

## Bio for Victor F Froelicher, MD

### Overview

Emeritus Professor of Medicine who started his cardiology career at the USAF School of Aerospace Medicine performing cardiac screening of pilots, astronauts and military athletes. He is an international expert in clinical exercise physiology, computerized ECGs, screening and the exercise sciences. He is co-author of the textbook "Exercise and the Heart". Since 1992, he has been the major Cardiac consultant to Stanford Sports Medicine and participated in the pre-participation exam of all Stanford athletes and professional teams in their care. He led the writing group for the first international document to specify the ECG criteria that lowered the false positive rate for screening athletes and has been a participant in the two Seattle ECG Criteria meetings. He initiated the program of ECG screening at Stanford and was the first Director of the Stanford Sports Cardiology clinic. He has published over 500 peer reviewed scientific papers, written eight books, participated in preparation of numerous guidelines. More recently he has been the senior author on review papers regarding ECG wearables and the applications of heart rate variability

### Contributions to Science

- \* **Sports Cardiology** – His group has contributed to recent advancements in sports cardiology and has presented lectures and papers regarding the application of ECG screening and of the cause of sudden cardiac death in athletes.
- \* **Screening of Asymptomatic Men** – While Director of CV research and LtCol at the USAF School of Medicine (1972-1977), he presented seminal data on the angiographic findings and follow up of aircrewmembers with abnormal ECGs and abnormal exercise tests.
- \* **The Cardiovascular Effects of Cardiac Rehabilitation (PERFEXT)** – While Director of Cardiac Rehabilitation at UCSD, he was PI of an NHLBI funded randomized trial of Cardiac Rehabilitation using then novel nuclear imaging techniques.
- \* **Prognostic Studies in Veterans** – While Chief of Cardiology at the LBVAMC, he developed the cardiology data bases for follow up studies of Veterans who had ECGs and exercise tests. The techniques perfected were the basis for the VETs treadmill studies and the ECG studies that are still on-going.
- \* **VA Co-operative Study of Quantitative Exercise Testing and Angiography (QUEXTA)** He was the originator and Co PI for this study which applied computer techniques to both exercise testing and coronary angiography. It is seminal in that it also removed work up bias by only including patients with chest pain who agreed to both exercise testing and coronary angiography prior to any testing.

### Experience in Medical Electronics Industry

In 1977, developed the first US digital 12 lead ECG acquisition with Dr David Mortara for a NHLBI project. This was the forerunner of the MAC-1 and led to the first commercial ECG Over reading Station. Has been consultant for computerized ECG interpretation for most of the ECG companies. Cofounded Cardea LLC with Dr David

Hadley PhD in 2010 and developed an ECG screening system for athletes widely used by college and professional sports teams. Merged in 2015 with Cardiac Insight Inc where he and Dr Hadley concentrated on the software for SOLO, the second-generation ECG patch.

### **Current Career Goals**

I would like to have an impact on lowering health care costs through democratization of the rest and exercise Electrocardiogram. With cardiac testing bypassing the ECG for more expensive imaging techniques, the data from the less expensive ECG is being lost. Both the rest and exercise ECG have enormous diagnostic and prognostic power that could be leveraged commercially. I am very much involved in developing the next generation of ECG patch with 2 ECG leads, Bluetooth and an accelerometer. We are also working on software for long term HRV and QT monitoring and obstructive sleep apnea.

### **Recent Papers**

Heart Rate Variability: An Old Metric with New Meaning in the Era of Using mHealth technologies for Health and Exercise Training Guidance. Part Two: Prognosis and Training. *Arrhythmia & electrophysiology review*. Singh, N., Moneghetti, K. J., Christle, J. W., Hadley, D., Froelicher, V., Plews, D. 2018; 7 (4): 247–55

Electrocardiographic left atrial abnormalities predict cardiovascular mortality. *Journal of Electrocardiology*. Ha, L., Grober, A. F., Hock, J., Wheeler, M., Elbadawi, A., Biniwale, N., Baig, B., Froelicher, V. 2018; 51 (4): 652–57

Heart Rate Variability: An Old Metric with New Meaning in the Era of using mHealth Technologies for Health and Exercise Training Guidance. Part One: Physiology and Methods *Arrhythmia & Electrophysiology Review* Singh, N., Moneghetti, K., Christle, J., Hadley, D., Plews, D., Froelicher, V. 2018; 7 (3): 193–98

Clinical Implications of Technological Advances in Screening for Atrial Fibrillation *Progress In Cardiovascular Diseases*. Singh, N., Chun, S., Hadley, D., Froelicher, V. 2018; 60 (4-5): 550–59

Limited Relationship of Voltage Criteria for Electrocardiogram Left Ventricular Hypertrophy to Cardiovascular Mortality. *American Journal Of Medicine*. Le Dung Ha, Elbadawi, A., Froelicher, V. F. 2018; 131 (1)

Optimizing QT Interval Measurement for the Preparticipation Screening of Young Athletes. *Medicine and science in sports and exercise* Pickham, D., Hsu, D., Soofi, M., Goldberg, J. M., Saini, D., Hadley, D., Perez, M., Froelicher, V. F. 2016; 48 (9): 1745-1750

<https://profiles.stanford.edu/victor-froelicher>