



LCHS7000 – Component 2: Analytical Report

Student Name:

Roshan Kaniyamparampil Shibu

Student Number:

2532300

Lecturer Name:

Muhammed Aliyu

Module Code: LCHS7000

Module Title: Social Epidemiology and Public Health Development

Assessment: Component 2 – Analytical Report

Submission Date: 19 August 2026

Word Count: 2,769

Task 1: Social Epidemiological Analysis

Age-Related Health Inequality Among Older Adults in England

Introduction

This report looks at health inequality among older adults in England those aged sixty-five and above. Chronological age is not a good indicator of biological ageing: health life expectancy at birth varies by about nineteen years across the most and least deprived deciles (Office for National Statistics, 2024a; Marmot et al., 2020). Thus, inequality in later life is not a reflection of ageing, but rather the result of a lifetime of material and psychosocial exposures (Oris et al., 2021). The six inequalities below are one gradient, expressed in terms of interacting mechanisms, that national responses address downstream and not at source

Contextual Background and Underlying Factors

Dementia and cognitive health

Dementia affects approximately 900,000 to one million people in the United Kingdom, projected to reach 1.6 million by 2040 (Wittenberg et al., 2019). The inequality lies less in incidence than in recognition: recorded diagnosis rates vary systematically by deprivation, ethnicity and rurality against a national ambition of 66.7 per cent (NHS England, 2025a; Hazan et al., 2024). The 2024 Lancet Commission attributed approximately 45 per cent of risk to fourteen modifiable factors, most socially patterned (Livingston et al., 2024), indicating that dementia reflects lifetime social exposure rather than inevitable ageing. Diagnosis rate is nonetheless a service rather than disease metric, and raising it without post-diagnostic support transfers burden to unpaid carers.

Falls, frailty and hip fracture

Approximately one in three people aged sixty-five and over falls annually, generating around 210,000 emergency admissions in England during 2022/23 (Office for Health Improvement and Disparities, 2024). The inequality lies in frailty rather than falls incidence: frailty and multimorbidity emerge roughly a decade earlier in the most deprived populations (Kingston et al., 2018), reflecting accelerated biological ageing through chronic stress, poor nutrition and hazardous housing. Hip fracture incidence is nonetheless reportedly higher in less deprived and White British populations owing to bone density differences, whereas post-fracture mortality follows the deprivation gradient, so incidence and case fatality must be distinguished (National Institute for Health and Care Excellence, 2025).

Multimorbidity

Barnett et al. (2012) found multimorbidity onset ten to fifteen years earlier in the most deprived Scottish populations, combined physical and mental comorbidity affecting 11.0 per cent of the most deprived against 5.9 per cent of the least deprived. This requires qualification: the study is Scottish, cross-sectional and over a decade old, establishing neither temporality nor direct transferability, though English modelling reports a consistent gradient (Kingston et al., 2018). Reverse causality also operates. Estimates remain sensitive to which conditions a definition includes, while single-disease service architecture is mismatched to the resulting complexity of need.

Pensioner poverty and material deprivation

Approximately 1.9 to 2.1 million pensioners live in relative low income after housing costs (Department for Work and Pensions, 2025), while Pension Credit take-up remains near 60 to 65 per cent, leaving over one billion pounds unclaimed annually (Department for Work and Pensions, 2024). Single women, private renters, disabled older people and Bangladeshi and Pakistani older people are disproportionately affected (Age UK, 2024a). This reflects cumulative disadvantage: interrupted contribution records, unpaid caring and low lifetime earnings produce inadequate entitlement decades later (Kuh and Ben-Shlomo, 2004). Poverty then drives the remaining inequalities by constraining heating, diet, transport and participation.

Loneliness and social isolation

Age UK estimates over one million chronically lonely older people in England (Age UK, 2024b), and meta-analysis associates loneliness and isolation with a 26 to 32 per cent increased likelihood of mortality (Holt-Lunstad et al., 2015). Two cautions temper this. Reverse causation is substantial, since declining health causes withdrawal as well as resulting from it; Steptoe et al. (2013) found objective isolation predicted mortality after adjustment whereas subjective loneliness did not, indicating the constructs are not interchangeable. Intervention evidence is also weak, systematic review of social prescribing finding poorly designed studies (Bickerdike et al., 2017).

