

Public Health and Clinical Recommendations for Physical Activity and Physical Fitness

Special Focus on Overweight Youth

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Abstract

Numerous physical activity and physical fitness recommendations exist for youth. To date, however, no investigator has systematically reviewed these public health and clinical guidelines to determine whether the recommendations address overweight youth. This review examines youth-oriented physical activity and physical fitness recommendations for both the public health community and the clinical community, and assesses how overweight youth are specifically targeted by each of these two groups. Our review determined the extent to which the recommendations assessed four components of physical activity (i.e. frequency, intensity, duration and type) and four components of physical fitness (i.e. cardio-respiratory capacity, strength, flexibility and body composition). We further reviewed clinical recommendations to determine how they included two facets of the physician-patient encounter: assessment and counselling. After identifying all

current physical activity and physical fitness recommendations for youth, we evaluated whether public health ($n = 13$) and clinical recommendations ($n = 12$) addressed physical activity and physical fitness for overweight youth. Findings revealed inconsistent, yet explicit, recommendations for the public health community where most organisations (12 of 13, 92%) included ≥ 3 physical activity components. In addition, organisations encouraged volumes of daily moderate- to vigorous-intensity physical activity for youth ranging from 30–60 or more minutes. Recommendations for the clinical community generally did not provide explicit physical activity and fitness recommendations to advise physicians on the assessment and counselling of patients and their families. Overweight youth were addressed within some recommendations (6 of 12, 50%) for the clinical community, but within few recommendations (2 of 13, 15%) for the public health community. To best inform public health and clinical communities, organisations developing future recommendations should include information fully documenting the decision-making processes used to develop the recommendations. In cases where mutual goals exist, public health and clinical communities should consider collaborating across agencies to develop joint recommendations.

Physically active adults benefit from a reduced risk of coronary heart disease, type 2 diabetes mellitus, hypertension, osteoporosis and colon cancer.^[1] Physically active children, compared with physically inactive children, may be less likely to experience chronic disease risk factors,^[2] to become obese,^[3] and may be more likely to remain active throughout adolescence^[4] and possibly into adulthood.^[1] In addition, reduction of behaviours that decrease available time for engaging in physical activity, such as watching television, can result in beneficial changes in body mass index (BMI).^[5] For these reasons, numerous public health and clinical organisations have developed recommendations for physical activity and physical fitness among youth.

Overweight children, in particular, may need to be targeted by recommendations as they are at higher risk than non-overweight children for developing adverse coronary heart disease risk factors and type 2 diabetes. They are at high risk for remaining overweight as adults, when maintaining weight loss is difficult,^[6] and they are at higher risk for adult morbidity and mortality from cardiovascular disease.^[7] Because of the increased number of overweight children in the US and other developed countries,^[8,9] the targeting of such recommendations is particularly relevant.

The development of physical activity and fitness recommendations requires expert groups to evaluate existing evidence for the amount and type of physical activity and physical fitness that optimally promote health and well-being. Many such recommendations or guidelines have been produced. Organisations have developed recommendations for both public health^[10-23] and clinical communities^[24-34] that offer individuals and groups guidance about assessment and promotion of physical activity and physical fitness. Public health-directed recommendations often address the youth population at large, whereas clinical community-directed recommendations focus on the individual patient and his or her family. Summaries^[35] and critical reviews^[36] of youth physical activity recommendations have been conducted. None of these, however, have systematically reviewed both public health and clinical guidelines to take into account whether the recommendations address overweight youth. Therefore, this review examines physical activity and fitness recommendations for the youth population as a whole within both the public health community and the clinical community, and assesses how overweight youth are specifically targeted within either of the two communities.

1. Methods

1.1 Definitions

For consistency of terminology, 'recommendations' included position statements, consensus statements, objectives or guidelines. For this review, we examined both physical activity and physical fitness recommendations written for two separate audiences: (i) the public health community; and (ii) the clinical community. Operationally, we defined public health recommendations as those generally written for the entire population as a whole as well as for health professionals, but not for the specific subgroup of clinicians. Clinical recommendations were defined as those being written for practicing clinicians to be used in the assessment and counselling of patients and their families.

Our review determined the extent to which the existing recommendations assessed four components of physical activity (i.e. frequency, intensity, duration and type) and four components of physical fitness (i.e. cardiorespiratory capacity, muscular strength, flexibility and body composition),^[37] whether they were intended for the public health or clinical community. We further reviewed clinical recommendations to determine whether they included two facets of the physician-patient encounter: (i) assessment, which addresses the patient history (questions asked of the patient) and the physical examination; and (ii) patient counselling, which addresses patient-directed health promotion issues. In completing our review, we evaluated whether the public health and clinical recommendations addressed physical activity and physical fitness for overweight youth.

1.2 Literature Search

We reviewed the literature to identify all current physical activity and physical fitness recommendations for youth. Medline searches using OVID and PubMed were conducted using combinations of the following text terms:

- children, youth, adolescent;
- physical activity, exercise, fitness;
- guideline, recommendation, objective.

Searches were restricted to English-language sources from 1980 to the present and to recommen-

dations from developed countries. We identified additional sources through personal files, cross-referencing of relevant sources, and organisational and personal contacts. Documents were abstracted by one reviewer and confirmed by a second reviewer.

1.3 Criteria for Inclusion and Exclusion

We included original recommendations developed by professionals working in the physical activity field or a related discipline. For each organisation represented, we included its most recent recommendation unless it was conceptually different from an earlier recommendation by the same organisation. For example, the American Academy of Pediatrics (AAP) Committee on Sports Medicine and Fitness developed specific assessment and counselling recommendations on physical activity and physical fitness in 1994.^[24] In 2002, the AAP included physical activity as part of its *Guidelines for Health Supervision*.^[34] Although the two recommendations emanated from the same organisation, they were conceptually different; hence, each was included in our review. Recommendations that merely referenced, supported, restated^[1] or operationalised^[38,39] previous recommendations were excluded. We limited our search on overweight youth to recommendations pertaining only to physical activity and physical fitness.

