Exhibit No.:	
Issues:	Weather Normalization and Water Utilization Trend Estimates
Witness:	Edward L. Spitznagel, Jr.
Exhibit Type:	Direct
Sponsoring Party:	Missouri-American Water Company
Case No.:	WR.2008.XXXX, SR.2008.XXXX
Date:	March 31, 2008

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2008-XXXX
SR-2008-XXX

DIRECT TESTIMONY

OF

EDWARD L. SPITZNAGEL, JR.

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

IN THE MATTER OF MISSOURI-AMERICAN WATER COMPANY FOR AUTHORITY TO FILE TARIFFS REFLECTING INCREASED RATES FOR WATER AND SEWER SERVICE	**)))))**	**CASE NO. WR-2008-XXXX** **CASE NO. SR-2008-XXXX**

AFFIDAVIT OF EDWARD L. SPITZNAGEL, JR.

Edward L. Spitznagel, Jr., being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony entitled "Direct Testimony of Edward L. Spitznagel, Jr."; that said testimony and schedules were prepared by him and/or under his direction and supervision; that if inquires were made as to the facts in said testimony and schedules, he would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of his knowledge.

Edward L. Spitznagel, Jr.
Edward L. Spitznagel, Jr.

State of Missouri
County of St. Louis
SUBSCRIBED and sworn to
Before me this 21 **day of** March **2008.**

Lisa Caress
Notary Public

My commission expires: 04/11/2010

DIRECT TESTIMONY
EDWARD L. SPITZNAGEL, JR.
MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR.2008.XXXX
SR.2008.XXX

TABLE OF CONTENTS

I. Witness Introduction 1

II. Purpose and Scope 2

II. Conclusions and Recommendations 9

DIRECT TESTIMONY

EDWARD L. SPITZNAGEL, JR.

WITNESS INTRODUCTION

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND EMPLOYER.

A. My name is Edward L. Spitznagel, Jr., and my business address is Campus Box 1146, One Brookings Drive, St Louis, Missouri 63130. I am employed by Washington University.

Q. WHAT IS YOUR PRESENT POSITION?

A. I am Professor of Mathematics in the College of Arts and Sciences at Washington University. I also hold a joint appointment in the Division of Biostatistics of the Washington University School of Medicine.

Q. Please review your educational background and work experience.

A. I hold a Bachelor of Science, summa cum laude, in mathematics, awarded in 1962 by Xavier University, Cincinnati, Ohio. I hold a Master of Science (1963) and Ph.D. (1965) in mathematics awarded by the University of Chicago. I have served on the Faculty of Arts and Sciences of Washington University since 1969. I have held a joint appointment in the Division of Biostatistics since 1978. From 1965 to 1969, I was on the faculty of Northwestern University.

Attached to my testimony is Schedule ELS-1, which provides a more detailed listing of my education and qualifications in the area of mathematics and statistics.

PURPOSE AND SCOPE

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS CASE?

A. I have been employed by Missouri-American Water Company ("MAWC" or "Company") to make weather-normalized predictions of water utilization for the period January 2008 to December 2008 and to determine if there are non-meteorological impacts on sales by customers.

Q. WHAT IS WEATHER NORMALIZATION?

A. From one year to the next, variations in temperature and precipitation lead to changes in water consumption. More water will generally be used during hotter, drier periods. The regulatory question is how to reflect those weather-related differences when setting rates.

For ratemaking purposes, revenues need to be set at as "normal" a level as possible, factoring out the potential or actual results of unusual weather conditions. This can be accomplished by building statistical models that predict water utilization from meteorological data and other possible predictors. An estimate of future utilization can then be made by using a long-term average of meteorological data and known values of the other predictors.

Q. WHAT ARE EXAMPLES OF THESE OTHER NON-METEOROLOGICAL PREDICTORS?

A. One is the year itself. Due to gradual introduction of water-conserving plumbing fixtures and appliances, in many regions use of water appears to be slowly declining over time. In other regions where growth has led to new homes with expansive lawns and/or larger commercial establishments, the use of water can increase over time.

Another is the month of the year. While water utilization increases during the warmer, drier summer months, analysis of variance shows that month as a categorical variable is a powerful predictor even after temperature and moisture have been included in the model.

Q. WHAT MODEL FOR WATER UTILIZATION DID YOU EMPLOY?

A. In a previous case before the Public Service Commission of the Commonwealth of Kentucky (1997), I screened a large number of candidate predictors by examining data from fourteen different operating systems in five states: Kentucky, Missouri, Ohio, Tennessee, and Virginia. Five of these fourteen operations were located in Missouri: Brunswick, Cottleville (St. Charles), Mexico, Parkville, and Warrensburg. I also received data from two other Missouri operations: Joplin and St. Joseph. These two systems billed on a quarterly basis but could not provide records on the numbers of customers billed in each billing cycle, so it was not possible to compute monthly consumption on a per-customer basis. Based on this work, I developed a multivariate model to predict utilization.

I used as candidate predictors only those variables that correlated consistently with utilization for most or all of these operating companies.

Q. WHAT WERE SOME OF THE VARIABLES THAT MET THIS CRITERION?

A. For heat, both mean temperature and cooling degree days correlated strongly with utilization. For moisture, the Palmer Drought Severity Index correlated strongly with utilization. Rainfall and the available soil moisture index used in Missouri at that time did not correlate nearly as well.

I then fitted the surviving candidates in a multivariate model to predict utilization. I found that calendar month was a strong predictor even in the presence of heat and moisture variables. Therefore, I included month as a categorical variable. With month included, I tested drought severity index, temperature, and calendar year as potential numeric predictors. I found that temperature was not a useful predictor in the presence of the other variables, so from that point onward, I did not use it.

For the months of January through April, there was no evidence that moisture predicted utilization. For the months of May through December, there was evidence of moisture predicting utilization, being a weak predictor in the months of May, June, November, and December and a strong predictor for the months of July through October.

Month was a very strong predictor, both as a main effect and interacting with the drought severity index. Because of this, I estimated twelve separate predictive models, one for each month of the year.

Q. WERE ANY CHANGES TO YOUR METHODS REQUIRED IN THE CURRENT AND PREVIOUS CASES?

A. From 2003 to 2006 a billing method called 4-4-5 was employed by the Company. The idea behind this method was to provide the company with income based on four quarters of a year, since the thirteen weeks of the 4-4-5 reporting corresponds to one-fourth of a year minus one day. In the previous case, due to some non-uniformity in this new billing method, I was unable to make accurate estimates of monthly consumption. As a consequence, I found it necessary to use annual consumption rather than monthly consumption. I also skipped over the year 2003, because the changeover to the 4-4-5 billing method caused monthly reporting to be very uneven in this year. I added the year 1995 to the consumption data so I would have ten years of consumption data to estimate the effects of weather.

In the current case, I used the same methodology for St. Charles, St. Joseph, and Joplin, this time using the ten years 1997 to 2007, with 2003 skipped as described above. For St. Louis County, I was able to return to weather normalization based on monthly data, described in detail on page 7 below.

Q. HOW DID YOU ADAPT THE MEASURE OF DROUGHT SEVERITY TO MAKING ESTIMATES ON AN ANNUAL RATHER THAN A MONTHLY BASIS?

A. Since the monthly predictions of my previous method were combined linearly to obtain daily consumption averaged over a year, I calculated the average value of the Palmer Drought Severity Index ("PDSI") over the eight weather-sensitive months of May through December and used this average value in an annual prediction equation. This effectively produces the same prediction, just with the computations done in a different order. The computations can be found in Schedule ELS-2. Both Type I (sequential) and Type III (partial) sums of squares and F-tests are given. The selection criterion for retaining a term in the model was based on its Type III sum of squares and F-test. If the drought severity index was not statistically significant, it was removed from the model. If the year since 1990 was not statistically significant, it was removed from the model.

Q. ONCE YOU HAD ESTIMATED THE COEFFICIENTS IN THESE MODELS, HOW DID YOU PROJECT UTILIZATION FOR JANUARY 2008 THROUGH DECEMBER 2008?

A. In fitting each model, I added an additional line of data with years since 1990 set equal to 18, to correspond to the year 2008. I set the Palmer Drought Severity Index to the thirty-year average from 1978 to 2007 for the months of April through December, for the climate region in which the water company is located. I left the daily consumption missing so the regression coefficients would not be affected by the addition of this line of data. I then asked for the predicted value to be calculated, and I printed it out as the estimated average daily consumption for 2008. This produces the same result as if I had evaluated the regression equation with the values of 18 for the years since 1990, and the average regional PDSI value, but with no risk of computational error.

I used these predicted values when at least one of the years and PDSI was statistically significant. If neither variable was a statistically significant predictor of consumption, I used either a 6-year average (2000 through 2007, excluding 2003 and 2006 data) as the estimate of 2008 consumption or a 6 year time trend regression (2000 through 2007, excluding 2003 and 2006 data). I recommended to the Company using the time trend regression if the F-test was statistically significant. If it was not, I believe that a six year average, excluding the years 2003 and 2006, is appropriate.

Q. PLEASE DESCRIBE HOW YOU PERFORMED WEATHER NORMALIZATION BASED ON MONTHLY DATA FOR ST. LOUIS COUNTY.

A. From June of 2003 onward, data exists in an alternative form from the Company's customer service reporting system called ORCOM. This data contains total sales and billed days, allowing for a more accurate calculation of consumption per day than is possible with the 4-4-5 data. By combining this data with pre-4-4-5 data from 1996 through 2001, I obtained 120 months (ten years) of consumption data that eliminates the 4-4-5 reporting. In early 2002, two municipal water companies, Florissant and Webster Groves, were acquired by St. Louis County Water Company. In order to have the same customer base over the ten years of data, I requested from the Company sales and billed days data that excluded the data for the two acquired systems. I then combined years 2004-2007 from this data with the years 1996-2001 of monthly data, which is prior to both the 4-4-5 reporting and the acquisition of the Florissant and Webster Groves customers.

