

References

- Anderson, R.P., Jin, R. and Grunkemeier, G.L. 2003. Understanding logistic regression analysis in clinical reports: an introduction. *The Annals of Thoracic Surgery*, 75: 753-757.
- Ai, C. and Norton, E.C. 2000. Standard errors for the retransformation problem with heteroscedasticity. *Journal of Health Economics*, 19: 697–718
- Austin, P.C., Rothwell, D.M. and Tu, J.V. 2002. A Comparison of statistical modeling Strategies for analyzing length of stay after CABG surgery. *Health Services & Outcomes Research Methodology*, 3: 107–133.
- Augustin, N.H., Kublin, E., Metzler, B., Meierjohann, E. and von Wuhlisch, G. 2005. Analyzing the spread of beech canker. *Forest Science*, 51: 438-448.
- Bergeron, E., Lavoie, A., Moore, L., Clas, D. and Rossignol. 2005. Comorbidity and age are both independent predictors of length of hospitalization in trauma patients. *Canadian Journal of Surgery*, 48: 361-366.
- Bewick, V., Cheek, L. and Ball, J. 2005. Statistics review 14: Logistic regression. *Critical Care*, 9: 112-118.
- Bi, P., Whitby, M., Walker, S. and Parton, K.A. 2003. Trends in mortality rates for infectious and parasitic diseases in Australia: 1907-1997. *Internal Medicine Journal*, 33: 152-162.

- Blough, D.K. and Ramsey, S.D. 2000. Using Generalized Linear Models to Assess Medical Care Costs. *Health Services & Outcomes Research Methodology*, 1:185-202.
- Brownell, M.D. and Roos, N.P. 1995. Variation in length of stay as a measure of efficiency in Manitoba hospitals. *Canadian Medical Association Journal*, 152: 675-682.
- Bureau of Policy and Strategy. 2002. Thailand Health Profile 1999-2000. Ministry of Public Health: Express Transportation Organization. pp. 189-247.
- Cabre, M., Bolivar, I., Pera, G. and Pallares, R. 2004. Factors influencing length of hospital stay in community-acquired pneumonia: a study in 27 community hospitals. *Epidemiology and Infection*, 132: 821-829.
- Carl, G. and Kühn, I. 2007. Analyzing spatial autocorrelation in species distributions using Gaussian and logit models. *Ecological Modelling*, 207: 159-170.
- Cannoodt, L.J. and Knickman, J.R. 1984. The effect of hospital characteristics and organizational factors on pre and postoperative lengths of hospital stay. *Health Services Research*, 19: 561-585.
- Chow, K.M., Wu, A.K. and Szeto, C.C. 2003. Secular trend in medical education regarding infectious disease. *Medical Education*, 37: 881-883.
- Choprawon, C., Porapakham, Y., Sablon, O., Panjajaru, R. and Jhantharatat, B. (2005). Thailand's national death registration reform: Verifying the causes of death between July 1997 and December 1999. *Asia-Pacific Journal of Public Health*, 17: 110-116.

- Chuprapawan, C., Porapakkham, Y., Jirawatkul, A. and Paoin, W. 2003. Report on the study of causes of death of Thailand population who died within one year during 1997-1999 in 16 provinces in Thailand: Ministry of Public Health.
- Clarke, A. 2002. Length of in-hospital stay and its relationship to quality of care. *Quality Safety Health Care*, 11: 209-210.
- Clarke, A. and Rosen, R. 2001. Length of stay, how short should hospital care be?. *European Journal of Public Health*, 11: 166-170.
- Congdon, P. 2006. A model framework for mortality and health data classified by age, area, and time. *Biometrics*, 62: 269-278.
- Davis, R., Dunsmuir, W. and Streett, S. 2003. Observation-driven models for Poisson counts. *Biometrika*, 90: 777-790.
- Dixon, T., Shaw, M., Frankel, S. and Ebrahim, S. 2004. Hospital admissions, age, and death: retrospective cohort study. *British Medical Journal*, 328: 1288-1290.
- Dore, G.J., Li, Y., Plant, A.J. and Kaldor, J.M. 1998. Trends in infectious disease mortality in Australia, 1979-1994. *The Medical Journal of Australia*, 168: 601-604.
- Dormann, C.F., McPherson, J.M., Araújo, M.B., Bivand, R., Bolliger, J., Carl, G., Davies, R.G., Hirzel, A., Jetz, W., Kissling, W.D., Kühn, I., Ohlemüller, R., Peres-Neto, P.R., and Reineking, B., Schröder, B., Schurr, F.M. and Wilson, R. 2007. Methods to account for spatial autocorrelation in the analysis of species distributional data: a review. *Ecography*, 30: 609-628.

