WILL THE OLYMPICS SURVIVE?

T. KHOSLA, Ph.D.

Department of Medical Statistics, The Welsh National School of Medicine, Heath Park, CARDIFF. CF4 4XN

ABSTRACT

The United States of America dominated 58 events in athletics, field and swimming, which between them accounted for 35 per cent of all events in the Munich Olympiad. 1972; these events favour taller individuals. But, in 25 per cent of other events (1) cycling, (2) fencing, (3) gymnastics, (4) judo, (5) weightlifting and (6) Graeco Roman wrestling the U.S.A. did not win a single medal. The failure of the U.S.A. to maintain her lead in Munich was largely due to weaknesses in these other events in many of which the potential medallists can be derived from the lower half of the height distribution (events 3 to 6). These weaknesses are Russia's strength and they continued to remain unstrengthened at Montreal. Also, the domination held by the U.S.A. in swimming was seriously challenged by East Germany. The present trends indicate that the U.S.A.'s ranking is likely to slip further to the third position in Moscow 1980. Factors inhibiting the survival of the Olympics are pointed.

INTRODUCTION

Until recently the United States of America has dominated the International Olympics on most of the nineteen occasions since the revival of the ancient games in 1896 by winning the largest number of medals. No serious challenger to her commanding position was made until 1968. Russia entered the competition in a modest way in 1956 seriously challenged the supremacy of U.S.A. in 1968 (U.S.A. 107 medals; Russia 91), and replaced the Americans as the champions of the Games by winning 99 medals to the U.S.A.'s 93 in Munich 1972. As anticipated, Russia has again topped the list of leading nations by winning 125 medals to the U.S.A.'s 94 in Montreal.

The U.S.A.'s failure to maintain her lead in 1972 was largely due to her weaknesses in over 55 Olympic sporting events which between them yielded 165 medals, and in many of these events potential gold medallists could be found amongst those sections of the population who were shorter in stature. Very largely, U.S.A.'s strength lay in the swimming events, but in Montreal, Eastern Germany posed a serious challenge to the domination of the U.S.A. in the women's swimming events. The present trends indicate that the U.S.A.'s ranking in the tally of medals may slip further to third position in Moscow 1980.

DATA

The paper is in two parts. The data on age, sex, nationality and height, of the medallists from the U.S.A. and Russia were collated from three separate volumes published by the organizing committee for the Games of the XXth Olympiad, Munich 1972. The team events are not considered in Part I (relay events in running, swimming and team events in equestrian and gymnastics, etc.) to avoid multiple entries of the same athlete on age and height. Table I gives the number of medals on which the analysis is based. Over 80% of the reported medals are accounted for (Russia 83%, U.S.A. 89%) in the analysis on age, height and type of events for men and women; the medals unaccounted for do not introduce any bias in the overall findings on the failure of the U.S.A. to maintain the lead in Munich 1972. The anticipated failure in Montreal was documented in a short communication on 3rd July, 1976 (Khosla, 1976a) drawing attention to the weaknesses of U.S.A. in 38 specific events for men. Part II deals with the analysis of medals won by men and women in Montreal (Times 1976) within broad categories of events by the three leading nations (Russia, U.S.A. and East Germany) to uncover additional factors of importance in the further downgrading of U.S.A. in the tally of medals.

TABLE I

Number of Medals Won by Russia and the U.S.A. (Munich 1972)

Country	Gold	Silver	Bronze	Total
Russia	50 (43)*	27 (22)	22 (17)	99 (82)
U.S.A.	33 (28)	31 (26)	29 (29)	93 (83)

* Number of medals accounted for in Part I study are given in Parenthesis

CATEGORIES AND NUMBER OF EVENTS

PART I

Many events within broad categories are contested in the International Olympics, and each event yields three medals (gold, silver and bronze). For example in ath-

TABLE II

MALE MEDALLISTS FROM U.S.A. AND RUSSIA, MUNICH 1972*
(Events are listed by decreasing number of medals won by U.S.A.)

CATEGORY		No. of Medals		Maximum Points		U.S.A. Medals Won	U.S.A. Points		Russia Medals Won	Russia Points	
1. Swimming	(13)**	39		78)***		24	47)		2	4)	
				) 210			) 82			) 33	
2. Athletics, Track and Field	(22)	66		132)		18	35)		12	29)	
3. Wrestling (Free Style)	(11)	33		66		5	13		9	23	
4. Shooting	(8)	24		48		4	10		4	8	
5. Boxing	(11)	33		66		4	6		1	3	
6. Yachting	(6)	18		36		3	5		2	4	
7. Archery	(1)	3		6		1	3		0	0	
8. Equestrian	(3)	9		18		2	2		1	2	
9. Rowing	(7)	21		42		1	2		2	6	
10. Team Events	(6)	18		36		1	2		3	6	
11. Canoeing	(7)	21		42		1	1		4	12	
12. Cycling	(6)	18		36		0	0		2	4	
13. Fencing	(3)	9		18		0	0		2	4	
14. Gymnastics	(5)	15	114	30	228	0	0	24	5	11	54
15. Judo	(5)	15		30		0	0		4	7	
16. Weightlifting	(9)	27		54		0	0		5	12	
17. Wrestling (Graeco Roman)	(10)	30		60		0	0		6	16	
TOTAL	133	399		798		64	126		64	151	

