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## Ageing

### **1. Social Loneliness after Divorce: Time-Dependent Differential Benefits of Personality, Multiple Important Group Memberships, and Self-Continuity.**

*Lampraki C, Jopp D.S, Spini D, Morselli D. Gerontology, Vol 65, No.3, May 2019, Pp- 275–287*

Background: Critical events in the second half of life, such as divorce, pose a significant threat to well-being. Individuals undergoing divorce often experience feelings of social loneliness and may benefit differently from available resources depending on how much time has passed since the event. Personality traits have been found to be related to adaptation, with particularly strong effects immediately after the critical event. Other resources, such as identity-stabilizing mechanisms (i.e., valued social groups and self-continuity), may play a role only later in adaptation. However, little is known about the benefits of these resources and their potentially time-dependent effects on social loneliness when one is overcoming later-life divorce. Objectives: This study investigates the role of psychological (e.g., personality, self-continuity, multiple important group memberships) and social resources (e.g., new partner, having someone to help deal with divorce) for social loneliness in two post-divorce phases, using a married group as the reference, controlling for sociodemographic aspects and health. Methods: A representative sample of 850 divorced (aged 40–79 years) and 869 married individuals (aged 40–78 years) living in Switzerland were compared, using multiple regression analyses. Results: Differential predictive patterns for social loneliness between the two divorced groups and the married group were observed. For the short-term divorced (up to 2 years after divorce), higher extroversion and agreeableness and lower neuroticism were associated with lower levels of loneliness. For the long-term divorced (2–5 years after divorce) and for those who remained married, extroversion was similarly important for loneliness. Additionally, higher levels of self-continuity and multiple group memberships predicted lower loneliness, but the short-term divorced did not benefit from them. Having someone to help overcome the divorce benefited members of both divorced groups. A new partner was related to less loneliness, but only in the long-term divorced group. Conclusions: Our findings demonstrate that the effects of psychological and social resources on social loneliness vary by adaptation phase. Although extroversion is beneficial for all divorced and married individuals, other personality traits play a more decisive role in the initial adaptation phase. Identity-promoting resources (i.e., multiple group memberships, perceived self-continuity) are

beneficial only later in the adaptation process. To be successful, professional interventions must be tailored as needed.

**Keywords: Social groups, Identity, Divorce phases, Adaptation**

**2. Effectiveness of Daily Use of Bilateral Custom-Made Ankle-Foot Orthoses on Balance, Fear of Falling, and Physical Activity in Older Adults: A Randomized Controlled Trial.** Wang C, Goel R, Rahemi H, Zhang Q, Lepow B and Najafi B. *Gerontology*, Vol 65, No.3, May 2019, Pp-299–307

Background: Foot problems are prevalent in older adults, which may increase the risk and concern for falls. Ankle-foot orthoses (AFO) have been shown to be effective in the stabilization of lower extremities, but their long-term effectiveness in improving balance and their potential to encourage older adults to become more physically active are still debated. Objective: This randomized controlled trial investigated the effectiveness of daily use of a custom-made AFO on balance, fear of falling, and physical activity in older adults. Study Design: Forty-four older adults with concern about or at risk for falling were randomly allocated to either the control group (CG; 77.3% female, age  $75.6 \pm 6.5$  years, BMI  $29.3 \pm 6.4$ ) or the intervention group (IG; 63.6% female, age  $73.7 \pm 6.3$  years, BMI =  $27.8 \pm 4.8$ ). The IG received walking shoes and bilateral custom-made AFO. The CG received only walking shoes. At the baseline and 6-month follow-ups, balance and physical activity were assessed using validated wearable instrumentation and fear of falling was assessed using the Fall Efficacy Scale-International (FES-I). Adherence and acceptability toward wearing the AFO were assessed using self-reported questionnaires at the 6-month follow-up. Results: No significant between-group difference was observed at baseline ( $p = 0.144-0.882$ ). Compared to baseline and the CG, hip, ankle, and center-of-mass (COM) sways were significantly reduced at the 6-month follow-up in the IG while standing with the feet together during the eyes-open condition ( $p = 0.005-0.040$ ). Within the IG, the FES-I was reduced significantly ( $p = 0.036$ ) and there was an increasing trend in the number of walking bouts with a medium effect size ( $d = 0.52$ ,  $p = 0.440$ ) compared to baseline. However, there were no significant changes in FES-I and physical activity measures in the CG ( $p = 0.122-0.894$ ). The reduction in COM sway in the IG was moderately correlated with adherence ( $r = -0.484$ ,  $p = 0.047$ ) and strongly correlated with baseline COM sway ( $r = -0.903$ ,  $p <$

0.001). Conclusion: Results suggest that bilateral custom-made AFO plus walking shoes is effective in improving balance compared to walking shoes alone, and it significantly reduces the fear of falling, with a nonsignificant but noticeable positive trend in physical activity, compared to baseline. The results also suggest that older adults with poor balance at baseline and higher daily adherence to using the AFO will gain more benefit from the AFO intervention.

**Keywords: Ankle-foot orthoses, Older adults, Balance, Fear of falling, Physical activity**

**3. The Adapted Lifestyle-Integrated Functional Exercise Program for Preventing Functional Decline in Young Seniors: Development and Initial Evaluation.** *Schwenk M, Bergquist R, Boulton E, Van Ancum J.M, Nerz C, Weber M, Barz C, Jonkman N.H, Taraldsen K, Helbostad J.L, Vereijken B, Pijnappels M, Maier A.B, Zhang W, Becker C, Todd C, Clemson L, Hawley-Hague H. Gerontology, Vol 65, No.4, July 2019, Pp- 362–374*

Background: The Lifestyle-integrated Functional Exercise (LiFE) program is an intervention integrating balance and strength activities into daily life, effective at reducing falls in at-risk people  $\geq 70$  years. There is potential for LiFE to be adapted to young seniors in order to prevent age-related functional decline. Objective: We aimed to (1) develop an intervention by adapting Lifestyle-integrated Functional Exercise (aLiFE) to be more challenging and suitable for preventing functional decline in young seniors in their 60s and (2) perform an initial feasibility evaluation of the program. Pre-post changes in balance, mobility, and physical activity (PA) were also explored. Methods: Based on a conceptual framework, a multidisciplinary expert group developed an initial aLiFE version, including activities for improving strength, neuromotor performances, and PA. Proof-of-concept was evaluated in a 4-week pre-post intervention study measuring (1) feasibility including adherence, frequency of practice, adverse events, acceptability (i.e., perceived helpfulness, adaptability, level of difficulty of single activities), and safety, and (2) changes in balance/mobility (Community Balance and Mobility Scale) and PA (1 week activity monitoring). The program was refined based on the study results. Results: To test the initial aLiFE version, 31 young seniors were enrolled and 30 completed the study (mean age  $66.4 \pm 2.7$  years, 60% women). Of a maximum possible 16 activities, participants implemented on average

12.1 ± 1.8 activities during the intervention, corresponding to mean adherence of 76%. Implemented activities were practiced 3.6–6.1 days/week and 1.8–7.8 times/day, depending on the activity type. One noninjurious fall occurred during practice, although the participant continued the intervention. The majority found the activities helpful, adaptable to individual lifestyle, appropriately difficult, and safe. CMBS score increased with medium effect size ( $d = 0.72$ ,  $p = 0.001$ ). Increase in daily walking time ( $d = 0.36$ ) and decrease in sedentary time ( $d = -0.10$ ) were nonsignificant. Refinements included further increasing the task challenge of some strength activities and defining the most preferred activities in the trainer's manual to facilitate uptake of the program. Conclusion: aLiFE has the potential to engage young seniors in regular lifestyle-integrated activities. Effectiveness needs to be evaluated in a randomized controlled trial.