- Faramnuayphol, P., Chongsuvivatwong, V., and Pannarunothai, S. 2008.
Geographical variation of mortality in Thailand. *Journal of the Medical Association of Thailand*, 91: 1455-1460.
- Fienberg, S.E., Bromet, E.J., Follmann, D., Lambert, D. and May, S.M. 1985.
Longitudinal analysis of categorical epidemiological data: A study of three mile land. *Environmental Health Perspectives*, 63: 241-248.
- Gage, T.B. 1994. Population variation in cause of death: level, gender, and period effects. *Demography*, 31: 271-294.
- Goldfarb, M.G., Hornbrook, M.C. and Higgins, C.S. 1983. Determinants of hospital use: A cross-diagnostic analysis. *Medical Care*, 211: 48-66.
- Gustafson, D.H. 1968. Length of stay: prediction and explanation. *Health Services Research*, 3: 12-34.
- Hanson, B.L. 1973. A Statistical model for length of stay in a mental hospital. *Spring*, Spring, 8: 37-45
- Health Technology case study 24. 1983. Variations in Hospital Length of Stay: Their relationship to health outcomes. Washington D.C.: U.S. Government Printing Office. pp 9-22.
- Hill, K., Lopez, A.D., Shibuya, K. and Jha, P. 2007. Interim measures for meeting needs for health sector data: births, deaths, and causes of death. *Lancet*, 370: 1726-1735.

- Himsworth, R.L. and Goldacre, M.J. 1999. Does time spent in hospital in the final 15 years of life increase with age at death? A population based study. *British Medical Journal*, 319: 1338-1339.
- Horn, S.D., Sharkey, P.D., Buckle, J.M., Backofen, J.E., Averill, R.F. and Horn, R.A. 1991. The relationship between severity of illness and hospital length of stay and mortality. *Medical Care*, 29: 305-317.
- Hosmer, D.W. and Lemeshow, S. 2000. *Applied logistic regression* (2nd ed). New York: John Wiley & Sons, (Chapter 1).
- Hu, W., Mengersen, K. and Tong, S. Spline regression and auto-regression models with application to time series data. Available at [http://isi-eh.usc.es/trabajos/144_58_fullpaper.pdf]
- Huang, J., Boyd, C., Tyldesley, S., Zhang-Salmons, J., Groome, P.A. and Mackillop, W.J. 2002. Time spent in hospital in the last six months of life in patients who died of cancer in Ontario. *Journal of Clinical Oncology*, 20: 1584-1592.
- International Labour Office. 2004. A Technical Note to the Government: Financing Universal Health Care in Thailand. Geneva: The International Labour Office.
- Jia, S. and Rathi, S. 2008. On predicting log-transformed linear models with heteroscedasticity. SAS Global Forum, *Statistics and Data Analysis*. <http://www2.sas.com/proceedings/forum2008/370-2008.pdf>. [January 5, 2009].
- Kleinbaum, D.G. and Klein, M. 2002. *Logistic regression: a self-learning text*. (2nd ed.). New York: Springer-Verlag, (Chapter 1).

- Kulinskaya, E., Kornbrot, D. and Gao, H. 2005. Length of stay as a performance indicator: robust statistical methodology. *IMA Journal of Management Mathematics*. 16: 369-381.
- Lee, A.H., Fung, W.K. and Fu, B. 2003. Analyzing hospital length of stay: mean or median regression? *Medical Care*, 41: 681-686.
- Li, J. 1999. An application of lifetime models in estimation of expected length of stay of patients in hospital with complexity and age adjustment. *Statistics in Medicine*, 18: 3337-3344.
- Lim, A. and Choonpradub, C. 2007. A statistical method for forecasting demographic time series counts, with application to HIV/AIDS and other infectious disease mortality in southern Thailand. *Southeast Asian Journal of Tropical Medicine Public Health*, 38: 1029-1039.
- List, N.D., Fronczak, N.E., Gottlieb, S.H. and Baker, R.E. 1983. A cross-national study of differences in length of stay of patients with cardiac diagnoses. *Medical Care*, 21: 519-530.
- Liu, Y., Phillips, M. and Codde, J. 2001. Factors influencing patients' length of stay. *Australian Health Review*, 24: 63-70.
- Lix L.M., Ekuma, O., Brownell, M. and Roos, L.L. 2006. A framework for modeling differences in regional mortality over time. *Journal of Epidemiology and Community Health*, 58: 420-425.

