

Purpose and Scope

Supplementary Table S1 presents 106 empirical examples in which authors explicitly linked cross-sectional data or analysis to limitations on causal interpretation. The collection was assembled to document the forms and disciplinary breadth of this reporting convention rather than to estimate its prevalence.

Assembly of the Examples

The 106 examples were assembled through iterative, purposive searches rather than a systematic review. Searches using the Journal/Author Name Estimator (JANE) paired terms related to cross-sectional design or analysis, including “cross-sectional” and “cross-sectional data,” with terms related to causal interpretation, including “causal,” “causality,” “causal inference,” “cannot infer causality,” and related variants. Retrieved articles were reviewed to identify empirical reports in which authors explicitly linked their own cross-sectional data or analysis to a limitation on causal interpretation.

Additional searches combined cross-sectional and causal-language terms with terms describing proposed remedies, including “longitudinal,” “prospective,” “future research,” and “further research.” Selected prevention, public health, behavioral, clinical, and epidemiology journals were also searched directly for relevant examples. Proposing a remedy was not required for inclusion; eligible reports could recommend longitudinal, prospective, experimental, or other research, or state no specific remedy.

The collection was assembled to document the forms and disciplinary breadth of this reporting convention. It was not intended to be exhaustive, constitute a systematic review, or provide a representative sample from which the prevalence of the convention could be estimated.

Interpretation Notes

Statements were included when authors explicitly linked their own cross-sectional data or analytic approach to limits on causal interpretation, temporal ordering, directionality, or related concerns. Remedy categories are non-exclusive because an article could recommend more than one form of future research. Inclusion does not imply that the cited authors’ caution about causal interpretation was unwarranted.

Supplementary Table S1. Empirical cross-sectional studies explicitly limiting causal inference

This table presents 100 empirical examples. Quoted limitation language is reproduced verbatim

No.	Study citation	Design / analytic context	Location of statement	Verbatim causal-limitation statement	Specific threat(s) to causal interpretation	Longitudinal / prospective remedy	DOI / identifier
1	Bugg & Head (2011). Exercise moderates age-related atrophy of the medial temporal lobe. <i>Neurobiol Aging</i> ; 32(3):506-514.	Cross-sectional neuroimaging analysis	Limitations subsection	While the cross-sectional approach implemented here commonly represents an important first step in identifying moderators of age-related effects, such as those produced by exercise, this approach cannot determine causality.	Causal inference	Yes: longitudinal and intervention studies	DOI: 10.1016/j.neurobiolaging.2009.03.008; PMC31891908; PMID: 21731119
2	Tam & Greenfield (2010). Do Alcohol Warning Labels Influence Men's and Women's Attempts to Deter Others from Driving When Intoxicated? <i>J. Hum Factors Ergon Manuf.</i> 20(6):538-546.	Cross-sectional pooled national survey analysis	Limitations subsection	Additionally, the results are based on self-reports, involving cross-sectional not longitudinal data. Relationships are truly associational and direction of causality cannot be determined.	Causal inference and directionality	No explicit longitudinal or prospective remedy	DOI: 10.1002/rlm.20239; PMC3008779; PMID: 22473443
3	Gopalan et al. (2010). Correlates of Externalizing Behavior Symptoms Among Youth Within Two Impoverished, Urban Communities. <i>Child Youth Serv.</i> 31(3-4):92-120.	Cross-sectional secondary analysis of baseline data from a longitudinal program study	Limitations subsection	As with all cross-sectional data, the direction of causality is difficult to determine.	Directionality; measurement and omitted contextual factors	Yes: longitudinal studies	DOI: 10.1080/0145935X.2009.524468; PMC31281816; PMID: 21731119
4	Sroten et al. (2002). Structural determinants of food insufficiency, low dietary diversity and BMI: a cross-sectional study of HIV-infected and HIV-negative Rwandan women. <i>BMI Open</i> ; 2:e000714.	Cross-sectional analysis of a longitudinal cohort	Discussion, limitations paragraph	Limitations of our study include its cross-sectional nature, which does not allow us to infer causality.	Causal inference	Yes: longitudinal studies	DOI: 10.1136/bmjopen-2011-000714; PMC3329607; PMID: 22505309
5	Desvarieux et al. (2010). Periodontal bacteria and hypertension: The Oral Infections and Vascular Disease Epidemiology Study (INVEST). <i>J Hypertens</i> ; 28(7):1413-1421.	Cross-sectional concurrent analysis within a prospective cohort	Discussion, limitations paragraph	This study shares with others the limitations of cross-sectional data. Because both hypertension and periodontal microbiology were measured concurrently, the time sequence cannot be established and causal inferences cannot be made.	Causal inference and temporal sequence	Yes: prospective follow-up	DOI: 10.1097/HJH.0b013e328338cd36; PMC3403746; PMID: 20453665
6	Cois & Ehrlich (2013). Problem drinking as a risk factor for tuberculosis: a propensity score matched analysis of a national survey. <i>BMC Public Health</i> ; 13:871.	Cross-sectional nationally representative survey analysis	Discussion	The major limitations of this study derive from its cross-sectional design and the consequent use of measures of lifetime prevalence instead of incidence to infer causality.	Cross-sectional limitation contextualized with longitudinal evidence; confounding and self-report	No explicit longitudinal or prospective remedy	DOI: 10.1186/1471-2458-13-871; PMC3852702; PMID: 24053258
7	Tomey et al. (2013). Associations between neighborhood characteristics and self-rated health: A cross-sectional investigation in the Multi-Ethnic Study of Atherosclerosis cohort. <i>Health Place</i> ; 24:267-274.	Cross-sectional analysis within the MESA cohort	Discussion, limitations paragraph	An additional limitation of our study is the cross-sectional nature of the analysis. Reverse causality, i.e. that those with better physical health sought out or were better able to locate in better neighborhoods is also a possibility. The observational nature of the data, and the possibility of residual confounding, also limits causal inferences.	Reverse causality; residual confounding; observational design	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.healthplace.2013.10.001; PMC3874444; PMID: 24211514
8	Burghardt et al. (2015). DNA methylation, insulin resistance and second-generation antipsychotics in bipolar disorder. <i>Epigenomics</i> ; 7(3):343-352.	Original cross-sectional clinical study	Conclusion paragraph	As this is the first study to identify this relationship using a cross-sectional design causal inferences cannot yet be drawn.	Causal inference; treatment ordering and confounding	Yes: prospective studies	DOI: 10.2217/epi.15.5; PMC5401018; PMID: 26077424
9	Yoon et al. (2015). Associations of Pulmonary Function with Dementia and Depression in an Older Korean Population. <i>Psychiatry Investig.</i> 12(4):443-450.	Cross-sectional analysis within a prospective community survey	Discussion, limitations paragraph	The major limitation of the present study is related to its cross-sectional design, in that the direction of causality cannot be concluded.	Directionality; reverse causality explicitly considered	Yes: longitudinal studies or clinical trials	DOI: 10.4306/pi.2015.12.4.443; PMC4620300; PMID: 26508954