2. Results

2.1 Public Health Recommendations for Physical Activity

We identified ten organisations for a total of 13 public health physical activity or physical fitness recommendations for youth (table I). Health Canada reported recommendations for children (ages 6–9 years) and for adolescents (ages 10–14 years) in two separate documents.^[13,14] Recommendation sources included both US and international government agencies,^[12–14,21,22] and professional organisations.^[10,11,15–20] Although the specified age groups varied, about half of the recommendations targeted both children and adolescents (six of 13); one recommendation was written for preschool children^[19] and two were written for adolescents.^[14,16]

Table 1. Public health physical activity and physical fitness recommendations for children and adolescents

Organisation	Age group	Physical activity			Physical fitness		
title of recommendation (year)		comp.	recommendation	ovwt	comp.	recommendation	ovwt
ACS							
ACS Guidelines on Nutrition and Physical Activity for Cancer Prevention (2002)	Children and adolescents	F/I/D	At least 60 min, moderate to vigorous I, at least 5 days/wk	NR	NR	NR	NR
ACSM							
Guidelines for Exercise Testing and Prescription (2000)	Children and adolescents	T	Amount and type individualised based on maturity, medical status, skill and prior exercise	Yes	S	Weight loads allowing at least 8 reps/set for 1–2 sets Maximum of twice/wk 8–10 different exercises including all major muscle groups Not to the point of severe muscular fatigue Avoid power lifting/body building	NR
Australia, Commonwealth Department of Health and Aged Care							
National Physical Activity Guidelines for Australians (1999)	Children and adolescents	F/I/T/D	30 min, moderate I, most or all days/wk Enjoy some regular, vigorous activity	NR	NR	NR	NR
Health Canada							
Canada's Physical Activity Guide for Children (2002); Canada's Physical Activity Guide for Youth (2002)	Children and adolescents	F/I/T/D	Increase current daily moderate activity in progressions of 20–60 min/mo Increase current daily vigorous activity in progressions of 10–30 min/mo Decrease current daily non-active time in progressions of 30–90 min/mo	NR	S/FI	Combine age-appropriate S and FI activities	NR
Health Education Authority, UK							
Critique of Existing Guidelines for Physical Activity in Young People (1998)	Children and adolescents	F/I/T/D	60 min at least moderate I (5–8 METs, 40–60% of $\dot{V}O_{2max}$), nearly every day	NR	S	At least twice/wk	NR

Continued next page

Table I. Contd

Organisation title of recommendation (year)	Age group	Physical activity			Physical fitness		
		comp.	recommendation	ovwt	comp.	recommendation	ovwt
			T, I and D of physical activity should be psychologically and behaviourally developmentally appropriate			Activities emphasising trunk and upper extremity activities for young children involve climbing, gymnastics and callisthenics; for adolescents, supervised resistance training programme acceptable	
International Consensus Conference on Physical Activity Guidelines for Adolescents							
Physical Activity Guidelines for Adolescents: Consensus Statement (1994)	Adolescents	F/I/T/D	Daily physical activity as part of lifestyle activities At least 20 min of continuous moderate to vigorous activity at least 3 sessions/ wk	Yes	NR	NR	NR
National Academy of Sciences, Institute of Medicine							
Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (2002)	Children	F/I/D	60 min or more of moderate intensity physical activity and exercise daily	NR	NR	NR	NR
NASPE							
Physical Activity for Children: A Statement of Guidelines (1998)	Children	F/I/T/D	Age and developmentally appropriate activity: - 30–60 min on most/all days - accumulate 60+ min/day - at least 10–15 min periods of moderate to vigorous activity Discourage long periods of inactivity	NR	S/FI	Ages 5–9y: minimal callisthenics, formal resistance training not recommended; active play activities rather than specific exercises to develop FI Ages 10–12y: formal weight training acceptable, although other activities are generally better including activities requiring children to move and lift their own bodyweight; age-appropriate FI exercises or activities	NR

Continued next page

Table I. Contd

Organisation	Age group	Physical activity			Physical fitness		
title of recommendation (year)		comp.	recommendation	ovwt	comp.	recommendation	ovwt
NASPE							
Physical Activity for Children: A Statement of Guidelines (2004)	Children	F/I/T/D	Age and developmentally appropriate activity: - accumulate at least 60 min, and up to several hours, on all or most days, including moderate and vigorous physical activity with majority of time spent in intermittent activity - several bouts lasting 15 min or more each day - variety of age-appropriate physical activity to achieve optimal health, wellness, fitness and performance benefits Discourage extended periods of inactivity ≥2h	NR	S/FI	Young children: include climbing, jumping, doing stunts, tumbling, and developmentally appropriate callisthenics Older children: include callisthenics, resistance exercises with exercise bands, resistance training with light equipment and regular stretching	NR
NASPE							
Active Start (2002)	Infants, toddlers and preschoolers	F/T/D	Infants: explore environment, develop movement skills, involve large muscle groups Toddlers: at least 30 min of structured physical activity daily Preschoolers: at least 60 min of structured physical activity daily Toddlers and preschoolers: 60 min to several hours of unstructured physical activity daily; outside of sleeping, no inactivity >60 min	NR	NR	NR	NR
NIH							
Physical Activity and Cardiovascular Health (1996)	Children and adolescents	F/I/T/D	At least 30 min, moderate I, most/all days	NR	S/FI	S training can improve muscular function and may have cardiovascular benefits Muscular strength and joint FI important	NR
USDA							
Nutrition and Your Health: Dietary Guidelines for Americans (2000)	Children and adolescents	F/I/T/D	60 min, moderate I, most/all days Limit TV/computer/other inactivity by alternating with physical activity periods	NR	S/FI	Type of physical activity to include aerobic, S building and FI activities	NR
ACS = American Cancer Society; ACSM = American College of Sports Medicine; comp. = components; D = duration; F = frequency; FI = flexibility; I = intensity; METs = metabolic equivalents; NASPE = National Association of Sport and Physical Education; NIH = National Institutes of Health; NR = not reported; ovwt = overweight; reps = repetitions; S = strength; T = type; USDA = United States Department of Agriculture; VO2max = maximum oxygen consumption.							