* Data collated from 3 separate volumes published by the organizing committee for the Games of the XXth Olympiad, Munich 1972. Over 80% of the reported medals are accounted for in the present analysis; the medals unaccounted for do not introduce any bias in the overall findings.

** Number of events are given in parenthesis.

*** 3 points for gold, 2 for silver, 1 for bronze.

Table II Published from Khosla, T., *Brit.Med.Journ.*, (courtesy of the Editor), **2** p. 40 (July 3rd).

letics and field events (Table II) there are 22 separate events (running, jumping, hurdling, throwing, walking etc.). The Olympic events can be divided into two broad groups: closed and open. In the closed events (boxing, wrestling etc.) there is an official recognition that the heavier weights have an advantage over the lighter weights and the contestants are matched within rigid weight groupings. In the open events, however, no official recognition of any form of advantage is accepted, although scientific evidence has shown an overwhelming bias in favour of the very tall in many of the 'sporting events' (Khosla 1968, 1971).

New events have been added over the years (canoeing in 1936, judo and volley ball in 1964). Women started competing in 1928. There are 36 open events for women but so far closed events such as boxing or wrestling have not been introduced for them!*

Table II lists the categories of events for males in decreasing order of medals won by the U.S.A. in Munich 1972. For example the U.S.A. dominated the swimming events by winning 61% of the 39 medals (60% of maximum points). Of the total 126 points won by the U.S.A., 82 (65%) were derived from swimming, and track and field athletics. These events contributed only 26% of the 798 maximum points. In contrast, the U.S.A. did not win any points in cycling, fencing, gymnastics, judo, weightlifting and Graeco-Roman wrestling which

FOOTNOTE

**Though judo and its variants are popular women's sports – Ed.*

TABLE III

Female Medallists from U.S.A. and Russia
Munich 1972

CATEGORY		No. of medals	Maximum Points	U.S.A. Medals won	U.S.A. Points won	Russia Medals won	Russia Points won
Swimming	(12)*	36	72	16	33	2	3
Archery and foil	(2)	6	12	1	3	2	2
Athletics	(11)	33	66	2	2	4	11
Canoeing	(3)	9	18	0	0	2	6
Gymnastics	(4)	12	24	0	0	7	14
Team events	(1)	3	6	0	0	1	3
TOTAL	(33)	99	198	19	38	18	39

* Number of events.

together yield a total of 114 medals or 228 points (28.6% of total points). The table shows that Russia's achievements were distributed far more evenly. Similarly, the results on women (Table III) show that excepting the swimming events, Russia won more points than U.S.A. in athletics, canoeing and gymnastics.

Tables IV and V give the age and height distributions of the medallists from the two nations as both factors are of importance in determining the outcome of the

TABLE IV

Age Distribution of Medallists from Russia and USA

Age	MALES		FEMALES	
Years	Russia %	USA %	Russia %	USA %
< 20	0	15.5	38.9	68.4
20-24	39.7	52.1	22.2	21.0
25-29	36.8	22.5	22.2	5.3
30-34	19.1	1.5	11.1	0
35-39	2.9	4.2	5.5	0
40-44	1.5	4.2	0	5.3
Total	100 (68)*	100 (71)	100 (18)	100 (19)
Mean	27.0	24.5	23.6	20.4
S.D.	4.6	5.8	6.3	6.1

* Number of persons. The number differs from Table II because some events (Tandem cycle, canoeing Kayak 2, 4 etc.) have more than one person. Excludes ages of basketball, volleyball, etc. teams. Ages of champions winning more than one medal are entered as many times as medals are won.

TABLE V

Height Distribution of Medallists from Russia and U.S.A. and Percentiles of Height (U.S.A. General Population)

Height	MALES		FEMALES	
cm	Russia %	U.S.A. %	Russia %	U.S.A. %
150-154	4.4	0	16.7	0
155-159	1.5	0	0	0
160-164	7.4	0	33.3	0
165-169	7.4	4.2	38.9	15.8
170-174	11.8	7.0	11.1	57.9
175-179	25.0	18.3	0	21.0
180-184	19.1	28.2	0	0
185-189	11.8	21.1	0	5.3
190-194	11.8	14.1	0	0
195+	0	7.0	0	0
Total	100 (68)	100 (71)	100 (18)	100 (19)
Mean cm	177.6	183.8	163.9	173.6
S.D.	10.2	7.5	6.1	4.6

Percentiles of Height in cm (USA General Population Age 18-24 Years)

	1	5	10	20	50	80	90	95	99
♂	159.0	163.3	166.1	168.9	174.2	180.1	183.9	185.7	190.0
♀	148.0	152.4	154.0	156.5	162.3	167.4	169.7	172.4	176.0

events (Khosla 1971, 1975: Opie 1975). On average the U.S.A. male medallists were both younger (2.5 years) and taller (6.2 cms or 2.4 in.) than the corresponding

averages of the Russians; the female champions displayed the same trend.

