PD- AAQ- 243 37304

RECEIVED FEB 10 1984

To: Egyptian Nutrition CRSP Personnel

From: A. H. Ismail

Re: Daily Log of Egyptian Trip (12/15/83 to 1/4/84)

Day 1	12/15/83	Departed Lafayette, Indiana for Cairo, Egypt
Day 2	12/16/83	Arrived in Cairo, Egypt and checked in at Shepheards Hotel.
Day 3	12/17/83	Today was a national holiday; however, was made with the Beckman Company concerning the metabolic cart warranty. Also, a meeting was arranged for 12/18/83 to meet with the Beckman technical assistants.
Day 4	12/18/83	Went to the Nutrition Institute and met with Drs. J. Wolgemuth and Amin Kamel concerning the Beckman Metabolic cart and how to expedite the release of this equipment from customs. Went with Dr. Amin Kamel to the Beckman Company and discussed the service agreement covered by the warranty. A satisfactory agreement was arrived at with the Beckman personnel headed by Mr. Mohammed El-Said. Then I met with Drs. Farouk Abdel Wahab and Abdel Wahab El-Naggar and discussed the information to be covered in the training program, such as the procedures for operating the metabolic cart and the protocol to be adopted in collecting the resting metabolic rate (RMR) data. After this, Dr. Amin Kamel and myself met with Dr. Gabr to discuss ways and means of getting the Beckman Metabolic cart out of customs more expediently.
Day 5	12/19/83	I met with his excellency, Yousef Abou Hoff, deputy minister of sports and youth, who is a close friend of mine and discussed with him the problem associated with customs and the metabolic cart. It was suggested that the influence of his office may assist in solving this problem. In addition, he authorized me to borrow a similar piece of equipment (Ergo-oxyscreen) from the Sports Research Council and use it until the metabolic cart is released from customs.
Day 6	12/20/83	I visited the dean of the College of Physical Education for Men (Dr. Allawy) and reaffirmed our previous agreement of cooperation in relationship to allowing selected faculty members to participate in collecting the RMR data. Also, I visited the dean of the College of Physical Education for Women (Dr. S. Abdel Rahman) for the same purpose.

Day 7	12/21/83	I met with Dr. Farouk Abdel Wahab and discussed with him the agreement with the deputy minister of Sports and Youth, in terms of using the Ergo-oxyscreen which belongs to the Sports Research Council. As stated before, the Ergo-oxyscreen is similar to the Beckman metabolic cart and previous experiences in collecting RMR data with this equipment were shown to be reliable (See Draft Report Phase 1 Research and Food Intake and Function, pages 370-383).
Day 8	12/22/83	Met with Dr. Farouk Shaheen to discuss the following issues: 1) the readiness of the facilities in Kalama; 2) the personnel needed to inform the subjects about the testing and arrange a schedule for testing at the village; 3) the personnel needed to conduct the test and collect the data on RMR. It was agreed that Dr. F. Shaheen would attend to and implement each of these issues. In a meeting with Drs. Abdel Wahab El-Naggar and Farouk Abdel Wahab it was agreed that Tuesday (12/27/83) would be the first day for testing even though the Beckman Metabolic cart had not been released from customs.
Day 9	12/23/83	It is a holiday in Egypt.
Day 10	12/24/83	Met with trainees (eight medical doctors, three nutritionists, and four physical educators) who will assist in collecting the RMR data. Dr. Ismail presented a detailed explanation as to the description of the Beckman Metabolic cart and systematic steps to be followed in operating the equipment in order to obtain reliable data (see attached - Appendix 1 and 2). Since the Ergo-oxyscreen was to be used temporarily, a comparison of the operating procedures was made between the Ergo-oxyscreen and the Beckman Metabolic cart. Furthermore, the trainees went through a dry run using the Ergo-oxyscreen and to observe the reliability of the data.
Day 11	12/25/83	Met with Dr. F. Shaheen to finalize all steps required to initiate the testing. Also, I informed him that a meeting with the trainees on Monday (12/26/83) would be necessary for a review of the testing procedures.
Day 12	12/26/83	Met with the trainees and reviewed the testing procedures, as well as the operating procedures for both the Ergo-oxyscreen and the Beckman Metabolic cart. The training period tested for more than two hours and was extremely successful because of the various questions asked which showed that they

thoroughly studied the materials given to them. Had a meeting with Dr. Osman Galal after his return from India and discussed the possibility of establishing a work performance laboratory in the Nutrition Institute.