- Machlin, S.R. and Carper, K. 2004. Expenses for Inpatient Hospital Stays. Statistical Brief #164, March 2007. Agency for Healthcare Research and Quality, Rockville. Available: http://www.meps.ahrq.gov/mepsweb/data_files/publications/st164/stat164.pdf . [July 26, 2008].
- Mahapatra, P., Shibuya, K., Lopez, A.D., Coullare, F., Notzon, F.C., Rao, C. and Szreter, S. 2007. Civil registration systems and vital statistics: successes and missed opportunities. *Lancet*. Available: <http://www.thelancet.com>. [October 29, 2007].
- Manning, W.G. and Mullahy, J. 2001. Estimating log models: to transform or not to transform?. *Journal of Health Economics*, 20: 461–494.
- Marazzi, A., Paccaud, F., Ruffieux, C. and Beguin, C. 1998. Fitting the distributions of length of stay by parametric models. *Medical Care*, 36: 915-927.
- Martin, S. and Smith, P. 1996. Explaining variations in inpatient length of stay in the National Health Service. *Journal of Health Economics*, 15: 279-304.
- Mathers, C.D., Stein, C., Fat, D.M., Rao, C., Inoue, M., Tomijima, N., Bernard, C., Lopez, A.D. and Murray, C.J.L. 2002. Global Burden of Disease 2000: Version 2 methods and results. Global Programme on Evidence for Health Policy Discussion Paper No.50: World Health Organization.
- Mathers, C.D., Fat, D.M., Inoue, M., Rao, C. and Lopez, A.D. 2005. Counting the death and what they died from: and assessment of the global status of cause of death data. *Bulletin of the World Health Organization*, 83: 171:177.

- Mathers, C.D. and Loncar, D. 2006. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Medicine* [online journal], 3:e442. Available: <http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0030442>. [January 10, 2009].
- McMullan, R., Silke, B., Bennett, K. and Callachand, S. 2004. Resource utilisation, length of hospital stay, and pattern of investigation during acute medical hospital admission. *Postgraduate Medical Journal*, 80: 23-26.
- Murray, C.J., Lopez, A.D. 1997. Mortality by cause for eight regions of the world: Global Burden of Disease Study. *Lancet*, 349: 1269-1276.
- National Center for Health Statistics. 1973. Average length of Stay in Short-Stay Hospitals: Demographic Factors, United States-1968. *Vital and Health Statistics, Series 13-No 13*. Washington D.C.: U.S. Government Printing Office. pp. 1-40.
- National Intelligence Council. 2000. National intelligence estimate: the global infectious disease treat and its implications for the United States. *Environmental Change & Security Project Report 2000; Issue 6*: 33-65.
- National Statistical Office. 2002. The 2000 Population and Housing Census, Southern Region. Statistical. Data Bank and Information Dissemination Division: National Statistical Office.
- Panagiotakos, D.B. and Pitsavos, C. 2004. Interpretation of epidemiological data using multiple correspondence analysis and log-linear models. *Journal of Data Science*, 2: 75-86

- Peng, C.Y.J., So, T.S.H. and Stage, F.K. and John, E.P. 2002. The use and interpretation of logistic regression in higher education. *Research in Higher Education*, 43: 259-293.
- Pfeiffer, D.U., Duchateau, L., Kruska, R.L., Ushewokunze-Obatolu, U. and Perry, B.D. 1997. A spatially predictive logistic regression model for occurrence of theileriosis outbreaks in Zimbabwe. Proceedings of 8th Symposium of the International Society for Veterinary Epidemiology and Economics, Paris, France, July 8-11, 1997. *Special Issue of Epidemiologie et Santé Animale*, 31-32.
- Porapakkham, Y. 1986. Mortality and health issues: Levels and trends of mortality in Thailand. Asian Population Studies Series, No 77, United Nations Economic and Social Commission for Asia and the Pacific. Bangkok, Thailand.
- Prasartkul, P. and Vapattanawong, P. 2006. The completeness of death registration in Thailand: Evidence from demographic surveillance system of the Kanchaburi project. *World Health & Population*. Available: <http://www.longwoods.com>. [November 20, 2008].
- R Development Core Team. 2007. R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing.
- Reniers, G., Araya, T., Schaap, A., Kumie, A., Kebede, D., Nagelkerke, N., Coutinho, R., Sanders, E.J. 2005. Monitoring cause-specific adult mortality in developing countries: a comparison of data sources for Addis Ababa and its implications for policy and research. *Social Science & Medicine*, 61: 1952-1957.

