List of references on health expectancy
Monthly update n°1
15/10/2006 to 15/11/2006

New references with keywords and abstracts

- 2006 -

Health expectancies in the UK, 2002. *Health Statistics Quarterly* 2006;29(Spring):59-62.　　CB16/48

HEALTH EXPECTANCY
HEALTHY LIFE EXPECTANCY
DISABILITY-FREE LIFE EXPECTANCY
TRENDS
ORIGINAL CALCULATION
UNITED KINGDOM
2002

This report presents the latest figures on male and female life expectancy at birth and at age 65 for the UK and its four constituent countries in 2002.

Healthy life expectancy. *Postnote* 2006(257):1-4. [Review]　　CB16/49

HEALTH EXPECTANCY
TRENDS
UNITED KINGDOM

This report reviews the current debate on healthy life expectancy, oulines possible future scenarios, and looks at the pros and cons of different HLE measures

Bronnum-Hansen, H., Juel, K., Davidsen, M. **The burden of selected diseases among older people in Denmark**. *Journal of Aging and Health* 2006;18(4):491.　　CB16/47

HEALTH EXPECTANCY
LONG-STANDING ILLNESS
ORIGINAL CALCULATION
SULLIVAN METHOD
DENMARK

Life tables and health survey data are combined to estimate expected lifetime with and without long-standing illness. Estimates based on observed rates of mortality and prevalence of illness are compared with those based on hypothetical rates from which a specific disease has been eliminated. Results: Life expectancy would increase by 4.0 years for 65-year-olds if circulatory diseases are eliminated, and the

proportion of expected lifetime without long-standing, limiting illness would increase from 59.2% to 66.5% for men and from 52.2% to 55.6% for women. Elimination of musculoskeletal diseases would not change life expectancy but would increase the proportion of expected lifetime without long-standing illness. Conclusions: Because of comorbidity, more years of illness are to be expected if lethal diseases are to be eliminated. Elimination of nonfatal diseases would mainly transfer years with long-standing illness to years without illness.

Khoman, E., Weale, M. *Incidence-based Estimates of Healthy Life Expectancy for the United Kingdom: Coherence between Transition Probabilities and Aggregate Life Tables*. London: National Institute of Economic and Social Research; 2006. Report No: 270.   CB16/52

HEALTH EXPECTANCY
TRANSITIONS
MATHEMATICAL MODEL

Will the United Kingdom's ageing population be fit and independent, or suffer from greater chronic ill health? Healthy life expectancy is commonly used to assess this: it is an estimate of how many years are lived in good health over the lifespan. This paper examines a means of generating estimates of healthy and unhealthy life expectancy consistent with exogenous population mortality data. The method takes population transition matrices
and adjusts these in a statistically coherent way so as to render them consistent with aggregate life tables. It is applied to estimates of healthy life expectancy for the United Kingdom.

Macdonald, A., Straughn, J., Sutton, M. *Healthy life expectancy measurement in Scotland*. Edinburgh: Heriot-Watt University, Dpt of Actuarial Mathematics and Statistics; 2006.   CB16/35

HEALTH EXPECTANCY
GEOGRAPHIC COMPARISON
CALCULATION
ENGLAND
SCOTLAND
UNITED KINGDOM

The authors present an international comparison of HE in Scotland and in other European countries, including other parts of the United Kingdom. They carry out a preliminary investigation of HE based on a unique data set compiled by ISD (seeClark et al. (2004)), namely the near-complete linkage of the responses made by the individuals included in the 1998 Scottish Health Survey (SHeS), with their hospital records since 1981. It is clear that the hospital records add a longitudinal component to the survey data that would be used in conventional HE estimates, and the question is whether, or not, this will help to form a more objective definition of HE.

Nusselder, W. J., Peeters, A. **Successful aging: measuring the years lived with functional loss**. *Journal of Epidemiology and Community Health* 2006;60:448-455.   CB16/51

HEALTH EXPECTANCY
DISABILITY
MORTALITY
FUNCTIONAL STATUS
SUCCESSFUL AGING

MATHEMATICAL MODEL
MULTI-STATE LIFE TABLE

Current research of risk factors potentially associated with successful aging faces the difficulty of taking into consideration two distinct outcome measures: survival and functioning. Previous studies either used successful aging measures restricted to survivors or presented more than one outcome measure to handle the dual outcome. This article illustrates the utility of health expectancy measures, based on life tables, to integrate the effects of survival and functioning across all ages. It is shown that three hypothetical successful aging strategies, considered equally successful according to the traditional measures restricted to survivors, are associated with vastly different changes in the years lived with and without disability. Furthermore, the intervention considered most successful when considering multiple successful aging measures, was associated with the largest increase in the time lived with disability. It is recommended that research on successful aging should be based on summary measures of population health that reflect both survival and functioning throughout life. These will provide more relevant information than is currently available for individuals and societies to evaluate and choose between successful aging strategies.

Zimmer, Z. **Disability and active life expectancy among older Cambodians**. *Asian Population Studies* 2006;2(2):133-148. CB16/28

HEALTH EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)
ACTIVITIES OF DAILY LIVING (ADL)
FUNCTIONAL LIMITATION
AGED
ORIGINAL CALCULATION
SULLIVAN METHOD
CAMBODIA
2004

The current paper uses data from the 2004 Study of the Elderly in Cambodia (SEC) and focuses on disability status. The data is the first of its kind for Cambodia*a comprehensive survey employing a representative sample of adults 60 and older living across the country. Disability prevalence by age and sex, Active Life Expectancy (ALE) and common correlates of disability, using Activity of Daily Living (ADL) items, are examined. In addition, disability prevalence rates are compared to those for older adults living in other countries in South-east Asia. The results indicate that older Cambodians are more disabled than their counterparts living elsewhere. Possible reasons include long-term influence of social disruption and poverty. Women live longer than men, but spend a greater proportion of their remaining life in states of disability and severe disability. Correlates of disability show that younger age, being male, having higher income satisfaction, being married and living in urban areas associate with lower probabilities of reporting disability. A contribution of the analysis is the examination of a basic measure of health among a population of which little is known.

