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| **Supplementary Table 1.** Search terms used in PubMed MEDLINE |
| (("Red Meat"[MeSH Terms] OR "Meat Products"[MeSH Terms] OR (("meat"[Title/Abstract] OR "meats"[Title/Abstract]) AND "red"[Title/Abstract]) OR ("beef"[Title/Abstract] OR "veal"[Title/Abstract] OR "bison"[Title/Abstract]) OR ("beeves"[Title/Abstract] OR "veals"[Title/Abstract])) NOT "Ruminants"[MeSH Terms]) AND ("Nervous System"[MeSH Terms] OR "Diagnostic Imaging"[MeSH Terms] OR "Diagnostic Imaging"[MeSH Subheading] OR "image processing, computer assisted"[MeSH Terms] OR ("MRI"[Title/Abstract] OR "magnetic resonance imaging"[Title/Abstract] OR "resting-state MRI"[Title/Abstract] OR "resting state magnetic resonance imaging"[Title/Abstract] OR "diffusion tensor imaging"[Title/Abstract] OR "resting state magnetic resonance imaging"[Title/Abstract] OR "volume analysis"[Title/Abstract]) OR "diagnostic techniques, neurological"[MeSH Terms]) |
| Filtered to humans only |

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| **Supplementary Table 2.** References of excluded studies at the full-text screening level |
| **Citation** | **Reason for exclusion** |
| (1–24) | Exposure not adequately specified |
| (25–27) | Incorrect exposure |
| (28–32) | Outcomes exclude cognition |
| (33) | Outcomes not adequately specified |
| (34) | Exposure not measured in relation to outcome |

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| **Supplementary Table 3.** Descriptions of variables captured from the included studies in the final database |
| **Variable** | **Description**  | **Variable Type** |
| **Study-level information** |
| Index   | Order articles were entered into the database   | Numeric |
| Citation | Last name of the first author and year of publication | Free text |
| Source  | Traverse Science reference for which search a particular study came from   | Free text |
| Title   | Title of paper   | Free text |
| Year   | Publication year   | Numeric |
| Journal   | Title of journal   | Free text |
| Authors  | Last Name, Initials of first author   | Free text |
| Abstract   | Type of research article    | Free text |
| PMID  | PubMed ID of the article  | Numeric |
| DOI | DOI of the article | Free text |
| Study Type  | Whether the study was an intervention or observational   | Categorical;Qualitative |
| Study Design  | Whether the study was a parallel-arm, single-arm or crossover trial, or if observational by type, was cross-sectional, cohort, or case-control   | Categorical;Qualitative |
| Study Notes  | Additional details about the study type and/or design  | Free text |
| Subject Location, Country   | Country where participants of the study were located   | Multi-categorical |
| Sex   | Biological sex of participants enrolled in the study   | Categorical;Qualitative |
| Age Category  |  Whether the participants/subjects were infants (<3 years), children (3-11 years), adolescents (12-17 years), adults (18-64 years), or seniors (65+ years) | Multi-categorical;Qualitative |
| Cognitive Status at Baseline   | Whether the subjects were selected at baseline to include cognitive-related impairments or were at risk of cognitive-related impairments | Multi-categorical;Qualitative |
| Total vs Component | Whether the beef/red meat intake was reported as total diet or a component thereof | Categorical;Qualitative |
| Subject Notes  |  Additional details about subjects which may be important | Free text |
| Intervention Sample Size, Randomized   | The total number of subjects who were randomized to a treatment group | Quantitative |
| Intervention Number of Trial Arms  |  The number of intervention groups included in the trial | Quantitative |
| Randomization   | Whether or not study was randomized   | Categorical;Qualitative |
| Randomization Factor(s)   | Factors used (if any) to randomize participants into group assignments   | Categorical;Qualitative |
| Subjects Blinded | Whether the subjects were blinded in the trial | Categorical;Qualitative |
| Researchers Blinded | Whether the researchers were blinded in the trial | Categorical;Qualitative |
| Data Analysts Blinded | Whether the were data analysts blinded in the trial | Categorical;Qualitative |
| Intervention Duration | The duration of the intervention trial. For cross-over trials, this is the length of each arm.   | Quantitative |
| Intervention Duration Unit  |  Unit of intervention duration (*e.g.*, days, weeks, months) | Categorical;Qualitative |
| Intervention Duration in Months | All intervention duration units converted to the same unit of measure i.e., months | Quantitative |
| Clinical Trial Registration No.  |  The registration number of the trial, if registered | Numeric |
| Observational Sample Size, Analyzed  |  The total analytical sample size | Quantitative |
| Max FU Time, Cohorts  |  How long the study followed-up with participants for ascertainment of the outcome | Quantitative |
| FU Time Unit  |  Unit of follow-up time (*e.g.,* days, weeks, months) | Categorical;Qualitative |
| Max FU Time in Months | All FU time units converted to the same unit of measure i.e., months | Quantitative |
| Parent Study  |  If the study is analysing data from a larger study or cohort | Free text |
| Cognition Assessment Tool  |  The name of the assessment tool and/or methods that were used to assess cognition as reported in the paper | Multi-categorical;Qualitative |
| Notes  |  Additional notes regarding the measured outcomes or study conclusions | Free text |
| Overall Risk of Bias  |  The level of risk for potential bias in the study (*e.g.*, low, moderate, high) | Categorical;Qualitative |
| **Group Level** |
| Index | The order in which studies were entered into the database | Numeric |
| Citation | Last name of the first author and year of publication | Free text |
| Title | The title of the paper | Free text |
| Group No. | A number (1, 2, 3, etc.) given to each subset of meat category with associated data | Numeric |
| Group Identifier | A label/tag given to each subset of meat category with associated data (where applicable) | Free text |
| Concentration As | Whether the beef/red meat concentration was reported as a categorical intake or a specific mean value was provided | Categorical;Qualitative |
| Meat Form (as specified in the text) | The meat type/form as provided in the paper *e.g.*, red meat, red and processed meat | Free text |
| Meat form, Condensed | The meat type/form categorized into one of the following groups: beef only, red meat includes beef, red meat unspecified | Categorical;Qualitative |
| Group Sample Size | The number of subjects/participants in a specific group, as specified in “Group Identifier” | Quantitative |
| MOA | The method of ascertainment of dietary intake data i.e. how did authors determine dietary intake | Categorical;Qualitative |
| Concentration (as specified in text) | The concentration of beef/ red meat as reported in the paper | Quantitative |
| Average Type | Whether the reported intake is a mean or median | Categorical;Qualitative |
| CE (as specified in text) | The concentration error value as reported in the paper | Quantitative |
| CE Type (as specified in text) | Whether the CE value is reported as a standard error (SE), standard deviation (SD) or range (*e.g.*, IQR) in the paper | Categorical;Qualitative |
| Concentration Unit (as specified in text) | How beef/red meat consumption was measured/quantified *e.g.*, servings/day, g/week, times/week, as reported in the paper | Categorical;Qualitative |
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| Convert to per day | Where intake concentrations are provided as per week/per month etc., to be converted to a per day intake amount | Quantitative |
| Servings or Grams | Whether the intake amount is in servings or grams daily amount | Categorical;Qualitative |
| Convert servings to grams | Where intake concentrations are provided as servings, to be converted to a gram intake amount | Quantitative |
| Concentration Merged (g/day) | The concentration of beef/red meat intake in g/day (studies which reported concentration in different units were converted to g/day) | Quantitative |
| CE, converted | The concentration error of beef/red meat after conversion to g/day  | Quantitative |
| CE Type, converted | The converted CE value, in the case that a standard error (SE) was converted to a standard deviation (SD) | Categorical;Qualitative |
| Lower Range | The lower limit of a reported IQR, or calculated as the smallest value of the class interval | Quantitative |
| Upper Range | The upper limit of a reported IQR, or calculated as the highest value of the class interval | Quantitative |
| CV, % | The coefficient of variation, entered as a percentage | Quantitative |
| Concentration at Baseline/Outcomes | Was the reported concentration provided as a baseline intake or was it related to measured cognition outcomes | Categorical;Qualitative |
| Processed (Y/N) | Whether the subset contained processed meats or not | Categorical;Qualitative |
| Notes | Additional notes regarding the study and/or data extracted at the group-level | Free text |
| Unprocessed red meat intake, mean | The mean estimated intake of unprocessed red meat per specific region, as reported in Miller et al.(35) | Quantitative |
| Unprocessed red meat intake, L95CI | The lower 95% confidence interval for estimated unprocessed red meat intake per specific region, as reported in Miller et al.(35) | Quantitative |
| Unprocessed red meat intake, U95CI | The upper 95% confidence interval for estimated unprocessed red meat intake per specific region, as reported in Miller et al.(35) | Quantitative |
| Processed red meat intake, mean | The mean estimated intake of processed red meat per specific region, as reported in Miller et al.(35) | Quantitative |
| Processed red meat intake, L95CI | The lower 95% confidence interval for estimated processed red meat intake per specific region, as reported in Miller et al.(35) | Quantitative |
| Processed red meat intake, U95CI | The upper 95% confidence interval for estimated processed red meat intake per specific region, as reported in Miller et al.(35) | Quantitative |
| Total Red Meat Intake, Mean | The mean estimated intake of total red meat per specific region, as reported in Miller et al.(35) | Quantitative |
| Total red meat intake, L95CI | The lower 95% confidence interval for estimated total red meat intake per specific region, as reported in Miller et al.(35) | Quantitative |
| Total red meat intake, U95CI | The upper 95% confidence interval for estimated total red meat intake per specific region, as reported in Miller et al.(35) | Quantitative |
| CE, concentration error ; CI, confidence interval ; CV, coefficient of variation ; MOA, method of ascertainment |