I then ran separate regression models for each of the twelve months, shown in Schedule ELS-2. I then combined the estimates in the Excel workbook SLCWC2008.XLS, also shown in Schedule ELS-2. I was able to do this for both residential and commercial quarterly-billed customers. From these combined regression models, I calculated weather-normalized estimates of 2008 consumption for all of St. Louis County excluding Florissant and Webster Groves. I recommended to the company that these estimates be combined with a 4-year average consumption from Florissant and Webster Groves to provide estimates for the entire St. Louis County customer base. This way the acquisition of Florissant and Webster Groves, both of which have lower consumers of water, does not artificially magnify the (downward) time trend in consumption. I believe it is appropriate to continue this separate-estimation strategy until we finally have ten years of consumption available for Florissant and Webster Groves, from 2004 to 2013.

St. Louis County Water Company also has a class of monthly-billed commercial customers. Their consumption data was too erratic for weather normalization by regression. I have recommended that their consumption be estimated by computation of a 6 year average, using the methodology described in the paragraph below.

Q. WHAT METHODOLOGY DID YOU RECOMMEND THAT THE COMPANY USE IN THOSE CASES WHERE YOU DID NOT PERFORM WEATHER NORMALIZATION AND USAGE UTILIZATION TREND STUDY?

A. In such cases, I recommended either the average consumption over the last few years, or fit a trend line, and if it was statistically significant, to project into the next year, (i.e. 2008) in this case. Because of issues arising from the phase-in and phase-out of the 4-4-5 system, I recommended using 6 years of data from 2000 through 2007, with 2003 and 2006 being excluded.

CONCLUSIONS AND RECOMMENDATION

Q. WHAT ARE YOUR CONCLUSIONS AND RECOMMENDATIONS FOR THE COMPANY'S PROJECTIONS OF DAILY UTILIZATION UNDER AVERAGE WEATHER BY OPERATING DISTRICT AND CUSTOMER CLASS, IN GALLONS PER CUSTOMER PER DAY?

A. They are:

	Residential	Commercial
St Louis County Quarterly	248*	1,131*
St Louis County Monthly	N/A	15,022†
St Charles	270*	1,277†

St Joseph	160*	841†
Joplin	178‡	1,088*
Brunswick	123†	202†
Mexico	150†	620†
Parkville	266‡	1,126‡
Warrensburg	172†	677‡
Jefferson City	161†	710‡

* Reflects my recommendation for weather normalization. St. Louis quarterly is adjusted to include Florissant and Webster Groves customers.

† Based on a 6-year average (2000-2007, excluding 2003and 2006) rather than regression.

‡ Based on a 6-year trend line regression (2000-2007, excluding 2003 and 2006)

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Edward L. Spitznagel, Jr.

Born: Cincinnati, Ohio, September 4, 1941.

Education:
Xavier University, 1959-1962
Awarded Bachelor of Science Degree (Summa Cum Laude), 1962
University of Chicago, 1962-1965
Awarded Master of Science Degree, 1963
Awarded Ph.D. in Mathematics, 1965

Scholarships and Fellowships:
Xavier University, 1959-1962
Honorary Woodrow Wilson Fellow, 1962-1963
National Science Foundation Fellow, 1962-1965

Positions:
Assistant Professor of Mathematics
Northwestern University, 1965-1969
Associate Professor of Mathematics
Washington University, 1969-1980
Professor of Mathematics
Washington University, 1980-present
Joint appointment, Division of Biostatistics,
Washington University School of Medicine, 1978-present

Consulting Experience:
Litton Industries (USACDCEC, Fort Ord, CA)
Price Waterhouse (Advanced Auditing Methods, NY)
Mallinckrodt, Inc.
St. Louis County Juvenile Court
Monsanto Company
American Red Cross
Carboline Corporation
Regional Justice Information Service
Harris-Stowe State College
Equal Employment Opportunity Commission
American Optometric Association
Petrolite Corporation
U.S. Army Atmospheric Sciences Laboratory (White Sands, NM)
St. Louis County Water Company
Gateway Medical Research, Inc.
MasterCard
Simmons Market Research Bureau
Transactional Data Solutions
Missouri-American Water Company
Capital City Water Company
Kentucky-American Water Company
Tennessee-American Water Company
Iowa-American Water Company
New Jersey-American Water Company
Anheuser-Busch, Inc.
Partek, Inc.
Santa Clara County Mental Health Administration (San Jose, CA)
and many law firms

Publications:

1. New impedance method for determining viscoelastic constants. *Rev. Sci. Inst.* **35**, 582-586 (1964). (With Potzick and Catanese)

2. Hall subgroups of certain families of finite groups. *Math. Z.* **97**, 259-290 (1967).

3. A new look at the fifteen puzzle. *Math. Mag.* **40**, 171-174 (1967).

4. Terminality of the maximal unipotent subgroups of Chevalley groups. *Math. Z.* **103**, 112-116 (1968).

5. Note on the alternating group. *Amer. Math. Monthly* **75**, 68-69 (1968).

6. A computer study of the orders of finite simple groups. *Math. Comp.* **22**, 669-671 (1968). (With Szygenda)

7. Density of finite simple group orders. *Math. Z.* **106**, 175-177 (1968). (With Dornhoff)

8. An experimental approach in the teaching of probability. *The Mathematics Teacher* **61**, 565-568 (1968).

9. Structure and terminality of the maximal unipotent subgroups of Steinberg groups. *Illinois J. Math.* **13**, 400-405 (1969).

10. Poisson integrals: rigor or mortis? *Amer. J. Phys.* **38**, 266-267 (1970). (With Hart)

11. An elementary proof that primes are scarce. *Amer. Math. Monthly* **77**, 396-397 (1970).

12. *Selected topics in mathematics.* Holt, Rinehart and Winston (1971).

13. Lognormal model for ascorbic acid requirements in man. *Bioscience* **21**, 981-984 (1971).

14. The uses of computing in a modernized probability and statistics course. *Proceedings of the Second Annual Conference on Computers in the Undergraduate Curricula,* 217-222 (1971).

15. Properties of a game based on Euclid's algorithm. *Math. Mag.* **46**, 87-92 (1973).

16. Use of a questionnaire-oriented research project in teaching undergraduate statistics. *Proceedings of the Fourth Annual Conference on Computers in the Undergraduate Curricula,* 352-357 (1973).

17. An inexpensive computer assist in teaching large enrollment mathematics courses. *Proceedings of Symposia in Applied Mathematics (American Mathematical Society)* **20**, 175-179 (1974).

18. Use of SAS in teaching a first course in statistics. *Proceedings of the First Annual Conference of SAS Users Group International,* 85-89 (1976).

19. Maintenance and analysis of anesthesia/surgery data with SAS. *Proceedings of the Third Annual Conference of SAS Users Group International,* 74-76 (1978). (With Owens)

20. K.W.I.C. indexes with SAS. *Proceedings of the Third Annual Conference of SAS Users Group International,* 267-270 (1978).

21. The use of loglinear and multivariate logistic models to assess the associations between HLA antigen responses and disease. *Proceedings of the 1978 American Statistical Association Section on Statistical Computing,* 271-275 (1978). (With Miller and Kass)

22. ASA physical status classifications: a study of consistency of ratings. *Anesthesiology* **49**, 239-243 (1978). (With Owens and Felts)

23. Interfacing SAS with Mark IV. *Proceedings of the Fourth Annual Conference of SAS Users Group International,* 41-44 (1979).

24. SAS as a management tool for course registration and grading. *Proceedings of the Fourth Annual Conference of SAS Users Group International,* 158-161 (1979).

25. Tally of ASA classification responses. *Anesthesiology* **51**, 181 (1979). (With Owens and Felts)

26. Outcome studies of anesthesia - Washington University. in *Health Care Delivery In Anesthesia,* edited by R. A. Hirsh, W. H. Forrest, Jr., F. K. Orkin, and H. Wollman. George F. Stickley Co. 67-72 (1980). (With Owens)

27. Morphological and biochemical studies in the development of cholinergic properties in cultured sympathetic neurons I. Correlative changes in choline acetyltransferase and synaptic vesicle cytochemistry. *J. Cell Biology* **84**, 680-691 (1980). (With Johnson et al.)

28. Letter to the editor regarding the Mahoney, Bird and Cooke article: Annual clinical examination - the best available screening test for breast cancer (*N. Engl. J. Med.* **301**, 315-316 (1979)). *New England Journal of Medicine* **302**, 60 (1980). (With Gohagan et. al.)

29. Anesthetic side effects and complications: An overview. in *Anesthetic Side Effects and Complications: Seeking, Finding, and Treating,* edited by W. D. Owens. Little, Brown and Company. 1-9 (1980). (With Owens)

30. A SAS macro for computing the kappa statistic to assess reliability. *Proceedings of the Fifth Annual Conference of SAS Users Group International,* 159-163 (1980). (With Rice and Helzer)

31. Computer generated repeatable examinations. *Proceedings of the Fifth Annual Conference of SAS Users Group International,* 438-442 (1980).

32. Shaded map reports. *Proceedings of the Fifth Annual Conference of SAS Users Group International,* 475-481 (1980).

33. Individual and combined effectiveness of palpation, thermography, and mammography in breast cancer screening. *Preventive Medicine* **9**, 713-721 (1980). (With Gohagan et al.)

34. Effect of pedaling rate on submaximal exercise responses of competitive cyclists. *J. Appl. Physiol.* **51**, 447-451 (1981). (With Hagberg et al.)

35. Simulation of population genetics models with SAS. *Proceedings of the Sixth Annual Conference of SAS Users Group International,* 605-606 (1981).

36. Optimal strategies for breast cancer detection. in *Systems Science in Health Care,* edited by C. Tilquin. Pergamon Press. 321-330 (1981). (With Gohagan et al.)

37. Computer graphics in selection of screening strategies. *Proceedings of the Seventh Annual Conference of SAS Users Group International,* 167-170 (1982). (With Gohagan)

38. Optimal stratified sampling, with an application to auditing. *Proceedings of the Seventh Annual Conference of SAS Users Group International,* 415-417 (1982).