- 2005 -

Bebbington, A. C., Shapiro, J. *Ageing, Health status and determinants of health expenditure (AHEAD)*. Canterbury: University of Kent, PSSRU; 2005. Report No: PSSRU Discussion paper 2219.
CB16/37

TRANSITION PROBABILITY
DISABILITY
PERCEIVED HEALTH
ACTIVITY RESTRICTION

INSTITUTIONALIZATION
MORTALITY

This is the final report of Work package III of the AHEAD project, undertaken by PSSRU at the University of Kent, UK. The main output of this work-package was designed to be the estimation, based on the European Community Household Panel (ECHP) full dataset, of annual probabilities of transition between health states, including two states regarded as absorbing: permanent institutionalisation and death. The purpose of this work

Chang, C., Nocetti, D., Rubin, R. **Healthy life expectancy for selected race and gender subgroups: the case of Tennessee**. *Southern Medical Journal* 2005;98(10):977-984.   CB16/03

HEALTH EXPECTANCY
SEX COMPARISON
RACIAL COMPARISON
TENNESEE
USA
2001

OBJECTIVE: To analyze healthy life expectancy (HLE) for major racial and gender subgroups, based on the diverse population of Tennessee and compared with the United States.
MATERIALS AND METHODS: We use life table methodology and the HLE calculation model of the National Center for Health Statistics (NCHS), using two databases for 2001: NCHS National Vital Statistics Reports life tables and CDC Behavioral Risk Factor Surveillance System (BRFSS) survey.
RESULTS: For Tennessee, although average total life expectancy (TLE) is 73.6 years at birth, only 61.1 years of "good" health are expected. Substantial racial and gender differences are found in both TLEs and HLEs with black males having the lowest and white females the highest. Although females have longer TLE, they spend more years in an unhealthy state than males.
CONCLUSIONS: The findings raise new challenges for researchers and health policy makers for accomplishing the dual goals of longer life expectancy and elimination of health disparities among population subgroups.

Deeg, D. J. H. **Longitudinal characterisation of course types of functional limitations**. *Disability and Rehabilitation* 2005;27(5):253-261.   CB16/09

FUNCTIONAL LIMITATION

Purpose: Longitudinal data have provided evidence on factors that increase the risk of incidence of functional limitations. However, little insight exists in course types of functional limitations other than simple incidence or recovery.
Methods: This contribution examines the variety of course types across the first three cycles of the Longitudinal Aging Study Amsterdam (n?=?3107, initial ages 55?–?85 years, 6-year period covered). Using cluster analysis, course types were determined among both the survivors and the deceased. Multinomial analyses were performed to determine the predictive ability of baseline physical and mental chronic conditions for each course type.
Results: Eight course types were distinguished: (1) stable not limited (53%) (2) stable mild (8%) (3) stable severe (3%) (4) gradual increase (4%) (5) delayed increase (5%) (6) not limited, died t3 (8%) (7) increase t1?–?t2, died t3 (4%) (8) died t2 (15%). Socio-demographic and chronic conditions differentially predicted the course types. Arthritis was predictive mainly of course types not ending in death, cancer of course types ending in death. The other physical and mental conditions were predictive of both.

Conclusion: These longitudinal data show the usefulness of distinguishing between course types of functional limitations beyond incidence and recovery.

Gill, T., Allore, H., Hardy, S., Holford, T., Han, L. **Estimates of active and disabled life expectancy based on different assessment intervals**. *Journal of Gerontology: Medical Sciences* 2005;60A(8):1013-1016. CB16/31

HEALTH EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)
LONGITUDINAL STUDIES
DOUBLE DECREMENT TABLES METHOD

Background. Although disability in activities of daily living (ADLs) is a highly dynamic process, analytic strategies for estimating active and disabled life expectancy have assumed stability in ADL function between periodic surveys spanning 12-24 months or have used interval estimation or instantaneous rates based on long assessment intervals. We performed a prospective cohort study to compare estimates of active and disabled life expectancy based on traditional assessment intervals of 1-2 years with those based on more frequent assessments at 1-month intervals.
Methods. Participants included 754 initially nondisabled community-dwelling persons, aged 70 years or older, who were interviewed monthly for 4 years to ascertain ADL disability. Estimates ol active and disabled life expectancy were calculated using an increment-decrement life table for assessment intervals of I month. 1 year, and 2 years.
Results. For each of li\e age groups, the monthly assessment strategy yielded the highest values for active life expectancy and the lowest values for disabled life expectancy. The 95% confidence intervals for these values, however, overlapped the corresponding point estimates for the annual and biennial strategies.
Conclusions. Accurate estimates of active and disabled life expectancy may be obtained from epidemiologic studies that assess ADL function no more frequently than every other year.

Jagger, C., Barberger-Gateau, P., Robine, J.-M. **Disability in older people--indicators, process and outcomes [Editorial]**. *Disability and rehabilitation* 2005;27(5):209-214. CB16/05

REVES
HEALTH EXPECTANCY
MORTALITY
DISABILITY
CALCULATION METHOD
HARMONIZATION

Jagger, C., Spiers, N., Arthur, A. **The role of sensory and cognitive function in the onset of activity restriction in older people** *Disability and Rehabilitation* 2005;27(5):277-283. CB16/11

HEALTH EXPECTANCY
QUALITY OF LIFE
ACTIVITIES OF DAILY LIVING (ADL)
COGNITIVE FUNCTION
SENSORY FUNCTION

Background: Extending healthy active life expectancy is a priority if we are to achieve gains in both the quality and quantity of life lived at older ages. We investigated the role of sensory (vision and hearing)

and cognitive function on the onset of activity restriction in older people.

