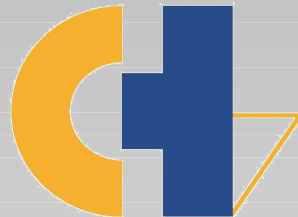


Aspects cardio-vasculaires de l'examen médico-sportif avec mention spéciale des sportifs au-delà de 40 ans



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Contenu cardiovasculaire du « Médico »

Anamnèse: douleurs thoraciques, (pré)syncope, vertiges, dyspnée, palpitations ou tachycardies à l'effort Anamnèse familiale!

Mort subite chez parents, frères/soeurs à un âge jeune

Examen clinique : aspect Marfan?, pouls périphériques, auscultation en position couchée et debout (assis), pression artérielle aux deux bras

MAIS: Avec ces seuls examens, chez seulement 3% des sportifs morts par CMH le diagnostic correct avait été posé avant l'autopsie [Maron 2003]

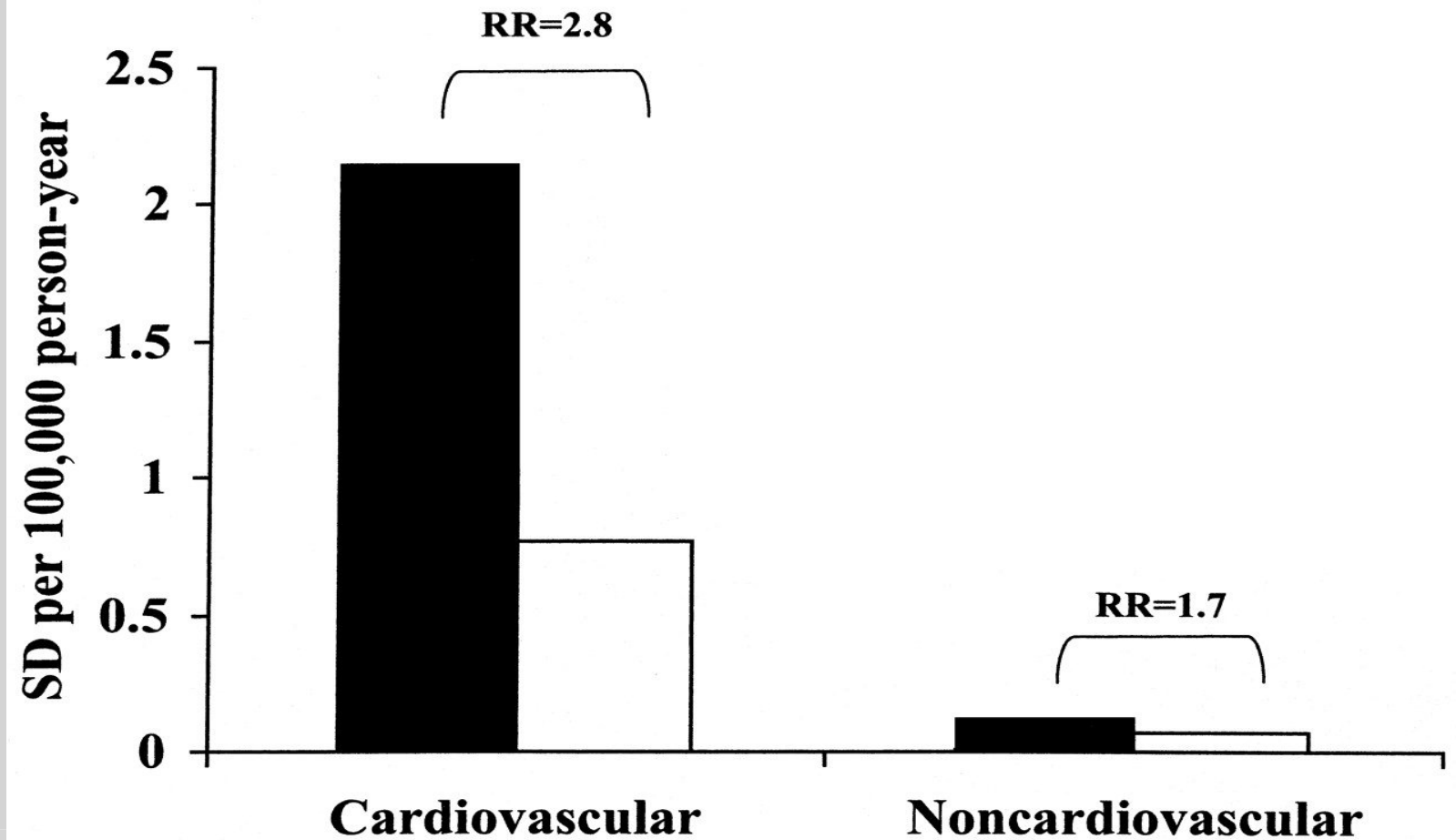
ECG au repos

(ECG à l'effort)

