PMID	First Author	Title	Year	Study Type	Prospect./ Restrospect.	Study	CVD	RF by CQ	Country	Setting	Main Study Objective	N at Baseline (N at Follow-up)	Target Population	Eligibility Criteria	Patient Characteristics	Study Groups	n at Baseline (n at Follow-up) for Study Groups	Total Follow-up Duration	Outcomes Measured	Results	Main Reported Findings by Critical Question
8030623	Raitakari OT	Effects of persistent physical activity and inactivity on coronary risk factors in children and young adults. The Cardiovascular Risk in Young Finns Study	1994	Cohort	Prospective	Young Finns	None	Q6 (RF5, RF8, RF9, RF10, RF11, RF14) Q7 (RF5, RF8, RF9, RF10, RF11, RF14)	Finland	Community (other)	Correlate physical activity levels with C-V RFs over 6 yr of follow-up	1,159/ 961	Pediatric/ Young adults	All subjects with complete data on physical activity who participated in the first & second surveys of the C-V Risk in Young Finns study in 1980 & 1983. Subjects were 12,15 & 18 yr at baseline. Follow-up conducted X 6 y.	Finnish cohort enrolled at 3-18 yr of age in 1980 and followed with serial RF evaluation q 3 y over time. Physical activity assessed by questionnaire in a subset of the cohort, aged 12,15 and 18 yr at baseline, and correlated with other CV RFs. 58% F.	N/A	1,159/961	6 yr	BMI Subscapular skin folds (SSFs) TC TG HDL LDL VLDL ApoA1 ApoB HDL2 HDL3 Fasting glucose(FG) Fasting insulin (INS) Physical activity index (PAI) --> 3 groups : Physically active = PAI >/=85 on all 3 exams(ACT); Moderately active (MOD) =PAI>15,<85 on all 3 exams; Physically inactive (INACT)= PAI</=15 on all 3 exams. Current smoking habit 48-h dietary recall	At 6 y evaluation, Ms had higher PAI scores than Fs(p=S**) and higher BMI (p=S*); Fs had greater SSFs, HDL ,HDL2, HDL3, ApoA1, HDL/TC(all,p=S**); LDL(p=S); and lower FG(p=S**). At 6 y evaluation, more Ms smoked (p=S*) and more Ms had started smoking during the F/U period (p=S**). Proportion of ACT subjects remained the same on F/U; %age of sedentary subjects increased from baseline, from 38.7% to 47.2% in Fs and from 29.1% to 43.8% in Ms. Activity patterns tracked with 57% of INACT subjects remaining inactive vs. 44% of ACT subjects. Probability of remaining sedentary was significantly stronger than probability of remaining active (p=S*). Persistently ACT Fs had lower TGs (p=S) and SSFs (p=S*)compared with persistently INACT Fs. SSFs, INS and TG were lower(all, p=S) and HDL higher (p=S) in persistently ACT vs. persistently INACT Ms. INACT Fs began smoking at a higher rate than did ACT Fs (p=0.053) and %age of smokers was higher in INACT Fs at 6 y F/U (45.5% vs 8.7%,p=S*)	Physical activity patterns tracked during 6 y F/U; tracking was better for sedentary behavior than for active behavior. C-V RFs clustered together at lower & higher levels in ACT & INACT subjects. Smoking was significantly more common in INACT subjects.
8030623	Raitakari OT	Effects of persistent physical activity and inactivity on coronary risk factors in children and young adults. The Cardiovascular Risk in Young Finns Study	1994																	ACT Ms never started to smoke during F/U while 33.3% of INACT Ms began smoking (p=S**). %age of smokers was 9.3% among ACT Ms vs 46.9% in INACT Ms(p=S**). In MVA, change in activity was associated with changes in INS & TGs in Ms (both,p=S).	