Methods: A survey of a total population (N?=?1579) of people aged 75 years and older, registered with a large general population in Melton Mowbray, Leicestershire, England, was undertaken in 1988 and linked with subsequent routine health assessments (up to a maximum of five) over 10 years. Activity restriction was defined as having difficulty performing on their own, requiring help or aids or not doing any one of seven Activities of Daily Living (ADLs). The study population comprised the 643 persons who were not restricted at baseline. Cox proportional hazard regression models were fitted to time of onset of activity restriction with those dying before activity restriction was reported being censored at time of death.

Results: After adjustment for confounding factors (socio-demographic and psychosocial factors, physical health and physical functional limitations), difficulty with both vision and hearing conferred a doubling of risk of activity restriction (RR?=?2.36, 95% CI 1.31 to 4.28). A unit decrease in the Information/Orientation subtest was associated with a 10% increase in risk (RR?=?1.10, 95% CI 1.02 to 1.19), even after adjustment for vision and hearing as well as other confounding factors, though baseline Mini-Mental State Examination score was not indicative of increased risk (RR?=?1.02, 95% CI 0.98 to 1.06).

Conclusion: Differentiating whether disability is a result of physical, sensory or cognitive functional limitations, is necessary to identify need and the direction in which efforts should be targeted to improve active life expectancy in older people.

Kaneda, T., Zimmer, Z., Tang, Z. **Socioeconomic status differentials in life and active life expectancy among older adults in Beijing**. *Disability and rehabilitation* 2005;27(5):241.   CB16/08

HEALTH EXPECTANCY
DISABILITY-FREE LIFE EXPECTANCY
HEALTH INEQUALITY
SOCIAL INEQUALITY
FUNCTIONAL LIMITATION
ACTIVITIES OF DAILY LIVING (ADL)
INSTRUMENTAL ACTIVITIES OF DAILY LIVING (IADL)
EDUCATION
INCOME
OCCUPATION
MULTI-STATE LIFE TABLE
BEIJING
CHINA

Purpose: The study compares life and active life expectancy estimates across indicators of socioeconomic status (SES) for a cohort of older adults in the Beijing municipality. Our aim is to determine if associations found are consistent across indicators and with those typically observed in the Western industrialized countries.

Method: A multistate life table method is used to estimate expected years of total and active life, defined as life spent without limitation in functions necessary for performing daily tasks.

Results: We find that men of higher status experience advantages with respect to life and active life expectancies. Among women, only active life expectancy is significantly higher for those of higher status, but the difference by income is not statistically significant. With respect to the proportion of life spent in an active state, both men and women of higher status benefit in comparison to their lower status counterparts. Finally, we find that disparities by SES generally increase with age.

Conclusions: Despite several inconsistencies across SES indicators by gender, findings generally confirm inequalities within a society that is organized very differently socially, economically, and politically from the West.

Pérès, K., Verret, C., Alioum, A., Barberger-Gateau, P. **The disablement process: Factors associated with progression of disability and recovery in French elderly people**. *Disability and rehabilitation* 2005;27(5):263-276.   CB16/10

ELDERLY
DISABILITY
ACTIVITIES OF DAILY LIVING (ADL)
INSTRUMENTAL ACTIVITIES OF DAILY LIVING (IADL)
FRANCE

Purpose: To study the factors associated with progression, recovery and death from different grades of disability in elderly people.
Method: The sample included 3198 participants of the PAQUID ('Personnes Agées QUID') cohort, aged 65 and over and community-dwellers at baseline. Subjects were re-interviewed 1, 3, 5, 8 and 10 years after baseline. A five-state Markov model was used to estimate transition intensities between four grades of disability and toward death. We used a hierarchic scale of disability, which combines basic and instrumental activities of daily living and mobility. Several explanatory variables were investigated: medical, personal and environmental factors.
Results: The factors associated with progression and/or no recovery of disability were cardiovascular diseases, stroke and diabetes, low cognition, visual impairment and dyspnoea (for pathologies and impairments), older age, female gender, low educational level (for risk factors), depression (for intra-individual factor) and being married, recent hospitalization and number of drugs (for extra-individual factors). Older age, male gender, tobacco consumption and living in an urban area were associated with mortality.
Conclusions: These findings confirm the independent contribution of each group of variables in the disablement process and stress their different impact on progression of disability or on recovery from different grades of disability.

Rakchanyaban, U., Prasartkul, P., Hayward, M., Thongthai, V., Punpuing, S., Gray, R. **The Impact of Chronic Diseases on Disability-free Life Expectancy among the Thai Elderly Population** *Journal of Population and Social Studies* 2005;13(2)   CB16/04

HEALTH EXPECTANCY
DISABILITY-FREE LIFE EXPECTANCY
DISEASE (CHRONIC)
ORIGINAL CALCULATION
SULLIVAN METHOD
THAILAND
2002

The objective of this study was to investigate the changes in disability-free life expectancy after the elimination of specific diseases in the elderly population. Data on health status were derived from the 2002 Survey of the Elderly in Thailand conducted by the National Statistical Office. Mortality information was obtained from the vital registration system of the Ministry of Interior and the Verbal Autopsy Study of 16 provinces in Thailand conducted by the Ministry of Public Health. Population data were also drawn from the vital registration system. Cause-deleted disability-free life expectancy was estimated by the Sullivan method using the cause-deleted prevalence of disability in the cause-elimination life tables, assuming the independence among causes of death and disability. It was found that while eliminating fatal diseases such as cancer and heart diseases led to an increase in disability-free life expectancy, life expectancy with disability would increase too. This resulted in an increasing burden to

society. On the other hand, the elimination of chronic non-fatal but disabling diseases such as neuro-psychiatric diseases and arthritis not only led to an increase in disability-free life expectancy, but also to a decline in life expectancy with disability. In order to improve the quality of life of the Thai elderly and to reduce the burden of elderly care on society, a more effort should be made to reduce chronic disabling non-fatal diseases.