(Echocardiographie)

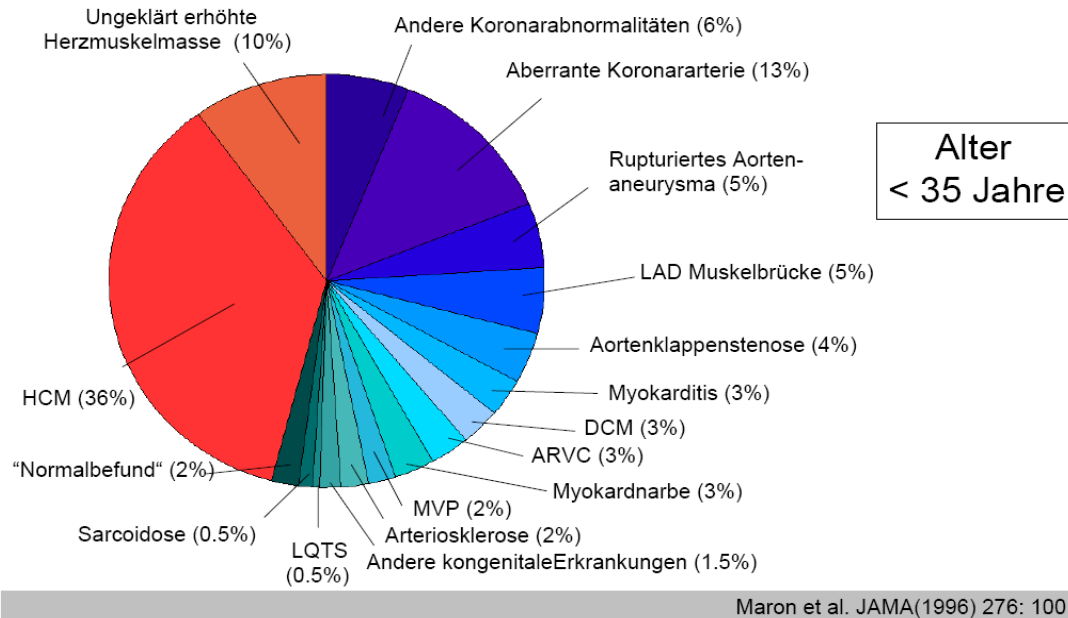
« Grand » Médico

Incidence and relative risk of sudden death (SD) among athletes (solid columns) and non-athletes (open columns) from cardiovascular and non-cardiovascular causes