Most recommendations (12 of 13, 92%) included at least three of the four prescriptive components of physical activity, although the recommendations differed in the frequency, intensity and duration prescribed (table I). Frequency recommendations ranged from three sessions per week^[16] to five or more days per week^[10] to nearly every day or daily.^[12-15,17-22] Although activity intensity was occasionally recommended as being moderate^[12,17,21,22] or vigorous,^[13,14] generally the recommendation included activities of both moderate and vigorous intensity.^[10,13-16,18,20] Duration was inversely associated with intensity as recommendations ranged from 20 minutes of vigorous activity^[16] to 30 minutes of moderately vigorous activity^[12,21] to 60 or more minutes of moderate intensity activity.^[10,15,17,20,22]

When younger children were considered, recommendations emphasised that physical activity be age and developmentally appropriate,^[15,18,20] include structured and unstructured forms^[19] or be individualised.^[11]

Three organisations advised placing limits on the time allotted for engaging in sedentary behaviours.^[13,14,18-20,22] Cited strategies included enforcing reductions in television viewing and computer use^[22] and discouraging long periods of inactivity.^[18,20] Only two public health physical activity recommendations specifically addressed overweight youth.^[11,16] Those recommendations suggested that the goals of exercise programmes for overweight youth include improvements in socialisation skills, self-esteem and weight reduction,^[11] and that youth with chronic disease risk factors may need specific activity programmes.^[16]

2.2 Public Health Recommendations for Physical Fitness

Of the 13 public health recommendations, seven (54%) included a strength component^[11,13-15,18,20-22] and five (38%) included a flexibility component.^[13,14,18,20-22] The strength-focused recommendations ranged from a general emphasis on muscular strength and flexibility^[21] to specific guidelines for weight lifting.^[11] Specific types of physical activities to improve strength were also cited.^[15,20] No public health recommendation included measures of body composition or cardiorespiratory fitness. In

addition, of the public health physical fitness recommendations, none addressed overweight youth.

2.3 Clinical Recommendations for Assessment of Physical Activity or Physical Fitness

Twelve recommendations were made by nine organisations for patient clinical assessment or counselling on physical activity or physical fitness (table II and table III).^[16,23-34] Table II shows the nine recommendations for assessing physical activity or physical fitness, but does not list the three organisations that did not include clinical assessment of physical activity or physical fitness in their recommendations. Similar to the public health recommendations, two recommendations were written for only adolescents,^[16,27] whereas the other seven recommendations were for both children and adolescents. For use in assessing patient history, five of the 12 recommendations (42%) included a physical activity or physical fitness component. Psychosocial assessments of barriers to being physically active were specifically cited in three recommendations.^[16,30,31] The recommendation provided by the American Heart Association Committee on Atherosclerosis, Hypertension, and Obesity in the Young (AHOY)^[26] was the most specific. This recommendation encouraged physicians to: (i) assess the type and duration of physical activity; (ii) ask about television viewing habits; and (iii) inquire about physical activity patterns of the patient's parent(s). Most other recommendations, however, did not provide enough detail to help clinicians understand how to assess physical activity or physical fitness. As part of clinical recommendations for physical activity or physical fitness, and as part of collecting patient history, three of the 12 (25%) recommendations addressed the issue of overweight.^[26,27,30]

For the physical examination, four recommendations suggested assessment of body composition^[24,26,27,30] as measurement of either height and weight^[26,27,30] or skinfold thickness.^[24,26,30] One organisation recommended assessment of all four physical fitness components.^[24] As part of the clinical recommendations for physical activity or physical fitness, when conducting the physical examination, three of the 12 (25%) recommendations addressed the issue of overweight.^[24,27,30]

Table II. Clinical recommendations for assessing physical activity or physical fitness by patient history and physical examination

Organisation	Age group	Patient history			Physical examination	
title of recommendation (year)		components	physical activity or physical fitness history	ovwt	physical fitness components	ovwt
AAP, Committee on Sports Medicine and Fitness						
Assessing Physical Activity and Fitness in the Office Setting (1994)	Children and adolescents	F/T/D	Ask about F, T and D of activity Ask about television watching and parental activity patterns	NR	BC: sum of skinfold measurements CR: submaximal or maximal cycle ergometer or treadmill tests S: push-up, pull-up, sit-up, grip dynamometer or isokinetic testing FI: 'sit and reach' test	Yes
AHA, Task Force on Risk Reduction						
How to Implement Physical Activity in Primary and Secondary Prevention (1997)	Children and adolescents	NR	NR	NR	Various exercise testing measures of functional capacity are of interest but not necessary for primary prevention except for those at high risk for cardiovascular disease	NR
AHA, Committee on Atherosclerosis, Hypertension, and Obesity in the Young (AHOY)						
Cardiovascular Health in Childhood (2002)	Preschoolers, children and adolescents	T/D/P	Assess activity level, changes in activity level, and access to regular convenient places of exercise Determine time spent on sedentary leisure activities (TV and video games) Address familial, socioeconomic and environmental factors Explore familial attitudes and encouragement	Yes	BC: weight-for-height ratio, BMI, skinfold thickness	NR
AMA						
Guidelines for Adolescent Preventive Services (1996)	Adolescents	NR	NR	Yes	BC: weight, stature, BMI	Yes

