.3 mmol/L ± 1.1 mmol/L, LDL: 2.8 mmol/L ± 0.9 mmol/L, HDL: 1.1 mmol/L ± 0.2 mmol/L		
Lee JC, Westgate G, Boli MK, et al. Physical activity energy expenditure and cardiometabolic health in three rural Kenyan populations. <i>Am J Hum Biol</i> . 01 2013;25(1):45-59. doi:10.1002/ajhb.22199	Pre-transition: N/A Post-transition: 161 Males and 170 Females rural Maasai in 2005	Observational study. Data were collected from anthropometric measures, blood pressure, glucose challenge test, health assessment questionnaire, 24-hour dietary intake recalls, and physical activity measurements.					Males: total fat intake: 2670 ± 1080 kJ/day Females: total fat intake: 1920 ± 793 kJ/day		Males: Average BMI: 21.0 ± 4.8 Females: 22.5 ± 4.8			
Mann DR, Shaffer RD, Anderson RL, Sandstead HT. Cardiovascular Disease in the Maasai. <i>J Abnorm Child Psychol</i> . Jul-Aug 1984; 12(4):289-312. doi:10.1016/0091-3159(84)90041-7	Pre-transition: 400 Males and 'some' additional females in the Maasai, J. Abnorm Child Psychol. 1984 Jul-Aug 1984; 12(4):289-312. doi:10.1016/0091-3159(84)90041-7 Post-transition: N/A	Observational study. Data were collected from anthropometric measures, blood pressure, medical history, ECG, serum cholesterol levels, and dietary intake.	Consumed high levels of milk (protein and fat)	Males: Average height for 14-19yrs: 168.6 ± 1.42 cm, 20-24yrs: 171.8 ± 0.74 cm, 25-29yrs: 173.3 ± 1.27 cm, 30-34yrs: 170.9 ± 0.71 cm, 44-49yrs: 172.0 ± 0.58 cm, 50+ yrs: 160.3 ± 3.89 cm, Average weight for 14-19yrs: 48.2 ± 1.2 kg, 20-24yrs: 56.1 ± 1.23 kg, 25-29yrs: 60.8 ± 1.7 cm, 30-34yrs: 57.3 ± 0.89 cm, 44-49yrs: 58.8 ± 0.63 cm, 50+ yrs: 66.4 ± 1.8 cm			Males: Cholesterol: of 14-19yrs: 114.7 ± 5.62 mg/dL, 20-24yrs: 114.1 ± 2.60 mg/dL, 25-29yrs: 130.2 ± 5.29 mg/dL, 30-34yrs: 129.0 ± 3.87 mg/dL, 44-49yrs: 129.0 ± 2.03 mg/dL, 50+ yrs: 119.7 ± 16.38 mg/dL, of ages: 15-64 ± 1.03 mg/dL, Total % of heart disease: 3.8%, SBP greater than or equal to 160 mmHg: 1.5%, DBP than or equal to 100 mmHg: 1.3%					
Mwambi P. A society in transition: Developmental and seasonal influences on the nutrition of Maasai women and children. Unpubl. 1986.	Pre-transition: Group ranch Miskiani 190 children and 63 adults in 1982-1983 Post-transition: Group ranch Olthar and Marwasi 198 children and 108 adults in 1982-1983	Observational study. Data were collected over two years from anthropometric measures, 24-hour dietary recall, and socioeconomic information.	Food derived from own livestock (milk, meat, blood); Miskiani: milk and milk products 31%, meat and animal fat: 12%, purchased foods (maize, sugar, oil): 56%			Alcohol: 0-1%	Females: Protein: 14%, Fat: 41%, Carbohydrate: 30% Food derived from own livestock (milk, meat, blood); milk and milk products (milk and butter): 64%, meat and animal fat: 4%, purchased foods (maize, sugar, oil): 32%			Alcohol: 1-4%		