10	Diaz et al. (2016). Sedentary behavior and subclinical atherosclerosis in African Americans: cross-sectional analysis of the Jackson Heart Study. <i>Int J Behav Nutr Phys Act.</i> 13:31.	Cross-sectional baseline analysis within a cohort	Discussion, limitations paragraph	Finally, because of the cross-sectional nature of our analyses, we cannot infer causality.	Causal inference; residual confounding named	No explicit longitudinal or prospective remedy	DOI: 10.1186/s12966-016-0349-y; PMC4772318; PMID: 26928285
11	Cassidy et al. (2016). Cross-sectional study of diet, physical activity, television viewing and sleep duration in 233,110 adults from the UK Biobank. <i>BMI Open</i> ; 6(3):e010038.	Cross-sectional baseline analysis of cohort data	Strengths and limitations of this study box	The cross-sectional nature means we cannot infer causality between disease and lifestyle behaviours.	Temporal ordering and directionality	No explicit longitudinal or prospective remedy	DOI: 10.1136/bmjopen-2015-010038; PMC4800116; PMID: 27008686
12	Galon et al. (2017). Epidemiology of hypertension in Northern Tanzania: a community-based mixed-methods study. <i>BMI Open</i> ; 7:e018825.	Community-based mixed-methods study with cross-sectional household survey	Strengths and limitations box	As this was a cross-sectional study, causal inferences cannot be drawn.	Causal inference; unmeasured confounding	No explicit longitudinal or prospective remedy	DOI: 10.1136/bmjopen-2017-018829; PMC5695455; PMID: 29127352
13	Koyanagi et al. (2017). Depression comorbid with tuberculosis and its impact on health status: cross-sectional analysis of community-based data from 48 low- and middle-income countries. <i>BMC Medicine</i> ; 15(1):209.	Cross-sectional multi-country survey analysis	Discussion, limitations paragraph	Finally, the direction of causality cannot be established due to the cross-sectional design.	Direction of causality	No explicit longitudinal or prospective remedy	DOI: 10.1186/s12916-017-0975-5; PMC5704363; PMID: 29179720
14	Ganz et al. (2018). Tobacco harm perceptions and use among sexual and gender minorities: findings from a national sample of young adults in the United States. <i>Addict Behav.</i> 81:104-108.	Cross-sectional analysis of one wave of a longitudinal cohort	Discussion, limitations paragraph	First, data are cross-sectional and thus causal inferences cannot be made.	Causal inference	Yes: longitudinal studies	DOI: 10.1016/j.addbeh.2018.01.032; PMC5848066; PMID: 29454177
15	Gunnarsson & Agerström (2018). Clinical pain, abstraction, and self-control: being in pain makes it harder to see the forest for the trees and is associated with lower self-control. <i>J Pain Res.</i> 11:1335-1334.	Original cross-sectional correlational study	Discussion, limitations paragraph	A further limitation is that the current correlational design does not allow us to draw any causal conclusions regarding pain, abstraction, and self-control.	Causal inference; unmeasured variables; reverse direction	No explicit longitudinal or prospective remedy; further research to clarify directionality recommended	DOI: 10.2147/JPR.S163044; PMC6007188; PMID: 29942145
16	Mueller et al. (2018). Behavioral Correlates of Empirically-Derived Dietary Patterns among University Students. <i>Nutrients</i> ; 10(6):716.	Cross-sectional analysis within the Tufts Longitudinal Health Study	Discussion, limitations paragraph	The cross-sectional design of our analysis does not allow us to infer causality, but only to evaluate associations between behavioral factors and dietary patterns.	Associational-only interpretation; residual confounding	Yes: longitudinal studies and controlled intervention studies	DOI: 10.3390/nu10060716; PMC6024866; PMID: 29865279
17	Chung et al. (2017). Influences on Immunization Decision-Making among US Parents of Young Children. <i>Matern Child Health J.</i> 21(12):2178-2187.	Cross-sectional analyses of independently administered 2012 and 2014 surveys	Discussion, paragraph immediately before Limitations heading	Although causal inferences cannot be made due to the cross-sectional nature of the study, these findings highlight the important role past experiences (e.g. parents' own or their networks') may play in shaping or confirming parents' immunization decisions.	Causal inference	No explicit longitudinal or prospective remedy identified in the verified excerpt	DOI: 10.1007/s10995-017-2336-6; PMC6036655; PMID: 28755045
18	Hung et al. (2017). Dietary and Supplemental Vitamin C and D on Symptom Severity and Physical Function in Knee Osteoarthritis. <i>Journal of Nutrition in Gerontology and Geriatrics</i> ; 36(2-3):121-133.	Cross-sectional baseline analysis of cohort data	Discussion, paragraph immediately preceding the Limitations section	Because of the cross-sectional nature of the data, we cannot determine causality or directionality in the association.	Directionality	Yes: longitudinal analyses and randomized controlled trials	DOI: 10.1080/10515197.2017.1317315; PMC6088727; PMID: 28557644
19	Jonsdottir et al. (2019). Factors associated with chronic and acute back pain in Wales, a cross-sectional study. <i>BMC Musculoskelet Disord</i> ; 20:215.	Cross-sectional secondary analysis of the Welsh Health Survey	Limitations subsection	The reported results cannot infer causality due to the nature of the study design.	Generic design disclaimer; unknown confounding; selection; measurement; reverse causality	Yes: longitudinal cohort studies	DOI: 10.1186/s12891-019-2477-4; PMC6521348; PMID: 31092222
20	Aquah et al. (2019). Predictors of underweight in children under-five years in Ghana. <i>Ghana Med J.</i> 53(1):71-78.	Cross-sectional secondary analysis of the 2014 Ghana Demographic and Health Survey	Discussion, limitations paragraph	This study is limited by its cross-sectional nature and hence causal inferences cannot be made.	Generic causal disclaimer; unobserved heterogeneity named	No explicit longitudinal or prospective remedy	DOI: 10.4314/gmj.v53i1.11; PMC6527829; PMID: 31138947
21	Palakshappa et al. (2019). Food Insecurity Is Associated with an Increased Prevalence of Comorbid Medical Conditions in Obese Adults: NHANES 2007-2014. <i>J Gen Intern Med</i> ; 34(8):1486-1493.	Cross-sectional NHANES analysis	Discussion, limitations paragraph	First, we cannot determine causation with the cross-sectional design used in this study.	Causal inference; bidirectionality; unmeasured characteristics	No explicit longitudinal or prospective remedy	DOI: 10.1007/s11606-019-05081-9; PMC6667608; PMID: 31161567
22	Beyer et al. (2019). A Metabolic Obesity Profile Is Associated With Decreased Gray Matter Volume in Cognitively Healthy Older Adults. <i>Front Aging Neurosci</i> ; 11:202.	Cross-sectional analysis from the LIFE-Adult Study	Strengths and Limitations of the Current Study	The main limitation of this study is that we cannot draw causal inferences based on our cross-sectional data.	Causal inference	Yes: longitudinal studies	DOI: 10.3389/fnagi.2019.00202; PMC6688741; PMID: 31427957
23	Luo et al. (2019). Individual-level and area-level socioeconomic status and schizophrenia: cross-sectional analyses using evidence from 1.9 million Chinese adults. <i>BMI Open</i> ; 9(5):e026552.	National population-based cross-sectional survey analysis	Discussion, limitations paragraph	Third, a cross-sectional design in this study cannot draw causal inferences.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1136/bmjopen-2018-026532; PMC6731895; PMID: 31488464