Continued next page

Table II. Contd

Organisation	Age group	Patient history		Physical examination		
title of recommendation (year)		components	physical activity or physical fitness history	ovwt	physical fitness components	ovwt
International Consensus Conference on Physical Activity Guidelines for Adolescents						
Physical Activity Guidelines for Adolescents: Consensus Statement (1994)	Adolescents	P	Identify barriers to either continued or increased physical activity Categorise patients as active or in need of more activity Determine risk for health outcomes improved by physical activity	NR	NR	NR
USDHHS, Agency for Healthcare Research and Quality						
Clinician's Handbook of Preventive Services (1998)	Children and adolescents	NR	Assess physical activity habits of both children and parents	NR	NR	NR
USDHHS, CDC						
Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People (1997)	Children and adolescents	NR	Assess physical activity	NR	NR	NR
USPHS, National Center for Education in Maternal and Child Health						
Bright Futures (2001)	Infants, children and adolescents	P	Assess self-efficacy, perceived barriers to activity and stage of change Middle childhood: determine amount of physical activity performed on a weekly basis	Yes	Middle childhood and adolescence BC: BMI with confirmatory skinfold if elevated and review results of patient's President's Council on Physical Fitness and Sports test to compare to national standards	Yes
USPSTF						
Guide to Clinical Preventive Services (1996)	Children and adolescents	P	Determine activity level and barriers to being active	NR	NR	NR
AAP = American Academy of Pediatrics; AHA = American Heart Association; AMA = American Medical Association; BC = body composition; BMI = body mass index; CDC = Centers for Disease Control and Prevention; CR = cardiorespiratory fitness; D = duration; F = frequency; FI = flexibility; NR = not reported; ovwt = overweight; P = psychosocial; S = strength; T = type; USDHHS = United States Department of Health and Human Services; USPHS = United States Public Health Services; USPSTF = United States Preventive Services Task Force.						

Table III. Clinical recommendations for counselling about physical activity or physical fitness

Organisation	Physical activity	Physical fitness		Overweight
title of recommendation (year)	components	components	recommendation	yes/no
AAFP				
Summary of Policy Recommendations for Periodic Health Examinations (2001), Age Charts for Periodic Health Examinations (2001)	NR	NR	Age-appropriate counselling for regular physical activity	Yes
AAP, Committee on Sports Medicine and Fitness				
Assessing Physical Activity and Fitness in the Office Setting (1994)	F/I	NR	Teach importance of regular moderate to vigorous physical activity Parents: encourage parents to be positive physically active role models	No
AAP				
Guidelines for Health Supervision III (2002)	NR	NR	Encourage physical activity as anticipatory guidance beginning at age 8y	No
ACSM and USDHHS, CDC				
Physical Activity and Public Health (1995)	NR	NR	Counsel to adopt and maintain regular physical activity	No
AHA, Task Force on Risk Reduction				
How to Implement Physical Activity in Primary and Secondary Prevention (1997)	F/I/T/D	S	Discuss physical activity and provide exercise prescriptions for patients and families Design physical activity programme being mindful of D, I, F, mode and progression. As I decreases, F and D should increase and vice versa Promote 30–60 min, 4–6 times/wk; or 30 min on most days/wk Plan for a lifetime of appropriate physical activity S: 8–10 exercise sets of 10–15 reps, moderate I, 2–3 sessions/wk	No
AHA, Committee on Atherosclerosis, Hypertension, and Obesity in the Young (AHOY)				
Cardiovascular Health in Childhood (2002)	F/I/T/D	NR	Promote 30 min of moderate to vigorous physical activity with energy expenditures significantly above resting level (ideally, at least 50–60% of maximal exertion) on most, preferably all, days/wk Emphasise variety of recreational, organised and lifestyle activities with focus on play rather than exercise	Yes

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Table III. Contd

Organisation	Physical activity	Physical fitness	Overweight	
title of recommendation (year)	components	components	recommendation	yes/no
			Parents: planned activities instead of food as part of reward system; time limits for sedentary activities; encourage daily time for physical activity; encourage role modelling and providing children with opportunities for more activity	
AMA				
Guidelines for Adolescent Preventive Services (1996)	F	NR	Offer annual health guidance about benefits of physical activity Encourage participation in regular, safe physical activities	Yes
International Consensus Conference on Physical Activity Guidelines for Adolescents				
Physical Activity Guidelines for Adolescents: Consensus Statement (1994)	F/I/T/D/P	NR	Individualise counselling based on patient assessment and specific recommendations noted in table I Develop a specific activity plan that involves appropriate family/other resources and is mindful of sociocultural and economic circumstances Counselling to build self-efficacy to minimise barriers and to facilitate social supports Provide educational materials and refer to community organisations that can assist with physical activity Parents: counsel to encourage familial support	Yes
USDHHS, Agency for Healthcare Research and Quality				
Clinician's Handbook of Preventive Services (1998)	T	NR	Encourage enjoyment of physical activities, promote activities which are sustainable through adulthood, suggest activities for daily routine and those that help develop a wide range of abilities	No
USDHHS, CDC				
Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People (1997)	NR	NR	Counsel about importance and provide information about physical activity Encourage maintenance of activity or design exercise prescriptions for inactive patients Refer to school and community physical activity programmes Parents: role modelling, family physical activities, discuss with children value of physical activity	Yes

Continued next page

Table III. Contd

Organisation	Physical activity	Physical fitness	Overweight	
title of recommendation (year)	components	components	recommendation	yes/no
USPHS, National Center for Education in Maternal and Child Health				
Bright Futures (2001)	Infancy: T	Infancy: NR	Use stages of change model of counselling specific for age group of child	Yes
	Early childhood: F/T	Early childhood: NR	Encourage developmentally-appropriate daily physical activity as part of a variety of activities of moderate to vigorous I activity	
	Middle childhood: F/I/T/D	Middle childhood: CR/S	Limit sedentary behaviours to 1–2 h/day	
	Adolescence: F/I/T/D	Adolescence: S	Middle childhood through adolescence: S training with several sets of multiple repetitions of low resistance; discourage weightlifting, power lifting or body-building until growth is complete Parents: classes for physical activity promotion, parent-infant play groups, promote physical activity for development of movement skills, wait until age 6y before organised sports, let child do tasks for themselves, participate in physical activity with children, role model, use child care providers with environment/ equipment amenable to physical activity and who promote physical activity	
USPSTF				
Guide to Clinical Preventive Services (1996)	F/I/T/D	CR/S/FI	Provide information about physical activity and disease prevention Assist in selecting regular, moderate I activities for daily routine Over several months, oversee progression to cardiovascular fitness Encourage development and maintenance of muscular strength and joint flexibility	No