Cold and non-decent housing

Approximately 1.5 million people aged sixty-five and over live in non-decent homes in England (Ministry of Housing, Communities and Local Government, 2024), fuel poverty being concentrated among low-income owner-occupiers unable to fund maintenance (Department for Energy Security and Net Zero, 2024). Cold indoor temperatures raise blood pressure and blood viscosity, precipitating cardiovascular and respiratory events, while damp and hazards compound respiratory morbidity and falls risk (Marmot Review Team, 2011; World Health Organization, 2018). Winter mortality falls overwhelmingly on those aged seventy-five and over (Office for National Statistics, 2024b). England's disproportionate winter excess relative

to colder Nordic countries supports a housing-quality explanation, though the evidence is ecological.

Interaction between the six issues

These form a reinforcing system: deprivation produces cold, hazardous housing and constrains participation; these accelerate frailty and multimorbidity; isolation delays diagnosis; and the resulting costs deepen deprivation. Poverty is simultaneously cause and consequence, which helps explain why disease-specific intervention fails to close the gradient.

National Responses to Reduce Health Inequalities

The Better Care Fund, mandated from 2015, pools NHS and local authority budgets to reduce avoidable admissions and delayed transfers among older people, and the Health and Care Act 2022 placed statutory inequalities duties on integrated care boards (NHS England, 2025b; Great Britain, 2022). However, the National Audit Office (2017) reported no demonstrable reduction in admissions or delayed transfers, and reviews of integrated care report improved experience alongside inconsistent utilisation effects (King's Fund, 2024). The Fund remains downstream, managing crises generated by determinants it does not address, and depends on local capacity weakest where need is greatest.

Winter Fuel Payment and Pension Credit policy is, by contrast, genuinely upstream. Restriction of the Payment to Pension Credit recipients in 2024, and its partial restoration in 2025 to pensioners with incomes below £35,000, produced one measurable equity gain in sharply increased Pension Credit take-up while withdrawing income from a substantial group just above the threshold (House of Commons Library, 2025). Attributing specific excess winter deaths to the change is not defensible from routine data, being confounded by influenza severity and energy prices. The structural judgement matters more: a benefit dependent on voluntary claiming under-reaches the most isolated, and automatic enrolment using administrative data would address the determinant rather than the symptom.

Organisational Response: Age UK

Age UK combines direct provision, research and advocacy, campaigning on Pension Credit take-up and social care funding (Age UK, 2024a; 2024b). Its influence is real, yet three limitations warrant analysis. Impact reporting is largely self-generated output data rather than independently evaluated outcomes; its federated structure produces geographic variation not following need, replicating an inverse care law within the voluntary sector; and reliance on statutory contracts creates tension between delivery and advocacy against commissioners. The Centre for Ageing Better instead addresses structural determinants but lacks comparable

reach (Centre for Ageing Better, 2025); neither alone can reach inequalities generated outside the care system.

Conclusion

Age-related health inequality in England reflects a socioeconomic gradient embodied across the life course rather than ageing itself, with poverty, housing and isolation shaping the distribution of dementia recognition, frailty and multimorbidity. It persists because dominant responses are downstream and service-focused, and because upstream income policy has been unstable and reliant on claiming behaviour. Reducing it requires proportionate upstream action with equity outcomes measured explicitly rather than assumed.

Task 2: Epidemiological Analysis

Type 2 Diabetes Among Adults Aged 40–64 in Birmingham, England

Introduction and Epidemiological Burden

Type 2 diabetes is a chronic condition of insulin resistance and progressive relative insulin deficiency, which is responsible for about 90 per cent of diabetes worldwide. In addition to clinical morbidity, it limits working-life employment, is stigmatised in some communities and requires self-management which can conflict with cultural food habits and family budgets.

The estimates vary significantly between countries and regions: the International Diabetes Federation (2021) estimated that there were 537 million adults (aged 20-79) with diabetes in 2021, and that this would rise to 783 million by 2045, while the NCD Risk Factor Collaboration (2024) estimated 828 million adults (aged 18+) with diabetes in 2022. This is because of methodology, not because the ages differ, the diagnostics are different, or because of missing survey information or the treatment of undiagnosed disease, which occurs locally.