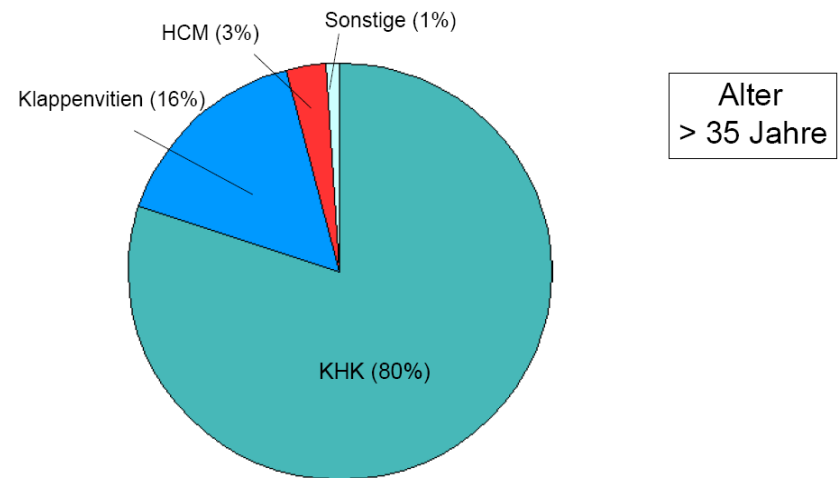


Corrado et al., JACC 2003

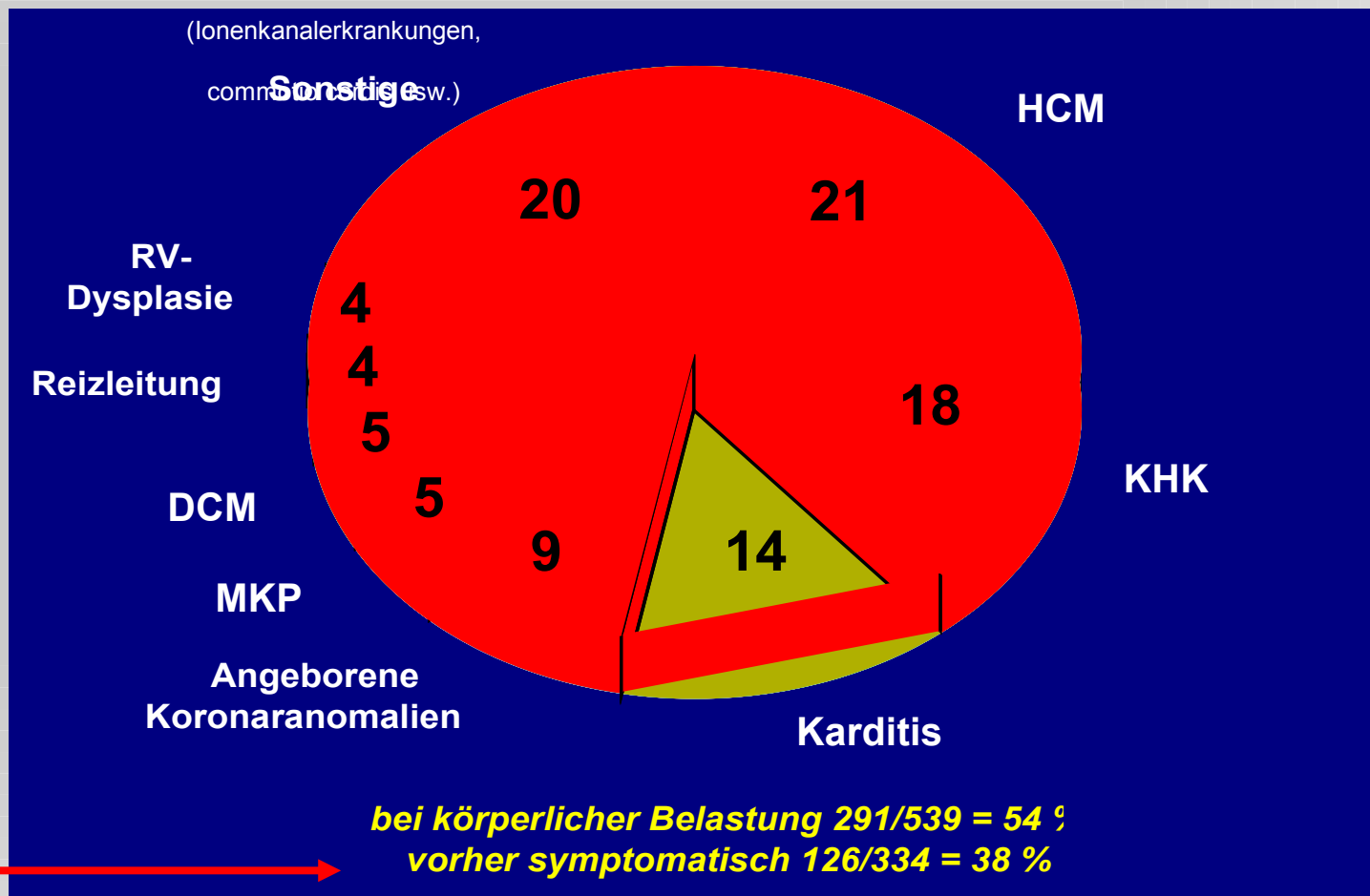
Kardiovaskuläre Ursachen des plötzlichen Herztodes *junger* Wettkampfsportler, USA



Kardiovaskuläre Ursachen des plötzlichen Herztodes *älterer* Wettkampfsportler, USA



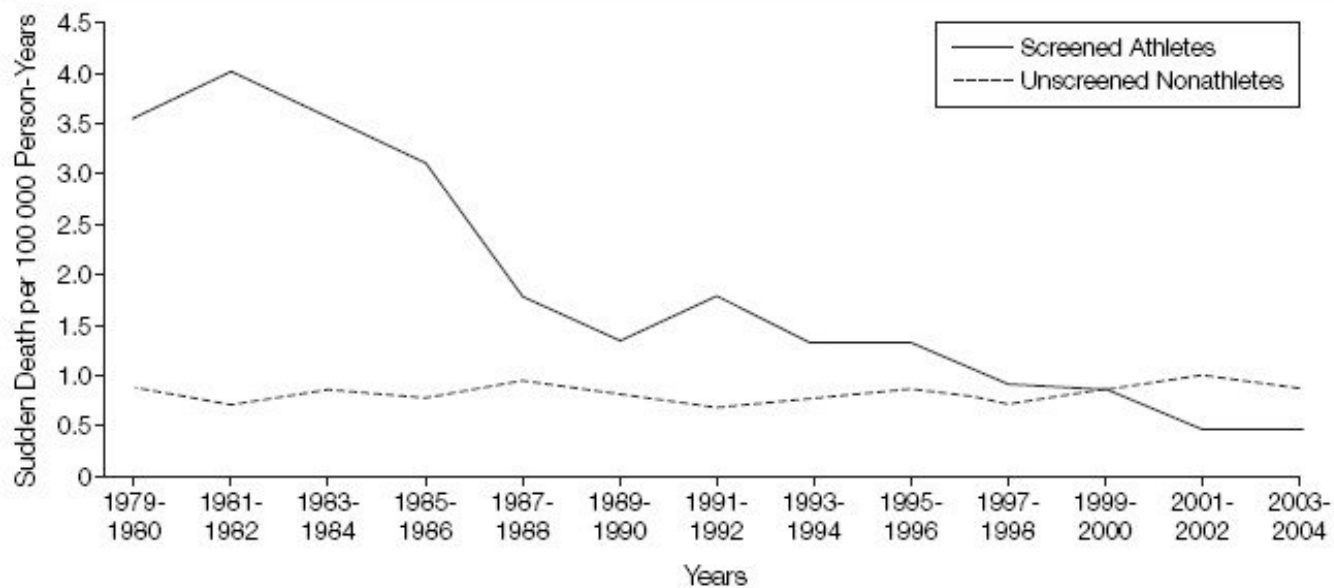
Morts subites non-traumatiques chez 703 personnes jeunes <40 ans



