School of Medicine

Graduate Entry year 1, 2012/13

## Gerontology

Course guide

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Graduate Entry year 1 Gerontology – Summer term

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**SOLE Feedback – GEP (GERONTOLOGY)**

The following two pages provide you with templates on which you can record your thoughts as the course proceeds. At the end of the course you can enter your views onto SOLE.

**Please answer all questions by selecting the response which best reflects your view. After the questions there is an opportunity to comment on any aspects about which you feel strongly.**

**N/A Strongly Agree Neutral Disagree Strongly  
 agree disagree**

#### 1. By the end of the course, I think the aims and objectives □ □ □ □ □ □ will have been met.

#### 2. Teaching and learning opportunities (e.g. lectures, □ □ □ □ □ □ small groups, practicals) for this course are suitable.

#### 3. Appropriate resources (e.g. books, computers, □ □ □ □ □ □ lab equipment etc.) are available for this course.

#### 4. Appropriate support materials (e.g. handouts, □ □ □ □ □ □ web pages, problem sheets) are available for this course.

#### 5. I receive sufficient guidance and feedback. □ □ □ □ □ □

#### 6. The workload on this module is manageable. □ □ □ □ □ □

#### 7. Overall I am satisfied with this course. □ □ □ □ □ □

8. If you wish to make further comments about this course, please use the space below**.**

**SOLE FEEDBACK - INDIVIDUAL LECTURERS**

**For each of the lecturers below, let us know whether or not you agree with the statement “OVERALL I AM SATISFIED WITH THIS LECTURER. In particular, we want to know whether the lectures were well structured and whether concepts were explained clearly.**

Please note that for SOLE, a Lecturer’s name will only appear once. This template gives you the opportunity to record your comments about each lecture in the order of delivery.

**At the bottom of this page, you have an opportunity to comment on any aspects about which you feel strongly.**

If you wish to make further comments, please use the space below

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Gerontology** | | **N/A** | **Strongly agree** | **Agree** | **Neutral** | **Disagree** | **Strongly**  **disagree** |
| Dr. Nigel Beckett | Theories of Ageing |  |  |  |  |  |  |
| Dr Ruth Peters | Demographics of Ageing |  |  |  |  |  |  |
| Dr Nigel Beckett | Age Related Changes |  |  |  |  |  |  |
| Dr Nigel Beckett | CGA & Assessing the Older Adult |  |  |  |  |  |  |
| Dr. Nigel Beckett | Concept of Frailty |  |  |  |  |  |  |
| Dr. Nigel Beckett | Cardiovascular changes with Ageing |  |  |  |  |  |  |
| Dr Ruth Peters | Cognitive function and Ageing |  |  |  |  |  |  |
| Dr. Nigel Beckett | The Story of Mrs Smith |  |  |  |  |  |  |

| **SESSION 1**  **Tuesday 7th May 2013** | **Please use this box for additional constructive feedback.** |
| --- | --- |
| **Dr Nigel Beckett**  Theories of Ageing |  |
| **Dr Ruth Peters**    Demographics of Ageing |  |
| **Dr Nigel Beckett**  Age Related Changes |  |
| **Dr Nigel Beckett**  CGA and Assessing the Older Adult |  |
| **Dr Nigel Beckett**  **The Concept of Frailty** |  |

| **SESSION 2**  **Thursday 23rd May 2013** | **Please use this box for additional constructive feedback.** |
| --- | --- |
| **Dr. Nigel Beckett**    Cardiovascular changes with Ageing |  |
| **Dr Ruth Peters**  Cognitive function and Ageing |  |
| **Dr Nigel Beckett**  The Story of Mrs Smith |  |

Gerontology

**COURSE STRUCTURE**

There are 2 half days of lectures that take place in the summer term. On the first day there are 5 lectures covering the theories of ageing, demographic changes, age-associated changes assessing older adults and introducing the concept of frailty. On the second half day there are 3 focusing on age associated changes in the cardiovascular and system ad the brain and their impact. The final lecture will pull together the themes covered in the lectures within a clinical context. The lectures will supplement the information within the course guide.

**ASSESSMENT**

**Summative Assessment**

The course will be examined in a single examination.  
The questions will be in Single Best Answer (SBA) and Extended Matching Question (EMQ) formats, both of which are machine-marked.

Further details about examinations are provided on the Intranet.

**TIMETABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date and campus** | **Time** | **Lecture topic** | **Lecturer** |
| Tuesday **07/05/2013** LT 3 WEC  Hammersmith Campus | 09:00 - 09:10 | General Introduction | Dr. N. S. Beckett |
| 09:10 – 09:30 | Theories of Ageing | Dr. N. S. Beckett |
| 09:40 – 10:00 | Demographic changes in the Population | Dr. R. Peters |
| 10:05 – 10:30 | Age-related Changes | Dr. N. S. Beckett |
| 10:40 – 11:10 | CGA and Assessing the Older Adult | Dr. N. S. Beckett |
| 11:15 – 11:45 | The Concept of Frailty | Dr. N. S. Beckett |
|  |  |  |  |
| Thursday **23/05/2013** LT 3 WEC  Hammersmith Campus | 14:00 – 14:50 | Ageing and the Circulation | Dr N. S. Beckett |
| 15:00 – 15:55 | Ageing the Brian | Dr. R. Peters |
| 16:10 – 16:45 | The Story of Mrs Smith | Dr. N. S. Beckett |

Recommended reading

Recommended textbooks:

Lecture Notes in Geriatrics. Coni, Webster 6th Ed 2003 ISBN 1405101628

Essentials of Clinical Geriatrics. Kane et al 5th Ed 2003 ISBN 0071409203

Physiological basis of Ageing and Geriatrics. Timiras 3rd Ed 2002 ISBN 0849309484

Gerontology - Learning objectives

*By the end of the session students should:*

1. Be aware of the main theories of ageing
2. Have an understanding of the demographic changes occurring within society and the implications of these changes to health care services
3. Be able to discuss strategies to promote healthy ageing
4. Be aware of the altered presentation of disease with age and how to assess older adults with healthcare problems
5. Gain an insight into the difficulties faced in managing health care problems in older people
6. Be aware of the changes, both physical and cognitive that occur with ageing in the brain.
7. Have an understanding of the age related changes that occur within the cardiovascular system and their impact on manifestation of cardiovascular disease in older people.
8. Have an overview of the age-associated changes that occur within other body systems
9. Have and understanding of the concept of Frailty

General Information

People are living longer and birth rates are falling. As a consequence there is a global shift in the age structure of populations with more people than ever aged over 65 years. This age shift has important health, social and economic consequences and policies to enhance the health, independence and productivity of older people are vital.

The world’s elderly population (over 65 years) is growing at the rate of 2.4% annually. In developed countries there are 165 million elderly people and this is expected to increase to 257 million by 2025. In the UK in 2001 18.4% of the population was over the pensionable age and ethnic minority elders compromised 7% of the overall population. Similar shifts are occurring in most First World nations, although not all due to the impact of AIDS. The fastest growing segment of the elderly population is the very elderly – those aged 80 or more. They currently make up 4% of the population by 2050 it ill be 11%. In 1996 there were 5523 people in England and Wales aged 100 or more. By 2036 this is expected to be 39,000.

This age shift within the population has far reaching implications. Disabilities and multiple health problems are more common in older people and thus the demands on the healthcare service will increase. It is predicted that there will be a large rise in cancer, ischaemic heart disease (IHD), diabetes mellitus (DM), dementia and other illnesses related to older age. Older individuals attend emergency departments more frequently than younger ones, their inpatient length of stay is greater and GP home visits are more commonly to older adults. A large proportion of home care services are dedicated to the older adults and a growing number of frail older people will necessitate the expansion of social service support for community dwellers and the number of places in residential and nursing care facilities. Smaller families, more women in employment and the migration of younger family members away from home will mean fewer people will be available to care for their older relatives when they need assistance. All this will require additional funding, not just to augment health and social services but to tackle issues such as employment, pensions, transport and town planning.

The challenges to an ageing population are global, national and local. Prevention is better than cure the old adage goes and people without disabilities face fewer impediments to continue in work, use less medical care and require fewer care services. The World Health Authority has adopted the term “active ageing to promote physical, social and mental wellbeing though out the life course, in order to extend healthy life expectancy, productivity and quality of life in older age”. This will require health professionals and planners to focus on health promotion, disease prevention and in later life maintaining independence, preventing, reversing or slowing down the onset of disease with the aim to improve the quality of life for older people.

The higher levels of morbidity, different patterns of disease presentation, slower and altered response to treatment with higher requirements for social support in older people forms the rationale for having physicians with expertise in dealing with such patients – Geriatricians. However, all health care practitioners (apart from peadiatricians and child psychiatrists) will deal with older and potentially frail adults and need to have some understanding of the impact that age has.

When it comes to disease presentation, older people are more likely to have a non-specific presentation or an atypical presentation. They can present with multiple pathologies some of which may erroneously be put down to the “symptoms of old age”. The lack of reserve or age related changes can lead to catastrophic consequences in the presence of single pathology (see example below). The non-specific presentation of disease is often referred to the “giants of geriatric medicine. A useful way to remember them is the 5 “I”s – intellectual failure, incontinence, immobility, instability and iatrogenic disease. It is always important to remember the later. Drug-related illness is a significant problem in the elderly with anything from 5-17% of hospital admissions being caused by adverse reactions to medications. Altered pharmacokinetics and pharmacodynamics, increase sensitivity of disease tissue to drug toxicity, increased drug interactions, problems with compliance and inappropriate prescribing all contribute to this. It is important to stress that medications should be prescribed when indicated and not withheld due to a patients age. Unfortunately due to the exclusion of older people from research the evidence base for treatment is often based on extrapolation from younger subjects. The general advice of start low, titrate slowly and keep things simple is a good place to start.