24	Christopoulos et al. (2019). Internalized HIV Stigma Is Associated with Concurrent Viremia and Poor Retention in a Cohort of U.S. Patients in HIV Care. <i>J Acquir Immune Defic Syndr.</i> 82(2):116-123.	Cross-sectional analysis within a clinical cohort	Discussion, limitations paragraph	Although our analyses are cross-sectional and we cannot infer causality, we provide the first large-scale assessment of internalized stigma and retention in HIV care in the United States.	Causal inference; unmeasured confounding; concurrent measurement	Yes: longitudinal analyses	DOI: 10.1097/QAI.0000000000000217; PMC6750269; PMID: 31513551
25	Kazem Karyani et al. (2019). Socioeconomic gradient in physical activity: findings from the PERSIAN cohort study. <i>BMC Public Health</i> ; 19:132.	Cross-sectional analysis of PERSIAN cohort participants	Discussion, limitations paragraph	Third, causal inferences cannot be made because of the cross-sectional nature of our study design.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1186/s12889-019-7715-z; PMC6802340; PMID: 31638932
26	Verhul et al. (2019). What Role Does Positive Psychology Play in Understanding Pain Intensity and Disability Among Patients with Hand and Upper Extremity Conditions? <i>Clin Orthop Relat Res</i> ; 477(8):1769-1776.	Original cross-sectional study	Discussion, limitations paragraph	First, this is a cross-sectional study and although we imposed predictors and outcomes as required by the regression analyses, causal inferences cannot be made.	causal inference and bidirectionality	Yes: prospective studies	DOI: 10.1097/CORR.0000000000000694; PMC7000015; PMID: 31107321
27	Brown et al. (2020). The Unrecognized Prevalence of Primary Aldosteronism: A Cross-sectional Study. <i>Ann Intern Med</i> ; 173(1):10-20.	Original multisite cross-sectional study	Discussion, limitations paragraph	Third, the cross-sectional design of the study means that causality cannot be determined.	Causal inference and reverse causality	No explicit longitudinal or prospective remedy	DOI: 10.7326/M20-0965; PMC7459427; PMID: 32448886
28	Becker et al. (2021). Psychopathology and Somatic Complaints: A Cross-Sectional Study with Portuguese Adults. <i>Healthcare (Basel)</i> ; 9(4):478.	Original cross-sectional survey of clinical and general-population samples	Discussion, limitations paragraph	Second, due to the cross-sectional nature of the study, causality could not be inferred.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.3390/healthcare9040478; PMC8073042; PMID: 33920545

29	Chen et al. (2021). Did School Meal Programs and SNAP Participation Improve Diet Quality of US Children from Low-income Households: Evidence from NHANES 2013–2014? <i>Nutrients</i> ; 13(10):3574.	Cross-sectional NHANES analysis	Discussion, limitations paragraph	A limitation of this study was its cross-sectional nature, which does not allow causal inference.	Causal inference and unmeasured or unobserved confounding	Yes: longitudinal studies	DOI: 10.3390/nu13103574; PMC8540084; PMID: 34684575
30	Zatar et al. (2022). Subjective cognitive decline and objective cognition among diverse U.S. Hispanics/Latinos: Results from the Study of Latinos-Investigation of Neurocognitive Aging (SOL-INCA). <i>Alzheimer's & Dementia</i> ; 18(1):43–52.	Cross-sectional analysis within an ancillary cohort study	Discussion, limitations paragraph	First, given its cross-sectional nature, a causal relationship cannot be established.	Causal inference	Yes: longitudinal studies	DOI: 10.1002/alz.12381; PMC8630099; PMID: 34957776
31	Kljajic et al. (2022). Why Do Students Procrastinate More in Some Courses Than in Others and What Happens Next? Expanding the Multilevel Perspective on Procrastination. <i>Front Psychol</i> ; 12:786249.	Cross-sectional multilevel mediation analysis; grades obtained later	Discussion, limitations paragraph	Although we have proposed a theoretically-sound mediational model and we want to encourage researchers to replicate this study, we also recognize that focusing mostly on cross-sectional associations is limitative and does not allow us to infer causality.	Causal inference, temporal ordering, bidirectionality, and alternative explanations	Yes: longitudinal and experimental studies	DOI: 10.3389/fpsyg.2021.786249; PMC3884079; PMID: 35237201
32	Uddin et al. (2022). The association between neighborhood social and economic environment and prevalent diabetes in urban and rural communities: The REGARDS study. <i>SSM - Population Health</i> ; 17:303050.	Cross-sectional baseline analysis of cohort data	Discussion, limitations paragraph	Lastly, due to the cross-sectional nature of the analysis, causal inferences cannot be made from the study findings.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.ssmph.2022.101050; PMC819294; PMID: 35295743
33	Walia et al. (2022). Ugandan Men Exposed to Intimate Partner Violence: A Cross-Sectional Survey of Nationally Representative Data. <i>Journal of Prevention</i> ; 43(4):567–588.	Cross-sectional DHS analysis	Discussion, limitations paragraph	Secondly, the cross-sectional survey by design is unable to establish causality, therefore it was not possible to determine the factors that caused the violence.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1007/s10935-022-00683-2; PMC9252969; PMID: 35650366
34	Borjesson et al. (2022). Correlates of cardiorespiratory fitness in a population-based sample of middle-aged adults: cross-sectional analyses in the SCAPIS study. <i>BMI Open</i> ; 12(12):e06636.	Cross-sectional baseline analysis of cohort data	Discussion, limitations paragraph	The cross-sectional design of the study prevents any causal inference and we cannot rule out reverse causality.	Causal inference and reverse causality	No explicit longitudinal or prospective remedy	DOI: 10.1136/bmjopen-2022-066336; PMC9756301; PMID: 36521886
35	Bacon et al. (2022). Relation of gait measures with mild unilateral knee pain during walking using machine learning. <i>Sci Rep</i> ; 12:22200.	Cross-sectional analysis within the Multicenter Osteoarthritis Study	Discussion, limitations paragraph	Given the cross-sectional nature of our study, it is not possible to determine the direction of causality.	Direction of causality	Yes: longitudinal studies	DOI: 10.1038/s41598-022-21142-2; PMC3783146; PMID: 36564397
36	Vandercappellen et al. (2023). Accelerometer-derived physical activity and sedentary time and cardiac biomarkers: The Maastricht Study. <i>Frontiers in Cardiovascular Medicine</i> ; 10:108171.	Cross-sectional baseline analysis of a prospective cohort	Discussion, limitations paragraph	Causal inference should be made with great caution due to the cross-sectional design.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.3389/fcvm.2023.108171; PMC10175613; PMID: 37187790
37	Ma & Li (2023). Systemic immune-inflammation index is associated with coronary heart disease: a cross-sectional study of NHANES 2009–2018. <i>Frontiers in Cardiovascular Medicine</i> ; 10:1199433.	Cross-sectional NHANES analysis	Discussion, limitations paragraph	The cross-sectional design precludes establishing causal relationships, necessitating prospective investigations for causal determination.	Causal inference	Yes: longitudinal studies	DOI: 10.3389/fcvm.2023.1199433; PMC10361751; PMID: 37485261
38	Cherenack et al. (2023). Stimulant Use, HIV, and Immune Dysregulation among Sexual Minority Men. <i>Drug Alcohol Depend</i> ; 251:110942.	Cross-sectional baseline analysis within a prospective cohort	Discussion, limitations paragraph	The current analysis cannot determine causality due to the cross-sectional design, and the purpose of the study was not to explain mechanisms driving immune dysregulation.	Causal inference and unmeasured confounding	Yes: longitudinal studies	DOI: 10.1016/j.drugalcdep.2023.110942; PMC10544798; PMID: 37651812