**Keywords: Healthy Aging, Exercise, Prevention, Functional Decline, Young Seniors**

**4. Changes in and Interactions between Physical and Mental Health in Older Japanese: The Nakanojo Study.** *Cho S, Park S, Takahashi S, Yoshiuchi K, Shephard R.J, Aoyagi Y. Gerontology, Vol 65, No.4, July 2019, Pp- 340–352*

Background: An age-related decrease in functional capacity is consistently reported, but it is not consistently related to a worsening of health-related quality of life (HRQOL) or psychological adjustment. A poor functional capacity and HRQOL have been associated with anxiety or depression, but the possible causal nature and direction of the relationship remain to be explored using long-term longitudinal data. Objective: The purpose of this study was to examine age-related changes in functional capacity, HRQOL, and scores on the Hospital Anxiety and Depression Scale (HADS), and possible causal interrelationships between these variables. Methods: Study participants were 5,124 Japanese aged  $\geq 65$  years. After the baseline study (2003), annual follow-up observations continued for 10 years. Generalized linear mixed models examined age-related changes in Barthel index (BI), Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG-IC), HRQOL, and HADS. Cross-lagged effects models tested possible causal interrelationships. Results: With age, functional capacity and HRQOL scores showed similar declines in both sexes. Changes in mental health, anxiety, and depression developed more slowly than decreases in physical health (BI, TMIG-IC, and

physical functioning scores). Cross-lagged effects models demonstrated that functional capacity had positive effects on psychological adjustment, and that psychological adjustment had positive effects on functional capacity 5 years later. Interactions between functional capacity and psychological adjustment showed no sex differences. A decline in functional capacity negatively affected psychological adjustment, but reduced psychological adjustment had no significant impact on functional capacity 5 and 10 years later. Moreover, functional capacity and poor psychological adjustment showed no interactions in either sex. Conclusion: Functional capacity and mood state are interrelated. Greater function could sustain vitality and mental health, possibly reducing anxiety and depression.

**Keywords: Functional Capacity, Psychological Adjustment, Age-related Change, Causal Relationships**

**5. Low-Intensity Exercise Suppresses CCAAT/Enhancer-Binding Protein  $\delta$ /Myostatin Pathway Through Androgen Receptor in Muscle Cells.** *Son B.-K, Eto M, Oura M, Ishida Y, Taniguchi S, Ito K, Umeda-Kameyama Y, Kojima T, Akishita M.* Gerontology, Vol 65, No.4, July 2019, Pp- 397–406

Background: Androgen production following exercise has been suggested to contribute anabolic actions of muscle. However, the underlying mechanisms of the androgen receptor (AR) in androgen's action are still unclear. Objective: In the present study, we examined androgen/AR-mediated action in exercise, especially for the suppression of myostatin, a potent negative regulator of muscle mass. Methods: To examine the effects of exercise, we employed low-intensity exercise in mice and electric pulse stimulation (EPS) in C2C12 myotubes. Androgen production by C2C12 myotubes was measured by enzyme-linked immunosorbent assay. To block the action of AR, we pretreated C2C12 myotubes with flutamide. Quantitative real-time polymerase chain reaction was used to determine the expression levels of proteolytic genes including CCAAT/enhancer-binding protein delta (C/EBP $\delta$ ), myostatin and muscle E3 ubiquitin ligases, as well as myogenic genes such as myogenin and PGC1 $\alpha$ . The activation of 5'-adenosine-activated protein kinase and STAT3 was determined by Western blot analysis. Results: Both mRNA and protein levels of AR significantly increased in skeletal muscle of low-intensity exercised mice and C2C12 myotubes exposed to EPS. Production of

testosterone and dihydrotestosterone from EPS-treated C2C12 myotubes was markedly increased. Of interest, we found that myostatin was clearly inhibited by EPS, and its inhibition was significantly abrogated when AR was blocked by flutamide. To test how AR suppresses myostatin, we examined the effects of EPS on C/EBP $\delta$  because the promoter region of myostatin has several C/EBP recognition sites. C/EBP $\delta$  expression was decreased by EPS, and this decrease was negated by flutamide. IL-6 and phospho-STAT3 (pSTAT3) expression, the downstream pathway of myostatin, were decreased by EPS and this was also reversed by flutamide. Similar downregulation of C/EBP $\delta$ , myostatin, and IL-6 was seen in skeletal muscle of low-intensity exercised mice. Conclusions: Muscle AR expression and androgen production were increased by exercise and EPS treatment. As a mechanistical insight, it is suggested that AR inhibited myostatin expression transcriptionally by C/EBP $\delta$  suppression, which negatively influences IL-6/pSTAT3 expression and consequently contributes to the prevention of muscle proteolysis during exercise.

**Keywords: Exercise, Androgen Receptor, Myostatin, Interleukin 6 Proteolysis**

**6. Marital Transitions and Depressive Symptoms among Older Adults: Examining Educational Differences.** *Recksiedler C, Stawski R.S. Gerontology, Vol 65, No.4, July 2019, Pp-407-418*

Background: Later decades of the life course have undergone rapid transformations due to demographic changes in ageing societies, such as more frequent occurrences of later-life marital transitions. Adaption to these transitions, even when welcomed, brings novel chances and challenges in negotiating new social roles in old age, which could reinforce preexisting disparities in the acquisition and mastery of resources, social ties, and coping strategies. Objectives: Because the ability to weather later-life marital transitions may depend on the long arm of education acquired earlier in the life course, the present study aims to identify and track trends in the prevalence of marriage, divorce/separation, and widowhood among sociodemographic subgroups; link the occurrence of those transitions with mental health; and test the influence of educational attainment on these associations. Methods: We employ an intraindividual, within-person approach to quantify the occurrence of marital transitions and their impact using data from the Health and Retirement Study (n = 22,013; 1992-2010). Measures of



transition occurrence, depressive symptoms, and educational attainment were available across up to 10 biennial assessments. Results: Individuals with less than a high school diploma displayed the highest likelihood of losing their significant other through divorce/separation or death. Marital loss was associated with increasing, and marital gain with decreasing, depressive symptoms. Compared to those with less than a high school diploma, individuals with a high school or general equivalency diploma exhibited larger increases in depressive symptoms associated with widowhood, even though their average levels of depressive symptoms were lower in the absence of this transition. Conclusions: Our findings revealed a predictable educational gradient for the occurrence of marital transitions and later-life mental health. Yet higher, formalized education did not protect the participants from increased depression in the presence of a loss-related transition, which could suggest that the strains of spousal loss may to some degree function as a leveler of the preexisting social inequalities of stratified life courses. We conclude that the benefits conferred by education are not necessarily ubiquitous, and its impact on the adaptation to spousal loss may be more complex and nuanced depending on the range of prior experiences and available coping strategies.

**Keywords: Life events, Depression, Education, Social gradient, Ageing Societies, Health and Retirement Study**

## Child Health

**7. Do Children Carry the Weight of Divorce?** *Alice Goisis, Berkay Özcan & Philippe Van Kerm*. *Demography*, Vol 56, No.3, June 2019, Pp-785–811.

Relatively few studies have examined the physical health of children who experience parental separation. The few studies on this topic have largely focused on the United States and have used cross-sectional designs. Our study investigates the relationship between parental separation and children's body mass index (BMI) and overweight/obesity risk using the UK Millennium Cohort Study. Treating parental separation as a process, we analyze variations in children's physical health before and after the date of their parents' separation in order to capture potential anticipation, adaptation, delayed, or cumulative effects. We estimate fixed-effects models to account for the potential correlation between children's physical health and unobserved factors associated with parental separation, such as socioeconomic background and other time-invariant parental characteristics. We find no evidence of statistically significant anticipation effects in the build-up to parental separation or of statistically significant changes in children's physical health immediately after separation. However, our results show that in the longer term, the BMI of children whose parents separate significantly deviates from the BMI of children from intact families. Furthermore, this association is especially strong for separations that occur when children are under age 6.

**Keywords:** Divorce, Physical Health, BMI of children

**8. Boys, Girls, and Grandparents: The Impact of the Sex of Preschool-Aged Children on Family Living Arrangements and Maternal Labor Supply.** *Ang Sun, Chuanchuan Zhang & Xiangting Hu. Demography, Vol 56, No. 3, June 2019, Pp-813–833.*

In this study, we consider household decision-making on living arrangements and maternal labor supply in extended families with young children. In such a context, decision-making is driven by the concerns that the companionship of children is a household public good and that family members share childcare and related domestic duties. The incentive to share children's companionship is affected by son preference, whereas the economic motive of labor division hinges on the potential wage rate of the mother. Both channels play important roles in households with mothers whose wage rates are high, while sharing the companionship of (grand) sons is the main driving force in households with mothers whose wage rates are low. Using China Health and Nutrition Survey (CHNS) data, we find that among less-educated mothers, the incidence of a family coresiding with the paternal grandmother is at least 8.6 percentage points higher if the firstborn is a boy. At the same time, maternal labor supply increases by 2.9 days per month. By contrast, for educated mothers, the propensity for coresidence is higher, the working hours are longer, and the impact of the child's sex is not significant. Our study not only provides a better understanding of the demographic and economic factors determining coresidence and intrahousehold time allocations but also lends empirical support to policies aiming to increase female labor supply and improve the well-being of girls.