In England, recorded prevalence was approximately 7.0 per cent among adults aged 17 and over, against an estimated 7.8 per cent including undiagnosed disease (Office for Health Improvement and Disparities, 2025); Birmingham's is materially higher at approximately 9.1 per cent (Riaz et al., 2024). The city's population of 1.14 million is around 30 per cent aged 40–64 and half from minority ethnic groups (Office for National Statistics, 2022; Birmingham City Observatory, 2022), and since South Asian onset occurs roughly a decade earlier (Tillin et al., 2012), this band captures incident disease an older-adult focus would miss. Routine data report prevalence for 17 and over only, so 40–64 estimates require approximation from age-specific rates.

Public Health Measures: Prevention, Protection and Promotion

Prevention operates principally through the NHS Diabetes Prevention Programme, providing structured behavioural intervention for adults with non-diabetic hyperglycaemia. Evaluation reports lower progression among completers than among referred non-attenders, with cost-effectiveness demonstrated but uptake varying by age, deprivation and ethnicity (Bower et al., 2025). These are non-randomised comparisons vulnerable to selection bias, since completers differ systematically from non-completers; reported effect sizes are therefore likely optimistic. Protection operates through NHS Health Checks for adults aged 40 to 74, where uptake remains near half of those eligible and lower in deprived areas, producing an inverse care law effect (Chang et al., 2015). Promotion encompasses community lifestyle intervention and culturally adapted education. Critically, Cochrane review of general health checks found no

reduction in all-cause, cardiovascular or cancer mortality (Krogsbøll et al., 2019), a tension between policy priority and demonstrated benefit that any local programme must confront.

Determinants and Risk Factors

Biologically, visceral adiposity causes ectopic fat in liver and pancreas and thus insulin resistance and beta-cell lipotoxicity (Taylor, 2013). This is ethnically patterned as South Asian populations have greater visceral adiposity at lower BMI, and lower thresholds of 23 and 27.5 kg/m² for risk identification are recommended (National Institute for Health and Care Excellence, 2019). Instead, behavioural determinants – most importantly, physical inactivity and a diet rich in energy-dense, refined carbohydrates – are better thought of as socially patterned rather than as individual choices. Deprivation can be material (cost and availability of healthy food, heating and leisure); psychosocial (activation of the hypothalamic-pituitary-adrenal axis and central adiposity) and through the health system (low uptake of Health Check and continuity of care where there is greatest need) (Marmot, 2010).

Ethnic inequalities require particular interpretive care. Elevated risk among South Asian, Black African and African-Caribbean populations is well documented (Tillin et al., 2012), but minority ethnic populations in Birmingham are concentrated in the most deprived wards, so crude ethnic differences are substantially confounded by socioeconomic position. Ethnicity is a social rather than biological category, and broad census classifications conceal heterogeneity between Indian, Pakistani and Bangladeshi populations; attributing disparity to ethnicity itself risks misdirecting intervention toward cultural adaptation when material intervention may be more effective. Environmentally, fast-food outlet density and constrained active travel opportunity are patterned by deprivation, though this evidence is largely cross-sectional and ecological.

Epidemiological Studies and Health Needs Assessment

Riaz et al. (2024) analysed 108,514 NHS Health Check attendances in Birmingham between 2018 and 2023, attributing a substantial proportion of diabetes and prediabetes cases to socioeconomic deprivation, with risk concentrated in deprived wards and among South Asian and Black communities. Its scale and local specificity are strengths, but the design is cross-sectional and the sample comprises attendees, systematically more engaged than non-attenders; associations cannot establish causation and true burden is likely underestimated. The United Kingdom Asian Diabetes Study, a cluster-randomised trial of culturally competent care in Birmingham and Coventry, reported process improvements with limited gains in hard outcomes (Bellary et al., 2008), illustrating that cultural adaptation can improve engagement without reducing mortality where material determinants remain unaddressed.

Applying Bradshaw's taxonomy, normative need defined by HbA1c and validated risk scores substantially exceeds expressed need, since service use is lowest among the highest-risk groups, while comparative need benchmarked against England confirms a local excess. This divergence is the argument for proactive case-finding rather than passive provision, and a health equity audit of uptake across Birmingham wards would establish whether provision is distributed inversely to need.

Surveillance and Monitoring

The Quality and Outcomes Framework covers almost all registered patients, reporting diagnosed prevalence at practice level, but its denominator is registered rather than resident population, recording is contractually incentivised, and indicator changes break year-on-year comparability (NHS England, 2024). The National Diabetes Audit adds treatment targets, complications and mortality by age, ethnicity and deprivation, though participation is variable, ethnicity coding incomplete, and a reporting-period change compromises comparison (NHS England, 2025c). The Health Survey for England alone captures undiagnosed disease via HbA1c, but its sample is too small locally (NHS Digital, 2024a). Hospital Episode Statistics reflect administrative coding (NHS Digital, 2024b), while mortality data understate diabetes-attributable death, diabetes often being recorded as contributory (Office for National Statistics, 2024c).