AAFP = American Academy of Family Physicians; **AAP** = American Academy of Pediatrics; **ACSM** = American College of Sports Medicine; **AHA** = American Heart Association; **AMA** = American Medical Association; **CDC** = Centers for Disease Control and Prevention; **CR** = cardiorespiratory fitness; **D** = duration; **F** = frequency; **FI** = flexibility; **I** = intensity; **NR** = not reported; **P** = psychosocial; **reps** = repetitions; **S** = strength; **T** = type; **USDHHS** = United States Department of Health and Human Services; **USPHS** = United States Public Health Services; **USPSTF** = United States Preventive Services Task Force.

2.4 Clinical Recommendations for Counselling About Physical Activity or Physical Fitness

Table III shows the 12 organisations that provided clinical recommendations for counselling about physical activity or physical fitness. Five recommendations specified counselling about three or four specific components of physical activity.^[16,25,26,30,31] One recommendation specified three or four components of physical fitness.^[31] In addition to providing information to patients about physical activity, recommendations suggested that clinicians counsel patients about the importance of: adopting and maintaining physically active lifestyles;^[23] developing specific activity plans;^[16,25,26,28] enlisting support from family and friends;^[16] building self-efficacy;^[16] and limiting time spent in sedentary behaviours,^[26,30] such as watching television. As part of the clinical recommendations about physical activity or physical fitness counselling, half of them addressed the issue of overweight.

2.5 Clinical Recommendations that Address Overweight Youth

Table IV shows the physical activity and physical fitness recommendations for overweight children or adolescents. Recommendations generally fell into three categories: (i) referral to programmes for overweight youth; (ii) intensive counselling of children thought to be at high risk; and (iii) suggestions of physical activities with high energy expenditure. Recommendations specified referral of overweight children to special programmes for overweight youth^[29] or for obesity prevention counselling.^[32,33] Two organisations recommended assessment and, possibly, intensive counselling for children of overweight parents^[26] or for youth experiencing annual weight increases of ≥ 3 –4 BMI units.^[30] Organisations recommended that overweight children and adolescents expend energy through physical activity^[16] and that youth participate in feasible physical activities high in energy expenditure.^[11]

2.6 Summary of Clinical Recommendations

A summary and synthesis of clinical recommendations is shown in table V. In this case, the specificity of each clinical recommendation was qualitative-

ly labelled according to the actual number of components of physical activity or physical fitness addressed:

- not reported (no component)
- vague (one component)
- general (two components)
- explicit (three or more components).

Where the explicit category addressed more than one component, the specific number was noted in parentheses. We also qualitatively judged each clinical recommendation to determine whether it addressed overweight youth, irrespective of the number of physical activity or physical fitness components that were addressed as part of either assessment or counselling.

In general, clinical recommendations for the assessment and counselling of physical activity or physical fitness were not reported or were vague. The best case scenario was observed for physical activity counselling where five of the 12 organisations (42%) provided explicit recommendations. Two organisations (17%) provided explicit recommendations for assessing physical activity,^[23,25] whereas most of the organisations (75%) did not recommend counselling about physical fitness. Half of the organisations specifically addressed overweight youth.

It is difficult to establish remarkable trends regarding the specific focus on overweight among recommendations for physical activity and physical fitness. However, it is possible to examine the number of clinical guidelines that address overweight youth, before and after the publication of Troiano et al.'s paper of 1995,^[40] which first called attention to the trends in overweight among US youth. In table V, one notes that for 5-year time segments, one of two (1990–94), two of six (1995–99) and three of four (2000–04) recommendations addressed overweight youth; thus, over time, recommendations grew in number and content, perhaps in response to Troiano et al.'s important observation.

3. Discussion

The purpose of this review was to describe public health and clinical recommendations for physical activity and physical fitness for youth. Additionally, we assessed whether these recommendations specif-

Table IV. Physical activity or physical fitness recommendations that address overweight as part of public health or clinical recommendations

Organisation and title of recommendation (year)	Recommendation for overweight children or adolescents
AAFP	
Summary of Policy Recommendations for Periodic Health Examinations (2001); Age Charts for Periodic Health Examinations (2001)	Obesity prevention counselling starting at age 2y (details not specified)
AAP, Committee on Sports Medicine and Fitness	
Assessing Physical Activity and Fitness in the Office Setting (1994)	Determine body composition with skinfold measurements in patients who are becoming obese and monitor weight loss progress
ACSM	
Guidelines for Exercise Testing and Prescription (2000)	Goals of exercise prescription programme: reduced body mass and fat, conditioning, socialisation and improved self-esteem Activities should be high in caloric expenditure but feasible to child (walking, recreational games, swimming)
AHA, Committee on Atherosclerosis, Hypertension, and Obesity in the Young (AHOY)	
Cardiovascular Health in Childhood (2002)	For those children with overweight parents: assess usual activity patterns to highlight simple preventative measures to increase physical activity and decrease inactivity. These children may also benefit from more intensive counselling To prevent excessive weight gain and obesity, counselling should include strategies on how to be more physically active
AMA	
Guidelines for Adolescent Preventive Services (1996)	Screen annually for obesity by determining weight and stature Conduct in-depth dietary and health assessments if: (i) BMI >95th percentile for age and sex (overweight) or (ii) BMI 85th–94th percentile for age and sex and either has had BMI increase of at least 2 units in previous 12mo or has specific risk factors or concerns
International Consensus Conference on Physical Activity Guidelines for Adolescents	
Physical Activity Guidelines for Adolescents: Consensus Statement (1994)	For obese adolescents, physical activity is an important adjunct to dietary change for weight control and regular energy expenditure through physical activity appears to be essential for weight loss maintenance Those with elevated risk factors for chronic illnesses may need more specific activity recommendations
USDHHS, CDC	
Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People (1997)	Refer overweight children and adolescents to a physical activity and nutrition programme for overweight young people
USPHS, National Center for Education in Maternal and Child Health	
Bright Futures (2001)	Recommended for overweight children: obtain physical activity history to assess physical activity level, time spent in sedentary behaviours and any contraindications to physical activity Further evaluation if: (i) BMI >95% or (ii) annual increase of 3–4 BMI units Moderate or shorter, more intense physical activities every day or nearly every day