| **Supplementary Table 4.** Classification of cognitive tools by tool type |
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| **Type** | **Tool\*** | **Reference** |
| Domain-specific | 4-IADL | (36) |
| 9-HPT | (37) |
| Beery Test of Visual-Motor Integration | (38) |
| BRIEF-A | (39) |
| CANTAB | (40) |
| CogState | (41) |
| DECO | (42) |
| Digit Span Tests (forwards, backwards) | (43) |
| EBMT | (44) |
| RPM | (45) |
| Stroop Test | (46) |
| Global | MMSE or variation (includes TICS) | (47,48) |
| MoCA | (49) |
| Peabody Picture Vocabulary Test or variation | (50) |
| TMT | (51) |
| WISC-R or variation | (52) |
| WPPSI-III | (53) |
| SDQ | (54) |
| Abbreviations: 4-IADL, 4-Instrumental Activities of Daily Living; 9-HPT, 9-Hole Peg Test ; BRIEF-A, Behavior Rating Inventory of Executive Function – Adult Version ; CANTAB, Cambridge Neuropsychological Test Automated Battery ; DECO, Détérioration Cognitive Observée ; EBMT, East Boston Memory Test ; RPM, Raven’s Progressive Matrices ; MMSE, Mini-Mental State Examination ; MoCA, Montreal Cognitive Assessment ; TMT, Trail Making Test ; WISC-R, Wechsler Intelligence Scale for Children ; WPPSI-III, Wechsler Preschool and Primary Scale of Intelligence ; SDQ, Strengths and Difficulties Questionnaire ; TICS, Telephone Interview for Cognitive Screening |
| \*School test scores and other custom tools are not included this table. |

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