**Age-associated Changes in Organs/ Systems**

Cross–sectional studies of ageing show that all physiological processes in general decline or deteriorate with age, although it is important to remember that not all individuals will go through these changes at the same rate. More reliable information comes from longitudinal studies and again these demonstrate an age-associated dysregulation in multiple systems, that gives rise to the complexity that is ageing. Below is a summary of some of the changes that have been described.

**1. Gastrointestinal system:**

With few notable exceptions, the digestive system maintains normal functioning in the elderly. In order to distinguish between what would be expected as a normal age related change and pathology a physician should be aware of the normal physiology of ageing. Up to 40% of elderly people often complain of dry mouths. Normal background saliva secretion is decreased with age. However salivary secretion, simulated by food is normal. In addition elderly have problems with dentations and also the power of mastication is reduced. In elderly patients there is decreased pressure and a delayed relaxation of the lower oesophageal sphincter. The oesophageal contractions are also reduced. There is also an increased instance of atrophic gastritis with people over 60 years and the gastric acid output is also reduced. The gastric emptying time is normal for solids but reduced for liquids. Small bowel histology and transit time do not appear to change with age. The absorption capacity is also predominantly normal. Colonic transit time certainly increases with age. Ageing reduces the pancreatic secretion of lipase, but the secretion of bicarbonate and amylase does not. In the liver there is a decrease in weight, both absolute and relative to body weight. There is delayed hepatic clearance of certain drugs and they also have slower regeneration after injuries. Phase 1 reactions of the liver particularly oxidation, hydrolysis and reduction are all affected. Phase 2 reactions which include glucuronidiation is unaffected by age.

**2. Cardiovascular system:**

The changes and their impact will be covered in more detail in the session. The predominant change which occurs with ageing is increasing stiffness of the arteries. The large elastic arteries become less compliant with an increase in wall thickness. The increase in arterial wall stiffness leads to an increase in systolic blood pressure with age. Systolic pressure continues to rise with age, unlike diastolic pressure which tends to rise with age until about 55 years and then tends to decrease. Pulse pressure, (the difference between systolic and diastolic pressure), thus rises with old age. High blood pressure is also the most important modifiable risk factor for stroke. Strokes are a cause of significant mortality and morbidity in the elderly. Associated with these vascular changes the cardiac function and structure alters. There is an increase in left ventricular mass and a reduction in myocardial relaxation. Myocardial contraction tends to remain normal with ageing. Cardio pulmonary reflexes are impaired in studies on older people. This is partly due to the impaired ability of the cardio pulmonary receptor to alter plasma rennin activity in elderly subjects. Postural hypotension also frequently occurs in the elderly. The overall prevalence is about 10% in elderly people living in the community.

# *3. Central Nervous System:*

The physical and cognitive changes that effect the brain with age will be covered in more detail during the session. CT and MRI scanning in healthy elderly people has shown that the volume of cerebral spinal fluid within the surrounding brain increases with age, the ventricles enlarge and the gaps between the major gyri widen. About 50% of normal elderly persons show some degree of white matter changes. The brain attains a maximum weight at about 20 years of age and remains at this weight until 40-50 years of age after which it decreases in weight at a rate of 2-3% per decade eventually reaching a value of some 10% below maximum by age of 80 years. There is an age related decline in cognition. Dementia increases with age of which Alzheimer’s is the commonest form.

**4. Respiratory system:**

The most dominant changes that occur are stiffening of the chest wall, a decrease in intercostal places, apparent loss of respiratory strength and loss of elastic recall of the lung tissues. Most studies showed that there is little change in the total lung capacity and only a small raise in the functional residual capacity with ageing. Age associated changes in respiratory system may also alter gas exchange due to loss of lung elastic recall. There is also a decrease in pulmonary capillary blood volume and increase in dead space ventilation. These may affect the functional capacity of the ageing individual. Aerobic capacity in sedentary older people declines at the rate of 10% per decade, although this can be increased by physical training in older people between the ages of 60 and 80.

## 5. Musculoskeletal System:

Osteoporosis is one of the most common diseases encountered in geriatric practice. Bone mass decreases with ageing. There is an age associated increase in skeletal fragility. Women lose about 60% of their trebacular bone and up to 35% of the cortical bone. Men are also affected but they only tend to lose about two thirds of the above amount. As a consequence of this problem fractures are very common in the elderly. The most common fractures in the elderly are wrist, hip, and vertebrae. In the elderly there is also impaired osteoblast function. However the bone healing rate is usually not affected by ageing. Menopause is a major contributor to osteoporosis. The oestrogen deficiency in menopause is an important cause of bone loss and subsequent fractures. In men the gonadol function decreases in some older men and male hypogonadism is often associated with vertebrae fractures.