Reyes-Beaman, S., Jagger, C., Garcia-Peña, C., Munz, O., Beaman, P., Stafford, B. **Active life expectancy of older people in Mexico**. *Disability and rehabilitation* 2005;27(5):213-219.   CB16/06

HEALTH EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)
ACTIVITIES OF DAILY LIVING (ADL)
GEOGRAPHIC COMPARISON
ORIGINAL CALCULATION
SULLIVAN METHOD
MEXICO
1998-1999

Background: Social and economic development together with demographic changes and health interventions have resulted in an increase in life expectancy and a rapidly ageing population in Mexico. Whether people will live longer active and independent lives is still, however, unknown. We will address this question, providing the first estimates of active life expectancy by age, sex and local regional area in Mexico.
Methods: Active life expectancy was calculated using the Sullivan method with abridged life tables. Information on the older Mexican population covered by the Mexican Institute of Social Security (IMSS) and the number of deaths for the same group in the year 2000 was obtained from the Office for Health Statistics and Information at IMSS in Mexico. Information on ability to perform basic activities of daily living was obtained from the National Survey on Ageing carried out in IMSS during 1998?–?99.
Results: For males and females combined, active life expectancy decreased from 26.9 years at 60 years to 5.7 years at 85 years. Women's life expectancy exceeded that of men but women lived more years dependent. Similarly, older people in geographical areas with longer life expectancy spent a lower proportion of remaining life active.
Conclusion: The success in increasing life expectancy above average in some groups of older people covered by IMSS has been accompanied by increments in the proportion of remaining years dependent upon others for help in basic self-care

Reynolds, S. L., Saito, Y., Crimmins, E. M. **The impact of obesity on active life expectancy in older American men and women**. *The Gerontologist* 2005;45(4):438-444.   CB16/36

HEALTH EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)
ORIGINAL CALCULATION
MULTI-STATE LIFE TABLE (IMaCh)
USA
1993-1998

Purpose: The purpose of this article is to estimate the effect of obesity on both the length of life and length of nondisabled life for older Americans.
Design and Methods: Using data from the first 3 waves of the Asset and Health Dynamics Among the Oldest Old (AHEAD) survey, this article develops estimates of total, active, and disabled life expectancy

for obese and nonobese older men and women. We used the Interpolation of Markov Chains (IMaCh) method to estimate the average number of years obese and nonobese older persons can expect to live with and without activity of daily living (ADL) disability.

Results: Our findings indicate that obesity has little effect on life expectancy in adults aged 70 years and older. However, the obese are more likely to become disabled. This means that obese older adults live both more years and a higher proportion of their remaining lives disabled.

Implications: The lack of significant differences in life expectancy by obesity status among the old suggests that obesity-related death is less of a concern than disability in this age range. Given steady increases in obesity among Americans at all ages, future disability rates may be higher than anticipated among older U.S. adults. In order to reduce disability among future cohorts of older adults, more research is needed on the causes and treatment of obesity and evaluations done on interventions to accomplish and maintain weight loss.

Romero, D. E., da Costa LeiteII, I., Landmann Szwarcwald, C. **Healthy life expectancy in Brazil: applying the Sullivan method**. *Cadernos de Saúde Pública* 2005;21(suppl 1):S7-S18.   CB16/32

HEALTHY LIFE EXPECTANCY
DISABILITY
ORIGINAL CALCULATION
SULLIVAN METHOD
BRAZIL
2003

The objective of this study is to present the method proposed by Sullivan and to estimate the healthy life expectancy using different measures of state of health, based on information from the World Health Survey carried out in Brazil in 2003. By combining information on mortality and morbidity into a unique indicator, simple to calculate and easy to interpret, the Sullivan method is currently the one most commonly used for estimating healthy life expectancy. The results show higher number of healthy years lost if there is a long-term disease or disability that limits daily activities, regardless of the difficulty in performing such activities or the severity of the functional limitations. The two measures of healthy life expectancy adjusted by the severity of functional limitation show results very similar to estimates based on the perception of state of health, especially in advanced age. It was also observed, for all measures used, that the proportion of healthy years lost increases significantly with age and that, although females have higher life expectancy than males, they live proportionally less years in good health.

Sagardui-Villamor, J., Guallar-Castillón, P., García-Ferruelo, M., Banegas, J. R., Rodríguez-Artalejo, F. **Trends in Disability and Disability-Free Life Expectancy Among Elderly People in Spain: 1986-1999**. *Journal of Gerontology: Medical Sciences* 2005;60A(8):1028-1034.   CB16/33

HEALTH EXPECTANCY
DISABILITY-FREE LIFE EXPECTANCY
ORIGINAL CALCULATION
SULLIVAN METHOD
TRENDS
SPAIN
1986-1999

Background. This paper examines recent trends in the prevalence of disability and disability-free life expectancy in the population aged 65 years and older in Spain.
Methods. Data were drawn from two National Disability, Impairment and Handicap Surveys conducted in

1986 and 1999. Only severe disability was studied, and disabilities overcome through use of external technical aids were included.

Results. In the period 1986–1999, a relative annual decline of 3.7% in overall disability was observed for men. The decline was somewhat less marked in women, participants aged 75 years and older, and those with the lowest educational level. In men, there was a relative annual decline of just over 3% in walking and hearing disabilities, of under 1% in seeing and cognitive disabilities, and a slight rise in self-care disability. Trends among women were similar, though self-care disability rose by 1.78%. In the period 1986–1999, total and disability-free life expectancy rose across all age groups in both sexes. Among men aged 65 years, the proportion of life expectancy with disability fell from 42.1% in 1986 to 21.6% in 1999; the comparable figures for women were 49.8% in 1986 and 30.6% in 1999. Indeed, a reduction in life expectancy with disability was observed even among persons aged 80 years and older.

Conclusion. From 1986 through 1999, prevalence of severe disability among Spanish elderly persons decreased substantially, and the duration of life with disability was compressed between a later onset and the time of death. Among women, however, self-care disability—the type of disability requiring most social resources for its attention—underwent a sharp rise.

