

## Supplementary Material S1: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist

| Section                                               | Item | Prisma-ScR checklist item                                                                                                                                                                                                                                                                                  | Reported on page #        |
|-------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Title</b>                                          |      |                                                                                                                                                                                                                                                                                                            |                           |
| Title                                                 | 1    | Identify the report as a scoping review.                                                                                                                                                                                                                                                                   | 1                         |
| <b>Abstract</b>                                       |      |                                                                                                                                                                                                                                                                                                            |                           |
| Structured summary                                    | 2    | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.                                                                              | 2                         |
| <b>Introduction</b>                                   |      |                                                                                                                                                                                                                                                                                                            |                           |
| Rationale                                             | 3    | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.                                                                                                                                   | 3                         |
| Objectives                                            | 4    | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualise the review questions and/or objectives.                                  | 3                         |
| <b>Methods</b>                                        |      |                                                                                                                                                                                                                                                                                                            |                           |
| Protocol and registration                             | 5    | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.                                                                                                             | 4                         |
| Eligibility criteria                                  | 6    | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.                                                                                                                                       | 4-5                       |
| Information sources*                                  | 7    | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.                                                                                                  | 4                         |
| Search                                                | 8    | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.                                                                                                                                                                            | Supplementary material S2 |
| Selection of sources of evidence†                     | 9    | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.                                                                                                                                                                                      | 5                         |
| Data charting process‡                                | 10   | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | 5                         |
| Data items                                            | 11   | List and define all variables for which data were sought and any assumptions and simplifications made.                                                                                                                                                                                                     | 5                         |
| Critical appraisal of individual sources of evidence§ | 12   | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).                                                                                                      | NA                        |
| Synthesis of results                                  | 13   | Describe the methods of handling and summarising the data that were charted.                                                                                                                                                                                                                               | 5                         |
| <b>Results</b>                                        |      |                                                                                                                                                                                                                                                                                                            |                           |
| Selection of sources of evidence                      | 14   | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.                                                                                                                               | 6                         |
| Characteristics of sources of evidence                | 15   | For each source of evidence, present characteristics for which data were charted and provide the citations.                                                                                                                                                                                                | 6-7                       |
| Critical appraisal within sources of evidence         | 16   | If done, present data on critical appraisal of included sources of evidence (see item 12).                                                                                                                                                                                                                 | NA                        |

Continued

## Supplementary Material S1: Continued

| Section                                   | Item | Prisma-ScR checklist item                                                                                                                                                                       | Reported on page # |
|-------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Results of individual sources of evidence | 17   | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.                                                           | 7                  |
| Synthesis of results                      | 18   | Summarise and/or present the charting results as they relate to the review questions and objectives.                                                                                            | 16-17              |
| <b>Discussion</b>                         |      |                                                                                                                                                                                                 |                    |
| Summary of evidence                       | 19   | Summarise the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | 18                 |
| Limitations                               | 20   | Discuss the limitations of the scoping review process.                                                                                                                                          | 19                 |
| Conclusions                               | 21   | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.                                       | 19                 |
| <b>Funding</b>                            |      |                                                                                                                                                                                                 |                    |
| Funding                                   | 22   | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.                 | 20                 |

JB1 = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\*Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JB1 guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and explanation. Ann Intern Med. 2018;169:467–473. <https://doi.org/10.7326/M18-0850>.



