



Biostatistics

Year 1 — Bachelor of Dental Surgery

Reference and Resource List — Chapters 1 to 11

Supporting the MCQ, SBA, SAQ and flashcard question bank

BM Education FZE

Disclaimer

Questions in this bank were generated with the assistance of artificial intelligence and reviewed against the references listed. They are provided for educational revision only, are not a substitute for prescribed textbooks, clinical guidelines or supervised clinical training, and no warranty is given as to their accuracy or completeness.

References are presented in Vancouver style. Part 1 lists the core references that underpin the subject as a whole and are relevant across most chapters; Part 2 lists the additional references specific to each chapter. Square-bracket numbers in Part 2 refer to the numbered entries in Part 1.

PART 1 — CORE REFERENCES (ALL CHAPTERS)

1.1 Principal biostatistics and medical statistics textbooks

1. Daniel WW, Cross CL. Biostatistics: A Foundation for Analysis in the Health Sciences. 11th ed. Hoboken (NJ): John Wiley & Sons; 2018.
2. Petrie A, Sabin C. Medical Statistics at a Glance. 4th ed. Chichester: Wiley-Blackwell; 2020.
3. Kirkwood BR, Sterne JAC. Essential Medical Statistics. 2nd ed. Oxford: Blackwell Science; 2003.
4. Bland M. An Introduction to Medical Statistics. 4th ed. Oxford: Oxford University Press; 2015.
5. Altman DG. Practical Statistics for Medical Research. London: Chapman & Hall; 1991.
6. Campbell MJ, Swinscow TDV. Statistics at Square One. 11th ed. Chichester: Wiley-Blackwell; 2009.
7. Indrayan A, Malhotra RK. Medical Biostatistics. 4th ed. Boca Raton (FL): CRC Press; 2018.
8. Mahajan BK. Mahajan's Methods in Biostatistics for Medical Students and Research Workers. 11th ed. New Delhi: Jaypee Brothers Medical Publishers; 2025.
9. Sundar Rao PSS, Richard J. An Introduction to Biostatistics and Research Methods. 5th ed. New Delhi: PHI Learning; 2012.

1.2 Statistics applied to dentistry

10. Bulman JS, Osborn JF. Statistics in Dentistry. London: British Dental Association; 1989.
11. Moles DR. Further statistics in dentistry: introduction. Br Dent J. 2002;193(7):375.
12. Petrie A, Bulman JS, Osborn JF. Further statistics in dentistry. Part 1: research designs 1. Br Dent J. 2002;193(7):377–80.
13. Petrie A, Bulman JS, Osborn JF. Further statistics in dentistry. Part 2: research designs 2. Br Dent J. 2002;193(8):435–40.

14. Petrie A, Bulman JS, Osborn JF. Further statistics in dentistry. Part 3: clinical trials 1. Br Dent J. 2002;193(9):495–8.
15. Petrie A, Bulman JS, Osborn JF. Further statistics in dentistry. Part 5: diagnostic tests for oral conditions. Br Dent J. 2002;193(11):621–5.
16. Petrie A, Bulman JS, Osborn JF. Further statistics in dentistry. Part 6: multiple linear regression. Br Dent J. 2002;193(12):675–82.
17. Petrie A, Bulman JS, Osborn JF. Further statistics in dentistry. Part 9: Bayesian statistics. Br Dent J. 2003;194(3):129–34.

1.3 Epidemiology, dental public health and community dentistry

18. Celentano DD, Szklo M, Farag Y. Gordis Epidemiology. 7th ed. Philadelphia (PA): Elsevier; 2024.
19. Bhopal RS. Concepts of Epidemiology: Integrating the Ideas, Theories, Principles and Methods of Epidemiology. 3rd ed. Oxford: Oxford University Press; 2016.
20. Rothman KJ. Epidemiology: An Introduction. 2nd ed. New York (NY): Oxford University Press; 2012.
21. Daly B, Batchelor P, Treasure E, Watt R. Essential Dental Public Health. 2nd ed. Oxford: Oxford University Press; 2013.
22. Mascarenhas AK, Okunseri C, Dye BA, editors. Burt and Eklund's Dentistry, Dental Practice and the Community. 7th ed. St Louis (MO): Elsevier; 2021.
23. Peter S. Essentials of Public Health Dentistry (Community Dentistry). 7th ed. New Delhi: Arya Medi Publishing; 2023.
24. Hiremath SS. Textbook of Public Health Dentistry. 3rd ed. New Delhi: Elsevier India; 2016.