Van Oyen, H., Bossuyt, N., Deboosere, P., Gadeyne, S., Abatih, E., Demarest, S. **Differential inequity in health expectancy by region in Belgium**. *Sozial- und Präventivmedizin* 2005;50(5):301-310. CB16/07

HEALTH EXPECTANCY
DISABILITY-FREE LIFE EXPECTANCY
HEALTH INEQUALITY
EDUCATION
GEOGRAPHIC COMPARISON
BELGIUM

OBJECTIVES: To evaluate the size of social inequities in health between regions in Belgium using a composite health measure, the disability free life expectancy (DFLE).
METHODS: Mortality data (5-years follow-up of the 1991 census) are combined with the 1997 Health Interview Survey to estimate the DFLE by education. Differences in partial life expectancy25-74 (LE25-74) and in DFLE25-74 between those at the bottom and those at the top of a relative social scale are used to compare the regional inequities.
RESULTS: The higher educated person has a longer LE, with more years free of disability and less years with disability (in years: Flemish males: LE = 46.48; DFLE = 42.08; Walloon males: LE = 44.92; DFLE = 39.80; Flemish females: LE = 47.90; DFLE = 41.93; Walloon females: LE = 46.90; DFLE = 39.84) compared to the population at the bottom of the education hierarchy (in years: Flemish males: LE = 44.86; DFLE = 30.16; Walloon males: LE = 42.77; DFLE = 27.00; Flemish females: LE = 46.86; DFLE = 28.30; Walloon females: LE = 45.44; DFLE = 25.30). The inequity in LE and in DFLE is larger in the Walloon Region than in the Flemish Region. Only the regional difference in inequity in LE is statistically significant.
CONCLUSION: The DFLE can be used to monitor the size of health inequities.

Zimmer, Z. *Active Life Expectancy and Functional Limitations Among Older Cambodians:Results from a 2004 Survey*. Population Council, Policy Research Division; 2005. Report No: 201.   CB16/29

HEALTH EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)
ACTIVITIES OF DAILY LIVING (ADL)
FUNCTIONAL LIMITATION
AGED

ORIGINAL CALCULATION
SULLIVAN METHOD
CAMBODIA
2004

This study's aims are to: 1) determine the prevalence of functional limitations among older adults in Cambodia using activities of daily living (ADLs); 2) compare limitation prevalence with other countries in the region; 3) estimate active life expectancy; 4) examine standard correlates of functional status and assess whether they are associated with limitation in expected ways. ADLs included here are bathing, dressing, eating, and getting up from lying down. Degree of difficulty is used to determine whether limitations are moderate or severe. Results are generally consistent with expectations. For example, women live longer than men but spend a greater proportion of life with limitations, and older age is related to higher rates of limitation and less active life. Elderly Cambodians appear more likely to report limitations than their counterparts in neighboring countries. A contribution of the analysis is the examination of a basic measure of health among a population that until recently has been isolated from the rest of the world.

- 2004 -

Cambois, E., Lievre, A. **Risques de perte d'autonomie et chances de récupération chez les personnes âgées de 55 ans ou plus : une évaluation à partir de l'enquête Handicaps, Incapacités, Dépendance**. *Etudes et Résultats* 2004(349):1-11.   CB16/46

TRANSITION PROBABILITY
MULTI-STATE LIFE TABLE (Imach)
FRANCE

The authors assess the health status of men and women aged 55 and over and its evolution after two years.

Clark, D., McKeon, A., Sutton, M., Wood, R.   ***Healthy life expectancy in Scotland***   Scottish Executive; 2004.   CB16/34

HEALTH EXPECTANCY
ORIGINAL CALCULATION
SULLIVAN METHOD
SCOTLAND
UNITED KINGDOM

The Healthy Life Expectancy in Scotland report provides the first published estimates of HLE for the Scottish population. The report provides estimates of HLE for females and males separately, at birth and at age 65. Estimates are available for Scotland as a whole, for deprivation quintiles, and for NHS Board and Local Council areas. The two main approaches to defining good health used in the report are:
• use of limiting longstanding illness (LLI), where 'good health' is defined as reporting the absence of LLI, and
• use of self-assessed general health status (SAH), where 'good health' is defined as reporting health as 'good' or 'fairly good'.
The sources of health status data used are the Scottish Household Survey, the General Household Survey, and the 2001 Census.

Kaneda, T., Zimmer, Z., Tang, Z. ***Differentials in life expectancy and active life expectancy by***

socioeconomic status among older adults in Beijing. Population Council, Policy Research Division; 2004. Report No: 189. CB16/30

HEALTH EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)
ACTIVITIES OF DAILY LIVING (ADL)
SOCIAL INEQUALITY
FUNCTIONAL LIMITATION
ORIGINAL CALCULATION
MULTI-STATE LIFE TABLE
CHINA
BEIJING
1990s

The study compares estimates of life expectancy and active life expectancy across indicators of socioeconomic status for a cohort of older adults in Beijing Municipality. Our aim is to determine whether associations found are consistent across indicators and with those typically observed in Western industrialized countries. A multistate life table method is used to estimate expected years of total and active life, defined as life spent without limitation in functions necessary for performing daily tasks. We find that men of higher status experience advantages with respect to life and active life expectancies. Among women, only active life expectancy is significantly greater for those of higher status, but the difference by income is not statistically significant. With respect to the proportion of life spent in an active state, both men and women of higher status benefit in comparison to their lower status counterparts. Finally, we find that disparities by socioeconomic status generally increase with age. Despite several inconsistencies across socioeconomic status indicators by sex, findings generally confirm inequalities observed in Western Countries.

