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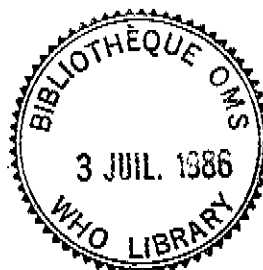
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*Epidemiology - Education
Statistics
Education, Medical
Europe*

TEACHING EPIDEMIOLOGY AND HEALTH STATISTICS
TO MEDICAL STUDENTS

Report on a Seminar

Sesimbra, Portugal
26-30 May 1980

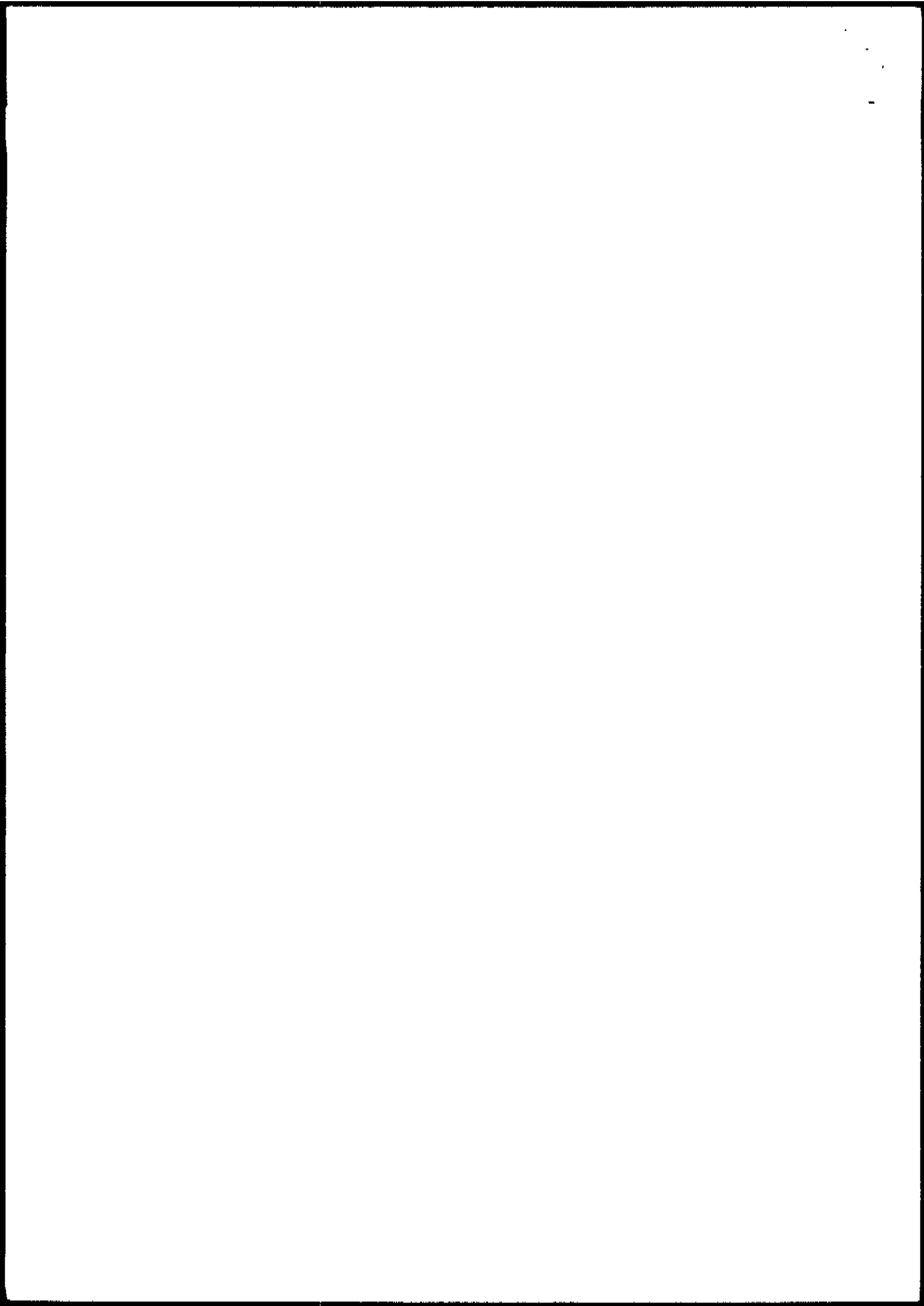


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1. Introduction

The Seminar was one in a series of WHO activities in statistical and epidemiological education at various levels. It was attended by 19 participants from 12 countries in the European Region, 4 temporary advisers and 3 staff members of WHO (see Annex II for list of participants).