## Supplementary material S2

Ovid MEDLINE search strategy

- 1 cardiovascular diseases/ or exp cardiovascular abnormalities/ or exp heart diseases/ or exp vascular diseases/
- 2 exp asthma/ or exp pulmonary disease, chronic obstructive/
- 3 diabetes mellitus/ or exp diabetes mellitus, type 1/ or exp diabetes mellitus, type 2/ or latent autoimmune diabetes in adults/ or prediabetic state/
- 4 exp Osteoporosis/
- 5 Accidental Falls/
- 6 Sarcopenia/
- 7 exp kidney diseases/ and chronic.tw,kf,hw.
- 8 Presbycusis/
- 9 exp Hearing Loss/
- 10 exp Blindness/
- 11 Alzheimer Disease/
- 12 (Chronic-Obstructive-Pulmonary-Disease\* or COPD or Cardiovascular-Disease\* or Heart-Disease\* or stroke or Diabetes or Osteoporosis or accidental-fall\* or Sarcopenia\* or Kidney-Disease\* or Presbycusis or hearing or deaf\* or blind\* or vision or Alzheimer\* or dementia\*).tw,kf.
- 13 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12
- 14 (ph or ep or et or pp).fs.
- 15 exp cohort studies/
- 16 (longterm or long-term or repeat\* or serial or longitudinal\* or follow-up or followup or cohort\* or retrospective\* or prospective\*).tw,kf.
- 17 15 or 16
- 18 (life-course\* or trajector\*).tw,kf.
- 19 \*Blood Pressure/
- 20 exp \*forced expiratory flow rates/ or \*forced expiratory volume/
- 21 exp \*Muscle Strength/
- 22 exp \*Vital Capacity/
- 23 \*respiratory function tests/ or \*airway resistance/ or \*lung compliance/ or exp \*lung volume measurements/ or exp \*spirometry/
- 24 \*carotid intima-media thickness/ or \*vascular stiffness/
- 25 exp \*Pulse Wave Analysis/
- 26 exp \*Retinal Vessels/
- 27 \*Blood Glucose/
- 28 \*Glycated Hemoglobin A/
- 29 exp \*bone density/ or exp \*muscle strength/ or exp \*hand strength/ or exp \*musculoskeletal development/
- 30 \*Albuminuria/
- 31 exp \*Glomerular Filtration Rate/
- 32 exp \*Auditory Threshold/
- 33 exp \*Visual Acuity/
- 34 \*cognition/ or exp \*cognitive reserve/ or \*executive function/
- 35 (blood-pressure or vascular-function\* or vascular-stiffness or augmentation-index or pulse-pressure or pulse-wave-velocit\* or retinal-microvasculature\* or carotid-artery-intima-media-thickness or cIMT or carotid-artery-distensibilit\* or carotid-artery-elasticit\* or lung-function\* or FEV or FVC or respiratory-function\* or forced-expiratory-flow-rate\* or forced-expiratory-volume\* or spirometry vital-capacit\* or respiratory-function-test\* or lung-volume-measurement\* or blood-glucose or HbA1c or bone-densit\* or bone-morpholog\* or bone-strength or bone-geometr\* or muscle-strength or muscle-densit\* or muscle-morpholog\* or grip-strength or hand-strength or albuminuria or glomerular-filtration-rate\* or vision or cognition or cognitive-reserve or verbal-iq or performance-iq or executive-function\*).tw,kf.
- 36 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35
- 37 13 and 17 and 18 and 36
- 38 14 and 17 and 18 and 36
- 39 37 or 38
- 40 limit 39 to (case reports or comment or editorial or guideline or letter or practice guideline or preprint)
- 41 39 not 40