Urhausen and Kindermann, Ther Umsch 1998

Risque de mort subite plus élevé chez jeune sportif de compétition

Figure. Annual Incidence Rates of Sudden Cardiovascular Death in Screened Competitive Athletes and Unscreened Nonathletes Aged 12 to 35 Years in the Veneto Region of Italy (1979-2004)



During the study period, the annual incidence of sudden cardiovascular death decreased by 89% in screened athletes (P for trend $< .001$). In contrast, the incidence rate of sudden cardiovascular death did not demonstrate consistent changes over time in unscreened nonathletes.

Corrado et al., JAMA 2006

La mort subite du sportif: Incidence

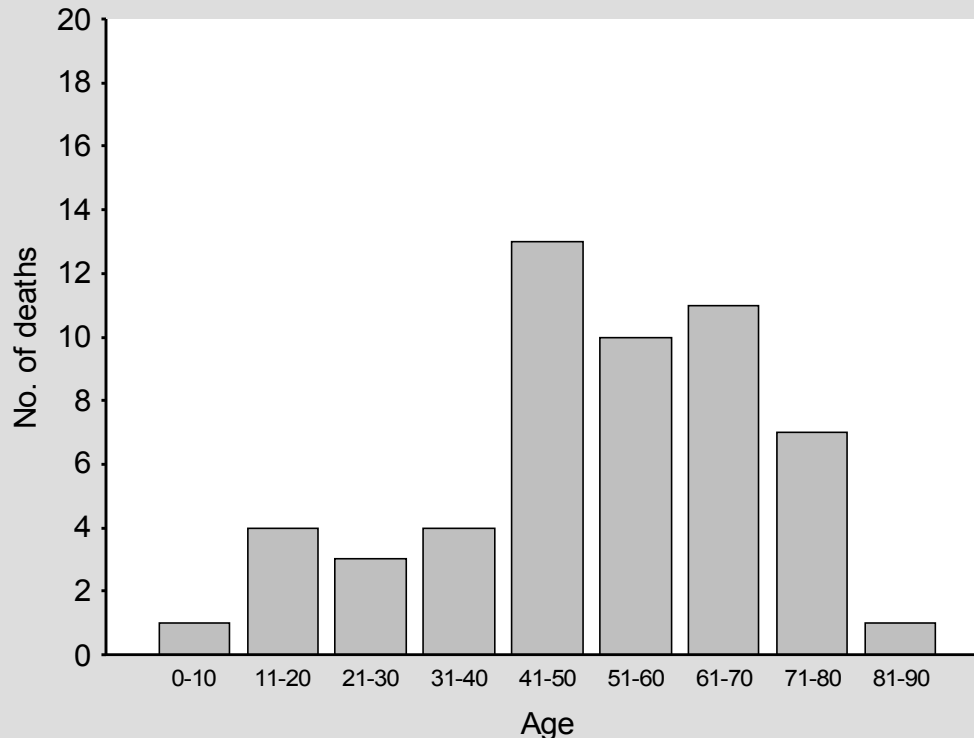
Dépend de:

- Sexe (*hommes >> femmes*)
- Age



Antonio Puerta, FC Sevilla, 25.08.2007

La mort subite du sportif: quelques chiffres absolus



45/52 CAD, most in
association with golf
and bowls

52 deaths within 6 h of participation in sporting activity from
01/1984 to 12/1988 in the district of Birmingham
(population of 1.130.000)

Whittington & Banerjee, J Roy Soc Med
1994

La mort subite du sportif: Incidence

Dépend de:

- Sexe (*hommes >> femmes*)
- Age (*surtout 40-50 ans*)
- Intensité de l'effort (*„vigorous exercise“: risque x17*)