1.4 Study design, evidence-based dentistry and critical appraisal

25. Greenhalgh T. How to Read a Paper: The Basics of Evidence-Based Medicine and Healthcare. 6th ed. Chichester: Wiley-Blackwell; 2019.
26. Straus SE, Glasziou P, Richardson WS, Haynes RB. Evidence-Based Medicine: How to Practice and Teach EBM. 5th ed. Edinburgh: Elsevier; 2018.
27. Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ. 1996;312(7023):71–2.
28. Fletcher RH, Fletcher SW, Fletcher GS. Clinical Epidemiology: The Essentials. 5th ed. Philadelphia (PA): Lippincott Williams & Wilkins; 2014.
29. Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, et al., editors. Cochrane Handbook for Systematic Reviews of Interventions. Version 6.5. Cochrane; 2024. Available from: <https://training.cochrane.org/handbook>

1.5 Measurement, sampling and survey methods

30. Streiner DL, Norman GR, Cairney J. Health Measurement Scales: A Practical Guide to Their Development and Use. 5th ed. Oxford: Oxford University Press; 2015.
31. World Health Organization. Oral Health Surveys: Basic Methods. 5th ed. Geneva: World Health Organization; 2013.
32. World Health Organization. Global Oral Health Status Report: Towards Universal Health Coverage for Oral Health by 2030. Geneva: World Health Organization; 2022.
33. Kish L. Survey Sampling. New York (NY): John Wiley & Sons; 1965.
34. Lwanga SK, Lemeshow S. Sample Size Determination in Health Studies: A Practical Manual. Geneva: World Health Organization; 1991.

1.6 Reporting standards and research guidelines

35. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet*. 2007;370(9596):1453–7.
36. CONSORT 2025 statement: updated guideline for reporting randomised trials. *BMJ*. 2025;389:e081123.
37. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71.
38. Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis CA, Glasziou PP, Irwig L, et al. STARD 2015: an updated list of essential items for reporting diagnostic accuracy studies. *BMJ*. 2015;351:h5527.
39. Kottner J, Audigé L, Brorson S, Donner A, Gajewski BJ, Hróbjartsson A, et al. Guidelines for Reporting Reliability and Agreement Studies (GRRAS) were proposed. *J Clin Epidemiol*. 2011;64(1):96–106.
40. EQUATOR Network. Enhancing the QUALity and Transparency Of health Research. Available from: <https://www.equator-network.org>

1.7 Professional standards and curriculum requirements

41. General Dental Council. The Safe Practitioner: A Framework of Behaviours and Outcomes for Dental Professional Education. London: General Dental Council; 2023. Available from: <https://www.gdc-uk.org>
42. Association for Dental Education in Europe. The Graduating European Dentist. Available from: <https://adee.org>
43. National Dental Commission Act, 2023 (Act No. 34 of 2023). New Delhi: Government of India; 2023.
44. World Medical Association. WMA Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. Ferney-Voltaire: World Medical Association; 2024. Available from: <https://www.wma.net>

Key journals for currency

Journal of Dental Research · Community Dentistry and Oral Epidemiology · British Dental Journal · Journal of Dentistry · Journal of Clinical Periodontology · Caries Research · Evidence-Based Dentistry · Journal of Evidence-Based Dental Practice · BMJ · Journal of Clinical Epidemiology · BMC Medical Research Methodology · Statistics in Medicine

PART 2 — CHAPTER-SPECIFIC REFERENCES

Chapter 1 — Foundations of Biostatistics and Its Role in Dentistry

1.1 What is biostatistics? · 1.2 Key concepts and terminology · 1.3 Types of variables and data · 1.4 Measurement scales

Core texts: [1] Ch. 1 · [2] chapters on types of data · [8] · [9] · [10] · [11]

Additional

- Stevens SS. On the theory of scales of measurement. *Science*. 1946;103(2684):677–80.
- Knapp TR. Treating ordinal scales as interval scales: an attempt to resolve the controversy. *Nurs Res*. 1990;39(2):121–3.
- Jamieson S. Likert scales: how to (ab)use them. *Med Educ*. 2004;38(12):1217–8.
- Altman DG, Bland JM. Statistics notes: variables and parameters. *BMJ*. 1999;318(7199):1667.