AAFP = American Academy of Family Physicians; **AAP** = American Academy of Pediatrics; **ACSM** = American College of Sports Medicine; **AHA** = American Heart Association; **AMA** = American Medical Association; **BMI** = body mass index; **CDC** = Centers for Disease Control and Prevention; **USDHHS** = United States Department of Health and Human Services; **USPHS** = United States Public Health Services.

ically addressed overweight youth. Our review revealed three major findings:

1. *Physical activity recommendations written for the public health community tended to include spe-*

cific components of physical activity prescription (i.e. frequency, intensity, duration, type) whereas recommendations for physical fitness did not include specific components of physical fitness.

Table V. Summary of the specificity^a of clinical recommendations for physical activity, physical fitness and overweight

Organisation	Title of recommendation (year)	Physical activity		Physical fitness		Overweight ^b assessment and counselling
		assessment	counselling	physical examination	counselling	
AAFP	Summary of Policy Recommendations for Periodic Health Examination (2001), Age Charts for Periodic Health Examinations (2001)	0	0	0	0	Addressed
AAP	Committee on Sports Medicine and Fitness – Assessing Physical Activity and Fitness in the Office Setting (1994)	Explicit (3)	General	Explicit (4)	0	0
	Guidelines for Health Supervision III (2002)	0	0	0	0	0
ACSM/USDHHS, CDC	Physical Activity and Public Health (1995)	0	0	0	0	0
AHA	Task Force on Risk Reduction – How to Implement Physical Activity in Primary and Secondary Prevention (1997)	0	Explicit (4)	0	Vague	0
AHA	Committee on Atherosclerosis, Hypertension, and Obesity in the Young (AHOY) – Cardiovascular Health in Childhood (2002)	Explicit (3)	Explicit (4)	Vague	0	Addressed
AMA	Guidelines for Adolescent Preventive Services (1996)	0	Vague	Vague	0	Addressed
ICCPAGA	Physical Activity Guidelines for Adolescents: Consensus Statement (1994)	Vague	Explicit (4)	0	0	Addressed
USDHHS CDC	Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People (1997)	0	0	0	0	Addressed
USDHHS AHRQ	Clinician's Handbook of Preventive Services (1998)	0	Vague	0	0	0
USPHS, NCEMCH	Bright Futures (2001)	Vague	Explicit (4)	Vague	General	Addressed
USPSTF	Guide to Clinical Preventive Services (1996)	Vague	Explicit (4)	0	Explicit (3)	0

a Specificity of clinical guidelines was qualitatively assessed based on the actual number of components of physical activity or physical fitness included within each guideline as follows: not reported (0) or no component; vague, 1 component; general, 2 components; explicit, 3 or more components, with the actual number listed in parentheses.

b Recommendation addressed or did not address (0) overweight youth as a specific focus.

AAFP = American Academy of Family Physicians; **AAP** = American Academy of Pediatrics; **ACSM** = American College of Sports Medicine; **AHA** = American Heart Association; **AHRQ** = Agency for Healthcare Research and Quality; **AMA** = American Medical Association; **CDC** = Centers for Disease Control and Prevention; **ICCPAGA** = International Consensus Conference on Physical Activity Guidelines for Adolescents; **NCEMCH** = National Center for Education in Maternal and Child Health; **USDHHS** = US Department of Health and Human Services; **USPHS** = US Public Health Service; **USPSTF** = US Preventive Services Task Force.

Most public health physical activity recommendations included at least three of the four prescriptive components, although the total amount of physical activity recommended differed between recommendations, primarily due to differences in duration. When younger children were considered, organisations emphasised physical activity be developmentally appropriate;^[15,18-20] however, in general, organisations recommended either 30^[12,21] or 60 minutes^[10,15,17,18,22] of daily moderate- to vigorous-intensity activity. More recently developed recommendations advocated 60 or more minutes of daily activity, presumably in response to the increased prevalence of overweight youth.^[15,17,20,22,36] Evidence-based recommendations for optimal amounts of physical activity to improve health should be the gold standard. A recent review suggested, however, that the scientific evidence needed to provide the basis for informed decision making and policy development for youth is often lacking and concluded that experimental and epidemiological studies are needed to determine optimal amounts of frequency, intensity and duration of physical activity to promote health among youth.^[36]

2. Recommendations for clinical assessment of physical activity and physical fitness were rare or vague. Clinical recommendations to counsel about physical activity were explicitly described by nearly half of the organisations; however, explicit counselling recommendations for physical fitness were rare.