39	Zhu et al. (2023). Association of non-HDL-C and depression: a cross-sectional analysis of the NHANES data. <i>Front Psychiatry</i> ; 14:1274648.	Cross-sectional NHANES analysis	Discussion, limitations paragraph	Finally, cross-sectional studies cannot infer causality, and prospective studies are needed to further determine validation.	Causal inference	Yes: longitudinal studies	DOI: 10.3389/fpsyg.2023.1274648; PMC10623352; PMID: 37928909
40	Eklom-Bak et al. (2023). Accelerometer-derived physical activity and subclinical coronary and carotid atherosclerosis: cross-sectional analyses in 22,703 middle-aged men and women in the SCAPIS study. <i>BMI Open</i> ; 13(11):e073380.	Cross-sectional baseline analysis of a prospective cohort	Discussion, limitations paragraph	However, the cross-sectional design of the study prevents any causal inference and we cannot rule out reverse causality.	Causal inference and reverse causality	Yes: longitudinal studies	DOI: 10.1136/bmjopen-2023.073380; PMC10668326; PMID: 37996228
41	Huang et al. (2024). Independent and combined effects of smoking, drinking and depression on periodontal disease. <i>BMC Oral Health</i> ; 24(1):535.	Cross-sectional NHANES analysis	Discussion, limitations paragraph	First, no causality can be inferred from the data due to the cross-sectional nature of the study.	Causal inference and reverse causality	No explicit longitudinal or prospective remedy	DOI: 10.1186/s12993-024-04287-6; PMC11075253; PMID: 38711116
42	Mei et al. (2024). The relationship between remnant cholesterol and the risk of testosterone deficiency in US adults: a cross-sectional study based on NHANES. <i>Frontiers in Endocrinology</i> ; 15:1458193.	Cross-sectional NHANES analysis	Discussion, limitations paragraph	First, the cross-sectional nature of our study precludes establishing causal relationships, which is an inherent limitation of such designs.	Causal inference	Yes: cohort studies and randomized controlled trials	DOI: 10.3389/fendo.2024.1458193; PMC11462545; PMID: 39387048
43	Li et al. (2024). The Prevalence of Dental Carious Lesions and Associated Risk Factors in Chinese Children Aged 7-9 Years. <i>Oral Health Prev Dent</i> ; 22:b9508793.	Original cross-sectional school survey	Limitations subsection	First, this is a cross-sectional study that cannot establish a causal relationship between risk factors and tooth decay, so further longitudinal studies are needed to obtain more accurate data.	Causal inference	Yes: longitudinal studies	DOI: 10.3290/j.ohpd.b9508793; PMC11616910; PMID: 39057914
44	Pan et al. (2025). Sociodemographics and Digital Health Literacy in Using Wearables for Health Promotion and Disease Prevention: Cross-Sectional Nationwide Survey in Germany. <i>Journal of Prevention</i> ; 46(3):371–391.	Cross-sectional survey	Discussion, limitations paragraph	The cross-sectional nature of the study design limits our ability to establish causal relationships.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1007/s10935-024-00821-y; PMC12206174; PMID: 39692799
45	Peng et al. (2025). The cross-sectional association between cardiometabolic index and abdominal aortic calcification in U.S. adults: evidence from NHANES 2013–2014. <i>Frontiers in Nutrition</i> ; 12:1537795.	Cross-sectional NHANES analysis	Discussion, study strengths and limitations subsection	However, given the cross-sectional nature of NHANES, the associations observed in this study cannot establish causality.	Causal inference and temporality	Yes: longitudinal studies	DOI: 10.3389/fnut.2025.1537795; PMC12263387; PMID: 40627436
46	Abbasi et al. (2025). Dietary Antioxidant Quality Score and Epilepsy Odds in US Adults: A Cross-Sectional NHANES Study. <i>Brain and Behavior</i> ; 15(11):e71018.	Cross-sectional NHANES analysis	Discussion, limitations paragraph	First, the cross-sectional design of NHANES precludes causal inference and limits our ability to determine the temporal sequence between antioxidant intake and epilepsy development.	Causal inference and temporal sequence	Yes: longitudinal studies	DOI: 10.1002/brb3.71018; PMC12572107; PMID: 41163342
47	Muratori et al. (2022). Parenting practices and dysregulation profile in a sample of Italian children. <i>J Affect Disord</i> ; 301:268–272.	Cross-sectional observational study of Italian children and parenting practices	Abstract, limitation statement	The cross-sectional nature of the study precludes inferences on causality.	Causal inference; reverse causality and bidirectionality	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.jad.2022.01.041; PMID: 35065403
48	Fuller et al. (2025). Parental employment quality and the mental health and school performance of children and youth. <i>J Epidemiol Community Health</i> ; 79(7):552–558.	Cross-sectional analysis of the population-representative 2014 Ontario Child Health Study	Discussion, limitations paragraph	This was a cross-sectional study precluding causal inferences, and all variables were by parental self-report which may be subject to bias.	Causal inference, temporal ordering, reverse causality and unmeasured confounding	Yes: longitudinal studies	DOI: 10.1136/jech-2024-223366; PMCID: PMC12322398
49	de Wet & Yelverton (2025). A Cross-Sectional Survey of Musculoskeletal Injuries in South African Shotokan Karate. <i>J Fund Morphol Kinesiol</i> ; 10(4):463.	Original descriptive cross-sectional survey	Discussion, limitations subsection	First, its cross-sectional design precludes any causal inferences and lacks temporal control: the association between greater experience and higher injury reporting, for instance, is likely a function of accumulated exposure over time rather than a direct causal relationship.	Causal inference and temporality	Yes: longitudinal studies	DOI: 10.3390/fmk10040463; PMC12734262; PMID: 41440784
50	Baeterfeld et al. (2024). Internalizing psychopathology and its links to suicidal ideation, dysfunctional attitudes, and help-seeking readiness in a national sample of college students. <i>J Affect Disord</i> ; 350:255–263.	Cross-sectional national college-student survey	Discussion, limitations paragraph	One limitation of the findings is that the cross-sectional nature of the survey precludes the ability to make conclusions regarding causality or temporality between psychopathology and suicidal ideation, dysfunctional attitudes, and readiness to seek help.	Causality and temporal ordering	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.jad.2024.01.058; PMC11057016; PMID: 38224742
51	Dias et al. (2024). Quality of life of families and siblings of children with cerebral palsy treated at a reference neurorehabilitation center in Brazil. <i>J Pediatr (Rio J)</i> ; 100(5):519–526.	Cross-sectional family/caregiver study	Discussion, limitations paragraph	The cross-sectional nature of these data precludes any statement of causality.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.jped.2024.03.010; PMC11361884; PMID: 38663449
52	Navas-Lopez et al. (2025). Quantitative and qualitative assessment of diet and its association with disease activity in pediatric ulcerative colitis. <i>J Pediatr Gastroenterol Nutr</i> ; 81(3):570–579.	Original cross-sectional pediatric clinical study	Abstract Conclusions	While these findings highlight a potentially relevant relationship, the cross-sectional nature of the study precludes establishing causality.	Causal inference and reverse causality	Yes: longitudinal or intervention studies	DOI: 10.1002/jpn3.70146; PMID: 40621635
