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# MATHEMATICAL MODELING OF ECHOCARDIOGRAPHIC ESTIMATION OF PULMONARY ARTERIAL SYSTOLIC PRESSURE AND ITS APPLICATIONS TO PULMONARY ARTERIAL HYPERTENSION SCREENING

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## ABSTRACT

*The flow of research in the medical fields uncovers new treatments and new approaches for treatment of the scourge of disease. Through extensive research in well know medical fields, new fields of study are discovered, allowing for the necessity of expanding the knowledge base of physicians. These expansions are generally referred to as “sub-specialties.” Unfortunately, the some subspecialties and their associated treatments are discovered only through autopsies of those who have died without complete explanation of the exact cause of death. This paper has a two fold purpose: (1) Help early discovery of the existence of a relatively unknown but a profoundly deadly disease (allowing for treatment of the disease) before mortality strikes using multiple nonlinear regression to determine the prediction function, and (2) Help to decrease the occurrence of false negatives (where patients who actually have the disease but are otherwise determined to be disease free), ensuring mortality.*

*One of these new fields of study is pulmonary hypertension (literally, high blood pressure in the lungs). Only a small number of pulmonologists are now dedicating their research (aided by both public and private funding) to this evolving field of study. During the summer of 2011, data concerning pulmonary hypertension were collected at the University of California, San Francisco, Medical School, in Fresno, California through an internship offered to Tim Anderson, and supervised by Vijay Balasubramanian, M.D., the leading Pulmonary Arterial Hypertension (PAH) specialist for California’s Central San Joaquin Valley.*

*The initial study of this internship was to try to develop a mathematical function which would be able to detect with some certainty the presence of the condition of pulmonary hypertension before the patient expired from associated complications. The ability to predict this presence early on would allow for experimental treatments so that detection with treatment can lead to ultimately curing the disease, or at least managing the disease to extend the life of future patients. The prediction function was generated through extensive trial and error using multiple nonlinear regression. This resulted in a p-value of less than 1%.*

The second part of the study was to decrease the existence of false negatives in medical treatment. Due to the fact that imperfect information is used in developing the prediction equation, it is always possible to make an error. Only with perfect information do we always make correct decisions in probability theory. Of the two types of errors that occur (Type I error and Type II error), Type I errors are more egregious. Consequently, if a more sensitive prediction function can be determined, it is then possible to decrease the occurrence of Type I errors. Due to the inverse relationship between Type I and Type II errors, if one error is minimized, then the other error has the potential to increase in occurrence. Type I error is also called a “false negative” in medical testing. What this means, that the patient has the undiscovered disease and the patient dies before treatment. With Type II errors (“false positives”), the patient is treated for the disease even though the patient does not have the disease! Unless the treatment itself is prohibitively expensive or causes severe injury to the body, it is conclusive that Type I errors (“false positives”) more catastrophic.

A secondary improvement (or smoothing) to the original prediction function was tested against an unrelated data set. In testing the reduction of Type I errors, 16 out of 17 originally reported Type I errors were eliminated.

The following is a much more technical discussion of the paper to be presented:

This study uses statistics to create a better correlation between Right Ventricular Systolic Pressure (RVSP) via Echocardiogram (ECHO) and Pulmonary Arterial Systolic Pressure (PASP) via Right Heart Catheterization (RHC) than the currently accepted correlation in order to better screen patients for Pulmonary Arterial Hypertension (PAH). PAH is a rare condition that often carries a grave prognosis. Accurately screening for PAH is a medical and economic concern.

Medically, accurate screening for PAH is of the utmost importance: a false negative can have devastating effects on a patient’s health. Economically, accurately screening patients can reduce healthcare costs by detecting disease earlier in its onset. The goal of PAH screening is to reduce the number of false negatives to almost zero. The current method of screening for PAH is to estimate a patient’s PASP by measuring RVSP through echocardiography. The patient is then definitively diagnosed by direct measurement of PASP through RHC. Theoretically, RVSP per ECHO is equal to PASP per RHC. However, this accepted correlation is not accurate. This study develops a better correlation equation between RVSP and PASP.