Critically, none of these systems measures incidence, and the undiagnosed fraction nationally a quarter to a third of cases is concentrated among the least engaged, so surveillance understates burden where it is greatest, biasing resource allocation against need. Triangulation across sources is therefore the defensible approach.

Public Health Impact

In the short term the burden falls on individuals through morbidity, self-management demand and reduced quality of life, and on services through review, medication and structured education. Longer term it manifests as cardiovascular disease, chronic kidney disease, retinopathy, neuropathy, amputation and premature mortality, while concentration in deprived and minority ethnic wards compounds community disadvantage and imposes care and productivity losses. Economic estimates vary by method and denominator: direct NHS costs are reported at approximately £10.7 billion with indirect costs of £3.3 billion (Hex et al., 2024), whereas the frequently cited ten per cent of NHS budget uses a different denominator, again illustrating measurement sensitivity.

Proposed Intervention

The proposed Birmingham Targeted Type 2 Diabetes Detection and Prevention Programme applies proportionate universalism (Marmot, 2010): universal in offer, intensified by need. A purely universal offer would widen inequality via the inverse care law, whereas a purely targeted one risks stigmatisation and missed cases. The target population is adults aged 40–64 registered with a Birmingham practice, prioritised by non-diabetic hyperglycaemia, ethnicity-adjusted BMI thresholds and residence in the most deprived quintile.

Activities comprise EHR case-finding via a validated risk score; point-of-care HbA1c testing in trusted community venues; culturally adapted NHS Diabetes Prevention Programme referral, with multilingual and sex-segregated options; referral to weight management or, where eligible, the NHS Path to Remission programme; and co-located benefits and food insecurity advice. Delivery would be jointly commissioned by Birmingham City Council and the ICB across primary care, pharmacy and voluntary partners, phased from co-production in year zero to city-wide provision by year two, building on existing national infrastructure.

Evaluation Framework

Evaluation would follow the Medical Research Council framework for complex interventions (Skivington et al., 2021), incorporating RE-AIM dimensions and a nested health equity audit. Randomisation being infeasible, phased rollout would enable difference-in-differences comparison between early and late implementing networks and matched comparator authorities; this quasi-experimental design remains vulnerable to secular trends, so causal attribution would be provisional. Process indicators would capture numbers screened, referral-to-enrolment conversion and completion quarterly, with reach assessed against the deprivation and ethnic distribution of the at-risk population. Short-term outcomes at six and twelve months would comprise HbA1c, weight and self-reported activity; long-term outcomes at three to ten years would comprise incidence, complications, admissions and mortality. Equity outcomes would use the slope index of inequality across deprivation deciles, with success defined as narrowing of the absolute gap rather than improvement in the mean, since an intervention benefiting all groups but the least deprived most has widened inequality while appearing successful.

Strengths and Limitations of the Epidemiological Approach

The approach draws on near-complete routine datasets permitting small-area, equity-stratified analysis against national comparators. Its limitations are nonetheless material. Undiagnosed disease is concentrated among the least engaged, so need is understated where greatest. Registered and resident denominators diverge in a city with high population churn; incentivised

coding means recorded prevalence partly reflects recording behaviour; and incomplete, probably non-random ethnicity coding distorts the comparisons on which the inequality analysis depends. Most local data are cross-sectional and ecological, precluding causal inference and risking the ecological fallacy in area-based targeting. Evidence for intervention components rests on non-randomised evaluation vulnerable to selection bias, and pandemic disruption between 2020 and 2022 further compromises trend interpretation.

Conclusion

Type 2 diabetes among adults aged 40 to 64 in Birmingham is substantial and unequally distributed, local prevalence exceeding the England average with risk concentrated by deprivation and ethnicity through material, behavioural, psychosocial and health-service pathways. Routine surveillance measures diagnosed prevalence rather than incidence and understates burden most severely in under-served populations. The proposed programme builds realistically on existing infrastructure, but evaluation must prioritise narrowing the gap rather than raising the average.