- Vetter TR. Fundamentals of research data and variables: the devil is in the details. *Anesth Analg*. 2017;125(4):1375–80.
- Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. *Bull World Health Organ*. 2005;83(9):661–69.

Chapter 2 — Data Collection in Dental Settings

2.1 Sources of data · 2.2 Methods of data collection · 2.3 Errors in data collection

Core texts: [1] Ch. 1 · [2] chapters on data entry and error checking · [22] chapters on the measurement of oral disease · [31] · [12]

Additional

- Sackett DL. Bias in analytic research. *J Chronic Dis*. 1979;32(1–2):51–63.
- Althubaiti A. Information bias in health research: definition, pitfalls, and adjustment methods. *J Multidiscip Healthc*. 2016;9:211–7.
- Bland JM, Altman DG. Statistics notes: measurement error. *BMJ*. 1996;312(7047):1654.
- Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. *Lancet*. 1986;1(8476):307–10.
- Pine CM, Pitts NB, Nugent ZJ. British Association for the Study of Community Dentistry (BASCD) guidance on the statistical aspects of training and calibration of examiners for surveys of child dental health. *Community Dent Health*. 1997;14 Suppl 1:18–29.

Chapter 3 — Organising and Summarising Data: Descriptive Statistics

3.1 Tabular presentation · 3.2 Graphical presentation · 3.3 Measures of central tendency · 3.4 Measures of dispersion · 3.5 Position of values in a data set · 3.6 Shape of distributions

Core texts: [1] Ch. 2 · [2] chapters on displaying and describing data · [5] · [6] · [7]

Additional

- Tukey JW. *Exploratory Data Analysis*. Reading (MA): Addison-Wesley; 1977.
- Altman DG, Bland JM. Quartiles, quintiles, centiles, and other quantiles. *BMJ*. 1994;309(6960):996.
- Altman DG, Bland JM. Statistics notes: the normal distribution. *BMJ*. 1995;310(6975):298.
- Bland JM, Altman DG. Transformations, means, and confidence intervals. *BMJ*. 1996;312(7038):1079.
- Krzywinski M, Altman N. Visualizing samples with box plots. *Nat Methods*. 2014;11(2):119–20.
- Weissgerber TL, Milic NM, Winham SJ, Garovic VD. Beyond bar and line graphs: time for a new data presentation paradigm. *PLoS Biol*. 2015;13(4):e1002128.

Chapter 4 — Basics of Probability

4.1 Concept of probability · 4.2 Basic rules of probability · 4.3 Probability distributions

Core texts: [1] Ch. 3–4 · [2] chapters on theoretical distributions · [3] · [17] · [9]

Additional

- Gigerenzer G, Edwards A. Simple tools for understanding risks: from innumeracy to insight. *BMJ*. 2003;327(7417):741–4.
- Krzywinski M, Altman N. Importance of being uncertain. *Nat Methods*. 2013;10(9):809–10.
- Goodman SN. Toward evidence-based medical statistics. 2: the Bayes factor. *Ann Intern Med*. 1999;130(12):1005–13.

- Woloshin S, Schwartz LM, Welch HG. Know Your Chances: Understanding Health Statistics. Berkeley (CA): University of California Press; 2008.

Chapter 5 — Sampling Concepts in Dental Research

5.1 Population and sampling frame · 5.2 Types of sampling methods · 5.3 Sampling error and sample size

Core texts: [1] Ch. 5 · [2] chapters on sampling and sampling distributions · [33] · [34] · [23] · [13]

Additional

- Elfil M, Negida A. Sampling methods in clinical research; an educational review. Emerg (Tehran). 2017;5(1):e52.
- Charan J, Biswas T. How to calculate sample size for different study designs in medical research? Indian J Psychol Med. 2013;35(2):121–6.
- Altman DG. Statistics and ethics in medical research: III. How large a sample? Br Med J. 1980;281(6251):1336–8.
- Killip S, Mahfoud Z, Pearce K. What is an intracluster correlation coefficient? Crucial concepts for primary care researchers. Ann Fam Med. 2004;2(3):204–8.
- Pandis N, Walsh T, Polychronopoulou A, Katsaros C, Eliades T. Cluster randomized clinical trials in orthodontics: design, analysis and reporting issues. Eur J Orthod. 2013;35(5):669–75.