To create the regression model, RVSP per ECHO and PASP per RHC data on 33 patients from California’s San Joaquin Central Valley was collected then statistically analyzed. After performing a statistical transformation and regression analysis on the data, the final equation was

$$PASP_{predicted} = (438 * RVSP + 1390) / 2.46.$$

*Additional data on 31 patients was collected in order to test the different correlation models. When each model was used to estimate PASP in patients, the original model (RVSP=PASP) yielded three false negatives while the new model produced none. Overall, the model presented by this study is a significantly more effective method of screening for PAH. With further work, it will be possible to virtually eliminate false negatives in PAH screening.*





# SOCIAL ENTREPRENEURSHIP IN HEALTHCARE

**Shawn M. Carraher, Indiana Wesleyan University**

**Aaron Cecil, Indiana Wesleyan University**

**Larry Dick, Rio Grande Bible Institute**

## ABSTRACT

*In the current paper we examine the dimensional nature of the 11-item Social Entrepreneurship scale of Carraher (2012) with modifications as suggested by Dick (2012). Using a sample of 276 health care professionals we find that the 11-item scale has a coefficient alpha reliability estimate of .94 which is better than the .89 found for the original 6-item version. We find that the better individuals gets along with those who they work with the stronger their social entrepreneurship for the organization. Suggestions for future research are included.*

## REFERENCES

- Buckley, M.R., Carraher, S.M., Carraher, S.C., Ferris, G.R., & Carraher, C.E. (2008). Human resource issues in global entrepreneurial high technology firms: Do they differ? *Journal of Applied Management & Entrepreneurship*, 13 (1), 4-14.
- Buckley, M., Fedor, D., Carraher, S., Frink, D., & Marvin, D. (1997). The ethical obligation to provide recruits realistic job previews. *Journal of Managerial Issues*, 9 (4), 468-484.
- Buckley, M., Fedor, D., Veres, J., Wiese, D., & Carraher, S.M. (1998). Investigating newcomer expectations and job-related outcomes. *Journal of Applied Psychology*, 83, 452-461.
- Buckley, M., Mobbs, T., Mendoza, J., Novicevic, M., Carraher, S.M., & Beu, D. (2002). Implementing realistic job previews and expectation lowering procedures: A field experiment. *Journal of Vocational Behavior*, 61 (2), 263-278.
- Budd, J. & Carraher, S. (1998). Validation of an inventory to measure attributes of strategic management. *Psychological Reports*, 82 (3 Pt 2), 1220-1222.
- Carland, J. & Carland, J. (1993). The role of personality in new venture creation. *Entrepreneurship, Innovation and Change*, 2(2), 129-141.
- Carland, J & Carland, J. (1995). The case of the reluctant client. *Journal of the International Academy for Case Studies*, 1(2), 76-79.
- Carland, J. & Carland, J. (1997). A model of potential entrepreneurship: Profiles and educational implications. *Journal of Small Business Strategy*, 8 (1), 1-13.
- Carland, J. & Carland, J. (2003). Pawn takes queen: The strategic gameboard in entrepreneurial firms. *Academy of Strategic Management Journal*, 2, 93-104.
- Carland, J. & Carland, J. (2004). Economic development: Changing the policy to support entrepreneurship. *Academy of Entrepreneurship Journal*, 10(2), 104-114.
- Carland, J. & Carland, J. (2006). Eminent domain: What happens when the state takes part of your land? *The Entrepreneurial Executive*, 11, 95-113.