39. *Early Detection of Breast Cancer: Risk, Detection Procedures, and Therapeutic Implications.* Praeger Publishers (1982). (With Gohagan et al.)

40. Plasma epinephrine and norepinephrine levels during anesthesia - enflurane-N_2O-O_2 compared with fentanyl-N_2O-O_2. *Anesth. Anal.* **61**, 366-370 (1982). (With Brown et al.)

41. Heterogeneity in schizophrenia - a cluster-analytic approach. *Psychiat. R.* **8**, 1-12 (1983). (With Farmer and McGuffin)

42. SAS methods for balanced repeated replications. *Proceedings of the Eighth Annual Conference of SAS Users Group International,* 844-847 (1983).

43. Breast self examination as a screening procedure. *Third International Conference on System Science in Health Care,* 455-458 (1984). (With Gohagan et al.)

44. ROC analysis of mammography alone and in combination with clinical palpation for breast screening. *Third International Conference on System Science in Health Care,* 463-466 (1984). (With Gohagan et al.)

45. Experimental design for the evaluation of nuclear magnetic resonance imaging in clinical medicine. *Third International Conference on System Science in Health Care,* 881-884 (1984). (With Gohagan et al.)

46. Graphic representation of logistic regression models. *Proceedings of the Ninth Annual Conference of SAS Users Group International,* 870-873 (1984). (With Gohagan et al.)

47. Utilization patterns of health maintenance organization disenrollees. *Medical Care* **22,** 827-833 (1984). (With Griffith and Baloff)

48. ROC analysis of mammography and palpation for breast screening. *Invest Radiol* **19,** 587-592 (1984). (With Gohagan et al.)

49. A proposed solution to the base rate problem in the kappa statistic. *Arch Gen Psychiatry* **42,** 725-728 (1985). (With Helzer)

50. A comparison of clinical and Diagnostic Interview Schedule diagnoses: Physician reexamination of lay-interviewed cases in the general population. *Arch Gen Psychiatry* **42,** 657-666 (1985). (With Helzer et al.)

51. A mouse embryo culture system for quality control testing of human in vitro fertilization and embryo transfer media and fetal cord sera. *Gamete Research* **11,** 411-419 (1985). (With Cheung et al.)

52. Comparison of variance estimation methods for complex sample designs under extreme conditions. *Proceedings of the Tenth Annual Conference of SAS Users Group International,* 1084-1088 (1985).

53. Sampling the household population. in *Epidemiologic Field Methods in Psychiatry: The NIMH Epidemiologic Catchment Area Program,* edited by W. Eaton and L. Kessler. Academic Press. 23-48 (1985). (With Holzer et al.)

54. Sampling: The institutional survey. in *Epidemiologic Field Methods in Psychiatry: The NIMH Epidemiologic Catchment Area Program,* edited by W. Eaton and L. Kessler. Academic Press. 49-66 (1985). (With Leaf et al.)

55. Statistical methods for estimating and extrapolating disease prevalence and incidence rates from a multisite study. in *Epidemiologic Field Methods in Psychiatry: The NIMH Epidemiologic Catchment Area Program,* edited by W. Eaton and L. Kessler. Academic Press. 351-373 (1985). (With Manton et al.)

56. Staging parameters for cancers of the head and neck: a multi-factorial analysis. *Laryngoscope* **95,** 1378-1381 (1985). (With Jacobs and Sessions)

57. Radiogenic breast cancer effects of mammographic screening. *Journal of the National Cancer Institute* **77,** 71-76 (1986). (With Gohagan et al.)

58. Difficult-to-recruit respondents and their effect on prevalence estimates in an epidemiologic survey. *American Journal of Epidemiology* **125,** 329-339 (1987). (With Cottler et al.)

59. Left globus pallidus abnormality in never-medicated patients with schizophrenia. *Proc Natl Acad Sci USA* **84,** 561-563 (1987). (With Early et al.)

60. Multispectral analysis of MR images of the breast. *Radiology* **163**, 703-707 (1987). (With Gohagan et al.)

61. The predictive validity of lay Diagnostic Interview Schedule diagnoses in the general population. *Arch Gen Psychiatry* **44**, 1069-1077 (1987). (With Helzer and McEvoy)

62. The effect of medication compliance on the control of hypertension. *Journal of General Internal Medicine* **2**, 298-305 (1987). (With Eisen et al.)

63. Teaching biostatistics with an emphasis on reading the medical literature. *Proceedings of the 1987 American Statistical Association Section on Statistical Education*, 111-115 (1987). (With Schechtman)

64. Evidence that the biliary migrating myoelectric complex (MMC) is preserved after feeding. *Gastroenterology* **95**, 894 (1988). (With Zenilman et al.)

65. Scheduling mammograms for asymptomatic women. *Preventive Medicine* **17**, 155-172 (1988). (With Gohagan et al.)

66. Increased fentanyl requirement in patients receiving long-term anticonvulsant therapy. *Anesthesiology Review* **15**, 54-55 (1988). (With Tempelhoff and Modica)

67. Accelerated train of four recovery from atracurium in patients receiving long-term anticonvulsant therapy. *Anesthesiology Review* **15**, 55-56 (1988). (With Modica and Tempelhoff)

68. Antimicrobial misuse in patients with positive blood cultures. *The American Journal of Medicine* **87**, 253-259 (1989). (With Dunagan et al.)

69. Exclusion of chromosomal mosaicism in amniotic-fluid cultures □ efficacy of insitu versus flask techniques. *Prenatal Diagnosis* **10**, 41-57 (1990). (With Cheung et al.)

70. Anticonvulsant therapy increases fentanyl requirements during anesthesia for craniotomy. *Can J Anaesth* **37**, 327-332 (1990). (With Tempelhoff and Modica)

71. Nitrous oxide, nausea, and vomiting after outpatient gynecologic surgery. *J Clin Anesth* **2**, 168-171 (1990). (With Felts and Poler)

72. The relation of ulcerative colitis to psychiatric factors: a review of findings and methods. *Am J Psychiatry* **147**, 974-981 (1990). (With North et al.)

73. Clinical classification and staging for primary malignancies of the maxillary antrum. *Laryngoscope* **100**, 1106-1111 (1990). (With Zamora et al.)

74. Time-series analysis of myoelectric cycling of sphincter of Oddi: evidence of cycling during fed state. *Am J Physiology* **259**, 511-517 (1990). (With Zenilman et al.)

75. The effect of prescribed daily dose frequency on patient medication compliance. *Arch Intern Med* **150**, 1881-1884 (1990). (With Eisen et al.)

76. Resistance to atracurium-induced neuromuscular blockade in patients with intractable seizure disorders treated with anticonvulsants. *Anesthesia and Analgesia* **71**, 665-669 (1990). (With Tempelhoff et al.)

77. *California Mental Health Needs* **1**, 1-182. California Department of Mental Health (1990). (With Meinhardt and Jerrell).

78. *California Mental Health Needs* **2**, 1-467. California Department of Mental Health (1990). (With Meinhardt and Jerrell).

79. Comments on psychiatric aspects of ulcerative colitis - reply. *Am J Psychiatry* **148**, 688 (1991). (With North et al.)

80. Do life events or depression exacerbate inflammatory bowel disease? *Annals of Internal Medicine* **114**, 381-386 (1991). (With North et al.)

81. Antibiotic misuse in two clinical situations - positive blood culture and administration of aminoglycosides. *Reviews of Infectious Diseases* **13**, 405-412 (1991). (With Dunagan et al.)

82. Agreement between DSM-III and III-R substance use disorders. *Drug and Alcohol Dependence* **29**, 17-25 (1991). (With Cottler et al.)

83. New methods in cross-cultural psychiatry: Psychiatric illness in Taiwan and the United States. *Am J Psychiatry* **148**, 1697-1704 (1991). (With Compton et al.)

84. Surgical pathology of cancer of the oral cavity and oropharynx. *Laryngoscope* **101**, 1175-1197 (1991). (With Sessions et al.)

85. Sensitivity of chromosomal mosaicism detected by different tissue-culture methods. *Prenatal Diagnosis* **11**, 927-928 (1991). (With Cheung et al.)

86. Are hard-to-interview street dwellers needed in assessing psychiatric disorders in homeless men? *International Journal of Methods in Psychiatric Research* **1**, 69-78 (1991). (With Smith and North)

87. Gender differences in sociopathy and somatization in men and women with homosexual experience. *International Journal of Methods in Psychiatric Research* **1**, 89-99 (1991). (With North et al.)

88. Anticoagulant effects of nonionic versus ionic contrast-media in angiography syringes. *Investigative Radiology* **27**, 185 (1992).

89. Posttraumatic stress disorder among substance users from the general population. *Am J Psychiatry* **149**, 664-670 (1992). (With Cottler et al.)

90. A systematic study of mental illness, substance abuse, and treatment in 600 homeless men. *Annals of Clinical Psychiatry* **4**, 111-120 (1992). (With Smith and North)

91. Clinical staging for primary malignancies of the supraglottic larynx. *Laryngoscope* **103**, 69-77 (1993). (With Zamora et al.)

92. Symptomatic cytomegalovirus infection in renal transplant recipients given either Minnesota antilymphoblast globulin (MALG) or OKT3 for rejection prophylaxis. *American Journal of Kidney Diseases* **21**, 196-201 (1993). (With Bailey et al.)

93. Alcohol, drugs, and psychiatric comorbidity among homeless women. *J Clin Psychiatry* **54**, 82-87 (1993). (With Smith and North)

94. Is antisocial personality a valid diagnosis among the homeless? *Am J Psychiatry* **150**, 578-583 (1993). (With North and Smith)

95. Post-traumatic stress in survivors of three disasters. *Journal of Social Behavior and Personality* **8**, 353-368 (1993). (With Smith and North)

96. Cytomegalovirus infection and pneumonitis. *Am Rev Respir Dis* **147**, 1017-1023 (1993). (With Ettinger et al.)

97. Epidermoid carcinoma of the oral cavity and oropharynx: validity of the current AJCC staging system and new statistical tools for the prediction of subclinical neck disease. *Otolaryngology and Head and Neck Surgery* **108**, 225-232 (1993). (With Ghouri et al.)