Mwambi PS. Food intake and growth in the Maasai. <i>Ecology of Food and Nutrition</i> . 1989;23(1):7-30.	Pre-transition: 61 Females (non-pregnant and non-lactating) in rural Maasai in 1982-1983 Post-transition: N/A	Observational study. Data were collected from anthropometric measures, 24-hour dietary recall, and samples of pregnancy foods.	Females: Dairy products (milk and butter): 42.4 ± 29.4%, meat and animal fat: 9.2 ± 12.4%, purchased foods (maize, sugar, oil): 48.4 ± 12.1%, Protein: 14.8 ± 7.2%, Fat: 36.8 ± 14.1%, Carbohydrate: 44.4 ± 18.4%, Alcohol: 0.9 ± 4.8			Females: Alcohol: 0.9 ± 4.8%						
Mwambi P, Oculikar C. Lipid intakes of Maasai women and children. <i>Ecology of food and nutrition</i> . 1993;23(2):155-165.	Pre-transition: 121 Females in rural Maasai in 1982-1983 Post-transition: N/A	Observational study. Data were collected for a 24-hour dietary recall.	Females: Total energy intake (kcal): 1329 ± 19; fat (g): 53.8 ± 1.1; % fat from fat 37.8 ± 0.7; Saturated fat (proportion of total fatty acids): 58.1 ± 0.51; monounsaturated fat 28.0 ± 0.25; polyunsaturated fat 3.5 ± 0.22; total cholesterol (mg): 219.1 ± 5.2									
Njikeleli M, Sarda K, Mubai J, Yarnon J. Dietary habits, plasma polyunsaturated fatty acids and selected anthropometric measures in the Maasai. <i>J Abnorm Child Psychol</i> . 2005;33(1):157-64. doi:10.1016/j.jabp.2005.05.011	Pre-transition: 27 Males and 11 Females pastoralist Maasai in Marsabit in 1998 Post-transition: N/A	Observational study. Data were collected from anthropometric measures, food intake, plasma fatty acid analysis, and HBA1c levels.	Fish: <1 day/week: 96.9%, 1-2 day/week: 3.1%, ≥2 day/week: 0% Meat: <1 day/week: 0%, 1-2 day/week: 4.9%, ≥2 day/week: 40.0% Vegetables: <1 day/week: 62%, 1-2 day/week: 21.9%, ≥2 day/week: 40.0% Consume milk: <1 day/week: 96.9%, 1-2 day/week: 0%, ≥2 day/week: 3.1% Fruit: <1 day/week: 78.1%, 1-2 day/week: 18.8%, ≥2 day/week: 3.1% Whole milk: <1 day/week: 43.8%, 1-2 day/week: 3.1%, ≥2 day/week: 53.1%	Males: 21.2 ± 0.8 Females: 21.5 ± 1.9			Males: SBP (mmHg): 117.7 ± 3.2, DBP (mmHg): 68.9 ± 2.3, Total Cholesterol (mmol/L): 4.7 ± 0.4, LDL (mmol/L): 3.1 ± 0.3, HDL (mmol/L): 1.1 ± 0.1, HBA1c (%): 5.7 ± 0.1 Females: SBP (mmHg): 119.4 ± 5.3, DBP (mmHg): 71.9 ± 4.2, Total Cholesterol (mmol/L): 5.8 ± 0.4, LDL (mmol/L): 4.0 ± 0.3, HDL (mmol/L): 1.1 ± 0.1, HBA1c (%): 5.7 ± 0.1					
Njikeleli M, Kuge S, Nera V, et al. Prevalence of obesity and dyslipidemia in middle-aged men and women in Tanzania. Africa: relationship with resting energy expenditure and dietary factors. <i>J Nutr Sci Vitaminol (Tokyo)</i> . Oct 2002;48(5):352-8. doi:10.3171/jn.48.352	Pre-transition: 59 Males and 87 Females pastoralist Maasai in Marsabit in 1998 Post-transition: N/A	Observational study. Data were collected from anthropometric measures, food intake, plasma fatty acid analysis, and HBA1c levels.	