Manuel, D. G., Schultz, S. E. **Health-related quality of life and health-adjusted life expectancy of people with diabetes in Ontario, Canada, 1996-1997**. *Diabetes Care* 2004;27(2):407-414. CB16/41

HEALTH EXPECTANCY
HEALTH-ADJUSTED LIFE EXPECTANCY (HALE)
ORIGINAL CALCULATION
SULLIVAN METHOD
CANADA
ONTARIO
1996-1997

Measures of health-related quality of life (HRQOL) from the 1996/97 Ontario Health Survey (n=35,517) were combined with diabetes prevalence and mortality data from the Ontario Diabetes Database (n=487,576) to estimate the impact of diabetes on life expectancy, health-adjusted life expectancy (HALE), and HRQOL.

Mathers, C. D., Iburg, K. M., Salomon, J. A., Tandon, A., Chatterji, S., Ustun, B., Murray, C. J. L. **Global patterns of healthy life expectancy in the year 2002**. *BMC Public Health* 2004;4(66) CB16/39

HEALTH EXPECTANCY
HEALTH-ADJUSTED LIFE EXPECTANCY (HALE)
GEOGRAPHIC COMPARISON
WORLD POPULATION

2002

Background: Healthy life expectancy – sometimes called health-adjusted life expectancy (HALE) – is a form of health expectancy indicator that extends measures of life expectancy to account for the distribution of health states in the population. The World Health Organization reports on healthy life expectancy for 192 WHO Member States. This paper describes variation in average levels of population health across these countries and by sex for the year 2002.
Methods: Mortality was analysed for 192 countries and disability from 135 causes assessed for 17 regions of the world. Health surveys in 61 countries were analyzed using new methods to improve the comparability of self-report data.
Results: Healthy life expectancy at birth ranged from 40 years for males in Africa to over 70 years for females in developed countries in 2002. The equivalent "lost" healthy years ranged from 15% of total life expectancy at birth in Africa to 8–9% in developed countries.
Conclusion: People living in poor countries not only face lower life expectancies than those in richer countries but also live a higher proportion of their lives in poor health.

Minicuci, N., Noale, M., Pluijm, S. M. F., Zunzunegui, M. V., Blumstein, T., Deeg, D. J. H., Bardage, C., Jylhä, M., CLESA working group. **Disability-free life expectancy: a cross-national comparison of six longitudinal studies on aging. The CLESA project**. *European Journal of Ageing* 2004;1(1):37-44.
CB16/45

HEALTH EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)
ORIGINAL CALCULATION
MULTI-STATE LIFE TABLE (Imach)
FINLAND
ISRAEL
ITALY
SPAIN
SWEDEN
THE NETHERLANDS

Disability-free life expectancy (DFLE) was compared in six countries taking part in the Cross-national determinants of Quality of Life and Health Services for the Elderly (CLESA) project. Data from six existing longitudinal studies were used: TamELSA (Tampere, Finland), CALAS (Israel), ILSA (Italy), LASA (The Netherlands), Aging in Leganés (Leganés, Spain) and SATSA (Sweden). A harmonised four-item disability measure (bathing, dressing, transferring, toileting) was used to calculate DFLE; the harmonised measure was dichotomised into independent in all four activities vs. dependent in at least one. Calculations of DFLE were made using the multistate life table approach and the IMaCh program (INED/EuroREVES, http://eurorevesinedfr/imach/) for subjects aged 65–89 years. Prevalence ratios of disability varied significantly across countries, with Italy and Leganés having the highest percentages among men and among women, respectively, while The Netherlands presented the lowest for both sexes. At 75 years of age the estimated total life expectancy among men ranged from 7.8 years in Tampere and Sweden to 9.0 years in Israel; among women it ranged from 9.5 years in Israel to 11.6 years in Italy. For both sexes Italy showed the lowest total life expectancy without disability (72% among men, 61% among women) and Sweden the highest (89% among men and 71% among women). The results yielded a north/south gradient, with residents in Tampere, The Netherlands and Sweden expected to spend a higher percentage of their lives without disability than those in Italy, Israel and Leganés

Phillips, H., Noumbissi, A. **Disability in South Africa**. *African Population Studies* 2004;19(2, suppl B):107-130. CB16/40

HEALTH EXPECTANCY
DISABILITY-FREE LIFE EXPECTANCY
DISABILITY
ORIGINAL CALCULATION
SULLIVAN METHOD
GEOGRAPHIC COMPARISON
SOUTH AFRICA
1996

This paper focuses on the prevalence and the patterns of disability in South Africa using the 1996 South Africa census micro data. Disability-free life expectancy is calculated and spatial variations are examined.

- 2003 -

Jagger, C., Goyder, E., Clarke, M., Brouard, N., Arthur, A. **Active life expectancy in people with and without diabetes**. *Journal of Public Health Medicine* 2003;25(1):42-46.   CB16/02

HEALTH EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)
ACTIVITIES OF DAILY LIVING (ADL)
AGED
LONGITUDINAL STUDIES
ORIGINAL CALCULATION
UNITED KINGDOM

Background: The aim of the study was to investigate the feasibility of monitoring older people's health by measuring active life expectancy among older people with and without diabetes using routinely collected primary care data.
Methods: The study comprised the first five rounds of a routine health assessment of those aged 75 years and over belonging to a large Midlands general practice (list size 32 500). A nurse carried out the health assessments in the participant's home. Being active was defined as the ability to perform (without difficulty, help or use of aids) at least six of seven activities of daily living (ADLs). Mortality data were collected through the practice register together with regular linkage to information from the Office for National Statistics. Period health expectancies were calculated for those known or found to be diabetic through the health assessments and for non-diabetic individuals.
Results: Calculation of active life expectancies (ALE) was based on 2474 persons (212 with and 2262 without diabetes). At all ages, people with diabetes had lower life expectancy and spent fewer years active. The proportion of remaining life spent active was, however, similar for both groups at younger ages, but by age 85 years people with diabetes spent only 32 per cent of remaining life active compared with 42 per cent for those without diabetes.
Conclusion: Annual health assessments of the over-75s in primary care together with linkage to mortality data provide a feasible method of monitoring older people's health, particularly for subgroups at greater risk of disability. At Strategic Health Authority or Primary Care Trust level these methods can monitor health needs, highlight health inequalities and evaluate intervention strategies.