Reference List

- Age UK (2024a) The State of Health and Care of Older People in England 2024. London: Age UK.
- Age UK (2024b) Loneliness and Isolation: Evidence Review. London: Age UK.
- Barnett, K., Mercer, S.W., Norbury, M., Watt, G., Wyke, S. and Guthrie, B. (2012) 'Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study', *The Lancet*, 380(9836), pp. 37–43.
- Bellary, S., O'Hare, J.P., Raymond, N.T., Gumber, A., Mughal, S., Szczepura, A., Kumar, S. and Barnett, A.H. (2008) 'Enhanced diabetes care to patients of south Asian ethnic origin (the United Kingdom Asian Diabetes Study): a cluster randomised controlled trial', *The Lancet*, 371(9626), pp. 1769–1776.
- Bickerdike, L., Booth, A., Wilson, P.M., Farley, K. and Wright, K. (2017) 'Social prescribing: less rhetoric and more reality. A systematic review of the evidence', *BMJ Open*, 7(4), e013384.
- Birmingham City Observatory (2022) Census 2021: ethnicity in Birmingham. Birmingham: Birmingham City Council.
- Bower, P., Meacock, R. and Evans, H. (2025) 'The effectiveness and cost-effectiveness of the NHS Diabetes Prevention Programme: the DIPLOMA research programme', *Health and Social Care Delivery Research*, 13(14).
- Centre for Ageing Better (2025) The State of Ageing 2025. London: Centre for Ageing Better.
- Chang, K.C-M., Soljak, M., Lee, J.T., Woringer, M., Johnston, D., Khunti, K., Majeed, A. and Millett, C. (2015) 'Coverage of a national cardiovascular risk assessment programme (NHS Health Check): a retrospective database study', *Preventive Medicine*, 78, pp. 1–8.
- Department for Energy Security and Net Zero (2024) Annual Fuel Poverty Statistics in England, 2024. London: DESNZ.
- Department for Work and Pensions (2024) Income-Related Benefits: Estimates of Take-Up. London: DWP.
- Department for Work and Pensions (2025) Households Below Average Income: an analysis of the UK income distribution. London: DWP.

- Great Britain (2022) Health and Care Act 2022. Chapter 31. London: The Stationery Office.
- Hazan, J., Wing, M., Liu, K.Y., Reeves, S. and Howard, R. (2024) 'Dementia diagnosis rates and the impact of ethnicity, rurality and deprivation', *Aging & Mental Health*.
- Hex, N., MacDonald, R., Pocock, J., Uzdzińska, B., Taylor, M. and Jones, C. (2024) 'Estimation of the direct and indirect costs of diabetes in the UK', *Diabetic Medicine*, 41(7), e15326.
- Holt-Lunstad, J., Smith, T.B., Baker, M., Harris, T. and Stephenson, D. (2015) 'Loneliness and social isolation as risk factors for mortality: a meta-analytic review', *Perspectives on Psychological Science*, 10(2), pp. 227–237.
- House of Commons Library (2025) Winter Fuel Payment eligibility from 2025/26. London: House of Commons Library.
- International Diabetes Federation (2021) *IDF Diabetes Atlas*. 10th edn. Brussels: International Diabetes Federation.
- King's Fund (2024) *Integrated Care Systems Explained*. London: The King's Fund.
- Kingston, A., Robinson, L., Booth, H., Knapp, M. and Jagger, C. (2018) 'Projections of multi-morbidity in the older population in England to 2035', *Age and Ageing*, 47(3), pp. 374–380.
- Krogsbøll, L.T., Jørgensen, K.J. and Gøtzsche, P.C. (2019) 'General health checks in adults for reducing morbidity and mortality from disease', *Cochrane Database of Systematic Reviews*, 1, CD009009.
- Kuh, D. and Ben-Shlomo, Y. (eds.) (2004) *A Life Course Approach to Chronic Disease Epidemiology*. 2nd edn. Oxford: Oxford University Press.
- Livingston, G., Huntley, J., Liu, K.Y., Costafreda, S.G. and Mukadam, N. (2024) 'Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission', *The Lancet*, 404(10452), pp. 572–628.
- Marmot, M. (2010) *Fair Society, Healthy Lives: The Marmot Review*. London: Institute of Health Equity.
- Marmot, M., Allen, J., Boyce, T., Goldblatt, P. and Morrison, J. (2020) *Health Equity in England: The Marmot Review 10 Years On*. London: Institute of Health Equity.
- Marmot Review Team (2011) *The Health Impacts of Cold Homes and Fuel Poverty*. London: Friends of the Earth and the Marmot Review Team.