9268963	Raitakari OT	Associations between physical activity and risk factors for coronary heart disease: the Cardiovascular Risk in Young Finns Study	1997	CrS	Prospective	Young Finns	None	Q6 (RF4,5,8,11,14) Q10 (RF 4,5,8,11, 14)	Finland	Community (other)	Analyze the association between physical activity levels and CV RFs in children and young adults	2,358		All subjects from the C-V Risk in Young Finns study who underwent evaluation in 1986 - year selected because widest # of biochemical measures available at that time.	Finnish cohort enrolled at 3-18 yr of age in 1980 and followed with serial RF evaluation over time, including activity level assessment by questionnaire. In this cross-sectional sub-study, a cohort aged 9-24 yr were evaluated for physical activity and other C-V RFs. F=1,244; M=1,114.	N/A	N/A	N/A	BMI Subscapular skin folds (SSFs) Tanner stage SBP DBP TC TG HDL LDL ApoA1 ApoB HDL2 HDL3 Insulin (INS) Serum lecithin:cholesterolacyltransferase(LCAT) Physical activity index (PAI) --> 3 groups : Physically active (ACT); Moderately active (MOD); Physically inactive (INACT)	Study cohort was younger, thinner & more active than those lost to F/U. Among Ms, higher PA was associated with lower BMI and SSFs. In Fs, higher PA was associated with lower SSFs but no difference in BMI. No relation between activity level & BP for Ms or Fs. Among Ms, apoB levels were significantly lower among ACT Ms with a significant dose effect. No difference in TC, LDL, HDL or apoB with activity in Fs. HDL-C, HDL/TC and apoA1/apoB were significantly higher in ACT Ms with a significant dose effect; high HDL2 levels were associated with activity but there was no association with HDL3. There was no association between activity & LCAT levels. In Ms & Fs, ACT was associated with low TGs in a dose-related manner. In Ms, INS were significantly lower in ACT group compared with INACT. No relationship between activity & INS in Fs.	High levels of physical activity were associated with high HDL, low TGs, low apo B and low insulin in males, but only low TGs in women. For both males and females, high physical activity levels were inversely associated with adiposity. There was no association between physical activity and BP. Q10. RFs in children are decreased with high levels of physical activity. Q6. Low levels of physical activity are associated with a cluster of C-V RFs including adiposity and dyslipidemia.
10912890	Janz KF	Tracking physical fitness and physical activity from childhood to adolescence: the Muscatine study	2000	Cohort	Prospective	Muscatine	None	Q8 (RF 4,5,8,11)	USA	Community (other)	To evaluate tracking of physical activity & fitness from childhood into adolescence	126/110	Pediatric/ Young adults	From a subset of 150 children from the Muscatine study group, 150 were contacted and ultimately 126 prepubertal subjects were enrolled.	M: n=61; mean age=10.6y F:n=62; mean age=10.3y.	N/A	126/110	5 y	Ht Wt BMI Tanner stage Skin folds (SFs) Waist circumference Body composition Maximal VO2 by bicycle ergometry Peak grip Activity questionnaire - TV/video game recall SBP DBP TC TG HDL LDL	VO2 values were greater in Ms than Fs throughout. In Ms, VO2 continued to increase throughout the study period; in Fs, VO2 was unchanged in y 5. Peak HR in Fs was consistently higher than in Ms; y-1 to y-5 HRs did not differ in Ms or Fs. Peak grip increased in Ms & Fs throughout the study. Weight-dependent variables showed the best tracking in both Ms & Fs. In Ms, peak grip tracked best with r ranging from 0.68 to 0.90 In Fs, peak grip also tracked well with r ranging from 0.52 to 0.80. In Ms, VO2max tracked well with r ranging from 0.48 to 0.86. In Fs, VO2max tracked well with r ranging from 0.43 to 0.74. 60% of Ms & 59% of Fs who were in the top tertile for VO2max at baseline were still there after 5 yrs.	Physical fitness & physical activity variables tracked well throughout the 5 yrs in Ms & Fs. Boys who were sedentary at baseline were 2.2 X more likely to be sedentary at F/U. Sedentary behavior tracked better in boys while vigorous activity tracked better in girls
10949011	Kimm SY	Longitudinal changes in physical activity in a biracial cohort during adolescence	2000	Cohort	Prospective	Growth	None	Q13 (RF11)	USA	Community (other)	Assess longitudinal changes in activity in a large biethnic cohort of girls from childhood through adolescence	2379	Pediatric/ Young adults	Physical activity self-reports completed at baseline. 3-d activity diary completed in 8 of 10 y of the study; habitual activity questionnaire completed as a structured interview in y 1, 3 & 5 and self-administered for y 7-10. Caltrac activity monitor was used to measure daily activity for 3-d coincident with the 3-d food record & activity diary, for the whole cohort in y 3-5.	1166 W girls, 1213 B girls from 3 geographic locations enrolled at age 9-10 y and followed annually X 10 y.	B girls: n=1213 W girls: n=1166	N/A	10 y	Activity diary scores - MET-min-d (-1 Power) Habitual activity questionnaire scores - MET-times-wk(-1 power) Caltrac scores - counts/d (-1 power)	For the group, activity scores were highly skewed with the majority of subjects reporting minimal activity. There was a consistent decline in level of reported activity from baseline to year 10 as indicated by 3-day diary scores (35% decrease;p=S**) and habitual patterns questionnaire (83%).(p=S**) There was a similar decline in activity as assessed by Caltrac accelerometer in years 3 - 5 when this data was available: 10% & 13% decrease by Caltrac in y3-4 & 4-5. When reports were available for all 3 methods from y 3 to y 5, consistent change was demonstrated: the AD score decreased by 22% and HAQ & Caltrac by 21%.	Activity levels decreased significantly from 9 - 19 y of age in this longitudinal cohort.
