

*Copy to Dr. Roubicek after mail strike over.*

July 31, 1968

MEMO

TO: Dr. Keys and Dr. Taylor

FROM: Dr. Blackburn

RE: Progress in Computer Analysis of ECG and Pulse Waves at Dalhousie

Wave recognition: The basic Mayo Clinic program for determining ECG wave onsets and offsets is used at Dalhousie, with special preprocessing (averaging) prior to wave recognition. I reviewed plots of rest, exercise and post-exercise ECGs on all cases in all areas (Finland, Montegiorgio, Velika Krsna, and Tanushimaru) and rejected or proposed reruns on less than 2% of rest, 4% post-exercise, and 8% during exercise records. This is a superior rejection rate, for technical reasons, than any other existing operating system. We will do a small analysis of rejects to determine whether the age or disease composition is different from the men providing the body of the data. Reasons for rejection were wildly noisy baselines and incorrect offsets of QRS.

Analysis: I reviewed pointouts, as in the enclosed examples, of data on 1) scalar XYZ amplitudes and durations, on 2) vector magnitudes and orientation, histograms of several QRS and ST amplitudes, 3) some plots and regressions of ECG amplitudes versus blood pressure, and 4) tabulations of Minn. codes versus Mayo diagnostic statements. We are now specifying those ECG items desirable for comparisons and publication. Cumulative frequency distribution curves, and data limits will be tabulated and compared for a minimum number of items, according to age and area. The multivariate relationships will be explored between ECG items and physical characteristics.

Sensitivity-specificity relationships are being re-explored using independent clinical classification and ranking programs. The latter based on amplitude measurements of individual vectors and on coefficients characterizing the ECG curve.

Pulse waves: The clinical and physical data are not yet in from V. Krsna or Japan, but preliminary measurement of the pulse wave forms has been made and the curve-fitting program is effective. A mathematical analysis has been

July 31, 1968

made on the curves themselves which shows a clear separation, with little overlap between two types of carotid waves.

Plans: We need more numbers for exercise ECGs and pulse waves, to stabilize the limits by area and age, and we plan to collect all "definite" heart disease cases from now on, plus a one in four sample of the others.

Since the equipment and engineer will be in Yugoslavia we believe it would be worthwhile to go ahead in Dalmatia and Slavonia if Buzina is able to obtain the technician and M. D. help the extra station requires. I am adding \$700 from my flexible fund to the \$2200 Dr. Keys has made available which should allow Dr. Rautaharju to go ahead with these plans.

We hope to set up a double station in Finland next year, with the idea of getting all or at least 1/2 of the subjects. We need further discussions on the analytical possibilities of the data which will be in hand by the end of 1970.

All baseline data is scheduled to be up-to-date by December 1 this year, assuming we can get the V. Krsna material in. I plan to work again in the winter in Halifax, to write up the material at hand and have prepared a rough outline of the baseline presentation to which I invite comments.

HB:lc