98. Results of a rubella screening program for hospital employees: a five-year review (1968-1990). *American Journal of Epidemiology* **138**, 756-764 (1993). (With Fraser et al.)

99. Subjective reports of withdrawal among cocaine users: recommendations for DSM-IV. *Drug and Alcohol Dependence* **33**, 97-104 (1993). (With Cottler et al.)

100. Posttraumatic stress disorder in survivors of a mass shooting. *Am J Psychiatry* **151**, 82-88 (1994). (With North and Smith)

101. Violence and the homeless: an epidemiologic study of victimization and aggression. *Journal of Traumatic Stress* **7**, 95-110 (1994). (With North and Smith)

102. On-site PT, aPTT and platelet count: A comparison between whole blood and laboratory assays with coagulation factor analysis in patients presenting for cardiac surgery. *Anesthesiology* **80**, 338-351 (1994). (With Despotis et al.)

103. Prospective evaluation and clinical utility of on-site coagulation monitoring in patients undergoing cardiac operation. *J Thorac Cardiovasc Surg* **107**, 271-279 (1994). (With Despotis et al.)

104. Two-compartment pharmacokinetics. *Proceedings of the Fifth Annual International Conference on Technology in Collegiate Mathematics,* edited by L. Lum. Addison-Wesley Publishing Company. 417-420 (1994).

105. Inhalant use: characteristics and predictors. *American Journal on Addictions* **3**, 263-272 (1994). (With Compton et al.)

106. Prediction of occult neck disease in laryngeal cancer by means of a logistic regression statistical model. *Laryngoscope* **104**, 1280-1284 (1994). (With Ghouri et al.)

107. Comparison of activated coagulation time and whole blood heparin measurements to laboratory plasma anti-Xa heparin concentration in cardiac surgical patients. *J Thorac Cardiovasc Surg* **108**, 1076-1082 (1994). (With Despotis et al.)

108. GAP: groups, algorithms, and programming (review). *Notices Amer Math Soc* **41**, 780-782 (1994).

109. Prediction of subclinical neck disease in laryngeal cancer patients using a logistic regression statistical model. in *Laryngeal Cancer: Proceedings of the 2nd World Congress on Laryngeal Cancer, Sydney, 20–24 February 1994,* edited by R. Smee and G.P. Bridger. Elsevier Science B.V. 570-573 (1994). (With Ghouri et al.)

110. Predictors of mortality in alcoholic women: a 20-year follow-up study. *Alcoholism, Clinical and Experimental Research* **18**, 1177-1186 (1994). (With Smith et al.)

111. Improvement in user performance following development and routine use of an expert system. *Medinfo* **8**, 1064-1067 (1994). (With Kahn et al.)

112. Exclusion of chromosomal mosaicism in amniotic fluid cultures □ determination of number of colonies needed for accurate analysis. *Prenatal Diagnosis* **14**, 1009-1017 (1994). (With Featherstone et al.)

113. Adult offspring of alcoholic women as family history informants. *Alcoholism, Clinical and Experimental Research* **18**, 1354-1360 (1994). (With Smith et al.)

114. The impact of heparin concentration and activated clotting time monitoring on blood conservation: A prospective, randomized evaluation in patients undergoing cardiac operation. *J Thorac Cardiovasc Surg* **110**, 46-54 (1995). (With Despotis et al.)

115. Risk factors for a positive tuberculin skin test among employees of an urban, midwestern teaching hospital. *Annals of Internal Medicine* **122**, 580-585 (1995). (With Bailey et al.)

116. Predictors of mortality in alcoholic men: a 20-year follow-up study. *Alcoholism, Clinical and Experimental Research* **19**, 984-991 (1995). (With Lewis et al.)

117. Complaints of constipation in obsessive-compulsive disorder. *Annals of Clinical Psychiatry* **7**, 65-70 (1995). (With North et al.)

118. Is there a relationship between "heavy drinking" and HIV high risk sexual behaviors among general population subjects? *The International Journal of the Addictions* **30**, 1453-1478 (1995). (With Shillington et al.)

119. Assessing gender interactions in the prediction of mortality in alcoholic men and women: a 20-year follow-up study. *Alcoholism, Clinical and Experimental Research* **19**, 1162-1172 (1995). (With Lewis et al.)

120. Factors associated with excessive postoperative blood loss and hemostatic transfusion requirements - a multivariate analysis in cardiac surgical patients. *Anesthesia and Analgesia* **82**, 13-21 (1996). (With Despotis et al.)

121. Comparing assessments of DSM-IV substance dependence disorders using CIDI-SAM and SCAN. *Drug and Alcohol Dependence* **41**, 179-187 (1996). (With Compton et al.)

122. Effects of gender and comorbidity on problem drinking in a community sample. *Alcoholism, Clinical and Experimental Research* **20**, 466-476 (1996). (With Lewis et al.)

123. Response of kaolin ACT to heparin: evaluation with an automated assay and higher heparin doses. *Ann Thorac Surg* **61**, 795-799 (1996). (With Despotis et al.)

124. Gastrointestinal symptoms and psychiatric disorders in the general population - findings from the NIMH epidemiologic catchment area project. *Digestive Diseases and Sciences* **41**, 633-640 (1996). (With North et al.)

125. Aprotinin prolongs activated and nonactivated whole blood clotting time and potentiates the effect of heparin in vitro. *Anesthesia and Analgesia* **82**, 1126-1131 (1996). (With Despotis et al.)

126. Are the mentally ill homeless a distinct homeless subgroup? *Annals of Clinical Psychiatry* **8**, 117-128 (1996). (With North et al.)

127. Increasing brain tumor rates: Is there a link to aspartame? *Journal of Neuropathology and Experimental Neurology* **55**, 1115-1123 (1996). (With Olney et al.)

128. Structured and semi-structured assessment of ICD-10 substance dependence disorders: CIDI-SAM vs. SCAN. *International Journal of Methods in Psychiatric Research* **6**, 285-293 (1996). (With Compton et al.)

129. Evaluation of a new point-of-care test that measures PAF-mediated acceleration of coagulation in cardiac surgical patients. *Anesthesiology* **85**, 1311-1323 (1996). (With Despotis et al.)

130. More effective suppression of hemostatic system activation in patients undergoing cardiac surgery by heparin dosing based on heparin blood concentrations rather than ACT. *Thrombosis and Haemostasis* **76**, 902-908 (1996). (With Despotis et al.)

131. The effects of cytomegalovirus serology on graft and recipient survival in cadaveric renal transplantation: implications for organ allocation. *American Journal of Kidney Diseases* **29**, 428-434 (1997). (With Schnitzler et al.)

132. Predictors of achieving stable housing in a mentally ill homeless population. *Psychiatric Services* **48**, 528-530 (1997). (With Pollio et al.)

133. Antithrombin III during cardiac surgery: effect on response of activated clotting time to heparin and relationship to markers of hemostatic activation. *Anesthesia and Analgesia* **85**, 498-506 (1997). (With Despotis et al.)

134. Nonpsychotic thought disorder: objective clinical identification of somatization and antisocial personality in language patterns. *Compr Psychiatry* **38**, 171-178 (1997). (With North et al.)

135. Changes in HIV/AIDS risk behaviors in drug users in St. Louis: applications of random regression models. *J Drug Issues* **27**, 399-416 (1997). (With Gallagher et al.)

136. Whole blood heparin concentration measurements by automated protamine titration agree with plasma anti-Xa measurements. *J Thorac Cardiovasc Surg* **113**, 611-613 (1997). (With Despotis et al.)

137. Impact of cytomegalovirus serology on graft survival in living related kidney transplantation: implications for donor selection. *Surgery* **121**, 563-568 (1997). (With Schnitzler et al.)

138. Homeless street people report conservative sexual attitudes yet anticipate risky behavior. *Psychiatric Rehabilitation Journal* **20**, 75-79 (1997). (With Song et al.)

139. One-year follow-up of survivors of a mass shooting. *Am J Psychiatry* **154**, 1696-1702 (1997). (With North and Smith)

140. Cytomegalovirus and HLA-A, B, and DR locus interactions: impact on renal transplant graft survival. *American Journal of Kidney Diseases* **30**, 766-771 (1997). (With Schnitzler et al.)

141. A comparison of clinical and structured interview diagnoses in a homeless mental health clinic. *Community Mental Health Journal* **33**, 531-543 (1997). (With North et al.)

142. Cocaine users with antisocial personality improve HIV risk behaviors as much as those without antisocial personality. *Drug and Alcohol Dependence* **49**, 239-247 (1998). (With Compton et al.)

143. The association of psychiatric diagnosis with weather conditions in a large urban homeless sample. *Soc Psychiatry Psychiatr Epidemiol* **33**, 206-210 (1998). (With North et al.)

144. Agreement between DSM-III and DSM-III-R substance use disorders. in *DSM-IV Sourcebook: Volume 4*, edited by T.A. Widiger et al. American Psychiatric Association. 29-42 (1998). (With Cottler et al.)

145. Taking chances: problem gamblers and mental health disorders—results from the St. Louis Epidemiologic Catchment Area Study. *Am J Public Health* **88**, 1093-1096 (1998). (With Cunningham-Williams et al.)

146. Importance of hemodynamic factors in the prognosis of symptomatic carotid occlusion. *JAMA* **280**, 1055-1060 (1998). (With Grubb et al.)

147. Correlates of early onset and chronicity of homelessness in a large urban homeless sample. *J Nerv Ment Dis* **186**, 393-400 (1998). (With North et al.)

148. Enrollment predictors of the special education outcome for students with SED. *Behavioral Disorders* **23**, 243-256 (1998). (With Mattison and Felix)

149. Substance abuse as a predictor of VA mental health care utilization among Vietnam veterans. *J Behav Health Serv Res* **26**, 126-139 (1999). (With Virgo et al.)