Corrado et al., JACC 2003: athlètes vs non-athlètes: risque x2,5

- 1/fréquence d'exercices vigoureux
(*risque moins élevé chez personnes mieux entraînées*)

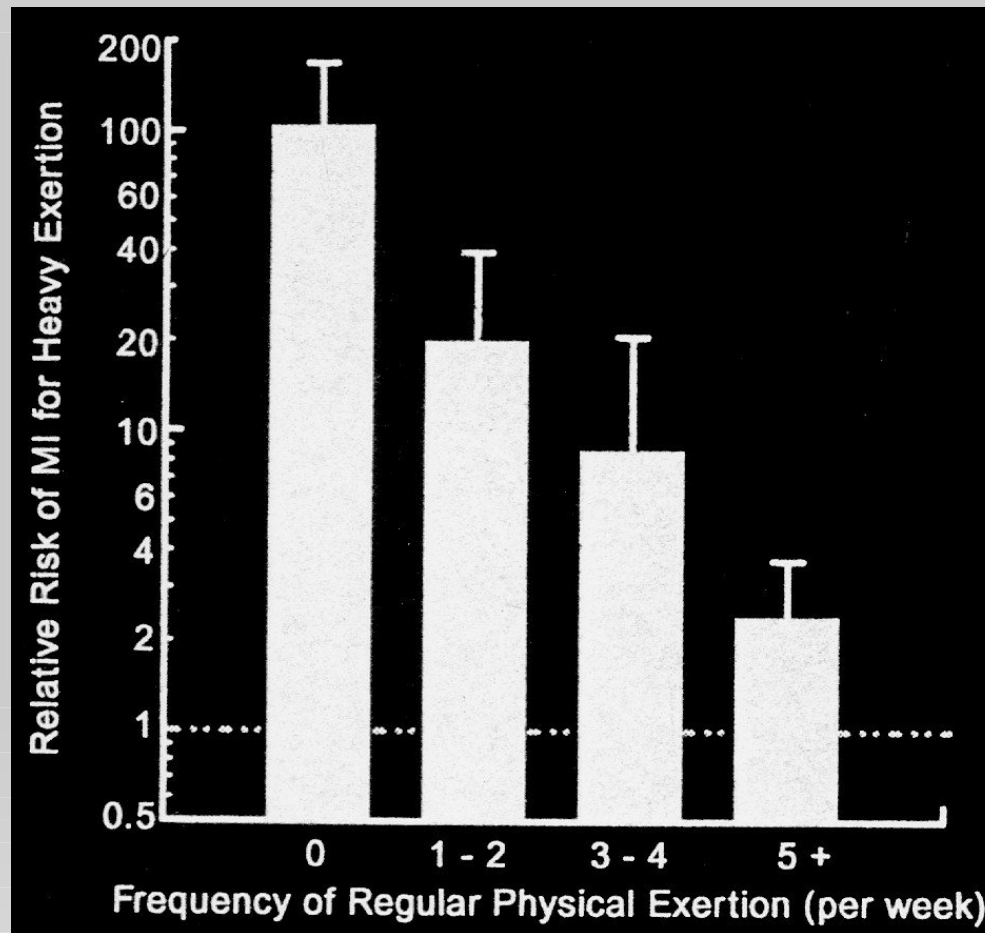
Albert et al., NEJM 2000: risque x11 si ≥ 5 /sem mais x74 si 0-1/sem