11439296	Trost SG	Physical activity and determinants of physical activity in obese and non-obese children	2001	CrS	Retrospective		None	Q13 (RF11)	U.S.A	Clinical	Compare the physical activity patterns and the hypothesized psychosocial and environmental determinants of PA in an ethnically diverse sample of obese and non-obese middle school children.	213 (187)	Pediatric/ Young adults	6th grade children Columbia, SC	Male: 48.4% African-American: 55.9% Mean age (SD): 11.4 yr (0.6)	Obese Non-obese	54 133	NR	Daily participation in moderate and vigorous PA > 3hr TV daily	Relative to their non-obese counterparts, obese children exhibited significantly lower daily accumulations of moderate and vigorous physical activity as well as significantly fewer 5, 10, and 20 min bouts of MVPA.	Q13: Relative to their non-obese counterparts, obese children exhibited significantly lower daily accumulations of moderate and vigorous physical activity as well as significantly fewer 5, 10, and 20 min bouts of MVPA.

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12012257	Janz KF	Increases in physical fitness during childhood improve cardiovascular health during adolescence: the Muscatine Study	2002	Cohort	Prospective	Muscatine	None	Q8 (RF4,5,8,11) Q10 (RF11) Q11 (RF11)	USA	Community (other)	Evaluate aerobic fitness, muscular strength & C-V RFs in a cohort of children followed longitudinally.	125/109	Pediatric/ Young adults	A group of 125 pre-pubertal subjects were selected from the Muscatine study population .	Longitudinal cohort study based in Muscatine, IA of children aged 8-18 yr at enrollment between 1971 & 1981, followed with biennial school surveys into adult life. A total of 14,066 children have undergone 32,636 evaluations. For this study, mean baseline age= 10.5 yrs; all pre- or early puberty at baseline	N/A	125/109	5 y	Ht Wt BMI Tanner stage Skin folds (SFs) Waist circumference Body composition Maximal VO2 by bicycle ergometry Peak grip Activity questionnaire SBP DBP TC TG HDL LDL	There was a weak to moderate correlation between change in fitness over the 5 y period & y-5 lipids, adiposity & WC. (LDL & decrease in VO2max: r = -0.24, p=S; TC/HDL & decrease in VO2max,r=-0.27, p=S; SSF & decrease in peak grip, r= - 0.32, p=S; WC & decrease in peak grip, r = 0.31, p=S. When adjusted for age,gender, FFM & Tanner stage, 5-y decrease in VO2 still correlated significantly with TC/HDL(- 0.27);LDL (-0.28); SSF(r= - 0.33); & WC(r= - 0.33)(all,p=S). When adjusted for age,gender, FFM & Tanner stage, change in peak grip still correlated significantly with SBP(r=- 0.21);SSF(r=- 0.32); WC(r=- 0.32)(all,p=S). Best correlation was increase in FFM with SBP (r=0.49); DBP(r=0.26),TC/HDL, r=-0.20;and WC (r=-0.47)(all, p=S) Average VO2 over 5 years correlated only with WC(r=0.38) & SSF(-0.49), both p=S. Average 5-y peak grip correlated with SBP(r= -0.20), SSF (r=-0.45) & WC (r=-0.48) (all, p=S) By MVA, change in muscular strength explained 4% of the variability in yr 5 SBP; change in aerobic fitness explained 11% of yr 5 TC/HDL & 5% of yr 5 LDL-C. Changes in aerobic fitness & strength explained 15% of the variability in 5 y adiposity & abdominal adiposity.	Maintaining high levels of physical fitness is associated with low levels of adiposity in adolescence. Small but significant amounts of lipid & BP outcomes in adolescence can be explained by fitness changes in the preceding 5 years.