Jitapunkul, S., Kunanusont, C., Phoolcharoen, W., Suriyawongpaisal, P., Ebrahim, S. **Disability-free life expectancy of elderly people in a population undergoing demographic and epidemiologic transition**. *Age and Ageing* 2003;32(4):401-405.   CB16/44

HEALTH EXPECTANCY
DISABILITY-FREE LIFE EXPECTANCY
ACTIVITIES OF DAILY LIVING (ADL)
ORIGINAL CALCULATION
SULLIVAN METHOD
THAILAND
1997

The authors determine prevalence and severity of disability among the elderly population and compare disability-free life expectancy and self-care life expectancy among different age groups and between sexes.

Mathers, C. D. **Towards valid and comparable measurement of population health**. *Bulletin of the World Health Organization* 2003;81(11):187-788. [Commentary]   CB16/38

HEALTH INDICATOR
HEALTH POLICY

- 2002 -

Years of healthy life in Utah. Salt Lake City: Utah Department of Health; 2002.   CB16/18

HEALTH EXPECTANCY
PERCEIVED HEALTH
MENTAL HEALTH
ACTIVITY LIMITATION
ORIGINAL CALCULATION
SULLIVAN METHOD
UTAH
USA
1993-2000

This report combines information about life expectancy and health status to calculate years of healthy life for the population of Utah (USA).Behavioral Risk Factor Surveillance System (BRFSS) questions on perceived health status, Physical health status, Mental health status, and activity limitation are used to assess health related quality of life.

Glossary of terms. In: Murray, C. J. L., Salomon, J. A., Mathers, C. D., Lopez, A. D., editors. Summary measures of population health concepts, ethics, measurement and applications. Geneva: WHO; 2002. p. 757-763.   CB16/26
GLOSSARY

Barendregt, J. J. *Incidence- and prevalence-based SMPH: making the twain meet*. In: Murray, C. J. L., Salomon, J. A., Mathers, C. D., Lopez, A. D., editors. Summary measures of population health concepts, ethics, measurement and applications. Geneva: WHO; 2002. p. 221-231.   CB16/25

HEALTH EXPECTANCY
HEALTH-ADJUSTED LIFE EXPECTANCY (HALE)
HEALTH POLICY

The author examines the difference between incidence- and prevalence-based SMPH, and investigate under what circumstances they produce
different results. The divide between incidence- and prevalence-based approaches forces policy-makers to choose between a current and a future perspective on population health. Both aspects should count and need to be balanced. Investigation of the causes of the difference between incidence- and prevalence-based indicators suggests that a dynamic method is needed to unite both approaches.

Buescher, P. A., Gizlice, Z. *Healthy Life Expectancy in North Carolina, 1996-2000*. Raleigh; 2002. Report No: SCHS Study n°129. CB16/19

HEALTH EXPECTANCY
PERCEIVED HEALTH
MENTAL HEALTH
ACTIVITY LIMITATION
ORIGINAL CALCULATION
SULLIVAN METHOD
NORTH CAROLINA
USA
1996-2000

This study combines the life table methodology with measures of morbidity or ill health to calculate healthy life expectancy for the population of North Carolina.
1996-2000 mortality data are used to calculate life expectancies for North Carolinians and 1993-2000 data from the Behavioral Risk Factor Surveillance System (BRFSS) are used to estimate, by age, average years of life remaining in good perceived health, in good physical health, in good mental health, and without activity limitation. These estimates are produced for the total population, males, females, whites, minorities, white males, white females, minority males, and minority females.

Crimmins, E. M. *Health expectancies: what can we expect from summary indicators of population health*. In: Murray, C. J. L., Salomon, J. A., Mathers, C. D., Lopez, A. D., editors. Summary measures of population health concepts, ethics, measurement and applications. Geneva: WHO; 2002. p. 213-219.
CB16/24
HEALTH EXPECTANCY
HEALTH INDICATOR
HEALTH POLICY

The author reviews the health process summary measures of population health are trying to capture and provides examples of the wealth of information that can be developed from a family of summary measures. A variety of summary measures will provide the most useful set of indicators for both researchers and policy-makers. Summary measures need to be chosen in light of the health problems that are of interest and the potential policies that are being evaluated.

Gold, M. R., Stevenson, D., Fryback, D. G. **HALYs and QALYs and DALYs, oh my: Similarities and differences in Summary Measures of Population Health**. *Annual Review of Public Health* 2002;23:115-134. CB16/21

HEALTH-ADJUSTED LIFE YEARS (HALYs)
QUALITY-ADJUSTED LIFE YEARS (QALYs)

DISABILITY-ADJUSTED LIFE YEARS (DALYs)
HEALTH POLICY

Health-adjusted life years (HALYs) are population health measures permitting morbidity and mortality to be simultaneously described within a single number. They are useful for overall estimates of burden of disease, comparisons of the relative impact of specific illnesses and conditions on communities, and in economic analyses. Quality-adjusted life years (QALYs) and disability-adjusted life years (DALYs) are types of HALYs whose original purposes were at variance. Their growing importance and the varied uptake of the methodology by different U.S. and international entities makes it useful to understand their differences as well as their similarities. A brief history of both measures is presented and methods for calculating them are reviewed. Methodological and ethical issues that have been raised in association with HALYs more generally are presented. Finally, we raise concerns about the practice of using different types of HALYs within different decision-making contexts and urge action that builds and clarifies this useful measurement field.