- Rukumnuaykit, P. 2006. Mortality and causes of death in Thailand: evidence from the survey of population change. *Asia-Pacific Population Journal*, 21: 67-84.
- Rumakom, P., Prasartkul, P. and Punpuing, S. 2002. Change to the epidemiological transition in Thailand due to HIV/AIDS: Implications for population and health policies. The 2002 IUSSP Regional Population Conference, Bangkok, 10-12 June 2002. Institute for Population and Social Research, Nakhon Pathom: Mahidol University.
- Rutaremw, G. 2000. Analysis of regional differentials in under-five mortality in Kenya using a count-data regression model. ACAP working Paper 14, March 2000, The African Census Analysis Project (ACAP), Population Studies Center. Philadelphia, Pennsylvania: University of Pennsylvania.
- Salive, M.E., Wallace, R.B., Ostfeld, A.M., Satterfield, S. and Havlik, R.J. 1993. Risk factors for septicemia-associated mortality in older adults. *Public Health Report*, 108: 447-453.
- Sashamani, M. and Gray, A. 2004. Time to death and health expenditure: an improved model for the impact of demographic change on health care costs. *Age and Ageing*, 33: 556-561.
- Sibai, A.M. 2004. Mortality certification and cause-of-death reporting in developing countries. *Bulletin of the World Health Organization*, 82: 83-83A.
- Serraino, D., Bidoli, E., Piselli, P., Angeletti, C., Bruzzone, S., Pappagallo, M., Puro, V., Girardi, E., Lauria, F., Ippolito, G. 2004. Time trends in infectious disease mortality in Italy: 1969-1999. *Epidemiology Preview*, 28: 322-329.

- Setrakian, J.C., Flegel, K.M., Hutchinson, T.A., Charest, S, Côté, L., de B. Edwardes, M.D. and Corbett, I.B. 1999. A physician-centred intervention to shorten hospital stay: a pilot study. *Canadian Medical Association*, 160: 1735-1737.
- Setel, P.W., Macfarlane, S.B., Szreter, S., Mikkelsen, L., Jha, P., Stout, S. and AbouZahr, S. 2007. A scandal of invisibility: making everyone count by counting everyone. Available: <http://www.thelancet.com>. [January 10, 2009].
- Spencer, F.A., Lessard, D., Gore, J.M., Yarzebski, J. and Goldberg, R.J. 2004. Declining length of hospital stay for acute myocardial infarction and postdischarge outcomes. *Archives Internal Medicine*, 164: 733-740.
- Tangcharoensathien, V., Faramnuayphol, P., Teokul, W., Bundhamcharoen, K. and Wibulpholprasert, S. 2006. A critical assessment of mortality statistics in Thailand: potential for improvements. *Bulletin of the World Health Organization*, 84: 233-239.
- Thai Working Group on HIV/AIDS Projection. 2001. Projections for HIV/AIDS in Thailand: 2000-2020. Bangkok: Karnsana Printing Press.
- Van den Block, L., Deschepper, R., Driescens, K., Bauwens, S., Bilsen, J., Bossuyt, N. and Deliens, L. 2007. Hospitalisations at the end of life: using a sentinel surveillance network to study hospital use and associated patient, disease and healthcare factors. *BMC Health Services Research*, 7: 69.
- Venables, W.N. and Ripley, B.D. 1999. *Modern Applied Statistics with S* (3rd ed). New York: Springer-Verlag.

Waller, L.A. and Gotway, C.A. 2004. *Applied spatial statistics for public health data*. New York: Wiley.

Wang, K., Yau, K.K.W. and Lee, A.H. 2002. A hierarchical Poisson mixture regression model to analyse maternity length of hospital stay. *Statistics Medicine*, 21: 3639-3654.

Wen, S.W., Liu, S., Marcoux, S. and Fowler, D. 1998. Trends and variations in length of hospital stay for childbirth in Canada. *Canadian Medical Association Journal*, 158: 875-80.

Westert, G.P., Nieboer, A.P. and Groenewegen, P.P. 1993. Variation in duration of hospital stay between hospitals and between doctors within hospitals. *Social Science & Medicine*, 37: 833-839.

Wolleswinkel-van den Bosch, J.H., van Poppel, F.W., Looman, C.W. and Mackenbach, J.P. 2001. The role of cultural and economic determinants in mortality decline in the Netherlands, 1875/1879-1920/1924: a regional analysis. *Social Science & Medicine*, 53: 1439-1453.

World Health Organization. 2007. World Health Statistics. France. Available: <http://www.who.int/whosis>. [February 18, 2009].

Xiao, J., Douglas, D., Lee, A.H. and Vemuri, S.R. 1997. A delphi evaluation of the factors influencing length of stay in Australian hospitals. *International Journal Health Planning Management*, 12: 207-218.

Xie, H., McHugo, G., Sengupta, A, Clark, R. and Drake¹, R. 2004. A Method for analyzing longitudinal outcomes with many zeros. *Mental Health Services Research*, 6: 239-246.

Zhu, J., Zheng, Y., Carroll, A.L. and Aukema, B.H. 2008. Autologistic regression analysis of spatial-temporal binary data via Monte Carlo maximum likelihood. *Journal of Agricultural, Biological and Environmental Statistics*, 13: 84-98.

Prince of Songkla University
Pattani Campus