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ORGANISATION MONDIALE DE LA SANTÉ  
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ВСЕМИРНАЯ ОРГАНИЗАЦИЯ ЗДРАВООХРАНЕНИЯ  
ЕВРОПЕЙСКОЕ РЕГИОНАЛЬНОЕ БЮРО

INDEXED

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TEACHING GERONTOLOGY AND GERIATRIC MEDICINE

Report on a Workshop

Edinburgh  
5-7 April 1982



ICP/ADR 045(2)  
0001k  
ENGLISH ONLY

1982

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The Workshop was opened by Dr J.J.A. Reid, Chief Medical Officer, Scottish Home and Health Department. In welcoming the participants, Dr Reid noted the steadily increasing interest in Scotland in the care of the elderly. The first consultant in geriatric medicine in Scotland had been appointed in 1952, and 30 years later there were 66 full-time specialists in the country. As in other European countries, the Scottish Home and Health Department accorded top priority to services for the elderly and recognized that, in line with the Declaration of Alma-Ata, good primary care was essential for the provision of adequate geriatric services.

Education played an essential role in improving the health of the elderly because only those who had been adequately trained in gerontology and geriatric medicine could provide the necessary skilled care. There was an obvious need for improvements in education in this field at the undergraduate and postgraduate levels, and in continuing medical education. It was clear that up to the present all countries had been producing many doctors who lacked a basic understanding of the principles of gerontology and geriatric medicine. Geriatric medicine provided an example of the effectiveness of an interdisciplinary approach which could, with benefit, be applied in other spheres of medical activity.

The meeting was attended by 19 participants from 15 countries (see Annex 3).

#### 1. Introduction

For the first time in history people are beginning to live out their life spans and may expect to live into an eighth decade. Increasing survival into old age is not confined to developed countries but also affects developing areas of the world. Its impact is therefore global. For most, life will be enjoyable and relatively independent, contrary to prevalent negative stereotypes of old age. Growing old must now be seen as a normal part of human development and health professionals, if they are to meet the needs of the client populations, must be familiar with aging and the care of the elderly.

Almost all doctors are involved in care of the elderly and a substantial body of knowledge in this field has been accumulated. In some countries geriatric medicine has developed as a specialty, and physicians and others have acquired expertise in health care of the elderly. Even in these countries, however, the great majority of old people receive their medical care from doctors who are not geriatricians, and the bulk of this responsibility falls on general practitioners. Thus all doctors now require in their basic medical education a firm grounding in aging and in geriatric medicine.

Well trained physicians who are confident and competent in the care of the elderly will clearly derive more professional satisfaction from work with aging populations than will those who lack such training. The recent emphasis in medicine on narrower specialization has tended to produce a generation of doctors who are inadequately trained to cope with the multiple pathology, functional impairment and complex social problems of elderly patients. Nor do doctors necessarily understand the effects of normal age changes especially those that occur in the very old. What is required is a training that will produce clinically competent individuals who fully recognize the influence of psychosocial factors on the wellbeing of the elderly, and who are adapted to a multidisciplinary model of working.

The challenge posed to medical education is considerable and urgent. Doctors must now be adequately trained both in normal aging and in the medical care of elderly patients.

Considerable international differences exist in patterns of medical training but, taking these into account, the members of the Workshop agreed on various essentials whose adoption would lead to more appropriate medical training, increased professional satisfaction and better care for the elderly.

The meeting was conducted in three sessions.

1. The undergraduate curriculum - basic science component, chaired by Professor A.N. Exton-Smith. Following the presentation of a paper by Professor A. Svanborg, Professor A. Viidik opened the discussion.
2. The undergraduate curriculum - clinical component, chaired by Professor G. Andrews. Following the presentation of a paper by Professor J. Williamson, Professor R.W. Stout opened the discussion.
3. Postgraduate and continuing education, chaired by Professor A. Svanborg. Following the presentation of a paper by Professor Exton-Smith, Professor P. de Nicola opened the discussion.

A final session, chaired by Professor Svanborg, was a presentation by the Rapporteurs of outline, conclusions, proposals and recommendations.