Mittleman et al., NEJM 1993



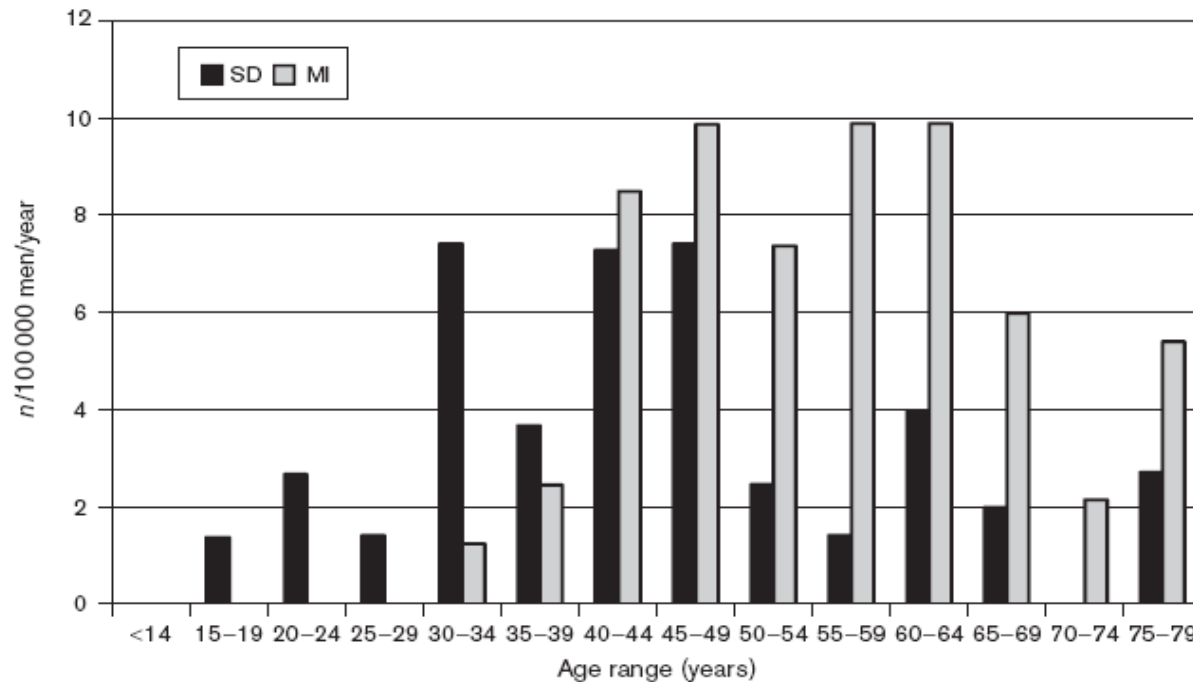
Antonio Puerta, FC Sevilla, 25.08.2007

**Moins de complications cardiaques
pendant les efforts physiques vigoureux
si fréquence plus élevée d'exercices vigoureux**



Mittleman et al., N Eng J Med 1993

Etude prospective sud-ouest France (population générale de 2 millions habitants)



Maladies génétiques, activité >>>

+++

<<< Facteurs de risque, âge

+++

Chevalier et al., Eur J Cardiovasc Prev Rehabil 2009

Problèmes du sport de **compétition**

Intensité de l'effort

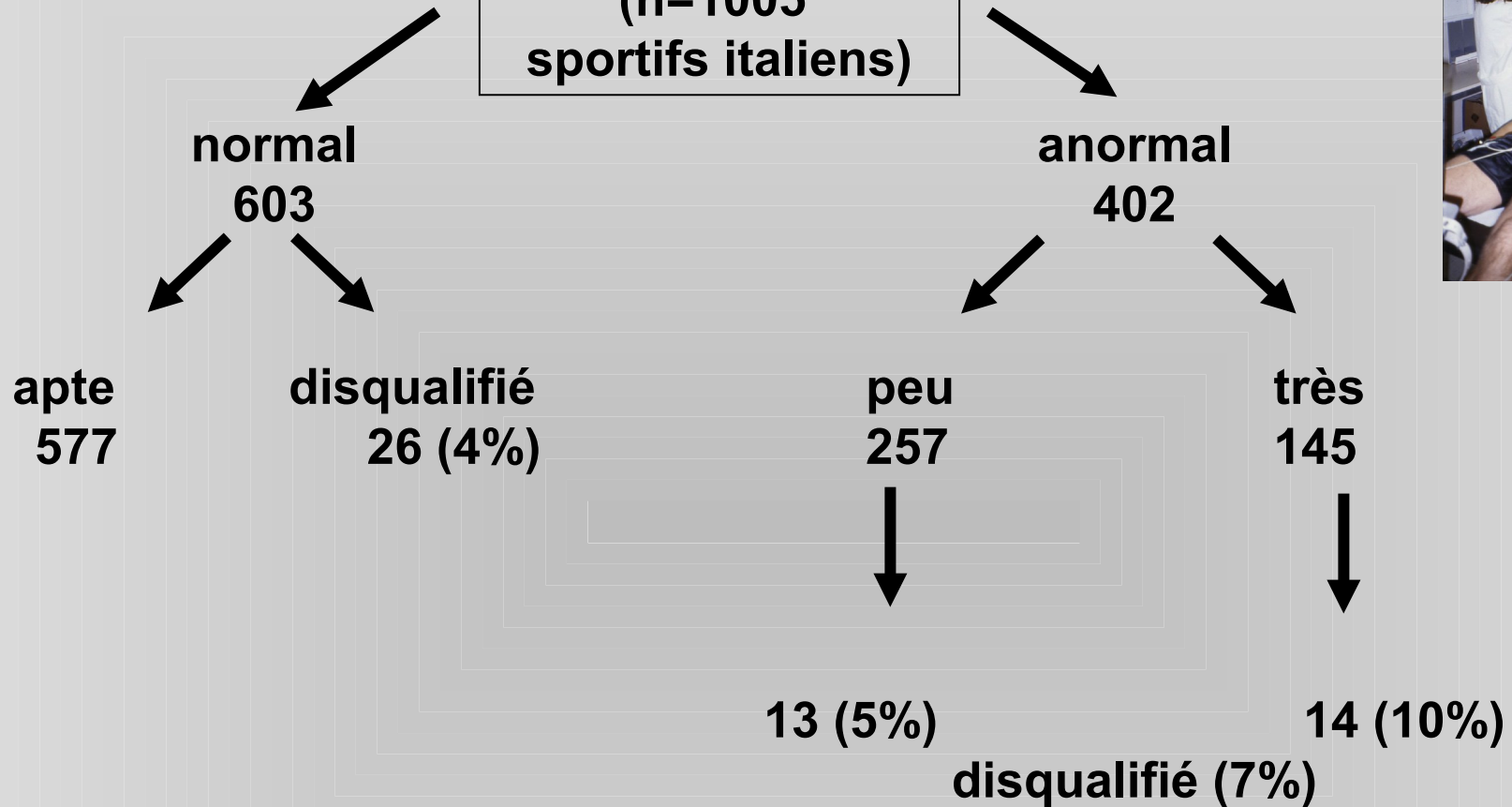
complications aiguës = mortalité
et chroniques = morbidité sur le
plan personnel