- Carland, J.A., Carland, J.W., & Stewart, W.H. (1996). Seeing what's not there: The enigma of entrepreneurship. *Journal of Small Business Strategy* 7 (1), 1-20.
- Carland, J., Carland, J.A., & Abhy, C. (1989). An assessment of the psychological determinants of planning in small businesses. *International Small Business Journal*, 23-34.
- Carland, J., Carland, J., & Carland, J. (1995). Self-actualization: The zenith of entrepreneurship. *Journal of Small Business Strategy*, 30-39.
- Carland, J.W., Carland, J.A., & Hoy, F. (1992). An entrepreneurship index: An empirical validation. Babson Entrepreneurship Conference, Fontainebleau, France.
- Carland, J.W. III, Carland, J.W., Carland, J.A., & Pearce, J.W. (1995). Risk taking propensity among entrepreneurs, small business owners and managers. *Journal of Business and Entrepreneurship*, 7 (1), 12-23.
- Carland, J.W., Hoy, F., Boulton, W.R., & Carland, J.A.C. (1984). Differentiating entrepreneurs from small business owners: A conceptualization. *Academy of Management Review*, 9 (2), 354-359.
- Carraher, S.M. (1991). A validity study of the pay satisfaction questionnaire (PSQ). *Educational and Psychological Measurement*, 51, 491-495.
- Carraher, S.M. (1991). On the dimensionality of the pay satisfaction questionnaire. *Psychological Reports*, 69, 887-890.
- Carraher, S. (1993). Another look at the dimensionality of a learning style questionnaire. *Educational and Psychological Measurement*, 53 (2), 411-415.
- Carraher, S. (1995). On the dimensionality of a learning style questionnaire. *Psychological Reports*, 77 (1), 19-23.
- Carraher, S.M. (2003). The father of cross-cultural research: An interview with Geert Hofstede. *Journal of Applied Management & Entrepreneurship*, 8 (2), 97-106.
- Carraher, S.M. (2005). An Examination of entrepreneurial orientation: A validation study in 68 countries in Africa, Asia, Europe, and North America. *International Journal of Family Business*, 2 (1), 95-100.
- Carraher, S.M. (2006). Attitude towards benefits among SME owners in Eastern Europe: A 30-month study. *Global Business and Finance Review*, 11 (1), 41-48.
- Carraher, S.M. (2008). Using E-Bay to teach global and technological entrepreneurship. *International Journal of Family Business*, 5 (1), 63-64.
- Carraher, S.M. (2011). Turnover prediction using attitudes towards benefits, pay, and pay satisfaction among employees and entrepreneurs in Estonia, Latvia, & Lithuania. *Baltic Journal of Management*, 6 (1), 25-52.
- Carraher, S.M., Buchanan, J.K., & Puia, G. (2010). Entrepreneurial Need for Achievement in China, Latvia, and the USA. *Baltic Journal of Management*, 5 (3), 378-396.
- Carraher, S.M. & Buckley, M. R. (1996). Cognitive complexity and the perceived dimensionality of pay satisfaction. *Journal of Applied Psychology*, 81 (1), 102-109.
- Carraher, S.M. & Buckley, M.R. (2008). Attitudes towards benefits and behavioral intentions and their relationship to Absenteeism, Performance, and Turnover among nurses. *Academy of Health Care Management Journal*, 4 (2), 89-109.
- Carraher, S.M., Buckley, M.R., & Carraher, C. (2002). Cognitive complexity with employees from entrepreneurial financial information service organizations and educational institutions: An extension & replication looking at pay, benefits, and leadership. *Academy of Strategic Management Journal*, 1, 43-56.
- Carraher, S.M., Buckley, M.R., & Carraher, C.E. (2008). Research challenges in sustainable strategic management: Change and sustainability. *International Journal of Sustainable Strategic Management*, 1 (1), 2-15.
- Carraher, S.M., Buckley, M., & Cote, J. (2000). Strategic entrepreneurialism in analysis: Global problems in research. *Global Business & Finance Review*, 5 (2), 77-86.
- Carraher, S.M. & Carraher, C. (1994). ISO 9000 - theories of management. *Polymer News*, 19, 373-376.
- Carraher, S.M. & Carraher, C. (1996). ISO environmental management standards: ISO 14,000. *Polymer News*, 21, 167-169.
- Carraher, S.M. & Carraher, C. (1996). ISO 9000. *Polymer News*, 21, 21-24.