Males: Green vegetables (g/d): 1.1 ± 1.7; Coconut milk (g/d): none, whole milk (mL/d): 1216.8 ± 1870.0; Fish (g/d): none, meat (g/d): 2.0 ± 2.4 Consume milk: <1 day/week: 96.9%, 1-2 day/week: 0%, ≥2 day/week: 3.1% Fruit: <1 day/week: 78.1%, 1-2 day/week: 18.8%, ≥2 day/week: 3.1% Whole milk: <1 day/week: 43.8%, 1-2 day/week: 3.1%, ≥2 day/week: 53.1%	Males: 20.7 ± 3.2, Obese (BMI >= 30): 1.7% Females: 21.0 ± 5.0, Obese (F: 10.7)		Semi-nomadic pastoralists that tend large herds of cattle and not involved in any agricultural activities; they are lean and fat and have an active lifestyle. REE (Resting energy expenditure, kcal/min): Males: 0.024 ± 0.008; Females: 0.020 ± 0.004	Males: Total Cholesterol (mmol/L): 5.1 ± 1.2; Triglycerides (mmol/L): 1.9 ± 1.5; LDL (mmol/L): 3.7 ± 1.3; HDL (mmol/L): 1.1 ± 0.4; Dyslipidemia: 28.8% Females: Total Cholesterol (mmol/L): 5.3 ± 1.2; Triglycerides (mmol/L): 1.7 ± 0.8; LDL (mmol/L): 3.7 ± 1.1; HDL (mmol/L): 1.3 ± 0.4; Dyslipidemia: 30.5%					
Day J, Simal JO, Othman J, R. The Maasai food system: food and nutrition security. <i>Indigenous Peoples Food Systems: The Many Dimensions of Culture, Diversity and Environment for Nutrition and Health</i> . FAO. 2009:231-249.	Pre-transition: N/A Post-transition: Females from 120 Maasai households in rural Kenya in 2004-2005 during drought season	Observational study. Data were collected from key informant interviews, focus group discussions, micronutrient analysis of herbs and fruits, and food sample collection and identification.					Total Energy (kcal): 1623; Protein (g): 126 g Mainly dependent on foods produced by others: rice, with diminished intake of milk, meat, blood, and herbs, and seasonal fruits during droughts					
Robinson D, Williams P, Day J. High-density lipoprotein cholesterol in the Maasai of East Africa: a case study. <i>Br Med J</i> . May 1979;1(81):1249. doi:10.1136/bmj.1.8173.1249	Pre-transition: 37 tribal Maasai Maasai in southern Kenya in 1977 Post-transition: 20 non-tribal Maasai Maasai in southern Kenya in 1977	Observational study. Data were collected from cholesterol levels.		Males (combined tribal with non-tribal): Total cholesterol levels (mmol/L): 4.77 ± 0.81; HDL (mmol/L): 1.05 ± 0.31; HDL to TC ratio (%): 22.63 ± 7.71								Males (combined tribal with non-tribal): Total cholesterol levels (mmol/L): 4.77 ± 0.81; HDL (mmol/L): 1.05 ± 0.31; HDL to TC ratio (%): 22.63 ± 7.71
Talla A. Ways of milk and meat among the Maasai: gender identity and food resources in a pastoral economy. <i>Ways of milk and meat among the Maasai: gender identity and food resources in a pastoral economy</i> . 1990:73-92.	Pre-transition: Pastoral Maasai of Kenya who subsists on producing their own foods and goods. Post-transition: Pastoral Maasai of Kenya that have become sedentary, with market exchange, cash transactions, and the consumption of non-pastoral foods.	Literature review. Data were collected from past studies.	Mainly milk, meat, and blood; honey beer also drunk at formal gatherings; vegetation (beans, bananas, fruits, plants, and roots) collected and eaten by women and children; crops (especially maize) consumed by everyone except for the warriors									Becoming increasingly dependent on purchased foodstuffs, majority of which is vegetable products; diet increasingly includes tea, sugar, cooking fat, potatoes, rice, and vegetables