The group's agenda included an examination of the role of epidemiology and health statistics and the reasons why these subjects should be taught to all medical students. The preparation of teachers for these subjects was also discussed.

Discussion at the Seminar was based on prepared talks at plenary sessions, contributions from each of the participants at plenary and small group sessions, and consideration of three publications (1-3):

It emerged from the Seminar that there was widespread agreement about most of the material and the conclusions given in these three publications. It is not the purpose of this report to enlarge or comment in detail on the publications, but to summarize the presentations and discussions at the Seminar and to record the priorities and points of emphasis that emerged.

2. Discussions

2.1 Role of epidemiology and health statistics - why they should be taught to all medical students

The need for teaching and learning in epidemiology and health statistics in the undergraduate medical curriculum should be clear from the stated objectives of a medical school. Detailed reasons for each subject are given by Lowe & Kostrzewski (1) and Lowe & Lwanga (2), and these were endorsed at the Seminar. It was agreed that, in the experience of most of those at the Seminar, the arguments have in general been accepted by university authorities. The difficulties arise in presenting the reasons to medical students, and also to members of the faculty of medical schools, and clinicians who teach other subjects to medical students. It was agreed that it is important to continue to try to tackle these difficulties by restating the arguments wherever appropriate. Repeated attention during the Seminar was given to the contribution of statistics and epidemiology to the scientific method; Karl Pearson's statement that the unity of science consists after all in its methodology rather than in its material content was used in support of this contribution. However, it was agreed that the teaching of the scientific method should not be confined to statistics and epidemiology, but should be an integral part of the whole medical curriculum.

The emerging concept of the undergraduate medical curriculum as providing the "core" knowledge for all students who would then specialize after qualification was noted, although in some countries different undergraduate training is given, e.g. for clinicians, paediatricians, stomatologists and hygienists. The rate of progress in medical knowledge and the changes in methods of management of patients require the newly qualified doctor to be able to evaluate critically new methods of treatment, prevention and rehabilitation. Knowledge of epidemiology and health statistics forms an important and essential part of this critical ability, which should remain with, and be used by, all doctors throughout their professional lives until retirement. Epidemiology is important in relation to changing attitudes to health produced by changing social circumstances. With increasing technology, making the best use of available resources will be, more than in the past, an increasing responsibility of every doctor. The epidemiological and statistical contributions to evaluation methods and techniques, particularly through the use of randomized trials, are therefore of paramount importance.

As well as its value as an integral part of the scientific method, epidemiology is of educational importance in giving medical students a broader outlook than that obtained by exclusive consideration of the one-to-one situation of the doctor-patient relationship. Not only is epidemiology of value in decisions about individual patients, but consideration of groups and populations should enlarge the student's perspective so that, as practitioners, they will have an increasing commitment to the health of the community as a whole. The epidemiological perspective is of fundamental importance in assessing priorities and demonstrating to students the importance, both in the past and in the future, of the prevention of disease. This epidemiological perspective is also required in order to see the increasing importance of rehabilitation in an increasingly aging population which is dominated by chronic disease. The ecological concept of health, i.e. that many diseases are due to multifactorial causes in the environment, is an essential part of the understanding of the disease process and is linked with the epidemiological concept of being "at risk". Students should study these broad perspectives. They should also be aware of the fact that doctors are, indeed, the main source of health and disease data.

It was considered strange that medical students and doctors so readily recognize the contributions of biomedical sciences but are less willing to appreciate the importance of epidemiology and statistics to diagnosis and treatment. An understanding of the natural history of disease is fundamental to prognosis and to good clinical practice. This, and knowledge of the reasons for the variability of observations, forms an essential part of each doctor's training.

2.2 Knowledge and skills to be taught - what knowledge and skills in epidemiology and health statistics medical students should acquire

In considering the knowledge and skills of any subject to be taught to medical students, it is necessary to see them against the background and objectives of the whole curriculum. As an increasing amount of all doctors' education is now at a postgraduate level, it is necessary to teach medical students only those aspects that are common to all careers within medicine. All medical students should have knowledge of groups and populations, just as throughout the twentieth century they had knowledge of units smaller than the individual, i.e. the systems of the body, individual organs and cellular and intracellular structure and function.