53	Benjet et al. (2017). Non-suicidal self-injury in Mexican young adults: Prevalence, associations with suicidal behavior and psychiatric disorders, and DSM-5 proposed diagnostic criteria. <i>J Affect Disord</i> ; 215:1–8.	Community-based cross-sectional study	Discussion, limitations paragraph	First, due to the cross-sectional design of the study, no directional or causal interpretations can be determined from the associations between psychiatric disorders and NSSI.	Causality and directionality	Yes: longitudinal studies	DOI: 10.1016/j.jad.2017.03.025; PMID: 28388307
54	Martinez et al. (2025). Association Between Polypharmacy and Self-Reported Hearing Disability: An Observational Study Using ATC Classification and HHE-S-It Questionnaire. <i>Audiol Res</i> ; 15(5):135.	Cross-sectional observational study	Discussion, limitations paragraph	In addition, the study's cross-sectional design did not allow for a causal link to be established between drug use and hearing impairment; however, it did identify some clinically relevant trends.	Causal inference and reverse causality	No explicit longitudinal or prospective remedy	DOI: 10.3390/audires15050135; PMC12561860; PMID: 41148760
55	Dias et al. (2024). Quality of life of families and siblings of children and adolescents with meningomyelocele. <i>Child Care Health Dev</i> ; 50(2):e13246.	Cross-sectional family/caregiver study	Discussion	The cross-sectional nature of the available data precludes any statements of causality.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1111/cch.13246; PMID: 38483061
56	Van Neker et al. (2024). An evaluation of sexual function and health-related quality of life following laparoscopic surgery in individuals living with endometriosis. <i>Hum Reprod</i> ; 39(5):992–1002.	Cross-sectional community-based online survey	Discussion, limitations paragraph	Firstly, the correlational research design means that causation cannot be inferred, and the findings from this study are instead useful in that they can help shape future longitudinal research.	Causal inference	Yes: longitudinal studies	DOI: 10.1093/humrep/deae063; PMC11063542; PMID: 38630555
57	Jahns et al. (2018). Recognition of Federal Dietary Guidance Icons is Associated with Greater Diet Quality. <i>J Acad Nutr Diet</i> ; 118(11):2120–2127.	Cross-sectional NHANES survey analysis	Abstract Conclusions	Recognition of federal dietary guidance icons was associated with higher diet quality recently, but the cross-sectional nature of the data precludes conclusions of causality.	Causal inference; temporal ordering and reverse causality	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.jand.2018.05.026; PMID: 30146482
58	Hammond & Colman (2020). The Role of Positive Health Behaviors in the Relation Between Early Life Stress and Migraine. <i>Headache</i> ; 60(6):1111–1123.	Cross-sectional national health survey analysis	Discussion, study strengths and weaknesses subsection	The cross-sectional nature of this study does not permit causal inference and as such, further work is needed to ascertain the roles of physical activity and diet in the prevention and treatment of migraine.	Causal inference and reverse causality	Yes: longitudinal and prospective studies	DOI: 10.1111/head.13808; PMID: 32320053

59	Poovey et al. (2023). Women's disordered eating and sexual function: the role of interoception. <i>J Sex Med</i> ; 20(6):859-870.	Cross-sectional online survey	Abstract, strengths and limitations subsection	The cross-sectional nature of this study precludes any conclusions regarding temporal precedence or causality.	Causal inference and temporal precedence	Yes: longitudinal and experimental studies	DOI: 10.1093/ixmed/qdad038; PMID: 37037663
60	Jorstad et al. (2023). Clustering psychopathology in male anabolic-androgen steroid users consuming weightlifters. <i>Brain Behav</i> ; 13(7):e3040.	Cross-sectional comparative study	Discussion, limitations subsection	The cross-sectional nature of the study precludes inferences about causality, and longitudinal studies will be required to better delineate the causal pathways involved in the psychopathology observed.	Causal inference and directionality	Yes: longitudinal studies	DOI: 10.1002/brb3.3040; PMC1033882; PMID: 37150843
61	Khaem et al. (2023). Differences in suicide risk correlates and history of suicide ideation and attempts as a function of disability type. <i>J Clin Psychol</i> ; 79(2):466-476.	Cross-sectional original study comparing suicide-risk correlates by disability type	Discussion, limitations paragraph	Further, the cross-sectional design precludes inferences of causality.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1002/clp.23419; PMC10087921; PMID: 35909343
62	Liza et al. (2024). Nutritional status, dietary habits, and their relation to cognitive functions: A cross-sectional study among the school aged (8-14 years) children of Bangladesh. <i>Plus One</i> ; 19(5):e0304363.	Cross-sectional multicenter study of Bangladeshi school-aged children	Abstract Conclusion	Although the cross-sectional design of the study precludes causal relationships from being determined, the study finding deserves further examination via longitudinal research.	Causal inference	Yes: longitudinal studies and clinical trials	DOI: 10.1371/journal.pone.0304363; PMC12132469; PMID: 38805518
63	Iannattone et al. (2025). Exploring positive and negative body image and health-related quality of life in women with endometriosis: a latent profile analysis. <i>Hum Reprod</i> ; 40(9):1699-1708.	Cross-sectional latent-profile study	Discussion, limitations paragraph	First, the study's cross-sectional design prevents any causal inferences from being drawn.	Causal inference and temporal ordering	Yes: longitudinal studies	DOI: 10.1093/humrep/deaf127; PMC12408892; PMID: 40591873
64	Schönbach et al. (2022). What socio-demographic characteristics of university students in Southern Germany predict their urban nature connectedness? <i>PLoS One</i> ; 17(8):e0272344.	Cross-sectional online study	Abstract	To draw conclusions about causality, further research is required to identify a clear cause-effect relationship between socio-demographic characteristics and urban nature connectedness.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1371/journal.pone.0272344; PMC9486862; PMID: 35921178
65	Ozturk et al. (2021). Relationships between family functioning, parenting and peer rejection in adolescent depression: A cross-sectional study. <i>North Clin Istanb</i> ; 8(3):212-221.	Multicenter cross-sectional case-control study	Abstract Conclusion	Although cross-sectional design precludes evaluation of causality, it may be prudent to evaluate family functions as well as peer victimization of depressed youth.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.14744/nci.2020.36744; PMC3240240; PMID: 34222800
66	Akyaempong et al. (2026). The mediation effect of attitude on the association between knowledge and practices toward air pollution among commercial drivers and traders in South-Western Ghana: A cross-sectional study. <i>Plus One</i> ; 21(1):e0239708.	Cross-sectional mediation study	Abstract	Although a cross-sectional design precludes causality, attitude partially mediated the association between knowledge and practices, but the effect was more substantial among drivers than traders.	Causal inference	Yes: longitudinal and intervention studies	DOI: 10.1371/journal.pone.0239726; PMC12795002; PMID: 41528973
67	Meng et al. (2023). Sleep quality, social rhythms, and depression among people living with HIV: a path analysis based on social zeitgeber theory. <i>Front Psychiatry</i> ; 14:1102946.	Cross-sectional path-analysis study among people living with HIV	Abstract limitation subsection	The cross-sectional study design precludes making assumptions about causality among factors.	Causal inference and directionality	Yes: longitudinal studies	DOI: 10.3389/fpsyt.2023.1102946; PMC10192574; PMID: 37215662