150. Long-term stability of Child Behavior Checklist profile types in a child psychiatric clinic population. *J Am Acad Child Adolesc Psychiatry* **38**, 700-707 (1999). (With Mattison)

151. Use of point-of-care test in identification of patients who can benefit from desmopressin during cardiac surgery: a randomized controlled trial. *Lancet* **354**, 106-110 (1999). (With Despotis et al.)

152. A randomized trial of povidone-iodine compared with iodine tincture for venipuncture site disinfection: effects on rates of blood culture contamination. *Am J Med* **107**, 119-125 (1999). (With Little et al.)

153. Psychiatric disorders among survivors of the Oklahoma City bombing. *JAMA* **282**, 755-762 (1999). (With North et al.)

154. Adverse events in platelet apheresis donors: A multivariate analysis in a hospital-based program. *Vox Sang* **77**, 24-32 (1999). (With Despotis et al.)

155. Development of a new staging system for recurrent oral cavity and oropharyngeal squamous cell carcinoma. *Cancer* **86**, 1387-1395 (1999). (With Lacy and Piccirillo)

156. The effects of psychiatric comorbidity on response to an HIV prevention intervention. *Drug and Alcohol Dependence* **58**, 247-257 (2000). (With Compton et al.)

157. Applying artificial neural network models to clinical decision making. *Psychological Assessment* **12**, 40-51 (2000). (With Price et al.)

158. The effect of epsilon-aminocaproic acid on HemoSTATUS and kaolin-activated clotting time measurements. *Anesthesia and Analgesia* **90**, 1281-1285 (2000). (With Saleem et al.)

159. Substance dependence and other psychiatric disorders among drug dependent subjects: race and gender correlates. *American Journal on Addictions* **9**, 113-125 (2000). (With Compton et al.)

160. Psychiatric disorders among drug dependent subjects: are they primary or secondary? *American Journal on Addictions* **9**, 126-134 (2000). (With Compton et al.)

161. Evidence for the involvement of two different MHC class II regions in susceptibility or protection in allergic bronchopulmonary aspergillosis. *J Allergy Clin Immunol* **106**, 723-729 (2000). (With Chauhan et al.)

162. Service use over time and achievement of stable housing in a mentally ill homeless population. *Psychiatric Services* **51**, 1536-1543 (2000). (With Pollio et al.)

163. Problem gambling and comorbid psychiatric and substance use disorders among drug users recruited from drug treatment and community settings. *Journal of Gambling Studies* **16**, 347-376 (2000). (With Cunningham-Williams et al.)

164. Longitudinal use of the Teacher's Report Form in tracking outcome for students with SED. *Journal of Emotional and Behavioral Disorders* **9**, 94-105 (2001). (With Mattison)

165. Effect of extended coverage of immunosuppressive medication by Medicare on the survival of cadaveric renal transplants. *American Journal of Transplantation* **1**, 69-73 (2001). (With Woodward et al.)

166. The association of irritable bowel syndrome and somatization disorder. *Ann Clin Psychiatry* **13**, 25-30 (2001). (With Miller et al.)

167. Remission from drug abuse over a 25-year period: patterns of remission and treatment use. *Am J Public Health* **91**, 1107-1113 (2001). (With Price et al.)

168. Laboratory screening prior to ECT. *The Journal of ECT* **17**, 158-165 (2001). (With Lafferty et al.)

169. Validation of a comorbidity education program. *Journal of Registry Management* **28**, 125-131 (2001). (With Johnston et al.)

170. A prospective study of coping after exposure to a mass murder episode. *Ann Clin Psychiatry* **13**, 81-87 (2001). (With North and Smith)

171. Twenty-five year mortality of US servicemen deployed in Vietnam: predictive utility of early drug use. *Drug and Alcohol Dependence* **64**, 309-318 (2001). (With Price et al.)

172. Photic and circadian expression of luciferase in MPeriod1-luc transgenic mice invivo. *Proc Natl Acad Sci USA* **99**, 489-494 (2002). (With Wilsbacher et al.)

173. Psychiatric disorders in rescue workers after the Oklahoma City bombing. *Am J Psychiatry* **159**, 857-859 (2002). (With North et al.)

174. Multivariate analysis to assess treatment effectiveness in advanced head and neck cancer. *Arch Otolaryngol Head Neck Surg* **128**, 497-503 (2002). (With Patel and Piccirillo.)

175. The specificity of family history of alcohol and drug abuse in cocaine abusers. *Am J Addict* **11**, 85-94 (2002). (With Compton et al.)

176. Coping, functioning, and adjustment of rescue workers after the Oklahoma City bombing. *J Trauma Stress* **15**, 171-175 (2002). (With North et al.)

177. Three-year follow-up of survivors of a mass shooting episode. *J Urban Health* **79**, 383-391 (2002). (With North et al.)

178. Test of the plausibility of adolescent substance use playing a causal role in developing adulthood antisocial behavior. *J Abnorm Psychol* **111**, 144-155 (2002). (With Ridenour et al.)

179. Development of a new head and neck cancer-specific comorbidity index. *Arch Otolaryngol Head Neck Surg* **128**, 1172-1179 (2002). (With Piccirillo et al.)

180. The clinical picture of depression in preschool children. *J Am Acad Child Adolesc Psychiatry* **42**, 340-348 (2003). (With Luby et al.)

181. Personality and depressive symptoms: a multi-dimensional analysis. *J Affect Disord* **74**, 123-130 (2003). (With Grucza et al.)

182. The role of psychiatric disorders in predicting drug dependence treatment outcomes. *Am J Psychiatry* **160**, 890-895 (2003). (With Compton et al.)

183. Is there a progression from abuse disorders to dependence disorders? *Addiction* **98**, 635-644 (2003). (With Ridenour et al.)

184. Modification of DSM-IV criteria for depressed preschool children. *Am J Psychiatry* **160**, 1169-1172 (2003). (With Luby et al.)

185. Improved glucose tolerance with lifetime diet restriction favorably affects disease and survival in dogs. *J Nutr* **133**, 2887-2892 (2003). (With Larson et al.)

186. Evaluation of gene expression measurements from commercial microarray platforms. *Nucleic Acids Res* **19**, 5676-5684 (2003). (With Tan et al.)

187. Alterations in stress cortisol reactivity in depressed preschoolers relative to psychiatric and no-disorder comparison groups. *Arch Gen Psychiatry* **60**, 1248-1255 (2003). (With Luby et al.)

188. Incorporation of gene-specific variability improves expression analysis using high-density DNA microarrays. *BMC Biol* **1**, 1 (2003). (With Budhraja et al.)

189. Modeling service access in a homeless population. *J Psychoactive Drugs* **35**, 487-495 (2003). (With Pollio et al.)

190. Functioning mediates between symptoms and provider assessment. *Ment Health Serv Res* **5**, 155-171 (2003). (With Striley and Stiffman)

191. Are rates of psychiatric disorders in the homeless population changing? *Am J Public Health* **94**, 103-108 (2004). (With North et al.)

192. Comparison of comorbidity indexes for patients with head and neck cancer. *Med Care* **42**, 482-486 (2004). (With Piccirillo et al.)

193. Prognostic importance of comorbidity in a hospital-based cancer registry. *JAMA* **291**, 2441-2447 (2004). (With Piccirillo et al.)

194. The Preschool Feelings Checklist: a brief and sensitive screening measure for depression in young children. *J Am Acad Child Adolesc Psychiatry* **43**, 708-717 (2004). (With Luby et al.)

195. Use of mental health services among older youths in foster care. *Psychiatric Services* **55**, 811-817 (2004). (With McMillen et al.)

196. Differential prognostic impact of comorbidity. *J Clin Oncol* **22**, 3099-3103 (2004). (With Read et al.)

197. The Homeless Supplement to the Diagnostic Interview Schedule: test-retest analyses. *Int J Methods Psychiatr Res* **13**, 184-191 (2004). (With North et al.)

198. The presentation of irritable bowel syndrome in the context of somatization disorder. *Clin Gastroenterol Hepatol* **2**, 787-795 (2004). (With North et al.)

199. Improving treatment services for substance abusers with comorbid depression. *Am J Addict* **13**, 295-304 (2004). (With Womack et al.)

200. A multistate trial of pharmacy syringe purchase. *J Urban Health* **81**, 661-670 (2004). (With Compton et al.)

201. The course of posttraumatic stress disorder in a follow-up study of survivors of the Oklahoma City bombing. *Ann Clin Psychiatry* **16**, 209-215 (2004). (With North et al.)

202. Characteristics of depressed preschoolers with and without anhedonia: evidence for a melancholic depressive subtype in young children. *Am J Psychiatry* **161**, 1998-2004 (2004). (With Luby et al.)

203. The course of PTSD, major depression, substance abuse, and somatization after a natural disaster. *J Nerv Ment Dis* **192**, 823-829 (2004). (With North et al.)

204. Analysis of costs, length of stay, and utilization of emergency department services by frequent users: implications for health policy. *Acad Emerg Med* **11**, 1311-1317 (2004). (With Ruger et al.)

205. Post-traumatic stress disorder, drug dependence, and suicidality among male Vietnam veterans with a history of heavy drug use. *Drug Alcohol Depend* **76**, S31-43 (2004). (With Price et al.)

206. A meta-analysis of soyfoods and risk of breast cancer in women. *Int J Cancer Prevention* **1**, 281-293 (2004). (With Yan)

207. Prevalence of psychiatric disorders among older youths in the foster care system. *J Am Acad Child Adolesc Psychiatry* **44**, 88-95 (2005). (With McMillen et al.)

208. Influence of lifetime food restriction on causes, time, and predictors of death in dogs. *J Am Vet Med Assoc* **226**, 225-231 (2005). (With Lawler et al.)

209. Preoperative use of enoxaparin increases the risk of postoperative bleeding and re-exploration in cardiac surgery patients. *J Cardiothorac Vasc Anesth* **19**, 4-10 (2005). (With McDonald et al.)

210. Comparison of post-disaster psychiatric disorders after terrorist bombings in Nairobi and Oklahoma City. *Br J Psychiatry* **186**, 487-493 (2005). (With North et al.)