Implications légales
responsabilité du club,
de la fédération,
de l'organisateur, image du sport



70-74y 5000m WC 2007
(WR H:19:47s, F: 23:50s)

ECG au repos (n=1005 sportifs italiens)



96% valeur prédictive négative
7% valeur prédictive positive

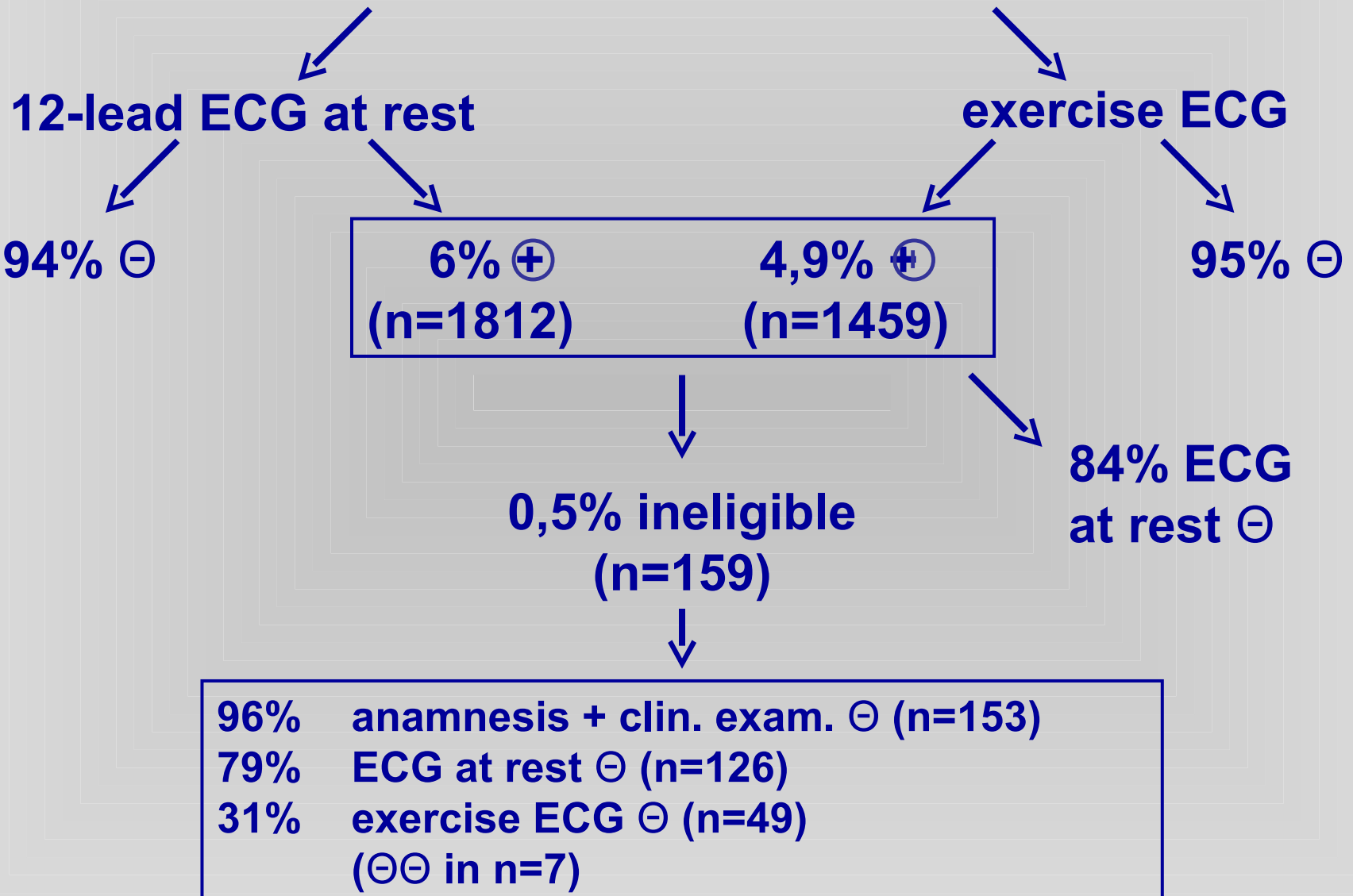
Recommendations for Preparticipation Screening and the Assessment of Cardiovascular Disease in Masters Athletes