68	Marta et al. (2025). Exploring pain perception and depression in vulvodinia: the role of catastrophizing and pain acceptance. <i>J Sex Med</i> ; 22(5):851-858.	Cross-sectional path-analysis study	Discussion, strengths and limitations subsection	Finally, the cross-sectional design of this study precludes causal inferences and limits the ability to determine the temporal order of the observed relationships between predictor and outcome variables.	Causal inference	Yes: longitudinal and experimental studies	DOI: 10.1093/ixmed/qdad046; PMID: 40106704
69	Jiang et al. (2025). Serum calcium levels and the risk of sarcopenia in young adults: Insights from NHANES 2011-2018. <i>Front Nutr</i> ; 12:1526879.	Population-based cross-sectional NHANES analysis	Abstract conclusion	However, the cross-sectional design precludes any inference of causality, and further longitudinal studies are warranted to confirm these findings.	Causal inference	Yes: longitudinal studies	DOI: 10.3389/fnut.2025.1526879; PMC12551309; PMID: 40161296
70	Paris et al. (2026). Cannabis use and cardiometabolic risk in schizophrenia. <i>Schizophr Res</i> ; 287:54-62.	Cross-sectional analysis of CATIE schizophrenia participants	Abstract conclusion	While these findings support emerging evidence of metabolic differences in cannabis users, the cross-sectional design precludes conclusions regarding causality. Longitudinal studies are needed to clarify long-term metabolic effects and guide targeted interventions.	Causal inference and reverse causality	Yes: longitudinal studies	DOI: 10.1016/j.schres.2025.11.013; PMID: 41265135
71	Fujiwara et al. (2018). Smoking among adults with serious psychological distress: Analysis of anonymized data from a national cross-sectional survey in Japan. <i>J Affect Disord</i> ; 239:131-137.	National cross-sectional survey analysis	Abstract limitation subsection	The cross-sectional design precludes assumptions about the direction of causality.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.jad.2018.07.008; PMID: 30005326
72	Romo-Nava et al. (2020). Evening chronotype as a discrete clinical subphenotype in bipolar disorder. <i>J Affect Disord</i> ; 266:556-562.	Cross-sectional clinical study of participants with bipolar disorder and control participants	Abstract limitation subsection	Limitations include a cross-sectional study design that precludes establishing causality.	Causal inference and directionality	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.jad.2020.01.151; PMID: 32056926
73	Saffari et al. (2026). Cross-Sectional Associations Between Health Behaviors and Intrinsic Capacity Among Older People in Taiwan Across Different Settings: The Role of Regular Physical Activity Engagement. <i>Journal of Prevention</i> ; Epub ahead of print; published online July 28.	Cross-sectional study of community dwellers, hospital outpatients, and hospital inpatients	Discussion	Considering that the present study was cross-sectional, the observed associations cannot determine any directionalities or causalities between the study variables.	Causal inference and reverse causality	Yes: longitudinal studies	DOI: 10.1007/s10935-026-00935-5; PMID: 42518084
74	Hammerley et al. (2023). Relationships Between the Home Learning Environment, Weight Status, and Dietary Intake: Results From a Cross-Sectional Study of Preschool-Aged Children in New South Wales, Australia. <i>Journal of Primary Prevention</i> ; 42(3):239-256.	Cross-sectional study of preschool-aged children and parents	Discussion, limitations paragraph	Given its cross-sectional nature, we cannot draw conclusions regarding causality, nor were we able to determine how these outcomes change over time.	Causal inference	Yes: longitudinal studies	DOI: 10.1007/s10935-021-00628-1; PMC7978452; PMID: 37342388
75	Coulter et al. (2024). Get Involved and Sexual Orientation Differences in Sexual Violence Knowledge, Prevention Behaviors, and Care-Seeking Behaviors. <i>Prevention Science</i> ; 25(4):590-602.	Cross-sectional analysis of baseline data from a cluster-randomized trial	Discussion, limitations paragraph	We analyzed cross-sectional baseline data, limiting our ability to infer causality.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1007/s11121-023-01640-z; PMC11111351; PMID: 38214789
76	Vázquez-Echeverría et al. (2026). Developmental Losses of Preschool Children Three Years into the COVID-19 Pandemic. <i>Prevention Science</i> ; 27(1):155-167.	Repeated cross-sectional comparison of five preschool cohorts	Discussion, limitations paragraph	The cross-sectional design limits the possibility to infer causality and does not inform us about the long-lasting effects of learning losses within any specific cohort.	Causal inference and within-cohort effects	Yes: longitudinal studies	DOI: 10.1007/s11121-024-01716-4; PMID: 39115651
77	Oh et al. (2024). Health Behavior and Attitudes During the COVID-19 Pandemic Among Vulnerable and Underserved Latinx in the Southwest USA. <i>Prevention Science</i> ; 25(2):279-290.	Cross-sectional survey study	Discussion, limitations paragraph	The cross-sectional and non-experimental nature of the data does not allow for any inferences of causality.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1007/s11121-023-01512-6; PMC9978289; PMID: 36862363
78	Lee et al. (2026). Association between weekend catch-up sleep and white blood cell count among Korean adults: A population-based cross-sectional study. <i>Preventive Medicine</i> ; 202:108474.	Cross-sectional analysis of KNHANES data	Discussion, limitations paragraph	First, the cross-sectional design restricts causal inference and prevents ruling out reverse causality.	Causal inference and reverse causality	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.ypmed.2025.108474; PMID: 41308703
79	Basterra-Gortari et al. (2024). Daily time spent on screens and psychological well-being: Cross-sectional association within the SUN cohort. <i>Preventive Medicine</i> ; 181:107912.	Cross-sectional analysis within the SUN cohort	Discussion	While our cross-sectional design precludes establishing causality, these findings suggest potential negative effects of prolonged screen use on specific aspects of well-being.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.ypmed.2024.107912; PMID: 38395314
80	Sun et al. (2026). Association between perceived changes in electronic cigarette retailer density and regulation support among adolescents in China. <i>Tobacco Control</i> ; 35:545-548.	Cross-sectional survey of Chinese adolescents	Discussion, limitations paragraph	Although the study attempted to delineate the relationship between perceived changes in retailer density and regulation support, the cross-sectional nature precluded us from drawing causal inference.	Causal inference	Yes: longitudinal studies or instrumental-variable analyses	DOI: 10.1136/tc-2025-059312; PMID: 40425292
81	Mehari et al. (2025). Social-Ecological Correlates of Involvement in Firearm-Related Violence in a Nationally Representative Survey of Adults. <i>American Journal of Public Health</i> ; 115(11):1903-1912.	Cross-sectional survey of U.S. adults	Discussion, limitations paragraph	The cross-sectional design made it impossible to point toward causality; the hypothesized predictors may be outcomes of firearm violence involvement, or the relations may be spurious.	Causal inference	Yes: longitudinal studies	DOI: 10.2105/AJPH.2025.308213; PMC12510094; PMID: 40934448