**Keywords: Family Living Arrangements, Maternal Labor, Son Preference**

**9. The Impact of Childcare on Poor Urban Women's Economic Empowerment in Africa.** *Shelley Clark, Caroline W. Kabiru, Sonia Laszlo & Stella Muthuri. Demography, Vol 56, No. 4, Aug 2019, Pp-1247–1272.*

Despite evidence from other regions, researchers and policy-makers remain skeptical that women's disproportionate childcare responsibilities act as a significant barrier to

women's economic empowerment in Africa. This randomized control trial study in an informal settlement in Nairobi, Kenya, demonstrates that limited access to affordable early childcare inhibits poor urban women's participation in paid work. Women who were offered vouchers for subsidized early childcare were, on average, 8.5 percentage points more likely to be employed than those who were not given vouchers. Most of these employment gains were realized by married mothers. Single mothers, in contrast, benefited by significantly reducing the time spent working without any loss to their earnings by shifting to jobs with more regular hours. The effects on other measures of women's economic empowerment were mixed. With the exception of children's health care, access to subsidized day care did not increase women's participation in other important household decisions. In addition, contrary to concerns that reducing the costs of childcare may elevate women's desire for more children, we find no effect on women's fertility intentions. These findings demonstrate that the impact of subsidized childcare differs by marital status and across outcomes. Nonetheless, in poor urban Africa, as elsewhere, failure to address women's childcare needs undermines efforts to promote women's economic empowerment.

**Keywords: Economic Empowerment, Childcare, Africa**

#### **10. Rising Household Debt and Children's Socioemotional Well-being Trajectories.**

*Lawrence M. Berger & Jason N. Houle. Demography, Vol 56, No. 4, Aug 2019, Pp-1273-1301.*

Debt is now a substantial aspect of family finances. Yet, research on how household debt is linked with child development has been limited. We use data from the National Longitudinal Survey of Youth 1979 cohort and hierarchical linear models to estimate associations of amounts and types of parental debt (home, education, auto, unsecured/uncollateralized) with child socioemotional well-being. We find that unsecured debt is associated with growth in child behavior problems, whereas this is not the case for other forms of debt. Moreover, the association of unsecured debt with child behavior problems varies by child age and socioeconomic status, with younger children and children from less-advantaged families experiencing larger associations of unsecured debt with greater behavior problems.

**Keywords: Household Debt, Socioemotional Well-being, Child Behavior**

**11. When and Where Birth Spacing Matters for Child Survival: An International Comparison Using the DHS.** *Joseph Molitoris, Kieron Barclay & Martin Kolk.* Demography, Vol 56, No. 4, Aug 2019, Pp-1349–1370.

A large body of research has found an association between short birth intervals and the risk of infant mortality in developing countries, but recent work on other perinatal outcomes from highly developed countries has called these claims into question, arguing that previous studies have failed to adequately control for unobserved heterogeneity. Our study addresses this issue by estimating within-family models on a sample of 4.5 million births from 77 countries at various levels of development. We show that after unobserved maternal heterogeneity is controlled for, intervals shorter than 36 months substantially increase the probability of infant death. However, the importance of birth intervals as a determinant of infant mortality varies inversely with maternal education and the strength of the relationship varies regionally. Finally, we demonstrate that the mortality-reducing effects of longer birth intervals are strong at low levels of development but decline steadily toward zero at higher levels of development. These findings offer a clear way to reconcile previous research showing that birth intervals are important for perinatal outcomes in low-income countries but are much less consequential in high-income settings.

**Keywords: Birth Spacing, Child Survival, Infant Mortality**

**12. Indian growth references from 0-18-Year-Old children and adolescents - A comparison of two methods.** *Vaman Khadilkar, Anuradha V Khadilkar, Neha Kajale.* Indian Journal of Endocrinology and Metabolism, Vol 23, No. 6, Nov-Dec 2019, Pp- 635-644

**Background and Aims:** For updating growth references, large datasets are usually required; collection of these data is expensive and cumbersome. Using a combination of regression equations, Preece Baines model and global LMS values, synthetic growth references for the target population can be generated. The objective of this study is to

compare growth references created from continuous anthropometric data using LMS method versus those created synthetically from anthropometric means at key ages. Methods: De-identified data on 46421 children (26037 boys) from 0-18 years of age from several multicentric studies conducted by the authors' group (2007 to 2017) were included in this study; growth references were constructed using the LMS method. For the production of synthetic references, arithmetic means of heights and weights at key ages were used and global LMS values were used from literature. Results: There was no difference in the medians for height, weight and BMI between the references created by the two methods. The extreme percentile values for height were similar ( $P < 0.05$ ). However, the spread of values for weight and BMI was narrower in the synthetic references. Conclusion: Growth references produced from continuous data differ from those produced synthetically using anthropometric means mainly at the extreme centiles for weight and body mass index; synthetic references take into consideration global trends over several decades.

**Keywords: Children, Height, India, LMS Method, Synthetic Growth References**

## Demography

**13. Local Social Inequality, Economic Inequality, and Disparities in Child Height in India.** *Diane Coffey, Ashwini Deshpande, Jeffrey Hammer & Dean Spears.* Demography, Vol 56, No. 4, Aug 2019, Pp-1427–1452.

This study investigates disparities in child height—an important marker of population-level health—among population groups in rural India. India is an informative context in which to study processes of health disparities because of wide heterogeneity in the degree of local segregation or integration among caste groups. Building on a literature that identifies discrimination by quantifying whether differences in socioeconomic status (SES) can account for differences in health, we decompose height differences between rural children from higher castes and rural children from three disadvantaged groups. We find that socioeconomic differences can explain the height gap for children from Scheduled Tribes (STs), who tend to live in geographically isolated places. However, SES does not fully explain height gaps for children from the Scheduled Castes (SC) and Other Backward Classes (OBCs). Among SC and OBC children, local processes of discrimination also matter: the fraction of households in a child's locality that outrank her household in the caste hierarchy predicts her height. SC and OBC children who are surrounded by other lower-caste households are no shorter than higher-caste children of the same SES. Our results contrast with studies from other populations where segregation or apartheid are negatively associated with health.

**Keywords:** Social Inequality, Economic Inequality, Child Height, Population-level Health, India

**14. A Cohort Perspective on the Demography of Grandparenthood: Past, Present, and Future Changes in Race and Sex Disparities in the United States.** *Rachel Margolis & Ashton M. Verdery.* *Demography*, Vol 56, No. 4, Aug 2019, Pp-1495–1518.

How has the demography of grandparenthood changed over the last century? How have racial inequalities in grandparenthood changed, and how are they expected to change in the future? Massive improvements in mortality, increasing childlessness, and fertility postponement have profoundly altered the likelihood that people become grandparents as well as the timing and length of grandparenthood for those that do. The demography of grandparenthood is important to understand for those taking a multigenerational perspective of stratification and racial inequality because these processes define the onset and duration of intergenerational relationships in ways that constrain the forms and levels of intergenerational transfers that can occur within them. In this article, we discuss four measures of the demography of grandparenthood and use simulated data to estimate the broad contours of historical changes in the demography of grandparenthood in the United States for the 1880–1960 birth cohorts. Then we examine race and sex differences in grandparenthood in the past and present, which reveal declining inequality in the demography of grandparenthood and a projection of increasing group convergence in the coming decades.

**Keywords: Grandparenthood, Race and Sex Disparities, United States**

**15. Tied Together: Adolescent Friendship Networks, Immigrant Status, and Health Outcomes.** *Cassie McMillan.* *Demography*, Vol 56, No. 3, June 2019, Pp-1075–1103.

This study examines the social integration of adolescent immigrants by directly analyzing the composition of their friendship networks. Using statistical network analysis, I first consider whether adolescents are more likely to befriend peers who share their immigrant generation status in a large, diverse sample of 7th through 12th graders from the National Longitudinal Study of Adolescent to Adult Health ( $n =$



67,586). Next, I test whether having a higher proportion of same-generation friends can protect immigrant youth from experiencing negative health outcomes and adopting risky behaviors. Results indicate that adolescents are more likely to form friendships with peers who share their immigrant generation status and that this tendency is particularly strong for first-generation immigrants. Furthermore, immigrant youth with greater proportions of same-generation friends are less likely to report several negative health behaviors and outcomes. My findings suggest that same-generation friendships can serve as a protective mechanism for immigrant youth, which may help explain the existence of an immigrant health paradox.