Guend, H., Stone-Newsom, R., Swallen, K., Lasker, A., Kindig, D. *State disability adjusted life expectancy: using census disability data*. Population Health Institute - University of Madison,WI; 2002. Report No: Technical Report. CB16/20

HEALTH EXPECTANCY
DISABILITY-ADJUSTED LIFE EXPECTANCY (DALE)
ORIGINAL CALCULATION
SULLIVAN METHOD
USA
1989-1991

The authors used the disability questions from the 1990 Census to create two estimates of Disability Adjusted Life Expectancy for the 50 United States for both males and females, at birth and at age 65. Variations in these measures across the States are presented. Advantages and disadvantages of using such secondary data for this purpose are discussed.

Guend, H., Swallen, K., Kindig, D., . *Exploring the racial/ethnic gap in healthy life expectancy United states 1989-1991*. Madison: Center for Demography and Ecology - University of Wisconsin-Madison; 2002. Report No: 2002-02. CB16/43

HEALTH EXPECTANCY
DISABILITY-FREE LIFE EXPECTANCY
ORIGINAL CALCULATION
SULLIVAN METHOD
RACIAL COMPARISON
USA
1989-1991

Racial/Ethnic disparities in healthy life are explored using Disability-Free Life Expectancy (1989-1991) estimated for Native, Asian and Pacific Islanders, black, white, and Hispanic Americans. Four types of disability were analyzed: any disability, workrelated disability, limitations in activities of daily living, and disability that is workrelated and limits activities of daily living and personal care too. We found that Natives and blacks spend a longer time of their shorter Life Expectancies disabled. Although women enjoy longer LE then men, they spent a higher proportion of life disabled. Racial groups score differently based on the type of disability too.

Mathers, C. D. *Health expectancies: an overview and critical appraisal*. In: Murray, C. J. L., Salomon, J. A., Mathers, C. D., Lopez, A. D., editors. Summary measures of population health concepts, ethics, measurement and applications. Geneva: WHO; 2002. p. 177-204.   CB16/22

HEALTH EXPECTANCY
REVIEW

This chapter describes the concept of health expectancy and an overview of methods of calculation. It also examines issues in the conceptualization, measurement and valuation of health status. A health expectancy indicator meeting the desirable criteria for summary measures of population health proposed by Murray et al (2000) is proposed.

Papadopoulos, N. T., Carey, J. R., Katsoyannos, B. Y., Kouloussis, N. A., Muller, H. J., Liu, X. **Supine behaviour predicts the time to death in male Mediterranean fruitflies (Ceratitis capitata)**. *Proceedings of the Royal Society of London - B. Biological Sciences* 2002;269:1633-1637.   CB16/50

AGING
HEALTH INDEX
LIFE EXPECTANCY
ACTIVE LIFE EXPECTANCY (ALE)

Authors compute active life and total survival for a male medfly cohort. Inactive life is defined as all life-days beyond supine behaviour is first observed.

Robine, J.-M. *A new health expectancy classification system*. In: Murray, C. J. L., Salomon, J. A., Mathers, C. D., Lopez, A. D., editors. Summary measures of population health concepts, ethics, measurement and applications. Geneva: WHO; 2002. p. 206-211.   CB16/23

HEALTH EXPECTANCY

To improve international comparability of health expectancy indicators it has become necessary to standardize the names used for various indicators. The various terms are explained and defined. A classification system is proposed.

– 2000 –

Chuan, K. E. **Measuring old age health expectancy in Singapore**. *Statistics Singapore newsletter* 2000(3rd quarter):5-9.   CB16/42

HEALTH EXPECTANCY
AGED
ORIGINAL CALCULATION
SULLIVAN METHOD
SINGAPORE
1995

Health expectancy in Singapore is calculated using sullivan method and data from the 1995 National Survey of Senior Citizens.

Manuel, D. G., Goel, V., Williams, J. I., Corey, P. **Health-adjusted Life Expectancy at the Local Level in Ontario**. *Chronic Diseases in Canada* 2000;21(2)   CB16/17

HEALTH EXPECTANCY
HEALTH-ADJUSTED LIFE EXPECTANCY (HALE)
ORIGINAL CALCULATION
SULLIVAN METHOD
ONTARIO
CANADA

Health expectancy measures are becoming a common method of combining information on mortality and health-related quality of life into one summary population health measure. However, health expectancy measures are infrequently measured at the local level, despite a shift toward health service planning to that level. Using a modified Sullivan method, we calculated health-adjusted life expectancy (HALE) for the 42 public health units in Ontario using life tables that were derived from mortality and population data for 1988-1992 and the Health Utilities Index from the 1990 Ontario Health Survey. There were large variations among health units in HALE at age 15 for both men (range: 51.3-58.2 years) and women (range: 56.6-62.9 years). Generally, rural and northern areas had the lowest HALE. Local differences in male HALE were greater than for life expectancy (7.1 versus 6.0 years). Despite a relatively large health survey (45,583 respondents, range: 729-1,746 per health unit), few HALE differences deviated significantly from the Ontario mean, raising concerns about the feasibility of estimating local health expectancy measures with adequate precision. Nevertheless, the wider local differences and different geographic distribution of local HALE compared with mortality measures, along with the additional benefit of being able to model the complex interaction of mortality and morbidity, suggest that HALE may be a useful population health measure

Murray, C. J. L., Salomon, J. A., Mathers, C. D. **A critical examination of summary measures of population health**. *Bulletin of the World Health Organization* 2000;78(8):981-994.   CB16/27

HEALTH EXPECTANCY
REVIEW

This paper reviews the issues and challenges in the design and application of summary measures and presents a framework for evaluating different alternatives. Summary measures have a variety of uses, including comparisons of health in different populations and assessments of the relative contributions of different diseases, injuries and risk factors to the total disease burden in a population. Summary measures may be divided into two broad families: health expectancies and health gaps. Within each family, there are many different possible measures, but they share a number of inputs, including information on mortality, non-fatal health outcomes, and health state valuations. Other critical points include calculation methods and a range of conceptual and methodological issues regarding the definition, measurement and valuation of health states. This paper considers a set of basic criteria and desirable properties that may lead to rejection of certain summary measures and the development of new ones.