## 2. The undergraduate medical curriculum

### 2.1 Basic science component

Basic science teaching in medicine must now reflect the changing needs of society and should include substantial teaching on normal aging. Physiologists, anatomists, biochemists and pharmacologists must go beyond the standard "25-year-old, 70-kilogram male" and seek to provide students with an understanding of the aging process relevant to their disciplines. The sociology and psychology of aging should be incorporated into the behavioural science course. Where no such course exists, special provision must be made for these aspects to be taught.

In schools where no individual can be identified who has special expertise in gerontology, basic science teaching in this field may be stimulated and coordinated by clinicians responsible for teaching geriatric medicine.

The basic science curriculum should reflect new knowledge on aging, such as the effects of aging on function, immune competence, pharmacokinetics and pharmacodynamics, cognitive function and personality. Suggestions for objectives and a core curriculum are presented in Annex 1, which incorporates suggestions for clinical education at all levels. There is urgent need for good teaching material and experiments in its use in this area.

### 2.2 Clinical component

Confidence and competence in caring for the elderly will best be promoted by sound clinical teaching in geriatric medicine, and this should be provided late within the clinical years when the student has acquired sufficient medical knowledge and clinical skills. It is essential that an identifiable block of curricular time should be allocated specifically to teaching geriatric medicine.

It should be stressed that, even within the clinical curriculum, due emphasis should be paid to the importance of basic biological and behavioural aspects, as these are so closely intertwined with the general functioning of the elderly and their presentation in a clinical context.

An earlier WHO Consultation on teaching gerontology and geriatric medicine, which met in March 1981, proposed nine teaching objectives, to which has been added a tenth relating to continuing and terminal care. It will be obvious that these teaching objectives apply in all clinical phases of education. Annex 2 lists these teaching objectives.

Teaching methods should take account of the breadth of good care of the elderly and exploit to the full the wide range of teaching opportunities available, including the patient's home, the day hospital, assessment and rehabilitation wards and continuing care units and nursing homes. The importance of a multidisciplinary approach must be strongly emphasized. It has been shown that where undergraduate teaching has been provided within existing specialist departments of geriatric medicine, it has been highly popular with students, who clearly appreciate the practical value and relevance of geriatric medicine and the varied and often unorthodox learning opportunities it offers.

The clinical course should include emphasis on prevention, the value of early detection of dysfunction in patients and their supporters, and the benefits of appropriate intervention. The great importance of fostering independence within the community should be stressed, along with the key roles of family members and other carers.

The organization and teaching of such a clinical course should be in the hands of identified clinical teachers who are themselves trained in the health care of the elderly. There remains, however, a responsibility for clinical teachers in all specialties to include instruction on old age as it affects their patients.

Proper evaluation of teaching is essential and may be achieved by examination or by assessment of students by teachers (and vice versa) Changes in amount of knowledge, in attitudes and in interest should be assessed.

### 3. Postgraduate medical education

Postgraduate medical education must also take account of the broad responsibility of the medical profession for the care of the elderly. Geriatric medicine should be included in the training of specialists, particularly in relation to internal medicine, general practice and psychiatry. The provision of this training should be organized in close collaboration with geriatricians. The training of general practitioners is especially important because of the key role of primary medical care in maintaining old people in optimal health within the community. It is recommended, therefore, that all general practitioners should receive instruction in aging and care of the elderly during their postgraduate training, and that this training should be obligatory.

For those who intend to specialize in geriatric medicine, postgraduate training should be on a level comparable to that for other specialties, with similar standards of practical experience and examination. Close training links with psychiatry are indicated and other disciplines, such as rehabilitation medicine and orthopaedic surgery, should be involved in teaching on rehabilitation and on locomotor and mobility problems among the elderly. This training should include guidance in and opportunities for research. This research may be in the field of gerontology, geriatric medicine or health care delivery.

Since the specialist in geriatric medicine will necessarily deploy a large range of resources in the hospital and the community, and be involved in work with other professionals, the acquisition of management skills is of great importance and must be reflected in training programmes.