Chapter 6 — Introduction to Epidemiological Measures

6.1 Morbidity measures · 6.2 Measures of association · 6.3 Attributable risk

Core texts: [18] chapters on measuring disease occurrence and estimating risk · [19] · [20] · [21] · [24]

Additional

- Vandenbroucke JP, Pearce N. Incidence rates in dynamic populations. Int J Epidemiol. 2012;41(5):1472–9.
- Noordzij M, van Diepen M, Caskey FC, Jager KJ. Relative risk versus absolute risk: one cannot be interpreted without the other. Nephrol Dial Transplant. 2017;32(suppl 2):ii13–18.
- Bland JM, Altman DG. Statistics notes: the odds ratio. BMJ. 2000;320(7247):1468.
- Davies HTO, Crombie IK, Tavakoli M. When can odds ratios mislead? BMJ. 1998;316(7136):989–91.
- Rockhill B, Newman B, Weinberg C. Use and misuse of population attributable fractions. Am J Public Health. 1998;88(1):15–9.
- Peres MA, Macpherson LMD, Weyant RJ, Daly B, Venturelli R, Mathur MR, et al. Oral diseases: a global public health challenge. Lancet. 2019;394(10194):249–60.

Chapter 7 — Basics of Statistical Inference

7.1 From sample to population · 7.2 Confidence intervals · 7.3 Hypothesis testing: core concepts

Core texts: [1] Ch. 6–7 · [2] chapters on confidence intervals and hypothesis testing · [4] · [5] · [6] · [14]

Additional

- Gardner MJ, Altman DG. Confidence intervals rather than P values: estimation rather than hypothesis testing. Br Med J (Clin Res Ed). 1986;292(6522):746–50.
- Altman DG, Bland JM. Standard deviations and standard errors. BMJ. 2005;331(7521):903.
- Altman DG, Bland JM. Absence of evidence is not evidence of absence. BMJ. 1995;311(7003):485.

- Bland JM, Altman DG. Statistics notes: one and two sided tests of significance. *BMJ*. 1994;309(6949):248.
- Sterne JAC, Davey Smith G. Sifting the evidence — what's wrong with significance tests? *BMJ*. 2001;322(7280):226–31.
- Greenland S, Senn SJ, Rothman KJ, Carlin JB, Poole C, Goodman SN, et al. Statistical tests, P values, confidence intervals, and power: a guide to misinterpretations. *Eur J Epidemiol*. 2016;31(4):337–50.
- Wasserstein RL, Lazar NA. The ASA's statement on p-values: context, process, and purpose. *Am Stat*. 2016;70(2):129–33.

Chapter 8 — Common Statistical Tests Used in Introductory Dental Research

8.1 Comparing means · 8.2 Comparing proportions · 8.3 Relationship between two variables

Core texts: [1] Ch. 8–9 and 12–13 · [2] chapters on basic techniques for analysing data · [3] · [7] · [16]

Additional

- Student. The probable error of a mean. *Biometrika*. 1908;6(1):1–25.
- Kuzon WM Jr, Urbanchek MG, McCabe S. The seven deadly sins of statistical analysis. *Ann Plast Surg*. 1996;37(3):265–72.
- Bland JM, Altman DG. Multiple significance tests: the Bonferroni method. *BMJ*. 1995;310(6973):170.
- Altman DG, Bland JM. Statistics notes: correlation, regression, and repeated data. *BMJ*. 1994;308(6933):896.
- Schober P, Boer C, Schwarte LA. Correlation coefficients: appropriate use and interpretation. *Anesth Analg*. 2018;126(5):1763–8.
- Mishra P, Singh U, Pandey CM, Mishra P, Pandey G. Application of Student's t-test, analysis of variance, and covariance. *Ann Card Anaesth*. 2019;22(4):407–11.