- Carraher, S. & Carraher, S.C. (2005). Felt fair pay of small to medium, sized enterprise (SME) owners in Finland and Latvia: An examination of Jaques' equity construct. *Journal of Small Business Strategy*, 16 (1), 1-8.
- Carraher, S.M. & Carraher, S.C. (2006). Human resource issues among SME's in Eastern Europe: A 30 month study in Belarus, Poland, and Ukraine. *International Journal of Entrepreneurship*, 10, 97-108.
- Carraher, S.M., Carraher, S.C., & Mintu-Wimsatt, A. (2005). Customer service management in Western and Central Europe: A concurrent validation strategy in entrepreneurial financial information services organizations. *Journal of Business Strategies*, 22, 41-54.
- Carraher, S.M., Carraher, S.C., & Whitely, W. (2003). Global entrepreneurship, income, and work norms: A seven country study. *Academy of Entrepreneurship Journal*, 9, 31-42.
- Carraher, S., Franklin, G., Parnell, J., & Sullivan, S. (2006). Entrepreneurial service performance and technology management: A study of China and Japan. *Journal of Technology Management in China*, 1 (1), 107-117.
- Carraher, S.M., Hart, D., & Carraher, C. (2003). Attitudes towards benefits among entrepreneurial employees. *Personnel Review*, 32 (6), 683-693.
- Carraher, S.M., Gibson, J. W., & Buckley, M.R. (2006). Compensation satisfaction in the Baltics and the USA. *Baltic Journal of Management*, 1 (1), 7-23.
- Carraher, S.M., Mendoza, J, Buckley, M, Schoenfeldt, L & Carraher, C. (1998). Validation of an instrument to measure service orientation. *Journal of Quality Management*, 3, 211-224.
- Carraher, S.M. & Michael, K. (1999). An examination of the dimensionality of the Vengeance Scale in an entrepreneurial multinational organization. *Psychological Reports*, 85 (2), 687-688.
- Carraher, S.M. & Parnell, J. (2008). Customer service during peak (in season) and non-peak (off season) times: A multi-country (Austria, Switzerland, United Kingdom and United States) examination of entrepreneurial tourist focused core personnel. *International Journal of Entrepreneurship*, 12, 39-56.
- Carraher, S.M., Parnell, J., & Spillan, J. (2009). Customer service-orientation of small retail business owners in Austria, the Czech Republic, Hungary, Latvia, Slovakia, and Slovenia. *Baltic Journal of Management*, 4 (3), 251-268.
- Carraher, S.M. & Paridon, T. (2008/2009). Entrepreneurship journal rankings across the discipline. *Journal of Small Business Strategy*, 19 (2), 89-98.
- Carraher, S.M., Scott, C., & Carraher, S.C. (2004). A comparison of polychronicity levels among small business owners and non business owners in the U.S., China, Ukraine, Poland, Hungary, Bulgaria, and Mexico. *International Journal of Family Business*, 1 (1), 97-101.
- Carraher, S.M. & Sullivan, S. (2003). Employees' contributions to quality: An examination of the Service Orientation Index within entrepreneurial organizations. *Global Business & Finance Review*, 8 (1) 103-110.
- Carraher, S.M., Sullivan, S. & Carraher, S.C. (2005). An examination of the stress experience by entrepreneurial expatriate health care professionals working in Benin, Bolivia, Burkina Faso, Ethiopia, Ghana, Niger, Nigeria, Paraguay, South Africa, and Zambia. *International Journal of Entrepreneurship*, 9 , 45-66.
- Carraher, S.M., Sullivan, S.E., & Crocitto, M. (2008). Mentoring across global boundaries: An empirical examination of home- and host-country mentors on expatriate career outcomes. *Journal of International Business Studies*, 39 (8), 1310-1326.
- Carraher, S.M. & Welsh, D.H.B. (2009). *Global Entrepreneurship*. Dubuque, IA: Kendall Hunt.
- Carraher, S.M. & Whitely, W.T. (1998). Motivations for work and their influence on pay across six countries. *Global Business and Finance Review*, 3, 49-56.
- Carraher, S.M., Yuyuenyongwatana, R., Sadler, T., & Baird, T. (2009). Polychronicity, leadership, and language influences among European nurses: Social differences in accounting and finances, *International Journal of Family Business*, 6 (1), 35-43.
- Chait, H., Carraher, S.M., & Buckley, M. (2000). Measuring service orientation with biodata. *Journal of Managerial Issues*, 12, 109-120.