15144353	Saakslahti A	Physical activity as a preventive measure for coronary heart disease risk factors in early childhood	2004	Cohort	Prospective	STRIP	None	Q6 (RF4,5,8,11) Q7 (RF4,5,8,11) Q11 (RF11) Q13 (RF11)	USA	Community (other)	Correlate activity levels over time in young children with C-V RFs.	155/144	Pediatric/ Young adults	155 children aged 4-7 y were randomly selected from the STRIP cohort of 1062 subjects.	RCT of individualized counseling focusing on healthy low fat & low saturated fat diet & good exercise behaviors 2 X/ y beginning in infancy. At age 7 mos, 540 children randomized to intervention, 522 to control. For this study, a subset underwent assessment of physical activity using a special diary 2X /yr X 4yrs. C-V RFs were measured 1X /yr.	N/A	155/144	3 yrs	Ht Wt BMI Activity observation diary for 1 weekend, 2X/yr SBP DBP TC TG HDL LDL	Yr by yr tracking of activity varied considerably, with r varying from 0.15-0.61 in Ms & 0.04-0.39 in Fs. In constantly active Fs, TC decreased during F/U , lowest in the last 2 yrs (p=S*); HDL/TC increased for this sub-group (p=S**). HDL/TC was significantly higher in the constantly active vs inactive Fs in the last study yr(p=S). Among Fs, low activity correlated with BMI at age 4 (p=S). In Fs at mean age of 6, high-activity was (-)ly related to TC (r=.32, p<.05) & TGs (r=.32,p<.05)) and (+)ly related to HDL/TC ratio (r=.37,p<.01). In Ms at 5 yrs, outdoor activity correlated (+)ly with SBP(r=0.23,p=S. and DBP(r=.25,p=S). When constantly active children are compared with constantly inactive group,TC & TGs were lower and HDL/TC was higher in Fs; effects were smaller in Ms.	In general, higher levels of activity were associated with better C-V risk profiles in Ms & Fs.
15766614	Telama R	Physical activity from childhood to adulthood: a 21-year tracking study	2005	Cohort	Prospective	Young Finns	None	Q8 (RF11) Q13 (RF11)	Finland	Community (other)	Evaluate stability of physical activity levels from childhood to adult life	2309/ 1563	Pediatric/ Young adults	All 2309 subjects randomly selected for participation in the C-V Risk in Young Finns study were eligible for the study. Data only used for subjects > 9 y.	Finnish cohort enrolled at 3-18 yr of age in 1980 and followed with serial RF evaluation over time, including activity level assessment by questionnaire every 3 y until 1992 and then again in 2001. At 24-39 yr of age, activity level re-evaluated relative to childhood levels.	N/A	2309/1563	21 yr	Physical activity index = PAI, by questionnaire Bicycle ergometer testing in subset of 102 subjects: VO2max, Wmax6, and estimated VO2 max during last 4 mins of testing.	Correlation of measured exercise capacity with PAI (+), in children & adults, ranging from 0.20-0.53, strongest with Wmax6 in adults. 21 yr tracking coefficient for childhood PAI correlated with adult PAI levels was (+), r=0.33-0.44 in Ms, p=S; and 0.14-0.26 in Fs,p=NS. Among Ms, tracking coefficients were consistently significant (p=S*); for Fs, tracking significant for 9, 12 and 15 y intervals and for longer intervals in older subjects (p=S-S*) Persistently high PAI (= top tertile of PAI) increased the odds that an individual would be as active as an adult: OR for 3 yr high PAI = 4.3-7.1 in Ms, 2.9-5.6 in Fs. OR for 6 yr high PAI = 8.7-10.8 in Ms, 5.9-9.4 in Fs. High physical activity level at 9 -18 yr predicted high activity level as an adult.	Activity levels at 9 -18 yrs significantly predicted activity levels as adults 21 yrs later. Persistently high activity levels in childhood predicted higher activity levels in adult life.