**Keywords: Adolescent Immigrants, Generation Friendships, Health Outcomes**

**16. Mind the “Happiness” Gap: The Relationship Between Cohabitation, Marriage, and Subjective Well-being in the United Kingdom, Australia, Germany, and Norway.** *Brienna Perelli-Harris, Stefanie Hoherz, Trude Lappegård & Ann Evans.* *Demography*, Vol 56, No. 4, Aug. 2019, Pp-1219–1246.

Many studies have found that married people have higher subjective well-being than those who are not married. Yet the increase in cohabitation raises questions as to whether only marriage has beneficial effects. In this study, we examine differences in subjective well-being between cohabiting and married men and women in midlife, comparing the United Kingdom, Australia, Germany, and Norway. We apply propensity score-weighted regression analyses to examine selection processes into marriage and differential treatment bias. We find no differences between cohabitation and marriage for men in the United Kingdom and Norway, and women in Germany. However, we do find significant differences for men in Australia and women in Norway. The differences disappear after we control for selection in Australia, but they unexpectedly persist for Norwegian women, disappearing only when we account for relationship satisfaction. For German men and British and Australian women, those with a lower propensity to marry would benefit from marriage. Controls eliminate differences for German men, although not for U.K. women, but relationship satisfaction reduces differences. Overall, our study indicates that especially after selection and relationship satisfaction are taken into account, differences between marriage and cohabitation disappear in all countries.

Marriage does not lead to higher subjective well-being; instead, cohabitation is a symptom of economic and emotional strain.

**Keywords: Cohabitation, Marriage, Subjective Well-being, United Kingdom, Australia, Germany, Norway**

## Disease

**17. Prevalence and Associated Factors of Sarcopenia and Frailty in Parkinson's Disease: A Cross-Sectional Study.** *Peball M, Mahlkecht P, Werkmann M, Marini K, Murr F, Herzmann H, Stockner H, de Marzi R, Heim B, Djamshidian A, Willeit P, Willeit J, Kiechl S, Valent D, Krismer F, Wenning G.K, Nocker M, Mair K, Poewe W and Seppi K.* *Gerontology*, Vol.65, No. 3, May 2019, Pp- 216–228

Background: Sarcopenia and frailty are found in up to one-third of the general elderly population. Both are associated with major adverse health outcomes such as nursing home placement, disability, decreased quality of life, and death. Data on the frequency of both syndromes in Parkinson's disease (PD), however, are very limited. Objective: We aimed to screen for sarcopenia and frailty in PD patients and to assess potential associations of both geriatric syndromes with demographic and clinical parameters as well as quality of life. Methods: In this observational, cross-sectional study, we included 104 PD patients from a tertiary center and 330 non-PD controls from a population-based cohort aged > 65 years. All groups were screened for sarcopenia using the SARC-F score and for frailty using the Clinical Frailty Scale of the Canadian Study of Health and Aging (CSHA CFS). Prevalence rates of sarcopenia and frailty were also assessed in 18 PD patients from a population-based cohort aged > 65 years. Moreover, PD patients from the tertiary center were evaluated for motor and non-motor symptoms, quality of life, and dependency. Results: The prevalence of sarcopenia was 55.8% (95% CI: 46.2–64.9%) in PD patients from the tertiary center and 8.2% (5.7–11.7%;  $p < 0.001$ ) in non-PD controls. Frailty was detected in 35.6% (27.0–45.2%) and 5.2% (3.2–8.1%;  $p < 0.001$ ). Prevalence rates for sarcopenia and frailty were 33.3% (16.1–56.4%;  $p = 0.004$ ) and 22.2% (8.5–45.8%;  $p = 0.017$ ) in the community-based PD sample. Both sarcopenia and frailty were significantly associated with longer disease duration, higher motor impairment, higher Hoehn and Yahr stages, decreased quality of life, higher frequency of falls, a higher non-motor symptom burden, institutionalization, and higher care levels in PD patients from a tertiary center compared to not affected PD patients (all  $p < 0.05$ ). Conclusions: Both frailty and sarcopenia are more common in PD patients than in the general community and are associated with a more adverse course of the disease. Future studies should look into underlying risk factors for the occurrence of sarcopenia and frailty in PD patients and into adequate management to prevent and mitigate them.

**Keywords: Parkinson's disease, Sarcopenia, Frailty, Prevalence, Epidemiology, Bruneck Study**

**18. The Long-Lasting Influenza: The Impact of Fetal Stress During the 1918 Influenza Pandemic on Socioeconomic Attainment and Health in Sweden, 1968–2012.** *Jonas Helgertz & Tommy Bengtsson.* *Demography*, Vol 56, No. 4, Aug 2019, Pp-1389–1425.

The 1918 influenza pandemic had not only a massive instant death toll but also lasting effects on its survivors. Several studies have shown that children born in 1919, and thus exposed to the H1N1 virus in utero, experienced worse health and socioeconomic outcomes in older ages than surrounding birth cohorts. This study combines several sources of contemporary statistics with full-population individual-level data for Sweden during 1968–2012 to examine the influence of fetal exposure to the Spanish flu on health, adulthood income, and occupational attainment. For both men and women, fetal exposure resulted in higher morbidity in ages 54–87, as measured by hospitalization. For males, exposure during the second trimester also affected mortality in cancer and heart disease. Overall, the effects on all-cause mortality were modest, with about three months shorter remaining life expectancy for the cohorts exposed during the second trimester. For socioeconomic outcomes, results fail to provide consistent evidence supporting any long-term consequences of fetal exposure. We conclude that although the immediate health effects of exposure to the 1918 pandemic were huge, the long-term effects were modest in size.

**Keywords: Fatal Stress, Influenza Pandemic, Socioeconomic Attainment, Sweden**

**19. Prevalence of psychiatric comorbidity among patients of type 2 diabetes mellitus in a hilly state of North India.** *Neeraj Kanwar, Ravi C Sharma, Dinesh D Sharma, Ramesh, Kiran Mokta, Jatinder K Mokta.* Indian Journal of Endocrinology and Metabolism, Vol 23, No. 6, Nov-Dec 2019, Pp-602-608.

Background: Psychiatric comorbidity with diabetes mellitus is common. Comorbidity of diabetes and psychiatric disorders can present in different patterns, which are associated with impaired quality of life, increased cost of care, poor treatment adherence, poor glycaemia control and increased emergency room visits. The present study was planned to assess the psychiatric comorbidity in type 2 diabetic patients at tertiary care hospital in a hilly state of North India. Objectives: To study the prevalence of psychiatric comorbidity among patients of type 2 diabetes mellitus and to study the association between psychiatric comorbidity, sociodemographic and clinical variables in such patients. Materials and Methods: A cross-sectional study was conducted after enrolling the eligible diabetic patients attending outpatient department services of medicine department, Indira Gandhi Medical College, Shimla. The Brief Illness Perception Questionnaire was used to assess the cognitive and emotional aspects of illness, Hamilton Depression Rating Scale for assessment of depression, Hamilton Anxiety Rating Scale for assessing severity of anxiety and Mini-International Neuropsychiatric Interview 6.0 for screening all major Axis I disorders. Results: Out of 320 patients of type 2 diabetes mellitus screened, 202 eligible patients were enrolled. Depression was the most common psychiatric comorbid illness present in (41.9%) patients. Depression was slightly higher in female patients and persons aged >50 years. Greater prevalence of depressive episodes was there in people with longer duration of diabetes. Conclusion: There were a significant percentage of diabetic patients having psychiatric illnesses. Their attitude towards these comorbidities may be changed by psychiatric counselling at regular intervals.