Day 13	12/27/83	Went to Kalama to see the readiness of the facilities for the data collection, and to my surprise it was not ready for testing because the man responsible for cleaning was on vacation. However, we mobilized a work force in Kalama to prepare the building site (e.g., clean floors, provide clean beds, mattresses, linen, etc.) for the collection of necessary data.
Day 14	12/28/83	We went to Kalama to collect the data needed and the electricity was out. Consequently, the testing was postponed until the next day and the subjects were re-scheduled accordingly.
Day 15	12/29/83	We went to the village early and collected the RMR data on six subjects. This particular day was satisfying to me not only for the good data obtained, but also to see the medical students, students from physical education, and the Nutrition Institute personnel work as a team to get the job done.
Day 16	12/30/83	We went to Kalama to continue the data collection; however, the electricity was out. Consequently, I had a meeting with Dr. Osman Galal and agreed that we cannot depend upon the village electric power for the collection of RMR and biochemical data. Therefore, a generator and voltage stabilizer must be available to properly collect the necessary data.
Day 17	12/31/83	We went to the village and collected RMR data on 10 subjects. Under the supervision of Dr. Ismail the trainees performed admirably in collecting the data needed.
Day 18	1/1/84	Met with Dr. Osman Galal to inform him about the way the villagers in Kalama perceive the RMR testing program and their willingness to cooperate wholeheartedly in the study. I suggested that the RMR testing program should be organized in such a way to encourage the subjects to participate in other care programs which have experienced difficulty.

Day 19	1/2/84	I was invited by Dr. O. Galal to attend the executive committee meeting headed by Dr. Gabr and was asked to give a report on the RMR program. I shared with the committee members relevant information dealing with the last testing situation and the willingness of the villagers to participate in the RMR testing program. Since the RMR data were collected every 30 seconds for a ten minute period following 20 minutes of complete rest, it was easy to observe the replicability of the data.
Day 20	1/3/84	Met with Drs. Galal, Hekmat, Amin and others to say good-bye.
Day 21	1/4/84	Departed Cairo, Egypt for New York and then Lafayette, Indiana.

Appendix 1

Subject Information to Obtain Reliable RMR Data

A. The following information must be provided to each subject and adhered to by the subjects, in order to obtain reliable resting metabolic rate (RMR) data:

1. Inform the subjects to come to the test without breakfast. Or, meals can be precluded for several hours prior to the test.

2. Instruct the subjects to limit their activity levels prior to the test. Also, allow the subject to rest comfortably before the collection of data.

3. An explanation of the test should be provided, as well as any demonstrations (i.e., insertion of mouthpiece), prior to the test, in order to reduce the anxiety level of the subject.

4. Immediately prior to the test, pulse rate and oral temperature should be obtained to ensure that the subject does not have an infection, as a fever will invalidate the RMR estimation.

5. Two factors should be observed carefully during the test:

   a. ventilatory response - hyperventilation will ↑ the respiratory quotient (R.Q.), while hypoventilation will ↓ the R.Q.

   b. Respiratory quotient (R.Q.) - this should range between 0.75 and 0.90; however, it will vary depending upon the nutritional status and the anxiety level of the subject.

Data Collection Prior to the RMR Assessment

B. Information from each subject must be obtained prior to the preparation for data collection. The following information must be collected:

1. Name - full name of the subject

2. Subject number - continuous number of subjects tested on a given day (i.e.: first subject = 1).

3. Subject I.D. number - this will be provided from a master list.

4. Subject Height - record the height of each subject to the nearest centimeter (cm) without shoes.

5. Subject Weight - record the weight of each subject to the nearest kilogram (kg) with a minimum of clothing.

6. Age - write the age of the subject on the line provided (to the nearest year).

7. Birth - write the birthdate of the subject on the line provided (mo/day/yr).

8. Sex = (1 = male; 2 = female)

9. The following should be obtained from a master list:

   a. Current Household (CURRHH)
   b. Household Type (HHTYPE)
   c. Member of the household (MEMBER)
   d. Location

RMR ASSESSMENT - DATA SHEET

1. Name:_____

2. Subject #:_____

3. Subject I.D.#:_____

4. Height:_____

5. Weight:_____

6. Age:_____

7. Birth:____/____/____

8. Sex:_____

9. a) CURRHH:_____

   b) HHTYPE:_____

   c) MEMBER:_____

   d) LOCATION:_____

C. The collection of resting metabolic rate (RMR) should be carried out according to the following protocol:

1. The Beckman Metabolic Measurement Card (MMC) must warm-up at least 30-60 minutes prior to data collection. To turn on the machine, press RWR ON. Also, the power and operate pushbuttons on the LB-2 and the OM-11 should be ON. (See attached - Figure 3.1).