Ministry of Housing, Communities and Local Government (2024) English Housing Survey 2023–24: headline report. London: MHCLG.

National Audit Office (2017) Health and Social Care Integration. London: National Audit Office.

National Institute for Health and Care Excellence (2019) Obesity: Identification, Assessment and Management. Clinical guideline CG189. London: NICE.

National Institute for Health and Care Excellence (2025) Falls: Assessment and Prevention in Older People and in People 50 and Over at Higher Risk. NICE guideline NG249. London: NICE.

NCD Risk Factor Collaboration (2024) 'Worldwide trends in diabetes prevalence and treatment from 1990 to 2022: a pooled analysis of 1108 population-representative studies with 141 million participants', *The Lancet*, 404(10467), pp. 2077–2093.

NHS Digital (2024a) Health Survey for England, 2022. Leeds: NHS Digital.

NHS Digital (2024b) Hospital Episode Statistics for England: Admitted Patient Care. Leeds: NHS Digital.

NHS England (2024) Quality and Outcomes Framework: Achievement, Prevalence and Exceptions Data. Leeds: NHS England.

NHS England (2025a) Recorded Dementia Diagnoses. Leeds: NHS England.

NHS England (2025b) Better Care Fund Policy Framework 2025 to 2026. Leeds: NHS England.

NHS England (2025c) National Diabetes Audit, Core Report. Leeds: NHS England.

Office for Health Improvement and Disparities (2024) Public Health Outcomes Framework: emergency hospital admissions due to falls in people aged 65 and over. London: OHID.

Office for Health Improvement and Disparities (2025) Diabetes Profile. London: OHID.

Office for National Statistics (2022) Census 2021: Birmingham local authority profile. Newport: ONS.

Office for National Statistics (2024a) Health State Life Expectancies by National Deprivation Deciles, England. Newport: ONS.

Office for National Statistics (2024b) Winter Mortality in England and Wales. Newport: ONS.

Office for National Statistics (2024c) Deaths Registered in England and Wales. Newport: ONS.

Oris, M., Baeriswyl, M., Ihle, A. (2021). The Life Course Construction of Inequalities in Health and Wealth in Old Age. In: Rojo-Pérez, F., Fernández-Mayoralas, G. (eds) Handbook of Active Ageing and Quality of Life. International Handbooks of Quality-of-Life. Springer, Cham. https://doi.org/10.1007/978-3-030-58031-5_5

Riaz, S., Nirantharakumar, K., Gokhale, K., Marshall, T. and Adderley, N.J. (2024) 'Socioeconomic and ethnic inequalities increase the risk of type 2 diabetes: an analysis of NHS Health Check attendees in Birmingham', *Frontiers in Public Health*, 12, 1443980.

Skivington, K., Matthews, L., Simpson, S.A., Craig, P., Baird, J., Blazeby, J.M., Boyd, K.A., Craig, N., French, D.P., McIntosh, E., Petticrew, M., Rycroft-Malone, J., White, M. and Moore, L. (2021) 'A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance', *BMJ*, 374, n2061.

Step toe, A., Shankar, A., Demakakos, P. and Wardle, J. (2013) 'Social isolation, loneliness, and all-cause mortality in older men and women', *Proceedings of the National Academy of Sciences*, 110(15), pp. 5797–5801.

Taylor, R. (2013) 'Type 2 diabetes: etiology and reversibility', *Diabetes Care*, 36(4), pp. 1047–1055.

Tillin, T., Hughes, A.D., Godsland, I.F., Whincup, P., Forouhi, N.G., Welsh, P., Sattar, N., McKeigue, P.M. and Chaturvedi, N. (2012) 'Insulin resistance and truncal obesity as important determinants of the greater incidence of diabetes in Indian Asians and African Caribbeans compared with Europeans: the SABRE prospective cohort study', *Diabetes Care*, 36(2), pp. 383–393.

Wittenberg, R., Hu, B., Barraza-Araiza, L. and Rehill, A. (2019) Projections of Older People with Dementia and Costs of Dementia Care in the United Kingdom, 2019–2040. London: Care Policy and Evaluation Centre, London School of Economics.

World Health Organization (2018) WHO Housing and Health Guidelines. Geneva: World Health Organization.