Recommendations to provide counselling were often explicitly described for physical activity, yet were rare for physical fitness. The recent recommendation from AHOY^[26] was a notable exception. AHOY provided the clinician with specific information on assessing physical activity and body composition as well as the specific components of physical activity and strength training to recommend to the patient and family. Explicit recommendations, such as those from AHOY, provide the clinician with valuable information both to conduct the clinical evaluation and to counsel the patient and family for health promotion. Although yet to be evaluated, provision of detailed recommendations for the clinician may increase the likelihood of physical activity and physical fitness assessment and counselling in clinical settings.^[35]

Clinical recommendations for physical activity and physical fitness were generally vague, whereas public health recommendations tended to be explicit. Intrinsic and extrinsic variables that influenced the recommendations process were not well described; however, we hypothesise that the content and focus of the recommendations may be influenced by three factors: (i) intended audience – public health recommendations are written for the population as a whole, whereas clinical recommendations are written for practicing clinicians to use with individual patients and families; (ii) expert authors – the breadth and depth of the authors' expertise in the areas of physical activity and physical fitness may reflect the amount of detail provided in recommendations; and (iii) evidence – the expert group's evaluation and interpretation of the evidence may influence the specificity of the recommendation. Disclosure of the process used to develop recommendations and of the issues or topics considered, but not accepted, for inclusion would be useful as a historical reference and to help inform groups developing future recommendations.

3. Public health physical activity and physical fitness recommendations did not generally address overweight youth, whereas half of the clinical recommendations addressed overweight youth.

In general, only some public health or clinical physical activity or physical fitness recommendations addressed overweight youth. Of the organisations with recommendations, most suggested assessment of body composition (usually as BMI). Some organisations advised clinicians to refer overweight youth to nutrition and physical activity programmes^[26,29] or recommended increasing energy expenditure through participation in appropriate physical activity.^[11,16,30] Few physical activity or physical fitness recommendations addressed overweight youth. We hypothesised four reasons:

- Evidence may have been unavailable to fully support recommendations for overweight children or adolescents. Future physical activity and physical fitness studies should include normal weight and overweight youth.
- Organisations may prefer to develop recommendations for the majority of constituents, rather than target specific subgroups of the population. For example, the more recent public health rec-

ommendations for physical activity^[20,21,23] tended not to develop recommendations for specific population subgroups, but attempted to fit one message to the larger population. At the same, they might have felt that the recommendation they had espoused would have been equally effective in youth of normal weight and overweight. Organisations did not make such distinctions clear in the presentation of their recommendations.

- At the time recommendations were developed, experts may not have considered overweight in youth a public health problem requiring special attention and recommendation. For example, as noted in section 2.6 for table V, with the exception of the 1994 recommendation, most clinical recommendations increased their specific focus over time on overweight youth to a moderate degree.
- Individual experts and organisations may have been concerned that targeted recommendations would stigmatise overweight youth.

3.1 Sedentary Behaviours

About half of public health sources recommended limiting the time spent engaging in sedentary behaviours, such as watching television, although few clinical organisations made that recommendation. Television viewing among children and adolescents was associated with antisocial behaviours^[41] and reductions in television viewing among elementary students showed beneficial changes in their BMIs.^[5] Because time spent in sedentary behaviour was not analogous to time spent in physical activity, organisations may not have considered sedentary behaviour when making physical activity recommendations. For example, the work of Robinson revealed that the declines in BMI may have been due to decreased eating behaviour associated with less television viewing.^[5] Regardless, television viewing may deserve greater attention in future recommendations.

This review is subject to at least two limitations. First, we did not include recommendations published in languages other than English. Second, because our search strategy first identified physical activity or physical fitness recommendations, we

may have missed non-physical activity or non-physical fitness recommendations targeted to overweight youth.

4. Conclusion

Our review revealed inconsistent, although explicit, recommendations for the public health community; organisations encouraged volumes of daily moderate- to vigorous-intensity physical activity for all youth ranging from 30–60 or more minutes. Recommendations for the clinical community, however, generally did not provide explicit suggestions for advising physicians on assessing and counselling patients and their families. Some recommendations for the clinical community addressed overweight youth, but few recommendations did so for the public health community.

Recommendations from several organisations may create confusion; but, at the same time, may also increase the visibility of physical activity. Given the wide range of existing recommendations, there is a need to demonstrate clearly the quality and richness of scientific evidence from which recommendations were derived as well as the process by which that occurred. This alone could help to assure more consistent recommendations developed by coordinated efforts from multiple organisations to best inform public health and clinical communities. Although not the intent of this review to identify the best recommendation, the International Consensus Conference on Physical Activity Guidelines for Adolescents (1994) and the AHOY *Cardiovascular Health in Childhood* (2002) seemed to have the most extensive literature base and the most patent process from which recommendations emerged. These latter two elements should be prerequisites for the development of any recommendation.

The time may be right to initiate the process to develop consistent recommendations for wide use. In cases where mutual goals exist, public health and clinical communities, and their organisational representatives, should consider developing joint recommendations through coordinated efforts. Ideally, this review will have helped to identify the key facets of recommendations for youth regarding physical activity and physical fitness including the focus for those who are overweight.