**Keywords: Comorbidity, Depression, Diabetes, Quality of Life**

**20. The effect of educational program based on the extended theory of reasoned action on Self-Care behaviors in women with type 2 diabetes.** *Ali Khani Jeihooni, Zahra Khiyali, Forough Faghih, Pooyan Afzali Harsini, Milad Rahbar.* Indian Journal of Endocrinology and Metabolism, Vol 23, No. 6, Nov-Dec 2019, Pp- 609-615

**Background and Objective:** The aim of this study is to determine the effect of educational program based on the extended theory of reasoned action on self-care behaviours in women with type 2 diabetes in Fasa. This quasi-experimental study was performed on 100 women with type 2 diabetes who referred to diabetes clinics in Fasa. **Materials and Methods:** Samples were randomly divided into experimental and control groups. The data were collected using a questionnaire based on the extended theory of reasoned action and self-care behaviours that were completed by both the control and experimental groups before and 3 months after the educational intervention. Data were analysed by SPSS software version 22, descriptive statistics tests, Chi-square test, independent T-test, and paired T-test. **Results:** The results of the study showed that after the educational intervention, the mean scores of all constructs of the extended theory of reasoned action in the experimental group were significantly increased compared to the control group ( $P < 0.05$ ). **Conclusion:** Also, the educational intervention had a significant effect on the promotion of patient's self-care behaviours in the experimental group and the HbA1c level decreased in the experimental group compared to the control group ( $P < 0.05$ ). In addition, it was found that the extended theory of reasoned action could be a suitable framework for designing educational interventions for promoting self-care behaviours in diabetic patients.

**Keywords:** Education, Self-care Behavior, Extended Theory of Reasoned Action, Type 2 Diabetes

**21. Cross-sectional Study on vitamin D levels in stress urinary incontinence in women in a tertiary referral center in India.** *Jai B Sharma, Vivek Kakkad, Sunesh Kumar, KK Roy.* Indian Journal of Endocrinology and Metabolism, Vol 23, No. 6, Nov-Dec 2019, Pp- 623-627.

**Objective:** To assess the levels of vitamin D in patients with Stress Urinary Incontinence (SUI) in gynecology clinic of All India Institute of Medical Sciences, New Delhi. **Materials and Methods:** This is a cross sectional study on a total of 40 women presenting to gynecology outpatient department with stress urinary incontinence diagnosed by history and examination. The women were divided with moderate, severe and very severe SUI confirmed by incontinence severity index (ISI) and pad test. Vitamin D (serum 25 OH D) levels were measured in all cases by electrochemiluminescence Immunoassay (ECLIA) using Roche Elecsys 2010 and levels of  $\geq 30$  ng/ml were taken as sufficient while levels between 20-30 ng/ml as insufficient and  $< 20$  ng/ml as deficient. Statistical analysis was performed using ANOVA test with P value of  $< 0.05$  taken as significant. **Results:** Mean age of patients was 41.6 years. Mean parity was 2.73 and mean duration of symptoms was 4.14 years. Vitamin D levels ranged between 6-38 ng/ml with mean being  $17.15 \pm 8.1$  ng/ml. Levels were deficient ( $< 20$  ng/ml) in 30 (75%) women, insufficient (20-30ng/ml) in 7 (17.5%) women and sufficient ( $> 30$ ng/ml) in 3 (7.57%) women. There was no significant correlation between severity of SUI and levels of vitamin D with Vit D being  $19.18 \pm 5.76$  ng/ml in moderate SUI,  $16.96 \pm 9.03$  ng/ml in severe SUI and  $13.60 \pm 2.09$  ng/ml in very severe SUI. **Conclusion:** There was very high prevalence of vitamin D deficiency in SUI patients with 75% patients showing deficient levels and 17.5% showing insufficient levels in SUI patients. There is need to provide vitamin D supplementation in such women.

**Keywords:** Incontinence Severity Index (ISI), Pad Test, Stress Urinary Incontinence (SUI), Vitamin D

**22. Feasibility and outcome of community-based screening for cardiovascular disease risk factors in a remote rural area of South India: The Chunampet rural-Cardiovascular health assessment and management program.** *Ariarathinam Newtonraj, Kalaiselvi Selvaraj, Anil J Purty, Sunil K Nanda, Mark C Arokiaraj, Antony Vincent, Mani Manikandan.* Indian Journal of Endocrinology and Metabolism, Vol 23, No. 6, Nov-Dec 2019, Pp- 628-634.

**Background:** As committed by India in Global Action Plan, Sustainable Development Goals and National Health Policy 2017, India has the responsibility to provide accessible, affordable noncommunicable disease care to the people. Our study aimed to find out the burden of cardiovascular risk factors among hypertension and diabetic patients, through a community-based screening, in a remote rural area of South India. **Methods:** A special program named “Chunampet Rural-Cardiovascular Health Assessment and Management Program” (CR-CHAMP) was launched in August and September 2017 in a Rural Health Training Center (RHTC), functioning under a private medical college in South India. In this program, participants with hypertension (HT) and diabetes (DM) were line listed from 10 remote villages, and then history, initial biochemical, hormonal, and hematological screenings were done to assess the cardiovascular diseases (CVDs) risk factors among these patients, following which special consultation was offered in RHTC. **Results:** Out of 415 eligible patients with HT and DM, 389 were approached; among them, 328 were willing to participate and were screened initially; among them, 235 were attended special consultation. Higher CVD risk was found in 21%. Prevalence of chronic kidney disease was 14%, deranged lipid profile was more than 50%, metabolic syndrome was 49%, anemia was 68%, abnormal waist-hip ratio was 56%, abdominal obesity was 59%, and overweight and obesity using body mass index (BMI) was 59%. Females' participation was more in our community-based screening procedure (66%) than male participation (34%). **Conclusion:** CR-CHAMP demonstrated feasibility and value of implementing a screening program for high-risk individuals with HT and DM for CVD risk through existing primary care in a remote rural area of South India. This will help the National Program and policymakers to plan for interventions in the remote rural area in future.

**Keywords: Cholesterol, Diabetes, Hypertension, Public Health, Screening**



**23. The effect of educational intervention based on BASNEF model on self-medication behavior of type 2 diabetic patients.** *Ali Khani Jeihooni, Maryam Barati, Amin Kouhpayeh, Seyyed Mansour Kashfi, Pooyan Afzali Harsini, Milad Rahbar.* Indian Journal of Endocrinology and Metabolism, Vol 23, No. 6, Nov-Dec 2019, Pp- 616-622

Background: Diabetes is one of the main reasons of the increase of morbidity and mortality around the world. Considering the burden of disease, self-medication can result in irrecoverable consequences. The aim of this study is to investigate the effect of educational intervention based on Beliefs, Attitudes, Subjective Norms and Enabling Factors (BASNEF) model on self-medication behaviors of type 2 diabetic patients in Fasa, Fars province, Iran, in 2017–2018. Materials and Methods: In this quasi-experimental study, 200 type 2 diabetic patients under cover of the diabetes center of Fasa were investigated (100 patients for experimental group and 100 patients for control group). A questionnaire investigating demographic information and BASNEF Model constructs (knowledge, attitude, enabling factors, subjective norms, and behavioral intention) was used for evaluating self-medication behaviors of patients before and 3 months after intervention. Results: The average age of experimental group was  $53.25 \pm 8.42$  and the average age of control group was  $54.18 \pm 8.13$ . Three months after intervention, experimental group showed significant enhancement in knowledge, attitude, enabling factors, subjective norms, and behavioral intention and their self-medication behaviors reduced, while control group showed no significant changes in mentioned factors. Conclusion: The present study indicated the efficiency of BASNEF model on reduction of self-medication behaviors of diabetic patients. Hence, this model can act as a framework for designing and implementing educational interventions in this field.

**Keywords: BASNEF Model, Diabetic Patients, Self-medication, Subjective Norms**

**24. Access to healthcare for children with Congenital Zika Syndrome in Brazil: perspectives of mothers and health professionals.** *Maria S V Albuquerque, Tereza M Lyra, Ana P L Melo, Sandra A Valongueiro, Thalia V B Araújo, Camila Pimentel, Martha C N Moreira, Corina H F Mendes, Marcos Nascimento, Hannah Kuper.* Health Policy and Planning, Vol 34, No. 7, September 2019, Pp- 499–507

The Congenital Zika Syndrome (CZS) epidemic took place in Brazil between 2015 and 2017 and led to the emergence of at least 3194 children born with CZS. We explored access to healthcare services and activities in the Unified Health Service (Sistema Único de Saúde: SUS) from the perspective of mothers of children with CZS and professionals in the Public Healthcare Network. We carried out a qualitative, exploratory study, using semi-structured interviews, in two Brazilian states—Pernambuco, which was the epicentre of the epidemic in Brazil, and Rio de Janeiro, where the epidemic was less intense. The mothers and health professionals reported that healthcare provision was insufficient and fragmented and there were problems with follow-up care. There was a lack of co-ordination and an absence of communication between the various specialized services and between different levels of the health system. We also noted a public-private mixture in access to healthcare services, resulting from a segmented system and related to inequality of access. High reported household expenditure is an expression of the phenomenon of underfunding of the public system. The challenges that mothers and health professionals reported exposes contradictions in the health system which, although universal, does not guarantee equitable and comprehensive care. Other gaps were revealed through the outbreak. The epidemic provided visibility regarding difficulties of access for other children with disabilities determined by other causes. It also made explicit the gender inequalities that had an impact on the lives of mothers and other female caregivers, as well as an absence of the provision of care for these groups. In the face of an epidemic, the Brazilian State reproduced old fashioned forms of action—activities related to the transmitting mosquito and to prevention with an emphasis on the individual and no action related to social determinants.