In considering in more specific terms the epidemiology that every medical student should know, the list of abilities given by Lowe & Kostrzewski (1, p. 18) received unanimous approval, subject to a few modifying comments and some additions to give emphasis to important aspects. Some thought that the list was written in a way more appropriate for postgraduate specialists in epidemiology, and that more emphasis should be on health than on disease and on medical and clinical aspects than on epidemiology. For example, in the last but one item in the list, it might be more appropriate to ensure the ability to read "medical" literature critically and not "epidemiological" literature as suggested. Further, in the last item, it might be preferable for the medical student to understand some of the more important uses of computers "in medicine" rather than "in epidemiology". It was also felt that the concept of being "at risk" was so important that it should be added to the list. It was agreed that detailed consideration should be given to the evaluation of screening for disease. In addition to the use of epidemiology in understanding the natural history of disease, such knowledge should also be shown to apply to the medicosocial management of individual patients and to the protection and promotion of community (or public) health.

It was suggested that students are much more interested than their teachers in aspects such as individual attitudes and social norms (e.g. suicide, drugs and smoking), which are extremely important determinants of health. It was remarked upon that epidemiology/statistics teachers are more inclined to present examples of biological measurements than attitude measurements. It was thus recommended that epidemiology/statistics teachers use more sociological concepts and techniques in their teaching.

Confidentiality is an important issue in epidemiological and statistical studies that should be discussed with students. The use of ethical guidelines, and where appropriate ethical committees, to ensure that important research is not hindered, while at the same time continuing confidentiality so that no patient would suffer from such studies, was agreed. Further guidelines in this field might become necessary to reassure patients and clinicians about such studies. It was agreed that, throughout the teaching of both epidemiology and statistics, local examples should be used whenever possible and appropriate. Studies done in foreign countries would usually require some alteration or addition to fit the local scene.

With regard to the content of teaching in statistics, it was agreed that there is much overlap between some components of health statistics and epidemiology - so great, in fact, that for many items there would be disagreement in deciding to which field they belong. For this reason, close coordination in teaching epidemiology and health statistics is essential. It was also agreed that some of the descriptive and analytical aspects of statistics, although often used by epidemiologists, are applicable widely throughout the medical undergraduate curriculum (e.g. in psychology and biochemistry).

The list of the ground needing to be covered, given by Lowe & Lwanga (2, p. 58) was regarded as a satisfactory summary of the subject necessary for all medical students. There was general agreement that, in this teaching, it is the principles that should be stressed and that it is not necessary for the student to know and be able to perform detailed methods and calculations in statistics. It was reported that it is sometimes possible to get the students to do the calculations quite correctly but for them still to be uncertain of their usefulness. In considering the items which should be taught to medical students, it was noted that, in the United Kingdom, students repeatedly found epidemiology dull but not difficult whereas they have found statistics dull and very difficult (4).

2.3 How to teach - innovative approaches to teaching epidemiology and health statistics

It was agreed that, in teaching epidemiology and health statistics, it is most important to motivate students (there is also the separate but important problem of motivating teachers!). Motivation of students could be done by a number of different methods, such as setting examinations, showing the relevance of the subject, explaining what will be offered to the students and what will be expected from them, arousing interest, encouraging involvement and encouraging teachers of other subjects to be supportive (5). Interest can be aroused by the use of pre-course and post-course tests to show students the increase in knowledge gained during the course.

The structure of the curriculum will depend on the resources available, the aims and objectives of the course and the relationship to other subjects, e.g. social sciences, clinical medicine, general practice, community medicine, social medicine, occupational medicine, public health and hygiene. The structure of the curriculum is also related to the length of the course and its timing in the curriculum. It was agreed that one of the aims of teaching epidemiology to all medical students is to make them more responsive to the communities they will serve.

The possible methods used for teaching are numerous for both epidemiology and health statistics. A variety of methods should be used in every course. These include lectures, small group seminars, tape/slide shows, practical exercises of various types and project work, either individual or in groups. Both epidemiology and health statistics teaching can include exercises in helping to solve a real local health service problem and seeing a "public health" doctor at work. Epidemiology can be successfully taught alongside clinical work, either as part of ward rounds or using data boards (6). Small-group teaching is generally only possible when there is a satisfactory staff/student ratio. Integrated teaching may also be possible in some medical schools, especially where epidemiology is integrated into clinical teaching. This also usually demands a satisfactory staff/student ratio, but is probably less time-consuming for the staff than the holding of seminars with very small groups of students.