82	Jackson et al. (2025). Persistent Sadness, Violence, and Bullying and Associations With Screen Time Among New York City Public High School Students, 2021. <i>American Journal of Public Health</i> ; 115(9):1397-1407.	Cross-sectional analysis of the 2021 New York City Youth Risk Behavior Survey	Discussion, limitations paragraph	Second, the NYC YRBS is a cross-sectional study and, as a result of its design, causality cannot be established.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.2105/AJPH.2025.308051; PMC12332309; PMID: 40440655
83	Johnson et al. (2026). Opioid-Related Medication Access for Adolescents Who Test Positive for Fentanyl. <i>Pediatrics</i> ; 157(6):e2025074031.	Retrospective cross-sectional study of adolescent emergency-department encounters	Discussion, limitations paragraph	Limitations to this study include its cross-sectional design, which does not permit causal inference about the associations observed, and its reliance on clinician-assigned diagnosis codes, which may lead to misclassification of exposures.	Causal inference	Yes: longitudinal studies	DOI: 10.1542/peds.2025-074301; PMID: 42134799
84	Bashir et al. (2025). Association of Vitamin D Deficiency with Diabetic Nephropathy in Type 2 Diabetes: A Hospital-Based Cross-Sectional Study. <i>Diseases</i> ; 13(12):405.	Hospital-based cross-sectional study of adults with type 2 diabetes	Discussion, limitations paragraph	The cross-sectional, observational design precludes causal inference, and the lack of longitudinal follow-up prevents assessment of whether vitamin D deficiency predicts progression of DN.	Causal inference, reverse causality and residual confounding	Yes: longitudinal and prospective studies	DOI: 10.3390/diseases13120405; PMC12731398; PMID: 41439946
85	Liu & Gong (2025). The Association Between the Triglyceride-Glucose Index and Its Combination with Obesity Metrics and Adult Spinal Pain: A Cross-Sectional Study. <i>Pain Physician</i> ; 28(6):E667-E676.	Cross-sectional analysis of NHANES participants aged 20 years or older	Discussion, limitations paragraph	Firstly, a cross-sectional study captures data at a single point in time, limiting its ability to establish temporal relationships between exposure and outcome variables. Unlike longitudinal studies, which track changes over time and allow for causal inference, cross-sectional designs provide only a snapshot of associations.	Causal inference, reverse causality and residual confounding	Yes: longitudinal and prospective studies	PMID: 41337770
86	Emam et al. (2026). Higher Total Omega-3 PUFA Levels and a Lower Omega-6:Omega-3 Ratio Are Associated with Lower Temporal Lobe Volume in Alzheimer's Disease. <i>Molecular Neurobiology</i> ; 63(1).	Cross-sectional study of omega-3 fatty acids and temporal-lobe volume in Alzheimer's disease	Discussion, limitations paragraph	This study was observational in nature and, thus, cannot establish causal relationships. Given the cross-sectional design, these mechanistic interpretations remain speculative and require longitudinal confirmation.	Causal inference, reverse causality and residual confounding	Yes: longitudinal studies	DOI: 10.1007/s12035-026-05766-3; PMID: 41790404
87	Du et al. (2026). Association between Low-carbohydrate Diets and 10-year Atherosclerosis Cardiovascular Disease Risk: Data From the National Health and Nutrition Examination Survey. <i>Current Diabetes Reviews</i> ; 22(6):e15733998411207.	Cross-sectional NHANES analysis of low-carbohydrate diets and predicted cardiovascular risk	Discussion, limitations paragraph	Finally, as this was a cross-sectional study, causal inference cannot be established, and prospective studies or randomized controlled trials will be required to validate our findings.	Causal inference and residual confounding	Yes: prospective studies or randomized controlled trials	DOI: 10.2174/015733998411207251130184836; PMID: 41588764
88	Yu et al. (2026). How does internet use affect the mental health of older adults: examining the mediating pathways of perception of social fairness and physical activity. <i>Frontiers in Public Health</i> ; 14:1765599.	Cross-sectional analysis of internet use, mental health, and mediating pathways among older adults	Abstract conclusion	A key limitation of this study is its cross-sectional design, which precludes causal inference.	Causal inference and reverse causality	Yes: longitudinal or experimental studies	DOI: 10.3389/fpubh.2026.1765599; PMC12552204; PMID: 41765073

89	Wang et al. (2026). Association between monocyte to high-density lipoprotein cholesterol ratio and stroke prevalence in American adults: A cross-sectional NHANES Study. <i>Journal of Stroke and Cerebrovascular Diseases</i> ; 35(3):108580.	Cross-sectional NHANES analysis of monocyte-to-HDL cholesterol ratio and stroke prevalence	Abstract results	However, the cross-sectional design precludes causal inference, which requires verification by prospective studies.	Causal inference	Yes: prospective studies	DOI: 10.1016/j.jstrokecerebrovasdis.2026.108580; PMID: 41653945
90	Miao et al. (2025). Non-linear association between weight-adjusted waist index and obstructive sleep apnea: a cross-sectional study from the NHANES (2005-2008 to 2015-2020). <i>Frontiers in Public Health</i> ; 13:1546597.	Cross-sectional NHANES analysis of weight-adjusted waist index and obstructive sleep apnea	Abstract conclusion	However, the cross-sectional design limits causal inference, and the exclusion of certain participants may affect the generalizability of the findings.	Causal inference, directionality, and confounding	Yes: longitudinal and prospective studies	DOI: 10.3389/fpubh.2025.1546597; PMC12575944; PMID: 40201365
91	Alshali et al. (2025). Association of Abdominal Circumference with Stepping Reaction Time and Functional Balance Among Adults: A Cross-Sectional Study. <i>Medicina</i> ; 61(11):2021.	Laboratory-based cross-sectional observational study of adults	Abstract	The cross-sectional design of this study precludes causal inference; longitudinal investigations are necessary to confirm these associations before implementing targeted fall prevention strategies.	Causal inference and confounding	Yes: longitudinal studies	DOI: 10.3390/med61112021; PMC12654772; PMID: 41303858
92	Mekic et al. (2019). Prevalence and determinants for xerosis cutis in the middle-aged and elderly population: A cross-sectional study. <i>Journal of the American Academy of Dermatology</i> ; 81(4):963-969.e2.	Cross-sectional study of middle-aged and older adults	Abstract limitations	Because of our cross-sectional design, we could not infer causality.	Causal inference	Yes: longitudinal studies	DOI: 10.1016/j.jaad.2018.12.038; PMID: 30586613
93	Senaratne et al. (2021). Device-measured physical activity and sedentary behaviour in relation to mental wellbeing: An analysis of the 1970 British cohort study. <i>Preventive Medicine</i> ; 145:106434.	Cross-sectional age-46 analysis within the 1970 British Cohort Study	Discussion, limitations paragraph	Data are cross-sectional which does not allow for any causality inference.	Causal inference	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.ypmed.2021.106434; PMID: 33485998
94	Yuan et al. (2025). Triglycerides/high-density lipoprotein-cholesterol ratio outperforms traditional lipid indicators in predicting metabolic dysfunction-associated steatotic liver disease among U.S. adults. <i>Frontiers in Endocrinology</i> ; 16:1591241.	Cross-sectional NHANES analysis of lipid indicators and metabolic dysfunction-associated steatotic liver disease	Abstract importance	Additionally, this study is based on NHANES data, which relies on self-reported measures and lacks longitudinal follow-up, limiting the ability to establish causal relationships.	Causal inference and residual confounding	Yes: prospective studies	DOI: 10.3389/fendo.2025.1591241; PMC12654762; PMID: 41303858