6. Genitourinary system:

By the age of 70 years the human bladder would have completed about 200,000 micturation cycles. The majority of the elderly will still have normal function of the lower urinary tract. They will however have to urinate more frequently than when they were young. The urine stream tends to get weaker and the bladder capacity also reduces. This means that they have to get up during the night to urinate. In addition age associated diseases such as benign prostatic hypotrophy may create a problem in the elderly. Post mortem studies have shown that the renal mass is reduced by the eighth decade of life. The loss ranges from 10-20%. The changes usually start in the outer cortex of the kidney. The blood pressure changes already mentioned often impacts on these changes. Tubular degeneration and intestinal fibrosis also occurs and also decreases with age. Creatinine clearance also decreases with age.

**7. Age related changes with skin:**

The outer layer of the epidermis is not affected to a great extent. It is still able to have the same amount of resistance to the diffusion of water vapour as in the young. Therefore the barrier function of the skin is well preserved. However the barrier is increasing susceptible to damage with ageing. The moisture content of the aged skin is less than that of young adult and hence tends to be more brittle. The turn over of the outer layer of the skin is also increased with ageing. The dermis becomes thinner with age. In addition it is more acelluar and avascular. Collagen fibres appear to be distorted in ageing. Men have thicker dermis than women. There is also a decrease in elastic tissue. Microcirculation is also affected with ageing. For the scalp, the rate of hair growth declines and the diameter of the individual hair terminal also decrease with age. There is also greying of hair with progressive loss of melanocyte in the hair follicle. In older women in particular there is increase in hair growth on the lip and chin. Men lose scalp and beard hair but have an increase in growth of hair around the eyes, eyebrows and nostrils. The rate of nail growth declines by an average of 35% between the ages of 20 and 80 years.

## 8. Voluntary muscles:

Ageing increases the loss of muscle strength. Men tend to be stronger than women throughout adult life but the percentage in decline is similar for both sexes. The loss of muscle strength is closely associated with the loss of muscle mass and muscle fibre. This is closely associated with loss of motor neurones to the muscles.

9. Eyes and Ears:

With increasing age there is a loss of hair cells in the cochlea, loss of ganglion cells in the cochlea and a decrease in the average number of fibres in the cochlear nerve. All these changes lead to presbyacusis, i.e., loss of hearing for high frequency sounds.

The cornea flatten with increasing age leading to astigmatism and there is a hardening of the lens and iris. There is a reduction in the response from ciliary muscles and floaters can accumulate in the vitreous humour. Changes in the skin and muscles leads to enophthalmos and ptosis. Ptosis of the upper eyelid is seen in 11% of normal adults over the age of 50. Small pupils (diameters of 1mm or less) are often found in older people and the pupils themselves tend to respond slowly to light.

10. Temperature Regulation

Older people have an impaired ability to maintain body temperature through thermogenesis. There is impaired sweating, shivering and impaired cutaneous vasoconstriction response to the cold. As well as this there is an impaired perception of change in temperature. All these changes increase an older persons susceptibility to hypothermia.

11. Glucose homeostasis and hormonal changes:

In the elderly (60 -90 years) insulin levels rise sharply with then drops below the young adult mean. This is probably due to reduced sensitivity of muscles to insulin, insulin resistance and a fall in insulin receptors in fat cells. Thus older individuals are more likely to have an impaired glucose tolerance test – the plasma glucose rises to a higher level and may remain elevated for longer. This is associated with a delay in the rise of plasma insulin. Also the renal threshold for glucose is increased with age and this is one reason why glucose testing is not a reliable measure of glyceamic control in elderly individuals – glycosuria may not develop until the blood glucose is markedly raised.

With increasing age there is a fall in oestrogens leading to vaginal dryness and thinning of the vaginal wall. These changes can lead to pain and bleeding during coitus. A major impact of the fall in oestrogens is the impact on bone loss as mentioned above. With ageing it is common to find a decrease in the size of follicles in the thyroid gland, progressive fibrosis and infiltration with lymphocytes. However, circulating free T4 and T3 do not change, except during an illness.

*It ought to be lovely to be old*

*To be full of peace that comes with experience*

*And wrinkled ripe fulfillment,*

*The wrinkled smile of completeness that follows a life*

*Lived undaunted and unsoured with accepted lies.*

*If people lived without accepting lies*

*They would ripen like apples, and be scented like pippins*

*In their old age* . (D. H Lawrence (*Beautiful Old Age*)