... the routine use of the exercise ECG in healthy asymptomatic athletes without major risk factors is not recommended.

Nevertheless, findings from the Multiple Risk Factor Intervention Trial (MRFIT) suggest that in asymptomatic populations with coronary risk factors, development of a positive exercise ECG test for myocardial ischemia is associated with a higher incidence of future coronary events [...] by as much as 15 times in men and 5 times in women.

In the Seattle Heart Watch Study, asymptomatic men over 40 years of age with >1 coronary risk factor and >2 abnormal features on exercise testing (including chest pain during maximal exertion, exercise duration < 6 minutes on the Bruce protocol, failure to attain at least 90% of age-predicted maximal heart rate, or ischemic ST-segment depression) showed a 30-fold increment in 5-year cardiac risk.

**Screening of 30.065 athletes
(age 30,7 years, 5-92, 40% >30)**



Screening de 30.065 sportifs:

159 (0,6%) disqualifiés pour causes cardiaques, parmi lesquels 79% montraient un ECG au repos normal, mais un ECG à l'effort anormal

Table 3 | Predictors of disqualification among athletes with normal findings on resting ECG

Variable	Odds ratio (95% CI)	P value
Sex (men v women)	0.61 (0.20 to 1.85)	0.4
Age 30-50	2.38 (1.07 to 5.92)	0.02
Age >50	4.49 (1.68 to 11.05)	0.003
BMI	1.03 (0.93 to 1.13)	0.6
Family history	1.06 (0.87 to 2.34)	0.8
Diastolic blood pressure (mm Hg)	1.01 (0.97 to 1.05)	0.7
Systolic blood pressure (mm Hg)	0.99 (0.97 to 1.02)	0.6
Type of sport practised	0.94 (0.83 to 1.06)	0.3
Heart rate (bpm)	0.99 (0.96 to 1.01)	0.3
Smoking habit	0.59 (0.28 to 1.29)	0.2

BMI=body mass index; bpm=beats per minute.

Sofi et al., BMJ 2008



Screening de 30.065 sportifs:

159 (0,6%) disqualifiés pour causes cardiaques, parmi lesquels 79% montraient un ECG au repos normal, mais un ECG à l'effort anormal

DéTECTABLE PAR:

ex. clin., (ECG), écho

auscultation, ECG, écho

test d'effort

ECG

ex. clin., (ECG), (écho)

(auscultation), ECG, écho

Table 2 | Causes of disqualification from competitive sports at the end of screening

	No (%)	Mean age (SD; range)
Valve diseases	47 (23.9)	39.9 (14.3; 18-64)
Arrhythmias	36 (18.4)	35.4 (13.4; 12-71)
Coronary artery disease	17 (8.7)	40.5 (13.9; 18-83)
Conduction disorders	13 (6.6)	33.7 (19.6; 17-69)
Hypertension	37 (18.9)	42.8 (11.3; 20-73)
Cardiomyopathies	9 (4.6)	28.4 (13.8; 8-63)
Other*	37 (18.9)	38.9 (16.4; 15-72)

*Malignancies, hip and knee prosthesis, venous thromboembolic disease, eye diseases, hearing loss, seizures, mental disorders.

modif. from Sofi et al., BMJ 2008

SEDENTARY adult/senior intending moderate/high
intensity activity
or **ACTIVE** adult/senior intending **high intensity** activity
or **COMPETITIVE** adult/senior athlete

Screening by physician
- History
- Phys. Exam.
- **Cardiovasc. Risk Score**
- Rest ECG

Low risk

Eligible

High risk

* incl. for competitive athletes >40/50 yrs (m/w)
and 1 risk factor or > 65 yrs or symptoms

Maximal exercise testing

negative

Eligible

positive

Further examination (echo,
scinti etc)
as appropriate according
to the established
protocols of ESC

Häufigkeit eines plötzlichen Herztodes im Rugby während einer Spielsaison in Südafrika (Opie, Lancet 1975)



7 Spieler ~ 1 pro 50.000 Spielstd.

4 Schiedsrichter ~ 1 pro 3.000 Spielstd.



Le bilan:

Entraînement chronique versus exercice aigu