## Supplementary Material S3: Healthy reference values used to standardise phenotype trajectories

| Phenotype                             | Reference value                                                    | Sources of evidence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Systolic blood pressure               | 120 mmHg                                                           | Whelton, P. K., Carey, R. M., Aronow, W. S., Casey, D. E., Jr, Collins, K. J., Dennison Himmelfarb, C., DePalma, S. M., Gidding, S., Jamerson, K. A., Jones, D. W., MacLaughlin, E. J., Muntner, P., Ovbiagele, B., Smith, S. C., Jr, Spencer, C. C., Stafford, R. S., Taler, S. J., Thomas, R. J., Williams, K. A., Sr, Williamson, J. D., . . . Wright, J. T., Jr (2018). 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. <i>Hypertension (Dallas, Tex. : 1979)</i> , 71(6), 1269–1324. <a href="https://doi.org/10.1161/HYP.0000000000000066">https://doi.org/10.1161/HYP.0000000000000066</a> |
| Diastolic blood pressure              | 80 mmHg                                                            | Whelton, P. K., Carey, R. M., Aronow, W. S., Casey, D. E., Jr, Collins, K. J., Dennison Himmelfarb, C., DePalma, S. M., Gidding, S., Jamerson, K. A., Jones, D. W., MacLaughlin, E. J., Muntner, P., Ovbiagele, B., Smith, S. C., Jr, Spencer, C. C., Stafford, R. S., Taler, S. J., Thomas, R. J., Williams, K. A., Sr, Williamson, J. D., . . . Wright, J. T., Jr (2018). 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. <i>Hypertension (Dallas, Tex. : 1979)</i> , 71(6), 1269–1324. <a href="https://doi.org/10.1161/HYP.0000000000000066">https://doi.org/10.1161/HYP.0000000000000066</a> |
| Heart rate                            | 80 beats per minute                                                | Mason, J.W., Ramseth, D.J., Chanter, D.O., et al. Electrocardiographic reference ranges derived from 79,743 ambulatory subjects. <i>Journal of Electrocardiology</i> . 2007 Jul; 40(3):228-234. DOI: 10.1016/j.jelectrocard.2006.09.003                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Pulse wave velocity (carotid-femoral) | 5.86 metres per second                                             | Díaz, A., Galli, C., Tringler, M., Ramírez, A., & Cabrera Fischer, E. I. (2014). Reference values of pulse wave velocity in healthy people from an urban and rural argentinean population. <i>International journal of hypertension</i> , 2014, 653239. <a href="https://doi.org/10.1155/2014/653239">https://doi.org/10.1155/2014/653239</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Pulse wave velocity (brachial-ankle)  | 12.3 metres per second                                             | Yiming, G., Zhou, X., Lv, W., Peng, Y., Zhang, W., Cheng, X., Li, Y., Xing, Q., Zhang, J., Zhou, Q., Zhang, L., Lu, Y., Wang, H., & Tang, B. (2017). Reference values of brachial-ankle pulse wave velocity according to age and blood pressure in a central Asia population. <i>PloS one</i> , 12(4), e0171737. <a href="https://doi.org/10.1371/journal.pone.0171737">https://doi.org/10.1371/journal.pone.0171737</a>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Glucose                               | 4.75 mmol/L                                                        | World Health Organization. (2024, May 24). <i>Mean fasting blood glucose</i> . <a href="https://www.who.int/data/gho/indicator-metadata-registry/imr-details/2380">https://www.who.int/data/gho/indicator-metadata-registry/imr-details/2380</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Glomerular filtration rate            | 105 mL/min/1.73m <sup>2</sup>                                      | National Kidney Foundation. (2023, Sep 05). <i>Understanding your lab values and other CKD health numbers</i> . <a href="https://www.kidney.org/kidney-topics/understanding-your-lab-values-and-other-ckd-health-numbers">https://www.kidney.org/kidney-topics/understanding-your-lab-values-and-other-ckd-health-numbers</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| FEV <sub>1</sub>                      | Trajectory peak                                                    | Not applicable – peak available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| FVC                                   | Trajectory peak                                                    | Not applicable – peak available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Bone mineral content                  | Trajectory peak                                                    | Not applicable – peak available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Bone mineral density (whole body)     | Trajectory peak                                                    | Not applicable – peak available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Bone mineral density (hip)            | 1.04 g/cm <sup>2</sup> (male) and 0.942 g/cm <sup>2</sup> (female) | Looker, A. C., Wahner, H. W., Dunn, W. L., Calvo, M. S., Harris, T. B., Heyse, S. P., Johnston, C. C., Jr, & Lindsay, R. (1998). Updated data on proximal femur bone mineral levels of US adults. <i>Osteoporosis International : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA</i> , 8(5), 468–489. <a href="https://doi.org/10.1007/s001980050093">https://doi.org/10.1007/s001980050093</a>                                                                                                                                                                                                                                                                                                                                                   |

## Supplementary Material S3: Continued

| Phenotype     | Reference value                          | Sources of evidence                                                                                                                                                                                                                                                                                                                                            |
|---------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grip strength | Trajectory peak                          | Not applicable – peak available.                                                                                                                                                                                                                                                                                                                               |
| Muscle mass   | 28.16 kg (male) and<br>18.72 kg (female) | Gould, H., Brennan, S. L., Kotowicz, M. A., Nicholson, G. C., & Pasco, J. A. (2014). Total and appendicular lean mass reference ranges for Australian men and women: the Geelong osteoporosis study. <i>Calcified tissue international</i> , 94(4), 363–372. <a href="https://doi.org/10.1007/s00223-013-9830-7">https://doi.org/10.1007/s00223-013-9830-7</a> |