These recommendations will greatly increase the demand for trained teachers in geriatric medicine, at present very limited in number. It is therefore recommended that resource centres should be identified with a view to developing methods of teaching in this field. Emphasis in these centres should be on the training of geriatricians and general practitioners. Evaluation of teaching methods should be encouraged so that those that are shown to be successful may be used or adapted by other centres. The establishment of these centres is an urgent priority which is commended to international and other funding agencies.

### 4. Continuing education in geriatric medicine

As in postgraduate education, the minimum requirement is to ensure that continuing education in geriatric medicine should be comparable with that in other specialties in each country.

Until undergraduate training in aging and geriatric medicine has reached an adequate level, special problems exist, since most doctors now practising have little or no training on which to build.

For reasons already stated, the priority for adequate continuing education for general practitioners is particularly high.

### 5. Training of teachers of gerontology and geriatric medicine

The broad education approach advocated in this report will clearly require a large and rapid increase in the number of teachers, and this problem should be regarded as deserving priority. The resources of WHO could, by identifying and helping to fund resource centres, help to meet this need. Regional centres should be established which offer training for health care professionals, and which evaluate the educational problems involved. Their experience would be made available to others through existing clearing-houses, such as the Information Centre on Education Opportunities and Courses in Gerontology and Health Care of the Elderly, in Zagreb.

It is recommended that WHO should convene a workshop on the training of teachers. WHO should also develop a model core curriculum.

### 6. Recommendations

This report should be sent to governments with a strong recommendation that it be distributed to medical schools. Since the problem is a global one, the distribution should be worldwide and not restricted to the European Region.

The presence of participants in the Workshop from other regions was unanimously agreed to be valuable and so cross-regional representation is recommended for future meetings in this field.

Annex 1

TEACHING OBJECTIVES AND CORE CURRICULUM COMPONENTS  
FOR UNDERGRADUATE TEACHING IN GERONTOLOGY

Teaching objectives

1. To develop an understanding of the complete normal life cycle: development, maturation and aging, one part of which gradually merges into the next.
2. To demonstrate the importance of a knowledge of the normal aging processes, for the purpose of differentiating between them and illness in old age.
3. To produce an understanding that the normal adult person undergoes important changes beyond the standard "25-year-old, 70-kg male".
4. To ensure a background knowledge of reduced adaptability during aging, which is a basis for the pathogenesis of the altered disease manifestations in the aged.

Core curriculum components

Since considerable international differences exist in how the basic sciences are taught in medical schools, it is not possible to indicate clearly what components of gerontology should be taught in which course. The curriculum components are therefore divided into topics on (1) genetic, (2) cellular, (3) organ and tissue, and (4) whole-organism levels. These topics should be taught in conjunction with the corresponding normal functions in appropriate sections: genetics, cytology or cell biology, anatomy, biochemistry, physiology, pharmacology, immunology and pathology courses. Some topics may be taught either in the physiology or in an appropriate clinical discipline (e.g. hearing in otology, vision in ophthalmology, cardiovascular response in clinical physiology).

The importance of coordination between the teaching of the different components is important. Their essence should be emphasized in each phase of medical education, possibly as an overview of the prevalent theories of aging. The earlier that gerontological aspects come into the curricula the better.

1. Genetic control of aging

Exchange of genetic material as a prerequisite for cellular "immortality". Aging of germ cell lines. Decrease of certain DNA components in aging post-mitotic cells. Correlation between longevity and efficiency of DNA repair mechanisms. Somatic mutations. Evolution of longevity. Inheritance of longevity. Decrease of longevity by gene aberration (e.g. Werner's and Down's syndromes). Accelerated sectorial aging in contrast to multi-gene governed universal aging.

The genetically determined aging as seen in survival curves. The influence of environment on the aging phenotype. Theories involving "death genes" or "genetic clocks" and those focusing on "lack of enough genetic programme" or "running out of genetic programme".

2. Cell biology of aging

The finite life-span of diploid somatic cells in vitro, and its correlation to species life-span and erythrocyte life-span in vivo. Cell behaviour in replenishing tissues and stem cell aging. Post-mitotic cells - accumulation of age pigment, degeneration and loss of cells.