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References

1. US Department of Health and Human Services. Physical activity and health: a report of the surgeon general. Atlanta (GA): US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996
2. Caspersen CJ, Nixon PA, DuRant RH. Physical activity epidemiology applied to children and adolescents. *Exerc Sport Sci Rev* 1998; 26: 341-403
3. Moore LL, Nguyen US, Rothman KJ, et al. Preschool physical activity level and change in body fatness in young children: the Framingham Children's Study. *Am J Epidemiol* 1995; 142 (9): 982-8
4. Malina RM. Tracking of physical activity and physical fitness across the lifespan. *Res Q Exerc Sport* 1996; 67 (3 Suppl.): S48-57
5. Robinson TN. Reducing children's television viewing to prevent obesity: a randomized controlled trial. *JAMA* 1999; 282: 1561-7
6. Jeffery RW, Drewnowski A, Epstein L, et al. Long-term maintenance of weight loss: current status. *Health Psychol* 2000; 19 (1 Suppl.): 5-16
7. Must A, Strauss RS. Risks and consequences of childhood and adolescent obesity. *Int J Obes* 1999; 23 (2 Suppl.): S2-S11
8. Ogden CL, Flegal KM, Carroll MD, et al. Prevalence and trends in overweight among US children and adolescents, 1999-2000. *JAMA* 2002; 288 (14): 1728-32
9. World Health Organization. Obesity: preventing and managing the global epidemic. Geneva: WHO, Division of Noncommunicable Diseases, Programme of Nutrition Family and Reproductive Health, 1998
10. Byers T, Nestle M, McTiernan A, et al. American Cancer Society guidelines on nutrition and physical activity for cancer prevention: reducing the risk of cancer with healthy food choices and physical activity. *CA Cancer J Clin* 2002; 52: 92-119
11. American College of Sports Medicine. Exercise testing and prescription for children, the elderly, and pregnant women. In: Franklin BA, Whaley MH, Howley ET, editors. *ACSM's guidelines for exercise testing and prescription*. 6th ed. Baltimore (MD): Lippincott Williams & Wilkins, 2000: 217-34
12. Commonwealth Department of Health and Aged Care. National physical activity guidelines for Australians. Sydney: Active Australia, 1999
13. Health Canada. Canada's physical activity guide for children. Brampton (ON): Minister of Public Works and Government Services, 2002
14. Health Canada. Canada's physical activity guide for youth. Brampton (ON): Minister of Public Works and Government Services, 2002
15. Pate RR, Trost SM, Williams C. Critique of existing guidelines for physical activity in young people. In: Biddle S, Sallis J, Cavill N, editors. *Young and active? Young people and health enhancing physical activity: evidence and implications*. London: Health Education Authority, 1998: 162-76
16. Sallis JF, Patrick K. Physical activity guidelines for adolescents: consensus statement. *Pediatr Exerc Sci* 1994; 6: 302-14
17. National Academy of Sciences, Institute of Medicine. Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids. Washington, DC: National Academies Press, 2002
18. Corbin CB, Pangrazi RP. Physical activity for children: a statement of guidelines. Reston (VA): National Association for Sport and Physical Education, 1998: 1-21
19. National Association for Sport and Physical Education. Active start: a statement of physical activity guidelines for children birth to five years. Reston (VA): NASPE Publications, 2000: 1-26
20. National Association for Sport and Physical Education. Physical activity for children: a statement of guidelines for children ages 5-12. 2nd ed. Reston (VA): NASPE Publications, 2004: 1-26
21. NIH Consensus Development Panel on Physical Activity and Cardiovascular Health. Physical activity and cardiovascular health. NIH Consensus Conference. *JAMA* 1996; 276: 241-6
22. US Department of Agriculture, US Department of Health and Human Services. Nutrition and your health: dietary guidelines for Americans. 5th ed. Washington, DC: US Government Printing Office, 2000
23. Pate RR, Pratt M, Blair SN, et al. Physical activity and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995; 273: 402-7
24. American Academy of Pediatrics. Assessing physical activity and fitness in the office setting. *Pediatrics* 1994; 93: 686-9
25. Fletcher GF. How to implement physical activity in primary and secondary prevention: a statement for healthcare professionals from the Task Force on Risk Reduction, American Heart Association. *Circulation* 1997; 96: 355-7
26. Williams CL, Hayman LL, Daniels SR, et al. Cardiovascular health in childhood: a statement for health professionals from the Committee on Atherosclerosis, Hypertension, and Obesity in the Young (AHOY) of the Council on Cardiovascular Disease in the Young, American Heart Association. *Circulation* 2002; 106: 143-60
27. American Medical Association. Guidelines for Adolescent Preventive Services (GAPS): recommendations monograph. 2nd ed. Chicago (IL): American Medical Association, 1996
28. Agency for Healthcare Research and Quality, US Department of Health and Human Services. Clinician's handbook of preventive services. 2nd ed. Washington, DC: US Department of Health and Human Services, 1998
29. Centers for Disease Control and Prevention. Guidelines for school and community programs to promote lifelong physical activity among young people. *MMWR Recomm Rep* 1997; 46 (RR-6): 1-36
30. Patrick K, Spear B, Holt K, et al., editors. Bright futures in practice: physical activity. Arlington (VA): National Center for Education in Maternal and Child Health, 2001
31. US Preventive Services Task Force. Guide to clinical preventive services. 2nd ed. Alexandria (VA): International Medical Publishing, 1996
32. American Academy of Family Practice. Summary of policy recommendations for periodic health examinations. Revision 5.1. Leawood (KS): American Academy of Family Practice, 2001
33. American Academy of Family Practice. Age charts for periodic health examinations. Revision 5.1. Leawood (KS): American Academy of Family Practice, 2001
34. American Academy of Pediatrics. Guidelines for health supervision. 3rd ed. Elk Grove Village (IL): American Academy of Pediatrics, 2002
35. Sallis JF, Patrick K, Frank E, et al. Interventions in health care settings to promote healthful eating and physical activity in children and adolescents. *Prev Med* 2000; 31: S112-20

36. Twisk JWR. Physical activity guidelines for children and adolescents: a critical review. *Sports Med* 2001; 31 (8): 617-27
 37. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep* 1985; 100 (2): 126-46
 38. Office of the Surgeon General, Public Health Service, US Department of Health and Human Services. The Surgeon General's call to action to prevent and decrease overweight and obesity. Rockville (MD): US Government Printing Office, 2000
 39. Office of Disease Prevention and Health Promotion, US Department of Health and Human Services. Healthy people 2010: objectives for improving health. Washington, DC: US Government Printing Office, 2000
 40. Troiano RP, Flegal KM, Kuczmarski RJ, et al. Overweight prevalence and trends for children and adolescents: The National Health and Nutrition Examination Surveys, 1963 to 1991. *Arch Pediatr Adolesc Med* 1995; 149 (10): 1085-91
 41. Ozmert E, Toyran M, Yurdakok K. Behavioral correlates of television viewing in primary school children evaluated by the child behavior checklist. *Arch Pediatr Adolesc Med* 2002; 156 (9): 910-4
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