211. Prevalence and predictors of pathological gambling: results from the St. Louis personality, health, and lifestyle (SLPHL) study. *J Psychiatr Res* **39**, 377-390 (2005). (With Cunningham-Williams et al.)

212. The role of organizational characteristics in determining patterns of utilization of services for substance abuse, mental health, and shelter by homeless people. *J Drug Issues* **35**, 575-591 (2005). (With North et al.)

213. Meta-analysis of soy food and risk of prostate cancer in men. *Int J Cancer* **117**, 667-669 (2005). (With Yan)

214. Factors associated with the transition from abuse to dependence among substance abusers: Implications for a measure of addictive liability. *Drug Alcohol Depend* **80**, 1-14 (2005). (With Ridenour et al.)

215. Primary and secondary transcriptional effects in the developing Down syndrome brain and heart. *Genome Biol* **6**, R107.1-R107.20 (2005). (With Mao et al.)

216. An observational analysis of behavior in depressed preschoolers: further validation of early-onset depression. *J Am Acad Child Adolesc Psychiatry* **45**, 203-212 (2006). (With Luby et al.)

217. Modulation of canine immunosenescence by life-long caloric restriction. *Vet Immunol Immunopathol* **111**, 287-299 (2006). (With Greeley et al.)

218. A comparison of agency-based and self-report methods of measuring services across an urban environment by a drug-abusing homeless population. *Int J Methods Psychiatr Res* **15**, 46-56 (2006). (With Pollio et al.)

219. Should aprotinin continue to be used during cardiac surgery? *Nat Clin Pract Cardiovasc Med* **3**, 360-361 (2006). (With Levy and Despotis)

220. The effects of childhood trauma on sex trading in substance using women. *Arch Sex Behav* **35**, 451-459 (2006). (With Vaddiparti et al.)

221. Changing epidemiology of small-cell lung cancer in the United States over the last 30 years: analysis of the surveillance, epidemiologic, and end results database. *J Clin Oncol* **24**, 4539-4544 (2006). (With Govindan et al.)

222. Risperidone in preschool children with autistic spectrum disorders: an investigation of safety and efficacy. *J Child Adolesc Psychopharmacol* **16**, 575-587 (2006). (With Luby et al.)

223. Interrater reliability and coding guide for nonpsychotic formal thought disorder. *Percept Mot Skills* **103**, 395-411 (2006). (With North et al.)

224. Risk factors for preschool depression: the mediating role of early stressful life events. *J Child Psychol Psychiatry* **47**, 1292-1298 (2006). (With Luby and Belden)

225. Relief of idiopathic subjective tinnitus: is gabapentin effective? *Arch Otolaryngol Head Neck Surg* **133**, 390-397 (2007). (With Piccirillo et al.)

226. Preschoolers' contribution to their diagnosis of depression and anxiety: uses and limitations of young child self-report of symptoms. *Child Psychiatry Hum Dev* **38,** 321-328 (2007). (With Luby et al.)

227. Racial/ethnic variation in the reliability of DSM-IV pathological gambling disorder. *J Nerv Ment Dis* **195,** 551-559 (2007). (With Cunningham-Williams et al.)

228. Legal status, emotional well-being, and subjective health status of Latino Immigrants. *J Natl Med Assoc* **99,** 1126-1131 (2007). (With Cavazos-Rehg and Zayas)

229. The temporal limits of cognitive change from music therapy in elderly persons with dementia or dementia-like cognitive impairment: a randomized controlled trial. *J Music Ther* **44,** 308-328 (2007). (With Bruer and Cloninger)

230. The relationship between alcohol problems and dependence, conduct problems and diagnosis, and number of sex partners in a sample of young adults. *Alcohol Clin Exp Res* **31,** 2046-2052 (2007). (With Cavazos-Rehg et al.)

231. A comparison study of psychiatric and behavior disorders and cognitive ability among homeless and housed children. *Community Ment Health* **44,** 1-10 (2008). (With Yu et al.)

```
Test for time trend, moisture, and month effects:
St. Louis Quarterly Residential, JAN1996-DEC2007,
excluding 2002 and 2003.

                The GLM Procedure

             Class Level Information

Class          Levels    Values

month              12    1 2 3 4 5 6 7 8 9 10 11 12


      Number of Observations Read         120
      Number of Observations Used         120
```

Test for time trend, moisture, and month effects:
St. Louis Quarterly Residential, JAN1996-DEC2007,
excluding 2002 and 2003.

The GLM Procedure

Dependent Variable: gallons

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	296943.3797	22841.7984	59.99	<.0001
Error	106	40357.5854	380.7319		
Corrected Total	119	337300.9650			

R-Square	Coeff Var	Root MSE	gallons Mean
0.880351	7.228367	19.51235	269.9414

Source	DF	Type I SS	Mean Square	F Value	Pr > F
since_90	1	8158.2307	8158.2307	21.43	<.0001
pdsi	1	10774.6587	10774.6587	28.30	<.0001
month	11	278010.4903	25273.6809	66.38	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
since_90	1	12018.3959	12018.3959	31.57	<.0001
pdsi	1	7517.7234	7517.7234	19.75	<.0001
month	11	278010.4903	25273.6809	66.38	<.0001

Run regressions by month: St. Louis Quarterly Residential, JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, JANUARY

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1843.61684	1843.61684	14.83	0.0049
Error	8	994.43402	124.30425		
Corrected Total	9	2838.05086			

Root MSE	11.14918	R-Square	0.6496
Dependent Mean	230.00670	Adj R-Sq	0.6058
Coeff Var	4.84733		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	270.99828	11.21267	24.17	<.0001
since_90	1	-3.62757	0.94194	-3.85	0.0049

Run regressions by month: St. Louis Quarterly Residential,
JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, FEBRUARY

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	6290.94906	6290.94906	43.14	0.0002
Error	8	1166.69170	145.83646		
Corrected Total	9	7457.64076			

Root MSE	12.07628	R-Square	0.8436
Dependent Mean	241.22060	Adj R-Sq	0.8240
Coeff Var	5.00632		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	316.94180	12.14504	26.10	<.0001
since_90	1	-6.70099	1.02027	-6.57	0.0002

Run regressions by month: St. Louis Quarterly Residential, JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, MARCH

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1454.25744	1454.25744	53.27	<.0001
Error	8	218.41297	27.30162		
Corrected Total	9	1672.67041			

Root MSE	5.22510	R-Square	0.8694
Dependent Mean	216.39610	Adj R-Sq	0.8531
Coeff Var	2.41460		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	252.80269	5.25485	48.11	<.0001
since_90	1	-3.22182	0.44144	-7.30	<.0001

Run regressions by month: St. Louis Quarterly Residential,
JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, APRIL

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1784.05712	1784.05712	135.53	<.0001
Error	8	105.30661	13.16333		
Corrected Total	9	1889.36373			

Root MSE	3.62813	R-Square	0.9443
Dependent Mean	207.36880	Adj R-Sq	0.9373
Coeff Var	1.74960		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	247.69281	3.64879	67.88	<.0001
since_90	1	-3.56850	0.30652	-11.64	<.0001

Run regressions by month: St. Louis Quarterly Residential, JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, MAY

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	4647.15195	2323.57598	19.35	0.0014
Error	7	840.57990	120.08284		
Corrected Total	9	5487.73185			

Root MSE	10.95823	R-Square	0.8468
Dependent Mean	240.06710	Adj R-Sq	0.8031
Coeff Var	4.56465		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	284.94864	13.65493	20.87	<.0001
pdsi	1	6.01747	2.93095	2.05	0.0792
since_90	1	-4.04531	1.14734	-3.53	0.0097

Run regressions by month: St. Louis Quarterly Residential, JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, JUNE

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	206.80651	103.40325	0.74	0.5112
Error	7	978.77709	139.82530		
Corrected Total	9	1185.58360			

Root MSE	11.82477	R-Square	0.1744
Dependent Mean	242.16390	Adj R-Sq	-0.0614
Coeff Var	4.88296		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	251.21061	14.92389	16.83	<.0001
pdsi	1	1.28640	3.03511	0.42	0.6844
since_90	1	-0.82848	1.23857	-0.67	0.5250

Run regressions by month: St. Louis Quarterly Residential, JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, JULY

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	666.95614	333.47807	1.20	0.3557
Error	7	1941.01983	277.28855		
Corrected Total	9	2607.97597			

Root MSE	16.65198	R-Square	0.2557
Dependent Mean	284.71830	Adj R-Sq	0.0431
Coeff Var	5.84858		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	303.79225	19.63823	15.47	<.0001
pdsi	1	-5.34905	3.48053	-1.54	0.1682
since_90	1	-1.63210	1.65483	-0.99	0.3569

Run regressions by month: St. Louis Quarterly Residential,
JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, AUGUST

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	3161.20546	1580.60273	1.86	0.2254
Error	7	5958.38574	851.19796		
Corrected Total	9	9119.59119			

Root MSE	29.17530	R-Square	0.3466
Dependent Mean	335.92100	Adj R-Sq	0.1600
Coeff Var	8.68517		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	387.05766	32.13195	12.05	<.0001
pdsi	1	-8.59718	5.40482	-1.59	0.1557
since_90	1	-4.31615	2.67048	-1.62	0.1501

Run regressions by month: St. Louis Quarterly Residential,
JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, SEPTEMBER

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	5670.78801	2835.39401	8.61	0.0130
Error	7	2306.52401	329.50343		
Corrected Total	9	7977.31202			

Root MSE	18.15223	R-Square	0.7109
Dependent Mean	345.95020	Adj R-Sq	0.6283
Coeff Var	5.24706		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	354.49284	19.96805	17.75	<.0001
pdsi	1	-13.77822	3.50937	-3.93	0.0057
since_90	1	-0.76208	1.69315	-0.45	0.6662

Run regressions by month: St. Louis Quarterly Residential, JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, OCTOBER

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	5026.07106	2513.03553	12.42	0.0050
Error	7	1416.40511	202.34359		
Corrected Total	9	6442.47617			

Root MSE	14.22475	R-Square	0.7801
Dependent Mean	348.74940	Adj R-Sq	0.7173
Coeff Var	4.07879		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	372.26664	14.78789	25.17	<.0001
pdsi	1	-12.32138	2.47874	-4.97	0.0016
since_90	1	-1.81185	1.23335	-1.47	0.1853

Run regressions by month: St. Louis Quarterly Residential, JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, NOVEMBER

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1884.09448	942.04724	2.66	0.1383
Error	7	2479.62782	354.23255		
Corrected Total	9	4363.72230			

Root MSE	18.82107	R-Square	0.4318
Dependent Mean	291.77110	Adj R-Sq	0.2694
Coeff Var	6.45063		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	319.75771	19.43052	16.46	<.0001
pdsi	1	-5.59229	2.72812	-2.05	0.0795
since_90	1	-2.37326	1.62563	-1.46	0.1877

Run regressions by month: St. Louis Quarterly Residential,
JAN1996-DEC2007, excluding 2002 and 2003.