**Keywords:** Access, Health System, Zika, Disability

**25. At-scale evidence from 26 national household surveys on the prevention of mother-to-child transmission of HIV cascade.** *Nicholas Wilson.* Health Policy and Planning, Vol 34, No. 7, September 2019, Pp- 514–519.

Prevention of mother-to-child transmission of HIV (PMTCT) can virtually eliminate vertical HIV transmission, yet more than 160 000 children were newly infected with HIV in 2016. We conducted a pooled analysis of national household surveys from 26

sub-Saharan African countries and calculated PMTCT coverage and access using unconditional and conditional likelihoods. Logistic regression analysis adjusted for country of residence was used to measure the association between socio-demographic factors and PMTCT coverage. The largest loss in the PMTCT cascade access occurred at being offered a HIV test at an antenatal care (ANC) clinic visit, with only 62.6% of women visiting an ANC clinic being offered a HIV test. Logistic regression analysis adjusted for country of residence indicated that completing primary school was associated with a higher likelihood of completing each step in the PMTCT cascade, including being offered a HIV test [odds ratio 2.18 (95% CI: 2.09–2.26)]. Urban residence was associated with a higher likelihood of completing each step in the PMTCT cascade, including being offered a HIV test [odds ratio 2.23 (95% CI: 2.15–2.30)]. To increase progression through the PMTCT cascade, policy-makers should target the likelihood an ANC client is offered a HIV test and the likelihood of facility delivery, steps where access is the lowest. Low educational attainment women and women in rural areas appear to have the lowest coverage in the cascade, suggesting that policy-makers target these individuals.

**Keywords: Africa South of the Sahara, Child, Demography, Educational status, Mothers Prenatal Care, HIV Screening, HIV Transmission, Clients Prevention**

**26. Are health workers reduced to being drug dispensers of antiretroviral treatment? A randomized cross-sectional assessment of the quality of health care for HIV patients in northern Uganda.** *Ulrike G Seeberger, Joseph J Valadez.* Health Policy and Planning, Vol 34, No. 8, October 2019, Pp- 559–565.

High quality of care (QoC) for antiretroviral treatment (ART) is essential to prevent treatment failure. Uganda, as many sub-Saharan African countries, increased access to ART by decentralizing provision to districts. However, little is known whether this rapid scale-up maintained high-quality clinical services. We assess the quality of ART in the Acholi and Lango sub-regions of northern Uganda to identify whether the technical quality of critical ART sub-system needs improvement. We conducted a randomized cross-sectional survey among health facilities (HF) in Acholi (n = 11) and Lango (n = 10). Applying lot quality assurance sampling principles with a rapid health facility assessment tool, we assessed ART services vis-à-vis national treatment guidelines using

37 indicators. We interviewed health workers (n = 21) using structured questionnaires, directly observed clinical consultations (n = 126) and assessed HF infrastructure, human resources, medical supplies and patient records in each health facility (n = 21). The district QoC performance standard was 80% of HF had to comply with each guideline. Neither sub-region complied with treatment guidelines. No HF displayed adequate: patient monitoring, physical examination, training, supervision and regular monitoring of patients' immunology. The full range of first and second line antiretroviral (ARV) medication was not available in Acholi while Lango had sufficient stocks. Clinicians dispensed available ARVs without benefit of physical examination or immunological monitoring. Patients reported compliance with drug use (>80%). Patients' knowledge of preventing HIV/AIDS transmission concentrated on condom use; otherwise it was poor. The poor ART QoC in northern Uganda raises major questions about ART quality although ARVs were dispensed. Poor clinical care renders patients' reports of treatment compliance as insufficient evidence that it takes place. Further studies need to test patients' immunological status and QoC in more regions of Uganda and elsewhere in sub-Saharan Africa to identify topical and geographical areas which are priorities for improving HIV care.

**Keywords: Antiretroviral Therapy, Quality of Care, HIV/AIDS Treatment, Uganda, Direct Observation**

## Fertility

**27. Shared Lifetimes, Multigenerational Exposure, and Educational Mobility.** *Xi Song & Robert D. Mare*. *Demography*, Vol 56, No. 3, June 2019, Pp-891–916.

In this article, we report analyses of the effects of fertility and mortality trends on the mutual exposure of grandparents and grandchildren and their consequences for multigenerational processes of social mobility in the United States from 1900 to 2010. Using historical vital statistics and stable population models, we report systematic analyses of grandparent-grandchild exposures from both prospective (grandparent) and retrospective (grandchild) perspectives. We also estimate exposure levels and trends specific to education levels of grandparents and grandchildren and decompose the overall trend into the effect of changing mortality, fertility level, and fertility timing. We show that changes in mutual exposure of grandparent and grandchild generations may have contributed to an increasing association between grandparents' and grandchildren's educational attainments.

**Keywords: Multigenerational Exposure, Fertility and Mortality, United States**

**28. The Effects of Conflict on Fertility: Evidence From the Genocide in Rwanda.** *Kati Kraehnert, Tilman Brück, Michele Di Maio & Roberto Nisticò*. *Demography*, Vol 56, No. 3, June 2019, Pp-935– 968.

Our study analyzes the fertility effects of the 1994 genocide in Rwanda. We study the effects of violence on both the duration time to the first birth in the early post-genocide period and on the total number of post-genocide births per woman up to 15 years following the conflict. We use individual-level data from Demographic and Health Surveys, estimating survival and count data models. This article contributes to the

literature on the demographic effects of violent conflict by testing two channels through which conflict influences fertility: (1) the type of violence exposure as measured by the death of a child or sibling, and (2) the conflict-induced change in local demographic conditions as captured by the change in the district-level sex ratio. Results indicate the genocide had heterogeneous effects on fertility, depending on the type of violence experienced by the woman, her age cohort, parity, and the time horizon (5, 10, and 15 years after the genocide). There is strong evidence of a child replacement effect. Having experienced the death of a child during the genocide increases both the hazard of having a child in the five years following the genocide and the total number of post-genocide births. Experiencing sibling death during the genocide significantly lowers post-genocide fertility in both the short-run and the long-run. Finally, a reduction in the local sex ratio negatively impacts the hazard of having a child in the five years following the genocide, especially for older women.

**Keywords: Fertility, Genocide, Sex ratio, Rwanda**

**29. Causal Impact of Having a College Degree on Women's Fertility: Evidence From Regression Kink Designs.** *Hosung Sohn & Suk-Won Lee.* *Demography*, Vol 56, No. 3, June 2019, Pp-969–990.

An important factor speculated to affect fertility level is education. Theoretical predictions regarding whether education increases or decreases fertility are ambiguous. This study analyzes the causal impact of higher education on fertility using census data administered by Statistics Korea. To account for the endogeneity of education, this study exploits the Korean higher education reform initiated in 1993 that boosted women's likelihood of graduating from college. Based on regression kink designs, we find that having a college degree reduces the likelihood of childbirths by 23 percentage points and the total number of childbirths by 1.3. Analyses of possible mechanisms show that labor market-related factors are a significant channel driving the negative effects; female college graduates are more likely to be wage earners and more likely to have high-wage occupations.

**Keywords: Fertility, Childbirths, Higher Education**

## Healthcare

**30. Multimethodology applied to the evaluation of Healthcare in Brazilian municipalities.** *Marcos Pereira Estellita Lins, Sergio Orlando Antoun Netto & Maria Stella de Castro Lobo.* Health Care Management Science, Vol 22, No. 2, June 2019, Pp-197–214

The integration of quantitative indicators with qualitative descriptions of context is a noticeable demand from many different scientific disciplines, since it contributes to linking theoretical and practical approaches to problem solving. Amongst them are the problem structuring methods, systems thinking and multimethodology. This work presents a mixed quantitative and qualitative methodological approach to aid formulation and structuring of performance measurement of health care in 5565 Brazilian municipalities. Data mining and data envelopment analysis (DEA) are applied in the context of conceptual mapping, thus shedding light on both quantitative and qualitative factors that influence health performance. Our aim is to propose a methodology for performance indicators to support health care policy making in Brazil, using quantitative indicators. However, the approach does not lose track of the role of important qualitative factors in the attribution of meaning to performance assessments. The methodological and analytical results can strengthen mutual understanding by analysts and stakeholders of the problem at hand. Quantitative results allow inefficient municipalities to understand the causes of their overall efficiency in terms of particular low partial DEA efficiencies combined with high deathrates.