2. After an adequate warm-up, perform a quick-check of the analyzers, using the top DISPLAY switch. (See Figure 3.3). Set the mode switch to MANUAL/HOLD and the BXB/AVG switch to BXB. Using the DISPLAY switch, check the following:

   a. TEMP - this should read between 20 and 32 C degrees; the temperature increases during warm-up; and daily adjustments can be made, using a centigrade thermometer (See Figure 3.13).

   b. BAROMETER - this should read between 700 and 760 mmHg; adjustments to the MMC pressure can be made from a barometric pressure reading in the laboratory (See Figure 3.13).

   c. ZERO - this should read from 0000 to 0005 without any sample flow for 30-seconds: press DATA RESET, then START buttons; if the drift is greater than .10 liters, adjust the volume ZERO (bias flow) on the front of the MMC (See Figure 3.12).

   d. SPAN - this should read from 0995 to 1005; if not, adjust the volume GAIN, accordingly (See Figure 3.12).

   e. VOLUME - attach the 1-liter syringe to the mouthpiece; press DATA RESET, then START buttons; proceed to push 10 strokes of the syringe through the system; the display should read 10 times the syringe volume; if not, adjust the GAIN, accordingly (See Figure 3.12).

   f. BREATH - this should equal the number of strokes performed in the volume calibration.

   g. Calibration of the O_2 and CO_2 analyzers: Using 100% nitrogen, connect the valve to the CAL port, and set the DISPLAY switch to CO_2 (See Figure 3.8). Depress the CAL switch and adjust the LB-2 to a reading of 0.00 on the top display. Release the CAL switch and turn the DISPLAY switch to O_2. Depress the CAL switch, and the O_2 reading should be less than 0.24. Remove the 100% nitrogen from the CAL port and attach the O_2/CO_2 calibration gas. Depress the CAL switch and adjust the O_2 reading to 16.00 on top display. Release the CAL switch and turn the DISPLAY switch to CO_2. Depress the CAL switch and adjust the CO_2 reading to 4.00 on the top display. Remove the calibration gas from the CAL port. (Note: during the calibration procedures, the pressure balances can be checked--(See Figures 3.4 and 3.7).

3. Now, the nutritional assessment program must be loaded into the MMC. The calculator must be in the OFF position. Select Mode should be in the MANUAL/LOAD position. Then, turn the calculator ON. The following steps should be performed sequentially:

   a. Press LOAD (light should be on).
   b. Insert card 1a, 1b thru 6a, 6b. If an error occurs, press RESET, and begin at a).
   c. Press VERIFY (the number on 6a, 6b should appear) - MMC prints 40,721. If not, press RESET, and start at a).
   d. Press NEW SUBJECT button - N S will be printed.
   e. Set the cycle mode on BREATH, the VOLUME on 100, and the TIME on 1 MIN.
   f. Press the proper Keys in the following order:
      i. enter subject height, then press HT IN, or HT CM.
      ii. enter subject weight, then press WT LB, or WT KG.
      iii. enter the age of the subject (years), then press AGE.
      iv. press the button for the sex of the subject, either MALE or FEMALE.
      v. press BSA PRE button for the estimation of body surface area.
   g. Set the AUTO/ROUND switch to an up position and the Select Mode switch to AUTO 1.

4. Prepare the subject for RMR assessment. Attach the noseclip and the mouthpiece properly. Allow at least 3 to 4 minutes of breathing for each subject prior to collecting data, in order to flush air through the mixing chamber. Once the subject appears comfortable, press GO, then press START. Also, set the Sense II switch in a down position.

5. After 20 minutes of data collection, the test will be terminated by pressing the STOP button.

*NOTE: this information must be obtained prior to the RMR assessment.