Residential Model, DECEMBER

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	121.68114	60.84057	0.09	0.9172
Error	7	4869.73950	695.67707		
Corrected Total	9	4991.42064			

Root MSE	26.37569	R-Square	0.0244
Dependent Mean	254.96320	Adj R-Sq	-0.2544
Coeff Var	10.34490		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	253.46237	26.91809	9.42	<.0001
pdsi	1	-1.61299	4.06375	-0.40	0.7032
since_90	1	0.13938	2.26199	0.06	0.9526

```
Test for time trend, moisture, and month effects:
St. Louis Quarterly Commercial, JAN1996-DEC2007,
excluding 2002 and 2003.

                The GLM Procedure

              Class Level Information

Class          Levels    Values

month              12    1 2 3 4 5 6 7 8 9 10 11 12


      Number of Observations Read         120
      Number of Observations Used         120
```

Test for time trend, moisture, and month effects:
St. Louis Quarterly Commercial, JAN1996-DEC2007,
excluding 2002 and 2003.

The GLM Procedure

Dependent Variable: gallons

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	6113707.138	470285.164	41.97	<.0001
Error	106	1187661.735	11204.356		
Corrected Total	119	7301368.873			

R-Square	Coeff Var	Root MSE	gallons Mean
0.837337	9.958447	105.8506	1062.923

Source	DF	Type I SS	Mean Square	F Value	Pr > F
since_90	1	414739.889	414739.889	37.02	<.0001
pdsi	1	117165.451	117165.451	10.46	0.0016
month	11	5581801.798	507436.527	45.29	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
since_90	1	316453.869	316453.869	28.24	<.0001
pdsi	1	53542.643	53542.643	4.78	0.0310
month	11	5581801.798	507436.527	45.29	<.0001

Run regressions by month: St. Louis Quarterly Commercial,
JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, JANUARY

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	54153	54153	22.02	0.0016
Error	8	19674	2459.29831		
Corrected Total	9	73828			

Root MSE	49.59131	R-Square	0.7335
Dependent Mean	906.88300	Adj R-Sq	0.7002
Coeff Var	5.46833		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	684.71976	49.87369	13.73	<.0001
since_90	1	19.66046	4.18973	4.69	0.0016

Run regressions by month: St. Louis Quarterly Commercial,
JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, FEBRUARY

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	7968.37794	7968.37794	0.93	0.3641
Error	8	68844	8605.46692		
Corrected Total	9	76812			

Root MSE	92.76566	R-Square	0.1037
Dependent Mean	830.09100	Adj R-Sq	-0.0083
Coeff Var	11.17536		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	915.31155	93.29386	9.81	<.0001
since_90	1	-7.54164	7.83733	-0.96	0.3641

Run regressions by month: St. Louis Quarterly Commercial, JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, MARCH

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	6669.17986	6669.17986	5.23	0.0516
Error	8	10209	1276.07429		
Corrected Total	9	16878			

Root MSE	35.72218	R-Square	0.3951
Dependent Mean	834.74070	Adj R-Sq	0.3195
Coeff Var	4.27943		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	756.77643	35.92558	21.07	<.0001
since_90	1	6.89949	3.01800	2.29	0.0516

Run regressions by month: St. Louis Quarterly Commercial,
JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, APRIL

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2640.93988	2640.93988	1.04	0.3382
Error	8	20365	2545.58336		
Corrected Total	9	23006			

Root MSE	50.45377	R-Square	0.1148
Dependent Mean	832.86110	Adj R-Sq	0.0041
Coeff Var	6.05789		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	783.79985	50.74106	15.45	<.0001
since_90	1	4.34170	4.26260	1.02	0.3382

Run regressions by month: St. Louis Quarterly Commercial,
JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, MAY

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	58105	29052	3.50	0.0882
Error	7	58051	8293.07086		
Corrected Total	9	116156			

Root MSE	91.06630	R-Square	0.5002
Dependent Mean	828.04930	Adj R-Sq	0.3574
Coeff Var	10.99769		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1026.24150	113.47671	9.04	<.0001
pdsi	1	10.49324	24.35711	0.43	0.6796
since_90	1	-17.66728	9.53477	-1.85	0.1063

Run regressions by month: St. Louis Quarterly Commercial, JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, JUNE

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	36067	18034	5.33	0.0392
Error	7	23696	3385.08696		
Corrected Total	9	59763			

Root MSE	58.18150	R-Square	0.6035
Dependent Mean	987.74530	Adj R-Sq	0.4902
Coeff Var	5.89033		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	768.21182	73.43011	10.46	<.0001
pdsi	1	16.44500	14.93366	1.10	0.3072
since_90	1	19.07119	6.09414	3.13	0.0166

Run regressions by month: St. Louis Quarterly Commercial,
JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, JULY

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	141937	70968	48.29	<.0001
Error	7	10288	1469.72566		
Corrected Total	9	152225			

Root MSE	38.33700	R-Square	0.9324
Dependent Mean	1152.49850	Adj R-Sq	0.9131
Coeff Var	3.32643		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	837.24454	45.21209	18.52	<.0001
pdsi	1	-13.31523	8.01304	-1.66	0.1405
since_90	1	28.03762	3.80983	7.36	0.0002

Run regressions by month: St. Louis Quarterly Commercial, JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, AUGUST

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	90519	45259	1.56	0.2745
Error	7	202613	28945		
Corrected Total	9	293132			

Root MSE	170.13142	R-Square	0.3088
Dependent Mean	1336.16410	Adj R-Sq	0.1113
Coeff Var	12.73282		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1199.85822	187.37270	6.40	0.0004
pdsi	1	-35.36476	31.51741	-1.12	0.2988
since_90	1	12.92311	15.57252	0.83	0.4340

Run regressions by month: St. Louis Quarterly Commercial, JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, SEPTEMBER

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	180645	90323	11.38	0.0063
Error	7	55545	7934.93227		
Corrected Total	9	236190			

Root MSE	89.07824	R-Square	0.7648
Dependent Mean	1390.93990	Adj R-Sq	0.6976
Coeff Var	6.40418		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1048.20926	97.98901	10.70	<.0001
pdsi	1	-21.31584	17.22147	-1.24	0.2557
since_90	1	30.32071	8.30879	3.65	0.0082

Run regressions by month: St. Louis Quarterly Commercial, JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, OCTOBER

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	259471	129735	38.06	0.0002
Error	7	23862	3408.92118		
Corrected Total	9	283333			

Root MSE	58.38597	R-Square	0.9158
Dependent Mean	1400.27590	Adj R-Sq	0.8917
Coeff Var	4.16960		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	987.89971	60.69739	16.28	<.0001
pdsi	1	-29.99331	10.17407	-2.95	0.0215
since_90	1	37.14907	5.06233	7.34	0.0002

Run regressions by month: St. Louis Quarterly Commercial, JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, NOVEMBER

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	49256	24628	4.67	0.0515
Error	7	36932	5275.93087		
Corrected Total	9	86187			

Root MSE	72.63560	R-Square	0.5715
Dependent Mean	1189.72590	Adj R-Sq	0.4491
Coeff Var	6.10524		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1012.26400	74.98765	13.50	<.0001
pdsi	1	-11.95679	10.52854	-1.14	0.2935
since_90	1	15.92574	6.27373	2.54	0.0388

Run regressions by month: St. Louis Quarterly Commercial,
JAN1996-DEC2007, excluding 2002 and 2003.

Commercial Model, DECEMBER

The REG Procedure
Model: MODEL1
Dependent Variable: gallons

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	101867	50933	2.61	0.1422
Error	7	136569	19510		
Corrected Total	9	238435			

Root MSE	139.67747	R-Square	0.4272
Dependent Mean	1065.10180	Adj R-Sq	0.2636
Coeff Var	13.11400		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	775.91429	142.54984	5.44	0.0010
pdsi	1	-9.09975	21.52035	-0.42	0.6851
since_90	1	25.62886	11.97880	2.14	0.0697

Projections of Residential Water Utilization, Gallons per Day, Saint Louis County Excluding Webster Groves and Florissant											
	Slope of	Slope of		30-yr Avg	Days	2006	2007	2008	2009	2010	
Month	PDSI	SINCE_90	Intercept	PDSI		Gal/Day	Gal/Day	Gal/Day	Gal/Day	Gal/Day	31
											30
Jan	0	-3.62757	270.9983	0.74000	92	212.96	209.33	205.70	202.07	198.45	31
Feb	0	-6.70099	316.9418	0.82615	92	209.73	203.02	196.32	189.62	182.92	31
Mar	0	-3.22182	252.8027	0.19154	90	201.25	198.03	194.81	191.59	188.37	28
Apr	0	-3.56850	247.6928	0.34769	90	190.60	187.03	183.46	179.89	176.32	31
May	6.01747	-4.04531	284.9486	0.65385	89	224.16	220.11	216.07	212.02	207.98	30
Jun	1.28640	-0.82848	251.2106	0.47231	92	238.56	237.73	236.91	236.08	235.25	31
Jul	-5.34905	-1.63210	303.7923	0.29538	91	276.10	274.47	272.83	271.20	269.57	30
Aug	-8.59718	-4.31615	387.0577	0.41769	92	314.41	310.09	305.78	301.46	297.14	31
Sep	-13.77822	-0.76208	354.4928	-0.02462	92	342.64	341.88	341.11	340.35	339.59	31
Oct	-12.32138	-1.81185	372.2666	0.17846	92	341.08	339.27	337.45	335.64	333.83	30
Nov	-5.59229	-2.37326	319.7577	0.11308	92	281.15	278.78	276.41	274.03	271.66	31
Dec	-1.61299	0.13938	253.4624	-0.01769	91	255.72	255.86	256.00	256.14	256.28	30
			Annual projections:			257.66	254.94	252.16	249.48	246.76	
STLWC2008.XLS											