**Keywords: Multimethodology, Healthcare, Brazil, Performance Measurement**

**31. Appointment scheduling in multi-stage outpatient clinics.** *Kenneth J. Klassen & Reena Yoogalingam.* Health Care Management Science, Vol 22, No.2, June 2019, Pp-229–244.

Healthcare providers can benefit from adding less costly capacity to their existing resources in order to satisfy demand while maintaining the quality of patient care. The addition of mid-level service providers (MLSPs) such as physician assistants or nurse

practitioners that carry out portions of patient care provides a viable alternative for adding physician capacity. This research considers the circumstances under which adding an MLSP to a single-physician outpatient office becomes the best strategy for the clinic, and determines how scheduling policies from the widely-researched single-stage environment should be adjusted for a multi-stage environment. Compared to a single-stage system where a physician completes all portions of the service, we show that adding an MLSP can reduce patient waiting time, patient flow time, and physician service time with patients. This, in turn, can enable the clinic to see more patients and/or free up physician time for other tasks. Appointment scheduling rules are developed for a multi-stage outpatient service system using a simulation optimization approach. Performance measures focus on the patient experience and clinic operation before and during each stage of service.

**Keywords: Mid-level Service Providers, Healthcare**

**32. The use of Data Envelopment Analysis (DEA) in healthcare with a focus on hospitals.** *Sebastian Kohl, Jan Schoenfelder, Andreas Fügner & Jens O. Brunner.* Health Care Management Science, Vol 22, No.2, June 2019, Pp-245–286

The healthcare sector in general and hospitals in particular represent a main application area for Data Envelopment Analysis (DEA). This paper reviews 262 papers of DEA applications in healthcare with special focus on hospitals and therefore closes a gap of over ten years that were not covered by existing review articles. Apart from providing descriptive statistics of the papers, we are the first to examine the research purposes of the publications. These research goals can be grouped into four distinct clusters according to our proposed framework. The four clusters are (1) “Pure DEA efficiency analysis”, i.e. performing a DEA on hospital data, (2) “Developments or applications of new methodologies”, i.e. applying new DEAY approaches on hospital data, (3) “Specific management question”, i.e. analyzing the effects of managerial specification, such as ownership, on hospital efficiency, and (4) “Surveys on the effects of reforms”, i.e. researching the impact of policy making, such as reforms of health systems, on hospital efficiency. Furthermore, we analyze the methodological settings of the studies and describe the applied models. We analyze the chosen inputs and outputs as well as all relevant downstream techniques. A further contribution of this paper is its



function as a roadmap to important methodological literature and publications, which provide crucial information on the setup of DEA studies. Thus, this paper should be of assistance to researchers planning to apply DEA in a hospital setting by providing information on a) what has been published between 2005 and 2016, b) possible pitfalls when setting up a DEA analysis, and c) possible ways to apply the DEA analysis in practice. Finally, we discuss what could be done to advance DEA from a scientific tool to an instrument that is actually utilized by managers and policymakers.

**Keywords: Data Envelopment Analysis, Healthcare, Hospitals**

**33. Patient-centric design of long-term care networks.** *Paul Intrevado, Vedat Verter & Lucie Tremblay.* Health Care Management Science, Vol 22, No.2, June 2019, Pp-376–390.

Long-term care networks may soon buckle under the weight of overwhelming demand. We present two dynamic, large-scale mixed-integer programs for long-term care network design that execute jointly strategic and tactical facility location, modular capacity acquisition, and patient-assignment decisions. The first model is an adaptive network-design model whose focus is more strategic in nature, whereas the second model focuses exclusively on the expansion of an existing long-term care network and incorporates additional tactical decisions such as patient backlogs. Working directly with the president of the Order of Québec Nurses—the provincial organization representing over 75,000 nurses—we incorporate facets such as assignment permanence, as well as develop and measure patient-centric quality-of-life proxies such as geographic mis-assignment and un-assigned patients, the latter of which is quantified via parametric optimization. Various network-design and patient-assignment policies are explored. We conclude that the use of home care as an alternative to long-term care facilities is cost prohibitive under specific conditions. Employing a bisection algorithm, we identify the implicit cost placed on keeping medically stable elderly patients in a hospital ward, concluding no cost savings are generated from such a policy. The model is analyzed and validated using empirical data from the long-term care network in Montréal, Canada.

**Keywords: Long-term Care Networks, Patient-centric Design**

**34. Bayesian logistic regression approaches to predict incorrect DRG assignment.**

*Mani Suleiman, Haydar Demirhan, Leanne Boyd, Federico Girosi & Vural Aksakalli. Health Care Management Science, Vol 22, No.2, June 2019, Pp-364–375.*

Episodes of care involving similar diagnoses and treatments and requiring similar levels of resource utilisation are grouped to the same Diagnosis-Related Group (DRG). In jurisdictions which implement DRG based payment systems, DRGs are a major determinant of funding for inpatient care. Hence, service providers often dedicate auditing staff to the task of checking that episodes have been coded to the correct DRG. The use of statistical models to estimate an episode's probability of DRG error can significantly improve the efficiency of clinical coding audits. This study implements Bayesian logistic regression models with weakly informative prior distributions to estimate the likelihood that episodes require a DRG revision, comparing these models with each other and to classical maximum likelihood estimates. All Bayesian approaches had more stable model parameters than maximum likelihood. The best performing Bayesian model improved overall classification performance by 6% compared to maximum likelihood, with a 34% gain compared to random classification, respectively. We found that the original DRG, coder and the day of coding all have a significant effect on the likelihood of DRG error. Use of Bayesian approaches has improved model parameter stability and classification accuracy. This method has already lead to improved audit efficiency in an operational capacity.

**Keywords: Diagnosis-Related Group (DRG), Bayesian Logistic Regression**

**35. Dependence and power in healthcare equipment supply chains.** *Jurriaan L. de Jong & W. C. Benton.* Health Care Management Science, Vol 22, No.2, June 2019, Pp-336–349.

Most healthcare organizations (HCOs) engage Group Purchasing Organizations (GPOs) as an outsourcing strategy to secure their supplies and materials. When an HCO outsources the procurement function to a GPO, this GPO will directly interact with the HCO's supplier on the HCO's behalf. This study investigates how an HCO's dependence on a GPO affects supply chain relationships and power in the healthcare medical equipment supply chain. Hypotheses are tested through factor analysis and structural equation modeling, using primary survey data from HCO procurement managers. An HCO's dependence on a GPO is found to be positively associated with a GPO's reliance on mediated power, but, surprisingly, negatively associated with a GPO's mediated power. Furthermore, analysis indicates that an HCO's dependence on a GPO is positively associated with an HCO's dependence on a GPO-contracted Original Equipment Manufacturer (OEM). HCO reliance on GPOs may lead to a buyer's dependence trap, where HCOs are increasingly dependent on GPOs and OEMs. Implications for HCO procurement managers and recommended steps for mitigation are offered. Power-dependence relationships in the medical equipment supply chain are not consistent with relationships in other, more traditional, supply chains. While dependence in a supply chain relationship typically leads to an increase in reliance on mediated power, GPO-dependent HCOs instead perceive a decrease in GPO mediated power. Furthermore, HCOs that rely on procurement service from GPOs are increasingly dependent on the OEMs.

**Keywords: Healthcare, Group Purchasing Organizations, Dependence and Power**

## Health Insurance

**36. Determinants of health insurance enrolment in Ghana: evidence from three national household surveys.** *Paola Salari, Patricia Akweongo, Moses Aikins, Fabrizio Tediosi.* *Health Policy and Planning*, Vol 34, No. 8, October 2019, Pp- 582–594.