15812450	Kahn HS	A population-based comparison of BMI percentiles and waist-to-height ratio for identifying cardiovascular risk in youth	2005	CrS	Retrospective	NHANES	None	Q5,Q6 (RF 4,5,8,11)	U.S.A	Clinical	Determine whether waist-to-height ratio or sex- and age-specific percentiles of BMI better identifies cardiovascular risk	7,657	Pediatric/ Young adults	4-17 yr Not pregnant	Non-Hispanic White (SE): 65.8% (1.7%) Non-Hispanic Black (SE): 15.6% (1.2%) Mexican-American (SE): 8.8% (0.9%) Other (SE): 9.8% (1.4%)	Groups were studied by BMI percentiles and waist-to-height ratio strata	NR	NR	Mean HR [bpm (SE)] Mean SBP [mm Hg (SE)] Mean LDL-C [mmol/L (SE)] Mean TG [mmol/L (SE)] Mean TC [mmol/L (SE)] Mean TC/HDL-C Mean apo B [g/L (SE)] Mean fasting serum glucose [mmol/L (SE)] Mean apo B/apo A-1	726 participants (representing 3.69 million youth) were identified as having WHtR stratum >BMI stratum. Compared with the 603 participants (representing 3.70 million youth) who were discordant in the opposite direction, weighted analyses showed they had higher mean levels of heart rate, low-density lipoprotein (LDL) cholesterol, fasting triglycerides, and total cholesterol (p <.015, adjusted for sex, age, and race-ethnicity). Mean systolic blood pressure was lower in the WHtR > BMI stratum but this difference was eliminated after adjustment for stature.	Q5, Q6: WHtR, a simpler anthropometric index than age- and sex-specific BMI %iles, better identified youth with adverse CV RFs in this population-based cohort.
16414945	Carnethon MR	Prevalence and Cardiovascular Disease Correlates of Low Cardiorespiratory Fitness in Adolescents and Adults	2005	Cohort	Retrospective	NHANES	None	Q6,8 (RF4,5,8,11)	USA	Community (other)	Describe the prevalence of low fitness in the US population aged 12 through 49 years and relate fitness to CVD risk factors in this population	3,110	Pediatric/ Young adults	Adolescent participants in NHANES for 1999-2000 and 2001-2002: 12-19 yr Completed submaximal treadmill exercise TEx testing No previous CVD diagnosis No abnormal hemodynamic parameters No existing medical conditions No physical limitations	12-19 yr 50% F Nationally representative racial/ethnic sample	Adolescents(12-19y) and adults (20-49y; not reported here.	N/A	N/A	SBP DBP TC TG HDL-C LDL Fasting glucose HbA1c BMI Waist circumference Treadmill exercise fitness score: LOW <20th%ile; MOD 20th-59th%ile; HIGH > 60th%ile.	(1) 33.6% of adolescents were in the LOW fitness category, 34.4% of Fs and 32.9% of Ms (p=NS). (2) LOW fitness was more prevalent in blacks(B) and Mexican-Americans(M-A) than in non-Hispanic whites (W). (3) BMI, WC & TC were consistently & inversely associated with fitness level. HDL was positively correlated with fitness in Ms but not in Fs. SBP was inversely assst'd with fitness level in Ms; no correlation in Fs. (4) When the LOW & HIGH fitness groups were compared, LOW participants had significantly higher BMI(p=S*,M & F)) & WC(p=S*, M&F) & significantly lower SBP(p=S for Fs,S* for Ms) & TC(p=S*, M&F). There were no significant differences for TG, HbA1C or FG. (5) When LOW fitness group was compared with MOD or HIGH for CV RFs: Overweight: OR F 2.27(1.64-3.15) M 2.88 (2.02-4.09) Obese: OR F 2.68(1.86-3.86) M 3.65 (2.32-5.75) HTN: OR F 1.35(0.68-2.70) M 1.03 (0.30-3.54) TC>200 OR F 1.89 (1.12-3.17) M 3.68 (2.55-5.31) Low HDL OR F 1.03 (0.74-1.43) M 1.25(0.7901.95) Abn FG OR F 1.95 (0.71-5.37) M 1.24 (0.79-1.95) Met S OR F 2.72 (0.85-8.74) M 4.20 (2.14-8.25)	Low fitness in adolescents is very common present in 1/3 of all subjects. Low fitness was significantly associated with a high prevalence of CV RFs including overweight/obesity, dyslipidemia & hypertension. Conversely, high fitness was associated with lower measures of all CV RFs except TGs, HbA1C and FG.