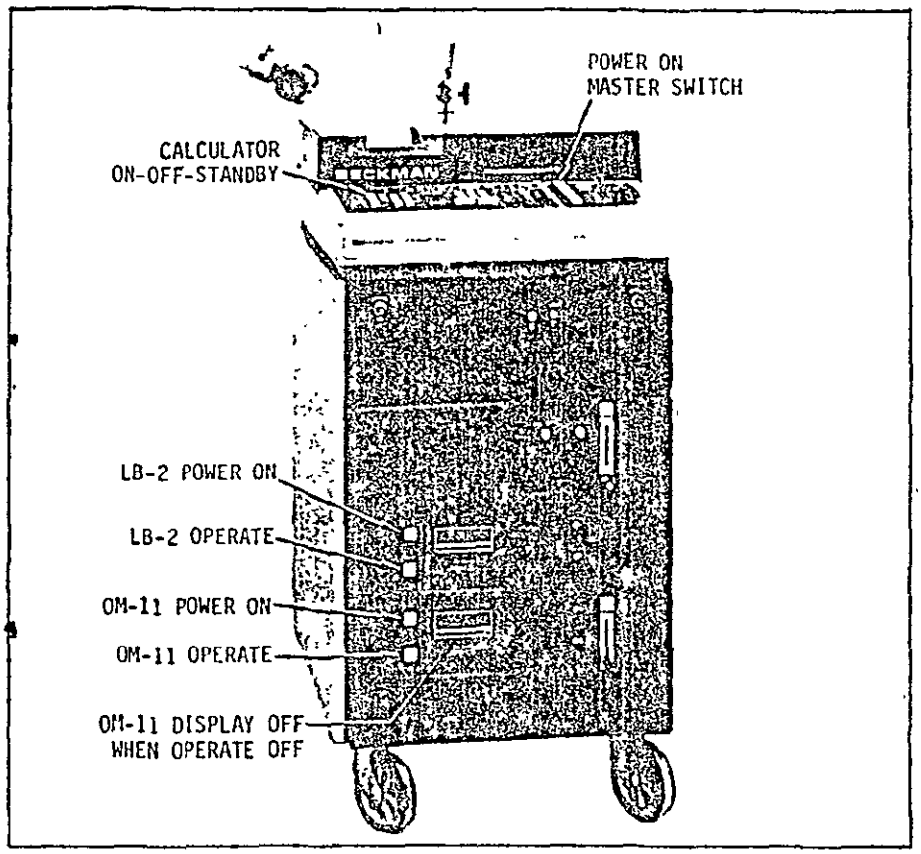

Figure 3-1. Metabolic Measurement Cart--Front View

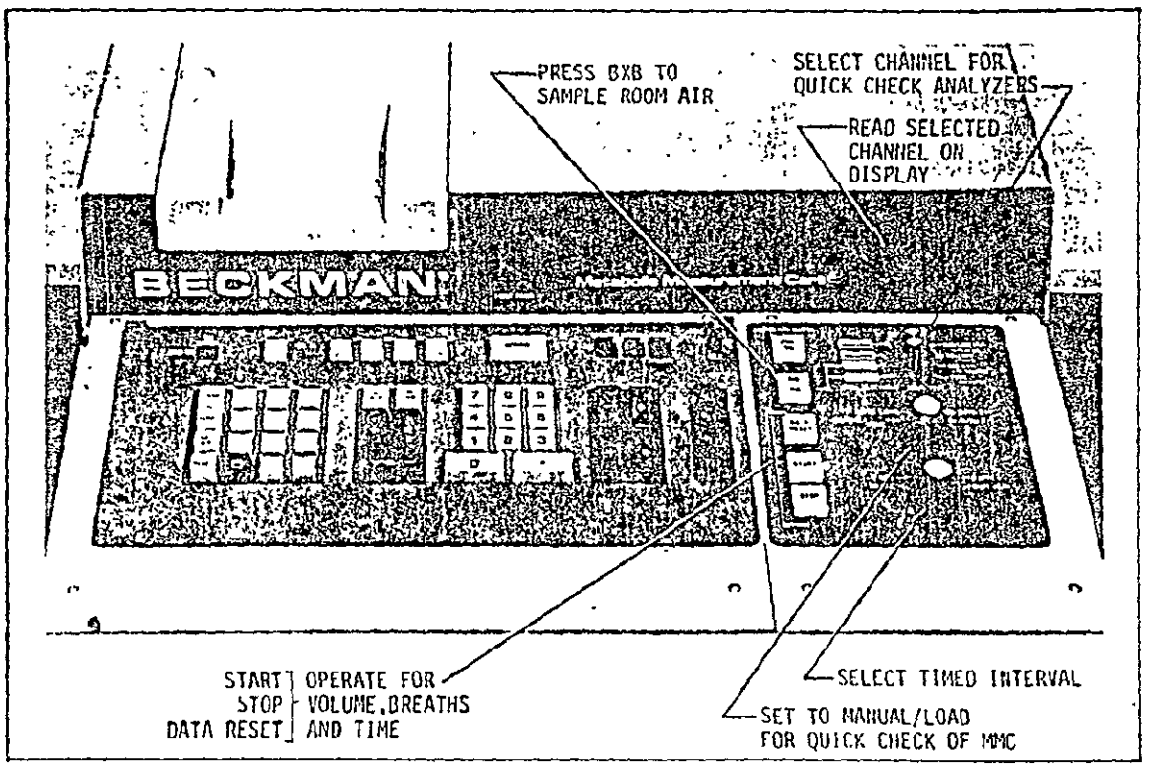