Chapter 9 — Diagnostic Test Evaluation

9.1 Validity of diagnostic tests · 9.2 Core measures · 9.3 Reliability and agreement

Core texts: [15] · [2] chapters on diagnostic tools and agreement · [28] chapters on diagnosis and abnormality · [18] chapters on the epidemiological approach to evaluating screening programmes · [38] · [39]

Additional

- Altman DG, Bland JM. Diagnostic tests 1: sensitivity and specificity. *BMJ*. 1994;308(6943):1552.
- Altman DG, Bland JM. Diagnostic tests 2: predictive values. *BMJ*. 1994;309(6947):102.
- Altman DG, Bland JM. Diagnostic tests 3: receiver operating characteristic plots. *BMJ*. 1994;309(6948):188.
- Deeks JJ, Altman DG. Diagnostic tests 4: likelihood ratios. *BMJ*. 2004;329(7458):168–9.
- Cohen J. A coefficient of agreement for nominal scales. *Educ Psychol Meas*. 1960;20(1):37–46.
- Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33(1):159–74.
- McHugh ML. Interrater reliability: the kappa statistic. *Biochem Med (Zagreb)*. 2012;22(3):276–82.
- Bader JD, Shugars DA, Bonito AJ. Systematic reviews of selected dental caries diagnostic and management methods. *J Dent Educ*. 2001;65(10):960–8.

Chapter 10 — Questionnaires, Scales and Indices in Dentistry

10.1 Designing basic questionnaires · 10.2 Validity and reliability of instruments · 10.3 Dental indices as measurement tools

Core texts: [30] · [31] · [32] · [22] chapters on the measurement of caries, periodontal disease and tooth loss · [2] chapters on types of data

Additional

- Likert R. A technique for the measurement of attitudes. *Arch Psychol.* 1932;140:1–55.
- Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika.* 1951;16(3):297–334.
- Bland JM, Altman DG. Statistics notes: Cronbach's alpha. *BMJ.* 1997;314(7080):572.
- Boynton PM, Greenhalgh T. Selecting, designing, and developing your questionnaire. *BMJ.* 2004;328(7451):1312–5.
- Klein H, Palmer CE, Knutson JW. Studies on dental caries: I. Dental status and dental needs of elementary school children. *Public Health Rep.* 1938;53(19):751–65.
- Greene JC, Vermillion JR. The simplified oral hygiene index. *J Am Dent Assoc.* 1964;68:7–13.
- Ainamo J, Barmes D, Beagrie G, Cutress T, Martin J, Sardo-Infirri J. Development of the World Health Organization (WHO) community periodontal index of treatment needs (CPITN). *Int Dent J.* 1982;32(3):281–91.
- Slade GD, Spencer AJ. Development and evaluation of the Oral Health Impact Profile. *Community Dent Health.* 1994;11(1):3–11.

Chapter 11 — Reading and Interpreting Statistical Results in Dental Literature

11.1 Understanding statistical sections of papers · 11.2 Interpreting output · 11.3 Critical thinking

Core texts: [25] · [26] · [27] · [36] · [35] · [37] · [29] · [40] · [2] chapters on presenting results

Additional

- Wasserstein RL, Schirm AL, Lazar NA. Moving to a world beyond “ $p < 0.05$ ”. *Am Stat.* 2019;73(sup1):1–19.
- Amrhein V, Greenland S, McShane B. Scientists rise up against statistical significance. *Nature.* 2019;567(7748):305–7.
- Sullivan GM, Feinn R. Using effect size — or why the P value is not enough. *J Grad Med Educ.* 2012;4(3):279–82.
- Cohen J. *Statistical Power Analysis for the Behavioral Sciences.* 2nd ed. Hillsdale (NJ): Lawrence Erlbaum Associates; 1988.
- Nagele P. Misuse of standard error of the mean (SEM) when reporting variability of a sample. A critical evaluation of four anaesthesia journals. *Br J Anaesth.* 2003;90(4):514–6.
- Ranganathan P, Pramesh CS, Buyse M. Common pitfalls in statistical analysis: clinical versus statistical significance. *Perspect Clin Res.* 2015;6(3):169–70.
- Ioannidis JPA. Why most published research findings are false. *PLoS Med.* 2005;2(8):e124.
- Lang TA, Altman DG. Basic statistical reporting for articles published in biomedical journals: the ‘statistical analyses and methods in the published literature’ or the SAMPL guidelines. *Int J Nurs Stud.* 2015;52(1):5–9.

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