- Crocitto, M., Sullivan, S.E. & Carraher, S.M. (2005). Global mentoring as a means of career development and knowledge creation: A learning based framework and agenda for future research. *Career Development International*, 10 (6/7), 522-535.
- Deng, F.J., Huang, L.Y., Carraher, S.M., & Duan, J. (2009). International expansion of family firms: An integrative framework using Taiwanese manufacturers. *Academy of Entrepreneurship Journal*, 15 (1), 25-42.
- Hart, D. & Carraher, S. (1995). The development of an instrument to measure attitudes towards benefits. *Educational and Psychological Measurement*, 55 (3), 498-502.
- Huang, L.Y. & Carraher, S. (2004). How effective are expatriate management and guanxi networks: Evidence from Chinese Industries. *International Journal of Family Business*, 1 (1), 1-23 .
- Lester, D., Parnell, J.A. & Carraher, S.M. (2010). Assessing the desktop manager. *Journal of Management Development*, 29 (3), 246-264.
- Lockwood, F., Teasley, R., Carland, J.A.C., & Carland, J.W. (2006). An examination of the power of the dark side of entrepreneurship. *International Journal of Family Business*, 3, 1-20.
- Paridon, T. & Carraher, S.M. (2009). Entrepreneurial marketing: Customer shopping value and patronage behavior. *Journal of Applied Management & Entrepreneurship*, 14 (2), 3-28.
- Paridon, T., Carraher, S.M., & Carraher, S.C. (2006). The income effect in personal shopping value, consumer selfconfidence, and information sharing (word of mouth communication) research. *Academy of Marketing Studies Journal*, 10 (2), 107-124.
- Parnell, J. & Carraher, S. (2001). The role of effective resource utilization in strategy's impact on performance. *International Journal of Commerce and Management*, 11 (3), 1-34.
- Parnell, J. & Carraher, S. (2003). The Management Education by Internet Readiness (MEBIR) scale: Developing a scale to assess one's propensity for Internet-mediated management education. *Journal of Management Education*, 27, 431-446.
- Scarpello, V. & Carraher, S. M. (2008). Are pay satisfaction and pay fairness the same construct? A cross country examination among the self-employed in Latvia, Germany, the U.K., and the U.S.A. *Baltic Journal of Management*, 3 (1), 23-39.
- Sethi, V. & Carraher, S.M. (1993). Developing measures for assessing the organizational impact of information technology: A comment on Mahmood & Soon's paper. *Decision Science*, 24, 867-877.
- Smothers, J., Hayek, M., Bynum, L.A., Novicevic, M.M., Buckley, M.R., & Carraher, S.M. (2010). Alfred D. Chandler, Jr: Historical impact and historical scope of his works. *Journal of Management History*, 16 (4), 521-526.
- Sturman, M.C. & Carraher, S.M. (2007). Using a Random-effects model to test differing conceptualizations of multidimensional constructs. *Organizational Research Methods*, 10 (1), 108-135.
- Sullivan, S.E., Forret, M., Carraher, S.M., & Mainiero, L. (2009). Using the kaleidoscope career model to examine generational differences in work attitudes. *Career Development International*, 14 (3), 284-302.
- VanAuken, H. & Carraher, S.M. (2012). An analysis of funding decisions for niche agricultural producers. *Journal of Developmental Entrepreneurship*, 17 (2), 12500121-125001215.
- Welsh, D. & Carraher, S.M. (2011). *Case Studies in Global Entrepreneurship*. Kendall Hunt P.
- Williams, M.L., Brower, H.H., Ford, L.R., Williams, L.J., & Carraher, S.M. (2008). A comprehensive model and measure of compensation satisfaction. *Journal of Occupational and Organizational Psychology*, 81 (4), 639-668.