The finding that the U.S.A. lost her lead to Russia, despite the seemingly advantageous factors arising from younger age and greater height needs explanation.

DISCUSSION

PART I

Age and performance are curiously related depending on the type of events. Champion swimmers are very young and some female gold medallists are barely 16 years old. The overwhelming domination by U.S.A. in the swimming events (24 medals for males and 16 medals for females) is reflected in the large number of medallists below 20 years of age (Table IV). Also some swimming events are related to the same type of physique (age, height and weight); 7 champions from U.S.A. won more than one medal and the 40 medals were shared between 30 persons. The particulars of some champions who won 2 or more medals are as follows:— (i) female aged 16, height 170 cms, weight 59 Kg, (ii) female 16, 176, 65, (iii) male 22.5, 186, 77.

Seven medals (females $<$ 20 years) from the Russian team were won in the gymnastics events, and they were shared between three champions. Like the swimming events some of the gymnastic events are also related to the same type of physique (particulars of some champions from Russia who won two or more medals are:— (i) female aged 17 years, height 154 cms and weight 38 Kg, (ii) male aged 20, 166, 57, (iii) male 23.6, 169, 61.

The above findings show that champion swimmers are *young* and *tall* (much above the average height), whereas champion gymnasts are *young* and *short* (much below the average height). Furthermore it has been documented (Khosla 1976c) that in swimming and gymnastic events the same person is capable of winning multiple medals, a point of strategic importance in the selection and training of potential champions.

About 40% of the Olympic events in the open category are water sports (canoeing, rowing, swimming and yachting and water polo). For example in canoeing there are 7 separate events for males (Kayak 1, 2, 4; Canadian 1, 2; Slalom 1, 2), and likewise in rowing there are 7 types (Table II). Russian teams (males and females) won eight gold medals in canoeing and rowing compared to the U.S.A.'s two (1 bronze and 1 silver).

The closed events (boxing, weightlifting, wrestling and judo) are contested within rigid weight groupings and because height and weight are positively correlated, light weight champions in these events are necessarily short (Khosla, 1968, 1971). Some of the male Russian champions from these events were very short (Table V, height 150 to 164 cms).

Basketball players are very tall (range of height in U.S.A. team of 10, 191 to 223 cms; mean and s.d. 204 ± 8.6) compared to the general U.S.A. population (mean and s.d. of males aged 18-24 years 174.2 ± 6.9 cm or 68.6 ± 2.7 in (Stoudt et al., 1965)). The shortest U.S.A. basketball player 191 cms is 2.4 standard deviations away from the general population mean. In comparison the heights of eight medallists from Russia in the closed events (wrestling, weightlifting, judo etc.) fall at the $<$ 10th percentile of the height distribution in U.S.A. ($<$ 165 cms or 65 in.), and such heights are commoner (9.2%) than the heights of tall basketball players ($<$ 1%, Table (V)).

In view of these findings the likelihood of U.S.A. regaining her lead at Montreal in 1976 was predicted (Khosla, 1976) to be small. The strategy needed to regain her lead involved providing facilities and wider access to sporting activities such as canoeing, cycling, rowing, weightlifting, judo, and Graeco Roman wrestling. This strategy also involved massive public relations efforts to elevate the status of some of the 'unspectacular' sporting activities particularly favourable to the average and shorter sections of the population such as lighterweight classes of the closed events particularly weightlifting, judo and Graeco Roman wrestling.

The existing height bias in the sporting activities favouring taller individuals in the U.S.A. indeed within any country has wider health implications (Khosla, 1972, 1975) apart from winning medals in that it is likely to inhibit the incentive to participate in sport at all stages of competition beginning at school. A wider access to a number of diverse sporting activities would have increased U.S.A.'s chances of regaining her lead in Montreal 1976.