In 2003, Ghana implemented a National Health Insurance Scheme (NHIS) to move towards Universal Health Coverage. NHIS enrolment is mandatory for all Ghanaians, but the most recent estimates show that coverage stands under 40%. The evidence on the relationship between socio-economic characteristics and NHIS enrolment is mixed, and comes mainly from studies conducted in a few areas. Therefore, in this study we investigate the socio-economic determinants of NHIS enrolment using three recent national household surveys. We used data from the Ghanaian Demographic and Health Survey conducted in 2014, the Multiple Indicator Cluster Survey conducted in 2011 and the sixth wave of the Ghana Living Standard Survey conducted in 2012–13. Given the multilevel nature of the three databases, we use multilevel logistic regression models to estimate the probability of enrolment for women and men separately. We used three levels of analysis: geographical clusters, household and individual units. We found that education, wealth, marital status—and to some extent—age were positively associated with enrolment. Furthermore, we found that enrolment was correlated with the type of occupation. The analyses of three national household surveys highlight the challenges of understanding the complex dynamics of factors contributing to low NHIS enrolment rates. The results indicate that current policies aimed at identifying and subsidizing underprivileged population groups might insufficiently encourage health insurance enrolment.

**Keywords:** Ghana, Health Insurance, Household Surveys, NHIS, Determinants of Enrolment

## Maternal Health

**37. Patient-experience during delivery in public health facilities in Uttar Pradesh, India.** *Dominic Montagu, Amanda Landrian, Vishwajeet Kumar, Beth S Phillips, Shreya Singhal, Shambhavi Mishra, Shambhavi Singh, Sun Yu Cotter, Vinay Pratap Singh, Fnu Kajal.* Health Policy and Planning, Vol 34, No. 8, October 2019, Pp- 574–581.

In India, most women now delivery in hospitals or other facilities, however, maternal and neonatal mortality remains stubbornly high. Studies have shown that mistreatment causes delays in care-seeking, early discharge and poor adherence to post-delivery guidance. This study seeks to understand the variation of women's experiences in different levels of government facilities. This information can help to guide improvement planning. We surveyed 2018 women who gave birth in a representative set of 40 government facilities from across Uttar Pradesh (UP) state in northern India. Women were asked about their experiences of care, using an established scale for person-centred care. We asked questions specific to treatment and clinical care, including whether tests such as blood pressure, contraction timing, newborn heartbeat or vaginal exams were conducted, and whether medical assessments for mothers or newborns were done prior to discharge. Women delivering in hospitals reported less attentive care than women in lower-level facilities, and were less trusting of their providers. After controlling for a range of demographic attributes, we found that better access, higher clinical quality, and lower facility-level, were all significantly predictive of patient-centred care. In UP, lower-level facilities are more accessible, women have greater trust for the providers and women report being better treated than in hospitals. For the vast majority of women who will have a safe and uncomplicated delivery, our findings suggest that the best option would be to invest in improvements mid-level facilities, with access to effective and efficient emergency referral and transportation systems should they be needed.

**Keywords: Maternal Health, Quality, Global Health, Person-centred-care**

**38. Maternal deaths should simply be 0': politicization of maternal death reporting and review processes in Ethiopia.** *Andrea Melberg, Alemnesh Hailemariam Mirkuzie, Tesfamichael Awoke Sisay, Mitike Molla Sisay, Karen Marie Moland.* Health Policy and Planning, Vol 34, No. 7, September 2019, Pp-492–498.

The Maternal Death Surveillance and Response system (MDSR) was implemented in Ethiopia in 2013 to record and review maternal deaths. The overall aim of the system is to identify and address gaps in order to prevent future death but, to date, around 10% of the expected number of deaths are reported. This article examines practices and reasoning involved in maternal death reporting and review practices in Ethiopia, building on the concept of 'practical norms'. The study is based on multi-sited fieldwork at different levels of the Ethiopian health system including interviews, document analysis and observations, and has documented the politicized nature of MDSR implementation. Death reporting and review are challenged by the fact that maternal mortality is a main indicator of health system performance. Health workers and bureaucrats strive to balance conflicting demands when implementing the MDSR system: to report all deaths; to deliver perceived success in maternal mortality reduction by reporting as few deaths as possible; and to avoid personalized accountability for deaths. Fear of personal and political accountability for maternal deaths strongly influences not only reporting practices but also the care given in the study sites. Health workers report maternal deaths in ways that minimize their number and deflect responsibility for adverse outcomes. They attribute deaths to community and infrastructural factors, which are often beyond their control. The practical norms of how health workers report deaths perpetuate a skewed way of seeing problems and solutions in maternal health. On the basis of our findings, we argue that closer attention to the broader political context is needed to understand the implementation of MDSR and other surveillance systems.

**Keywords:** Ethiopia, Maternal Health, Indicators, MDSR, Multi-sited Ethnography

## National Health Mission

**39. Decentralization in India's health sector: insights from a capacity building intervention in Karnataka.** *Shreelata Rao Seshadri, Krishna Kothai.* Health Policy and Planning, Vol 34, No. 8, October 2019, Pp- 595–604.

The Government of India has adopted decentralization/devolution as a vehicle for promoting greater equity and supporting people-centred, responsive health systems. This article reports on our year-long intervention project in Karnataka, South India, and articulates insights of both practical and theoretical significance. It explores the intersection of the political goal of enhanced local level autonomy and the programmatic goal of more responsive health service delivery. Focusing on the Village Health, Sanitation and Nutrition Committees (VHSNCs) set up under the National (Rural) Health Mission (NHM), the project set out to explore the extent to which political and programmatic decentralization are functional at the village level; the consonance between the design and objectives of decentralization under NHM; and whether sustained supportive capacity building can create the necessary conditions for more genuine decentralization and effective collaboration between village-level functionaries. Our methodology uses exploratory research with Panchayati Raj Institution (PRI) members and functionaries of the Health Department, followed by a year-long capacity building programme aimed at strengthening co-ordination and synergy between functionaries responsible for political and programmatic decentralization. We find that health sector decentralization at the village level in Karnataka is at risk due to lack of convergence between political and programmatic arms of government. This is compounded by problems inherent in the design of the decentralization mechanism at the district level and below. Sustained capacity building of the VHSNC can contribute to more effective decentralization, as part of a larger package of interventions that (1) provides for financial and other resources from the district (or higher) level to political and programme functionaries at the periphery; (2) helps the functionaries to develop a shared understanding of the salience of the VHSNC in addressing the health needs of their community; and (3) supports them to collaborate effectively to achieve clearly articulated outcomes.

**Keywords: Decentralization, National Health Mission, Village Health, Sanitation and Nutrition Committee (VHSNC), Community Health Worker (CHW), Karnataka Health Sector**



## Pregnancy

**40. Do home pregnancy tests bring women to community health workers for antenatal care counselling? A randomized controlled trial in Madagascar.** *Alison B Comfort, Randall C Juras, Sarah E K Bradley, Justin Ranjalahy Rasolofomanana, Anja Noeliarivelo Ranjalahy, Cynthia C Harper.* Health Policy and Planning, Vol 34, No. 8, October 2019, Pp- 566–573.

Task-shifting the provision of pregnancy tests to community health workers (CHWs) in low-resource settings has the potential to reach significantly more underserved women at risk of pregnancy with essential reproductive health services. This study assessed whether an intervention to supply CHWs with home pregnancy tests brought more clients for antenatal care (ANC) counselling. We implemented a randomized controlled trial among CHWs providing reproductive health services to women in Eastern Madagascar. We used ordinary least squares regressions to estimate the effect of the intervention, with district- and month-fixed effects and CHW baseline characteristics as control variables. Our outcomes of interest included whether the intervention increased: (1) the number of women at risk of pregnancy who sought services from CHWs; (2) the number of these women who knew they were pregnant by the end of visit; and (3) the number of these women who received ANC counselling during visit. We found that providing pregnancy tests to CHWs to distribute to their clients for free significantly increased the number of women at risk of pregnancy who sought services from CHWs. At follow-up, treatment-group CHWs provided services to 6.3 clients compared with 4.2 clients among control-group CHWs, which represents a 50% relative increase from the control-group mean. A significantly higher number of these clients knew they were pregnant by the end of the visit, with a mean of 0.95 in treatment compared with 0.10 in control (Coeff. 0.86; 95% CI 0.59–1.13). A significantly higher number of these clients received antenatal counselling at the visit (Coeff. 0.4; 95% CI 0.14–0.64). Introducing free home pregnancy tests as part of community-based health services can improve pregnancy care by attracting more clients at risk of pregnancy to services at the community level, enabling more women to confirm they are pregnant and receive antenatal counselling.

**Keywords: Pregnancy, Community Health Workers, Counselling, Madagascar, Pregnancy Tests, Prenatal Care, Community, Control Groups**