Cytology: changes in cell membranes, nucleus, mitochondria, lysosomes and other organelles; changes in basement membranes and the intercellular matrices.

Wear and tear of subcellular structures. Theory of life-span determination by cellular metabolic rate or time. Diffusion between cells and capillaries. Changes in enzyme specific activity and protein stability.

### 3. Organ and tissue aging

The endocrine organs: response to "tropins" and stress, circulating levels, alterations in cell membrane hormone receptors. Functional decline in, e.g. the gonads, while no change in the basic metabolism. Impairment of hormonal regulation of homeostasis.

The immune system: antibody marking of senescent cells. Altered B- and T-cell functions, thymus dependence and involution. Autoimmunity.

The cardiovascular system: cardiac output, blood pressure, peripheral resistance. Response to exercise.

The pulmonary system: decreased vital capacity and increased dead space. Morphological changes in the alveolar level. Blood oxygenation.

The musculoskeletal system: work capacity, maximum oxygen uptake, muscle strength and movement coordination. Osteoarthritis. Senile skeletal involution and osteoporosis.

The alimentary and excretory systems: uptake from the intestine. Decreases in functional kidney parameters.

The nervous system: brain weight and ventricular volume changes. Nerve cell loss and its uneven distribution through the brain. Senile plaques and neurofibrillary tangles. Cerebral circulation. Impairment of neural regulation of homeostasis.

The sensory organs: vision - changes in accommodation, visual acuity and perceptual phenomena; hearing - loss at various frequencies and changes in perceptual parameters; olfaction; tactile senses.

### 4. Whole-body aging

Changes in body composition. Decrease in basal metabolic rate correlated to cell loss. Changes in nutritional requirements.

Multiple pathology of the aging organism: age-related intensity increases in a variety of unrelated lesions (in human population under "ideal conditions" as well as in barrier-reared animal colonies), the common denominator being the decreased adaptability and the accumulation of noxious influences throughout the life-time.

Regulation of homeostasis: age-related mortality increases logarithmically after a critical age; unrelated diseases show the same curve with the same inclination as that for total mortality. This indicates the end results of decreased regulation of homeostasis and adaptability in the aging organism.

Theories of aging, an overview:

(a) genetic theories - multiregulation of gene expressions; genetic deficiencies in the cells (loss of key DNA, unrepaired DNA damage); somatic mutations; errors in transfer of information from DNA;

(b) non-genetic cellular changes - wear and tear of subcellular structures, possibly influenced by the rate of metabolism; diffusion impairment; accumulation of waste products; damage caused by free radicals; increased changes in molecular stability and conformation; accumulation of stable proteins in the intercellular matrices;

(c) impaired functions on organ and tissue levels - now untenable hypothesis concerning single organs (cardiovascular system, thyroid, gonads, neurohypophysis); accumulation of stress-induced function impairments; changes in immunological functions; decreased immunological competence; autoimmunity;

(d) changes in physiological control mechanisms - hormonal and neural regulations of body homeostasis.

Assessment of functional age (mainly applicable for population studies); physiological parameters; psychological parameters; social parameters; summarizing the results to a weighted score estimate.

5. Psychological aging

Perception and cognition. Intellectual functions. Problem solving and thinking. Memory and learning. Dynamics of life-cycle. Personality differences and lifestyles. Self-concept. Sexual behaviour. Reactions to death. Life-satisfaction. Maladjustment and psychopathology.

6. Social aging

Family variables (geographic distances, number of contacts with family), occupational variables (likelihood of remaining with company, self-ranking in hierarchy of company, later age of expected/preferred retirement, job satisfaction, social class, health behaviour).

Status and role changes through life-span. Attitudes towards aging and the elderly. Social support systems (spouse, children, friends, neighbourhood, institutionalized community care). Attitudes towards health and health care system.

Handbook literature

Finch, C.E. & Hayflick, L., ed. Handbook of the biology of aging. New York, Van Nostrand Reinhold, 1977.

Birren, J.E. & Schaie, K.W., ed. Handbook of the psychology of aging. New York, Van Nostrand Reinhold, 1977.