PART II

The analysis of results in Montreal (Times, 1976) show that the weaknesses of the U.S.A. revealed in Munich remained unstrengthened. Of the 62 events in rowing, canoeing, cycling, fencing, gymnastics, judo, weightlifting and Graeco Roman wrestling yielding 186 medals, the U.S.A. won only 4 medals to Russia's 49 (in 1972 the corresponding numbers were: U.S.A. 2, Russia 30). As in Munich, of the 77 medals won by the U.S.A. in men's events at Montreal, 39% were derived from swimming. In the men's swimming contests yielding 45 medals the U.S.A. maintained the domination by winning 30 medals compared with Russia's six and East Germany's one. But in the women's swimming events, the East German girls surprised the world by winning 19

medals (11 gold) to the U.S.A.'s 10 (1 gold) (Table VI); this achievement is particularly remarkable because in Munich, East Germany did not win a single gold medal.

TABLE VI

Distribution of Medals in Swimming Events (Montreal 1976)

Sex	COUNTRY U.S.A.	Russia	E.Germany	Other Nations	Total
			Number of Medals		
Male	30	6	1	8	45
Female	10	6	19	10	45
TOTAL	40	12	20	18	90

It is of further interest to note that East Germany topped the list of leading nations in women's contest with 49 (33.3%) of the 147 medals (Russia 36, U.S.A. 17). The analysis is documented elsewhere (Khosla, b, 1976). It is sufficient to mention here that other countries are unable to exploit the sporting potentialities of their women in the way that East Germany has done. A sociological factor has emerged in the optimum selection of female potential in Montreal. The virtual domination of East Germany in women's contest now appears a permanent feature of future olympics.

In boxing, both Russia and Cuba have posed serious threats to the U.S.A.'s pool of medals in these events (U.S.A. 7, Russia 6, Cuba 8). Here 'professional status' is a limiting factor for the optimum selection of potential medallists in the U.S.A.

To sum up, the weaknesses of U.S.A. in about 60 events are Russia's strength, and the domination held by U.S.A. until recently in swimming, boxing and athletics are challenged seriously by East Germany, Cuba and the newly emerged African nations. The present trends indicate that the U.S.A.'s ranking in the tally of medals may slip further to third position in Moscow 1980. Furthermore the continuation of the Olympics itself is likely to be in serious doubt if the U.S.A. fails as a leading contender. The biggest element of surprise in Moscow may well be the challenge to the remaining domination held by the U.S.A. in men's swimming events.

The question can be rightly asked: Are the olympics international? Only 13 countries have won 10 or more medals (Table VII). With the exception of Japan, four other countries from Asia (Korea, Pakistan, Iran and Thailand) could manage to win only seven medals between them, and 31 of the 32 medals won by the Asian countries were either from the closed events (boxing, wrestling, judo and weightlifting) or from gymnastics. It is not a surprise that Japan is unable to win a single medal in athletics, swimming, rowing etc. It has been documented elsewhere (Khosla, 1968, 1971) that these events are biased heavily in favour of the tall, and Japan can never win despite their meticulous training and selection because of their limiting factor on height.

Although Russia has won the largest number of medals, East Germany's achievements are most remarkable with 56.2 medals per 10 million population. The last column of Tables VII gives the rank order of the leading countries after adjusting for the population size. It is noteworthy that some of the Eastern European countries are taking keen interest in the olympics and of the affluent countries from the West only the U.S.A. and West Germany are placed in the top ten positions.

Every affluent country has the basic potentiality to win medals. It should be noted that Britain won the largest number of medals (137) in London 1908 (Banks, 1976), a record probably unbroken even to this day. Nazi Germany posed a serious challenge to the continuing domination of the U.S.A. by winning the largest number of medals in Berlin 1936 (Tyler, M. 1976).

Many factors are likely to inhibit the continuation of the olympics. Politics (Tyler, R. 1976), high costs of staging the Games, lack of international appeal because of unfair rules (Khosla, 1971, 1972), basic weaknesses in the U.S.A. sports system (Tables II and III) and lack of interest in the affluent Western countries (Table VII) are all likely to contribute to the discontinuation of the Olympics.

ACKNOWLEDGEMENTS

I am thankful to Mr. Peter Samuel for his help with the computer programming, and to Dr. E. J. Hamley for his constructive comments.

TABLE VII

Listing of 13 Countries Winning 10 or More Medals (Montreal 1976)

Country	Medals	Points	Population* (millions)	Medals Per 10 Million	Rank Order
1. Russia	125	262	235.5	5.3	9
2. U.S.A.	94	197	199.1	4.7	10
3. E. Germany	90	195	16.0	56.2	1
4. W. Germany	39	72	57.7	6.8	7
5. Rumania	27	44	19.3	14.0	5
6. Poland	25	47	31.9	7.8	6
7. Japan	25	48	99.9	2.50	11
8. Bulgaria	24	46	8.3	28.9	2
9. Hungary	21	34	10.2	20.6	3
10. Cuba	13	29	8.0	16.2	4
11. G. Britain	13	24	55.1	2.36	13
12. Italy	13	24	52.3	2.49	12
13. Canada	11	16	20.4	5.4	8

* Source:— Demographic year Book 1967, United Nations.

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