95	Chen et al. (2026). The association between liver disease and stroke risk: A cross-sectional study with machine learning in a large-scale Chinese cohort. <i>International Journal of Cardiology Cardiovascular Risk and Prevention</i> ; 25:200600.	Cross-sectional analysis of the 2018 CMBRS wave with machine-learning models	Abstract conclusion	The observational design precludes causal inference, but the findings highlight a concurrent link warranting further longitudinal investigation.	Causal inference and unmeasured confounding	Yes: longitudinal studies	DOI: 10.1016/j.ijcrp.2026.200600; PMC12583064; PMID: 41743673
96	Guo et al. (2025). Association of novel obesity indexes with cognitive impairment: A cross-sectional study of a low-income population in rural China in 2014. <i>BMC Public Health</i> ; 25(1):4102.	Cross-sectional study of older adults in a low-income rural Chinese population	Discussion, limitations paragraph	First, this study employed a cross-sectional design, which limits the ability to establish causal relationships between RFM and cognitive impairment.	Causal inference, temporal ordering, reverse causation, and residual and unmeasured confounding	Yes: prospective and longitudinal studies	DOI: 10.1186/s12889-025-25140-7; PMC12642054; PMID: 41286691
97	Abolrob et al. (2025). Understanding the influence of self-concept on clinical decision-making among nurses: A cross-sectional study. <i>PLOS ONE</i> ; 20(8):e0330905.	Cross-sectional survey of nurses in Palestinian governmental hospitals	Abstract conclusion	However, the cross-sectional design limits causal inference, and future longitudinal studies are needed to establish temporal relationships.	Causal inference and reverse causation or bidirectional relationships	Yes: longitudinal studies	DOI: 10.1371/journal.pone.0330905; PMC12377617; PMID: 40853011
98	Nishiyama et al. (2024). Association between gut microbiota and locomotive syndrome risk in healthy Japanese adults: a cross-sectional study. <i>npj Aging</i> ; 10(1):55.	Cross-sectional study within the Kanagawa ME-BYO prospective cohort	Discussion, limitations paragraph	Second, because this was a cross-sectional study, causal relationships could not be inferred.	Causal inference and reverse causation or bidirectional relationships	Yes: longitudinal or intervention studies	DOI: 10.1038/s41514-024-00184-y; PMC11589126; PMID: 39587126
99	Chen et al. (2025). Phthalate exposure is associated with increased CVD risk in CKD: evidence from NHANES and network toxicology analysis. <i>Renal Failure</i> ; 47(1):2571055.	Cross-sectional NHANES analysis of phthalate exposure and cardiovascular disease in chronic kidney disease	Abstract conclusion	However, given the cross-sectional nature of NHANES data, causal inferences cannot be made, and the potential for reverse causality and residual confounding should be considered.	Causal inference, reverse causality, and residual confounding	Yes: longitudinal studies	DOI: 10.1080/0886022X.2025.2571055; PMC12523515; PMID: 41087310
100	Yin et al. (2025). Association between Two Cardiovascular Health Algorithms and Kidney Stones: A Nationwide Cross-sectional Study. <i>European Urology Open Science</i> ; 73:8-16.	Cross-sectional NHANES analysis of cardiovascular-health scores and kidney stones	Abstract limitations	Limitations were as follows: cross-sectional design limiting causal inference, recall bias from self-reported data, and potential residual confounding.	Causal inference, temporal order, and reverse causality	Yes: longitudinal studies	DOI: 10.1016/j.euro.2025.01.003; PMC11894574; PMID: 39527186
101	Camacho et al. (2026). Assessing the relationship between community resilience and health outcomes: an observational local-authority level study in England. <i>J Epidemiol Community Health</i> ; 80(2):73-79.	Cross-sectional ecological analysis of 307 English local authority districts	Discussion, strengths and limitations subsection	Second, the analysis was cross-sectional, limiting causality inference.	Causal inference, temporal order, and reverse causality	Yes: longitudinal studies	DOI: 10.1136/jech-2025-224513; PMCID: PMC12911620; PMID: 41203271
102	Wu et al. (2017). Dog ownership supports the maintenance of physical activity during poor weather in older English adults: cross-sectional results from the EPIC Norfolk cohort. <i>J Epidemiol Community Health</i> ; 71(9):905-911.	Cross-sectional analysis within the EPIC-Norfolk cohort	Discussion, strengths and limitations subsection	In terms of limitations, the cross-sectional nature of our analysis means we cannot rule out the possibility of reverse causality, where more active individuals are more likely to own dogs.	Causal inference, reverse causality, and residual confounding	No explicit longitudinal or prospective remedy	DOI: 10.1136/jech-2017-208987; PMCID: PMC5561362; PMID: 28739839
103	Haley et al. (2019). Associations between county-level voter turnout, county-level felony voter disenfranchisement, and sexually transmitted infections among women in the Southern United States. <i>Ann Epidemiol</i> ; 29:67-73.e1.	Cross-sectional multilevel analysis of 666 women in the Women's interagency HIV Study	Discussion, limitations paragraph	Due to the cross-sectional nature of our study, we have not attempted to draw conclusions regarding the causality of the relationship between county-level political participation and having an STI.	Causal inference, and residual confounding	No explicit longitudinal or prospective remedy	DOI: 10.1016/j.annepidem.2018.10.006; PMC6344301; PMID: 30442564
104	Stanhope et al. (2023). Political representation and perinatal outcomes to Black, White, and Hispanic people in Georgia: a cross-sectional study. <i>Ann Epidemiol</i> ; 87:38-44.e2.	Cross-sectional county-level exposure analysis linked to individual Georgia birth-certificate records	Discussion, limitations paragraph	Third, this cross-sectional analysis precludes inference about causality.	Causal inference, temporal ordering and residual confounding	Yes: prospective natural-experiment and other quasi-experimental approaches	DOI: 10.1016/j.annepidem.2023.05.001; PMCID: PMC10842944; PMID: 37689094
105	Wang et al. (2019). Inflammation and hearing status in mid-childhood and mid-life: a population-based cross-sectional study. <i>Int J Epidemiol</i> ; 48(5):1556-1566.	Population-based cross-sectional study within the Longitudinal Study of Australian Children with plasma GlycA and audiometry data	Discussion, strengths and limitations subsection	Third, the cross-sectional nature of our study limited our ability to draw conclusions regarding directionality or causality.	Causal inference, directionality, and temporal ordering	Yes: repeated-measures longitudinal studies, longitudinal mediation analyses, and intervention studies	DOI: 10.1093/ije/dy023; PMID: 30815675
106	Mudie et al. (2018). How does the association of general and central adiposity with glycaemia and blood pressure differ by gender and area of residence in a Malawian population: a cross-sectional study. <i>Int J Epidemiol</i> ; 47(3):867-898.	Cross-sectional analysis of up to 27,880 rural and urban Malawian adults	Discussion, limitations paragraph	A key limitation is the cross-sectional nature of this study and hence the possibility that our findings are wholly, or partly, due to reverse causality and/or residual confounding.	Causal inference, reverse causality, and residual confounding	No explicit longitudinal or prospective remedy	DOI: 10.1093/ije/dy047; PMCID: PMC6005143; PMID: 29648664