Evaluation should be attempted both for the course and for the students. The student evaluation should be for their own use (formative) as well as for certification purposes. It could be based on essay or modified essay questions, multiple-choice questions, assessment of project work, and oral examinations. In evaluating the course, attention should be directed at whether and to what extent the aims and objectives have been achieved. Such evaluation may include the issue of a questionnaire on the course to be completed by the students - although the usefulness of such an assessment was not unanimously accepted. It was suggested that a follow-up survey of doctors several years after qualification might give more relevant information about how useful the course had actually been to each individual.

It was suggested that the minimum length of a course of medical statistics for medical students should be 30 hours (15 hours for lectures and 15 hours for exercises). For epidemiology, the minimum time suggested was also 30 hours, but the formal lectures should not account for more than 10 hours of this. It was agreed that these are minimal times in ideal circumstances and with a satisfactory staff/student ratio. There is nothing critical about the suggested times, and in institutions with fewer teaching resources, it is more important to prepare good teaching material than to complete a specific number of hours, so they might teach for less than these times.

3. Teaching material

The participants provided examples of the teaching material used in their courses; they are listed in Annex I. Copies can be obtained on request from the WHO Regional Office for Europe, 8 Scherfigsvej, DK-2100 ϕ , Denmark.

REFERENCES

1. Lowe, C.R. & Kostrzewski, J. Epidemiology: a guide to teaching methods. London, Churchill Livingstone, 1973.
2. Lowe, C.R. & Lwanga, S.K. Health statistics: a manual for teachers of medical students. Oxford, Oxford University Press, 1978.
3. Government of Pakistan/World Health Organization/International Epidemiological Association. The successful teaching of statistics to every medical student. Karachi, Jinnah Postgraduate Medical Centre, 1978.

4. Waters, W.E. Teaching epidemiology to medical students. International journal of epidemiology, 6: 329-330 (1977).
5. Ernster, V.L. On the teaching of epidemiology to medical students. American journal of epidemiology, 109: 617-618 (1979).
6. Garraway, M. et al. Preparation of data boards for teaching epidemiology in a clinical setting. Medical and biological illustration, 27: 151-154 (1977).

Annex I

EXAMPLES OF TEACHING MATERIAL

1. Department of Epidemiology, School of Public Health, Free University of Brussels. Exercice pratique: investigation d'une poussée épidémique d'ictère dans une ville.
2. Department of Epidemiology, School of Public Health, Free University of Brussels. Exercice pratique: l'incidence de l'angiosarcome du foie à l'Etat du Connecticut, EUA, à la période de 1935/1973.
3. Institute of Epidemiology, Medical Faculty, University of Belgrade. Exercise subject: organization of intestinal infections prevention.
4. Institute of Epidemiology, Medical Faculty, University of Belgrade. Seminar subject: hospital infections in the infant department - prevention.
5. Institute of Epidemiology, Medical Faculty, University of Belgrade. Exercise subject: application of the descriptive method in epidemiology - endemic nephropathy.
6. Institute of Epidemiology, Medical Faculty, University of Belgrade. Exercise subject: (1) The scope of the disease on the basis of morbidity and mortality data; (2) Processing of morbidity and mortality data based on infectious diseases reports, registries and other sources.
7. St Mary's Hospital Medical School. Practical on evaluation of care.
8. St Thomas's Hospital Medical School. Practical on smoking and health.
9. St Mary's Hospital Medical School and St Thomas's Hospital Medical School. Practical on change in myocardial infarction death rates.
10. St Mary's Hospital Medical School and St Thomas's Hospital Medical School. Practical on perinatal mortality on Humberside.
11. St Thomas's Hospital Medical School. Practical on asthma mortality.
12. St Mary's Hospital Medical School and St Thomas's Hospital Medical School. Describing the epidemiology of a disease: carcinoma of the cervix.
13. University of Southampton. Course objectives, content, structure and assessments (example of a hand-out given to each student at the beginning of the course).
14. University of Southampton. The epidemiology of migraine (example of an exercise with questions and answers to be completed by students with tutor or on their own).
15. Department of Social Medicine, Institute of Hygiene, University of Innsbruck. Prävalenzstudie zur Häufigkeit der chronischen Bronchitis bei Probanden der Gesunderuntersuchung in Abhängigkeit von der Luftgüte - Modellbeispiel für ein Seminar im Rahmen des Sozialmedizinunterrichts.

Annex II

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