Projections of Commercial Water Utilization, Gallons per Day, Saint Louis County Excluding Webster Groves and Florissant

Month	Slope of PDSI	Slope of SINCE_90	Intercept	30-yr Avg PDSI	Days	2006 Gal/Day	2007 Gal/Day	2008 Gal/Day	2009 Gal/Day	2010 Gal/Day	
											31
											30
Jan	0	19.6605	684.720	0.74000	92	999.29	1,018.95	1,038.61	1,058.27	1,077.93	31
Feb	0	-7.5416	915.312	0.82615	92	794.65	787.10	779.56	772.02	764.48	31
Mar	0	6.8995	756.776	0.19154	90	867.17	874.07	880.97	887.87	894.77	28
Apr	0	4.3417	783.800	0.34769	90	853.27	857.61	861.95	866.29	870.63	31
May	10.4932	-17.6673	1026.242	0.65385	89	750.43	732.76	715.09	697.42	679.76	30
Jun	16.4450	19.0712	768.212	0.47231	92	1,081.12	1,100.19	1,119.26	1,138.33	1,157.40	31
Jul	-13.3152	28.0376	837.245	0.29538	91	1,281.91	1,309.95	1,337.99	1,366.03	1,394.06	30
Aug	-35.3648	12.9231	1199.858	0.41769	92	1,391.86	1,404.78	1,417.70	1,430.63	1,443.55	31
Sep	-21.3158	30.3207	1048.209	-0.02462	92	1,533.87	1,564.19	1,594.51	1,624.83	1,655.15	31
Oct	-29.9933	37.1491	987.900	0.17846	92	1,576.93	1,614.08	1,651.23	1,688.38	1,725.53	30
Nov	-11.9568	15.9257	1012.264	0.11308	92	1,265.72	1,281.65	1,297.58	1,313.50	1,329.43	31
Dec	-9.0998	25.6289	775.914	-0.01769	91	1,186.14	1,211.77	1,237.39	1,263.02	1,288.65	30
			Annual projections:			1,128.83	1,142.47	1,155.72	1,169.73	1,183.36	
STLWC2008.XLS											

Test for time trend and moisture effects:
St. Charles Residential, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1475.89787	737.94893	18.70	0.0016
Error	7	276.25137	39.46448		
Corrected Total	9	1752.14924			

Root MSE	6.28208	R-Square	0.8423
Dependent Mean	275.17130	Adj R-Sq	0.7973
Coeff Var	2.28297		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	265.18398	7.89840	33.57	<.0001
since_90	1	0.84092	0.64228	1.31	0.2318
pdsi5_12	1	-6.52590	1.26903	-5.14	0.0013

Weather normalized estimates:
St. Charles Residential, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1408.24938	1408.24938	32.76	0.0004
Error	8	343.89986	42.98748		
Corrected Total	9	1752.14924			

Root MSE	6.55648	R-Square	0.8037
Dependent Mean	275.17130	Adj R-Sq	0.7792
Coeff Var	2.38269		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	275.19261	2.07335	132.73	<.0001
pdsi5_12	1	-7.10513	1.24137	-5.72	0.0004

Weather normalized estimates:
St. Charles Residential, 1997-2007,
excluding 2003.

year	resdaily	normalized
1997	275.466	280.912
1998	258.165	259.011
1999	284.332	286.587
2000	259.996	265.929
2001	266.647	262.847
2002	277.114	277.679
2004	260.527	257.581
2005	288.002	289.225
2006	300.952	286.117
2007	280.511	285.824
2008	.	269.943

Test for time trend and moisture effects:
St. Charles Commercial, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	5230.47605	2615.23802	1.94	0.2135
Error	7	9433.11412	1347.58773		
Corrected Total	9	14664			

Root MSE	36.70950	R-Square	0.3567
Dependent Mean	1300.64271	Adj R-Sq	0.1729
Coeff Var	2.82241		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1379.88334	46.15457	29.90	<.0001
since_90	1	-6.65622	3.75320	-1.77	0.1194
pdsi5_12	1	-10.54816	7.41563	-1.42	0.1979

```
Six-year average:
St. Charles Commercial, 2000-2007,
excluding 2003 and 2006.

       The MEANS Procedure

   Analysis Variable : comdaily

             Mean      N
       ------------------
          1276.87      6
       ------------------
```

Test for time trend and moisture effects:
St. Joseph Residential, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	613.32135	306.66068	5.09	0.0432
Error	7	421.75836	60.25119		
Corrected Total	9	1035.07971			

Root MSE	7.76216	R-Square	0.5925
Dependent Mean	175.64072	Adj R-Sq	0.4761
Coeff Var	4.41934		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	208.73562	10.97094	19.03	<.0001
since_90	1	-2.49440	0.83688	-2.98	0.0205
pdsi5_12	1	-4.41688	1.85768	-2.38	0.0491

Weather normalized estimates:
St. Joseph Residential, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	613.32135	306.66068	5.09	0.0432
Error	7	421.75836	60.25119		
Corrected Total	9	1035.07971	.		

Root MSE	7.76216	R-Square	0.5925
Dependent Mean	175.64072	Adj R-Sq	0.4761
Coeff Var	4.41934		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	208.73562	10.97094	19.03	<.0001
since_90	1	-2.49440	0.83688	-2.98	0.0205
pdsi5_12	1	-4.41688	1.85768	-2.38	0.0491

Weather normalized estimates:
St. Joseph Residential, 1997-2007,
excluding 2003.

year	resdaily	normalized
1997	187.223	184.042
1998	178.198	175.138
1999	179.583	186.093
2000	194.677	183.344
2001	161.547	168.157
2002	175.784	184.219
2004	163.503	164.246
2005	167.303	173.064
2006	181.270	172.292
2007	167.318	165.812
2008	.	159.608

Test for time trend and moisture effects:
St. Joseph Commercial, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1322.39464	661.19732	0.49	0.6308
Error	7	9396.85781	1342.40826		
Corrected Total	9	10719			

Root MSE	36.63889	R-Square	0.1234
Dependent Mean	847.51817	Adj R-Sq	-0.1271
Coeff Var	4.32308		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	872.85833	51.78493	16.86	<.0001
since_90	1	-1.56576	3.95025	-0.40	0.7036
pdsi5_12	1	-8.68445	8.76859	-0.99	0.3550

```
Six-year average:
St. Joseph Commercial, 2000-2007,
excluding 2003 and 2006.

       The MEANS Procedure

   Analysis Variable : comdaily

             Mean      N
        ------------------
         841.3250857   6
        ------------------
```

Test for time trend and moisture effects:
Joplin Residential, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	235.02625	117.51313	0.79	0.4887
Error	7	1035.23799	147.89114		
Corrected Total	9	1270.26424			

Root MSE	12.16105	R-Square	0.1850
Dependent Mean	198.49986	Adj R-Sq	-0.0478
Coeff Var	6.12648		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	216.53227	16.16772	13.39	<.0001
since_90	1	-1.52721	1.32526	-1.15	0.2870
pdsi5_12	1	-3.70752	3.71429	-1.00	0.3514

Six-year trend:
Joplin Residential, 2000-2007,
excluding 2003 and 2006.

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	7
Number of Observations Used	6
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	319.42204	319.42204	18.99	0.0121
Error	4	67.29182	16.82295		
Corrected Total	5	386.71386			

Root MSE	4.10158	R-Square	0.8260
Dependent Mean	192.87935	Adj R-Sq	0.7825
Coeff Var	2.12650		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	232.75069	9.30213	25.02	<.0001
since_90	1	-3.02820	0.69495	-4.36	0.0121

Six-year trend:
Joplin Residential, 2000-2007,
excluding 2003 and 2006.

year	resdaily	normalized
2000	206.560	202.469
2001	199.739	199.440
2002	192.357	196.412
2004	189.519	190.356
2005	183.506	187.328
2007	185.596	181.271
2008	.	178.243

Test for time trend and moisture effects:
Joplin Commercial, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	71387	35693	14.73	0.0031
Error	7	16967	2423.84527		
Corrected Total	9	88354			

Root MSE	49.23256	R-Square	0.8080
Dependent Mean	931.54835	Adj R-Sq	0.7531
Coeff Var	5.28502		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	628.79401	65.45307	9.61	<.0001
since_90	1	25.43847	5.36517	4.74	0.0021
pdsi5_12	1	-0.95934	15.03685	-0.06	0.9509

Ten-year trend:
Joplin Commercial, 1997-2007,
excluding 2003.

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	71377	71377	33.64	0.0004
Error	8	16977	2122.09785		
Corrected Total	9	88354			

Root MSE	46.06623	R-Square	0.8079
Dependent Mean	931.54835	Adj R-Sq	0.7838
Coeff Var	4.94513		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	626.89087	54.51345	11.50	<.0001
since_90	1	25.60147	4.41437	5.80	0.0004

Ten-year trend:
Joplin Commercial, 1997-2007,
excluding 2003.

year	comdaily	normalized
1997	853.56	806.10
1998	843.89	831.70
1999	870.39	857.30
2000	881.08	882.91
2001	848.65	908.51
2002	912.16	934.11
2004	919.71	985.31
2005	985.84	1010.91
2006	1076.18	1036.51
2007	1124.02	1062.12
2008	.	1087.72