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COPIES - KEYS

April 26, 1982

Ancel Keys, Ph.D.
Professor Emeritus
Laboratory of Physiological Hygiene
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Health Sciences Unit A

Dear Ancel:

Would you explain to me his point on misuse of "rates."

I would enclose an underlined p.c. to the editors with the admonition that editorial changing of the subtitle of the book (to multivariate risk) is a risky, if not unprofessional undertaking; though the harm is done, they should be made aware of the inappropriate liberty they took.

I would like your reaction to his statement that the differences between (?) communities are seriously underestimated, when the manner of selection of the communities might rather tend to overestimate the correlations.

Cordially,

Henry Blackburn, M.D.
Professor and Director

/jml

Enclosure

*attached ✓
4/27/82
JMB*

**n Countries: A Multivariate Analysis of Death
Coronary Heart Disease.** By Ancel Keys. 232 x
154 mm. Pp. 394. 1980. London, Harvard Uni-
versity Press. £15.00

There can be few epidemiological studies as ambi-
tious as the prospective study of coronary disease
in seven countries carried out by Ancel Keys and
his collaborators. They recruited sixteen cohorts of

middle-aged men, 12 763 in total, during the late
1950s and early 1960s, and this book reports the
detailed statistical analysis of the results of the
10-year follow-up study, during which 1512
deaths, 413 of them due to coronary disease, were
observed. Not surprisingly, the book is a long and
ambitious work. By its nature, it contains a large
quantity of numerical results in the form of graphs
and tables, yet it successfully avoids the very real
danger of becoming merely a compendium of
edited computer print-outs. The numerical in-
formation is conveyed concisely and clearly, there
is extensive and excellent use of graphs wherever
possible and both tables and figures are adequately
labelled. Only for a description of the distribution
of height, weight, skinfolds, blood pressure and
serum cholesterol at entry of the men into each
cohort is it found necessary to resort to the use of
a set of tables in an appendix.

Non-statisticians should not be put off by the
sub-title: the word 'multivariate' is inappropriate -
a better choice would have been 'multi-factorial',
since the book presents an analysis of a disease of
complex aetiology and cannot fail to consider
multiple risk factors. Only one chapter (of 32
pages) deals with multiple regression analysis and
even here the word 'multivariate' is misplaced -
such analysis would not be classed as multivariate
by statisticians these days. Nor should the potential
reader be deterred by the statement in the foreword
that the '... treatment of data is of necessity
highly sophisticated'. The analysis is sophisticated
neither in the proper nor the colloquial sense of
the word. With one reservation, the statistical
methods are well explained and if they are not
understandable to anyone who has passed the
MI-CM examination, then there is something very
seriously wrong with the syllabus! The caveat is that
Keys, in common with most modern epidemiolo-
gists, uses the word 'rate' to mean a proportion.
This is incorrect, and anybody wishing a lucid
description of the difference might do well to read
William Farr's methodological notes in the
decennial review of 1851.

The major aim of the study was to reconcile
differences between different communities with
our knowledge of coronary risk factors obtained
from prospective studies *within* single communities.
The analysis addresses this problem and proceeds
in a logical manner. After the first two chapters,
which deal with the aims and methods of the
study, chapter 3 describes differences in prevalence
between the communities as shown by the medical
examination on recruitment. Chapters 4 and 5
describe, respectively, mortality and incidence of
coronary heart disease in the cohorts during the
10 year follow-up. The differences in 'incidence
rates' are staggering, ranging from 26 to 1074 per
10 000.

The next 9 chapters each consider a single
coronary risk factor - age, blood pressure, serum
cholesterol, smoking, obesity, physical activity,

resting pulse, respiratory function and last (but by
no means least) diet. Each of these chapters juxta-
poses analyses of differences in risk *between*
communities and analyses *within* communities.
Chapter 15 on 'multivariate' analyses takes a
similar approach but considers risk scores by
linear functions of several risk factors.

To complete the analysis, chapter 16 analyses
longitudinal studies of changes in risk factors over
the 10-year period and demonstrates the common
finding that age relationships shown by longitudinal
and cross-sectional methods may differ markedly.

The only criticism which I should level at this
book is that there is a serious problem in statistical
method which is relevant to the aims of the analysis.
This is that inaccuracies in measurement and/or
natural variability of risk factors can seriously
attenuate relationships within communities while
leaving between-community relationships un-
changed. This phenomenon is referred to in the
discussion of the dietary data but deserves wider
discussion. It is likely that it is this which lies
behind the apparent paradox that multifactor risk
scores predict the ranking of incidence rates for
the various communities with remarkable accuracy
but seriously underestimate the extent of the
differences.

That apart, this is a well-written and important
book on one of the most elegant and ambitious
epidemiological studies ever undertaken. I cannot
imagine anybody with an interest in epidemiology
who would not want to read it.

D. Clayton



keys

*The Publishers present their compliments and
have pleasure in sending two copies of a review
which appeared in*

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