Binstock, R.H. & Shanas, E., ed. Handbook of aging and the social sciences. New York, Van Nostrand Reinhold, 1976.

Annex 2

LEARNING OBJECTIVES IN GERONTOLOGY AND GERIATRIC MEDICINE<sup>a</sup>

1. To encourage a humane and positive attitude towards old people and to demonstrate the satisfaction and fulfilment which comes from professional involvement with the elderly and their families.
2. To produce an understanding of demographic factors and social changes in the aging of societies.
3. To secure an understanding of age-related changes in the context of human development and an appreciation of the causes of disability in old age. Prevention and management of disability should be understood within both community and institutional settings.
4. To teach the special features of presentation of disease in old age and the problems of therapy. The problems associated with drug therapy in old age require special consideration.
5. To indicate the principles of rehabilitation and their application to the elderly, a major objective being the attainment and maintenance of optimum physical, social and mental function for each individual.
6. To demonstrate the importance of working as a member of a multidisciplinary team, with full understanding and appreciation of the roles and skills of physicians, nurses, rehabilitation therapists, social workers and other team members.
7. To indicate the importance of acquiring skill in communicating effectively with the elderly and those involved in their care. This should be done in such a way as to lead to fuller understanding of the importance of the family and the social network of care.
8. To ensure an understanding of the importance of protecting the liberty of the individual, so that the elderly may retain maximum choice and control over their own lifestyles and the manner in which they face death.
9. To reach an understanding of services available to old people and their families, with special emphasis on community aspects, and to stress the essential interdependence of these services and the need for effective cooperation between them and families and other carers.
10. To indicate principles and responsibilities of continuing care for elderly patients with irremediable disabilities, and of terminal care of dying patients.

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<sup>a</sup> Extracted from: Teaching gerontology/geriatric medicine and establishing a clearing-house on curricula: report on a Consultation. Copenhagen, WHO Regional Office for Europe, 1981 (document ICP/ADR 045).

Annex 3

ABSTRACTS OF TWO PAPERS BROUGHT TO THE MEETING

Integrated medical-student teaching.<sup>a</sup> R.W. Stout & W.G. Irvin.

This is the description of a combined course in community medicine, general practice, geriatric medicine and mental health devised to provide horizontal integration of related clinical subjects being conducted at the Queen's University, Belfast, Northern Ireland. The course lasts 12 weeks and is divided between joint topics of common interest and clinical clerkships in individual disciplines. It takes place in the fourth year of training.

A list of student-oriented objectives to be met by joint teaching is provided. The objectives are subdivided into knowledge, skills and attitudes to be acquired.

Teaching approaches that encourage student participation are described. A joint assessment of student achievement takes place at the end of the course in the form of a written paper. Subject matter from the course is also examined at the final examination.

Students felt that the course covered topics not encountered in other parts of the medical curriculum.

The faculty considered that a course of this type led to a better integration of clinical subjects and avoided repetition or omission of topics that are not clearly the responsibility of any individual department.

Project summary and module outlines. A model geriatrics curriculum in medical school undergraduate primary care education. R. Ham, Department of Family Practice, Southern Illinois University School of Medicine, Springfield, IL, USA.

The project described was made possible through an award in 1979 to the American Geriatrics Society with a subcontract to the Southern Illinois University. It was conducted in two phases, (a) development of a model geriatric curriculum and (b) testing and evaluation.

The modular approach to learning was selected to provide a basic, flexible and useful body of materials readily accessible to faculty and students. Each module was designed to stand separately, but also developed to form a continuous block if put together. Each module defines its ideal positioning in a curriculum, although medical schools could use the material in a flexible manner.

Each module consists of a defined rationale, objectives, post-test materials, required readings, suggested further readings, and instruments for evaluating both students and the material itself.

The elements of the geriatric curriculum were determined by a steering committee, and the titles and contents of the fifteen modules are listed.

It is hoped that this project will stimulate the development of suitable experience in geriatric medicine and promote excellence in health care of the elderly.

<sup>a</sup> Published in: Medical education, 16: 23-26 (1982).

Annex 4

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<sup>a</sup> Participation expenses not paid by WHO.

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