Figure 3-3. Quick Check of Analyzers and Controls

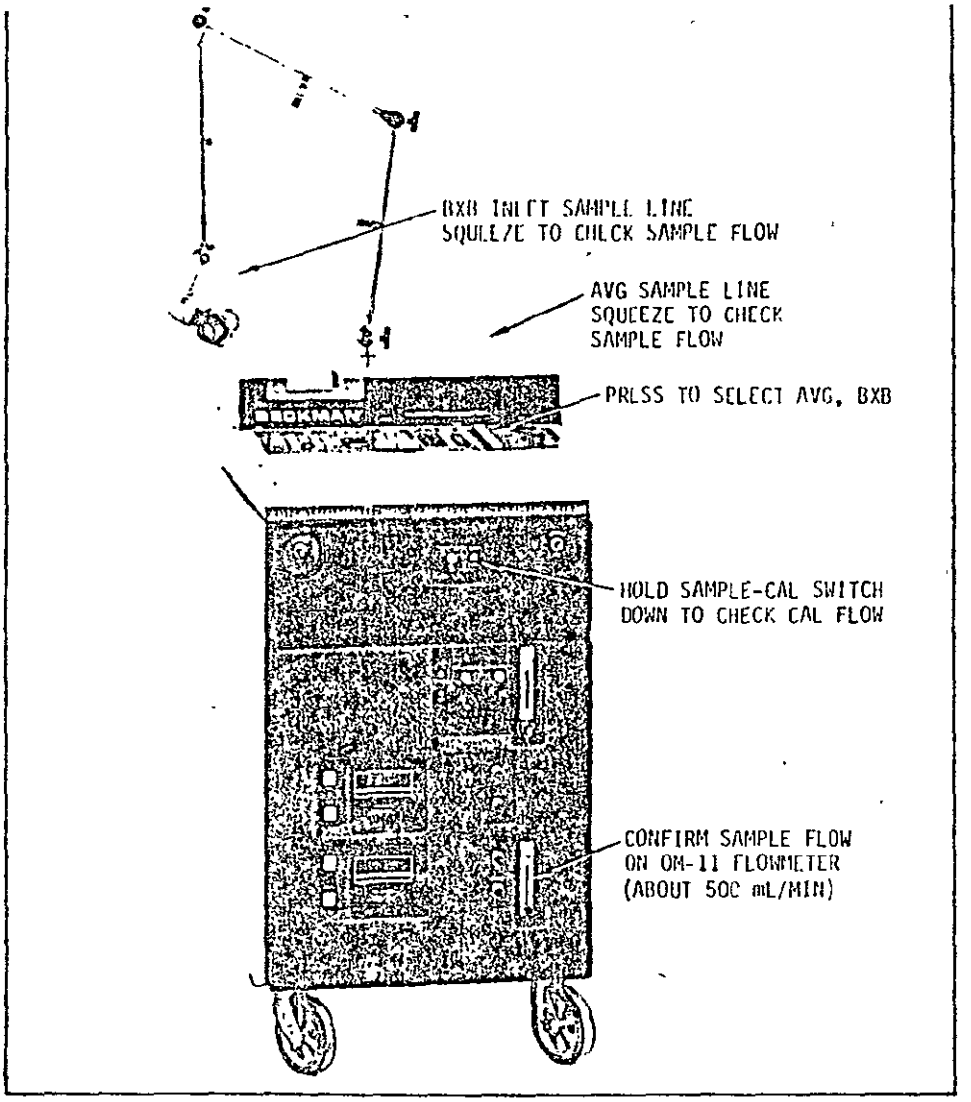

Figure 3-4. Checking for Flows

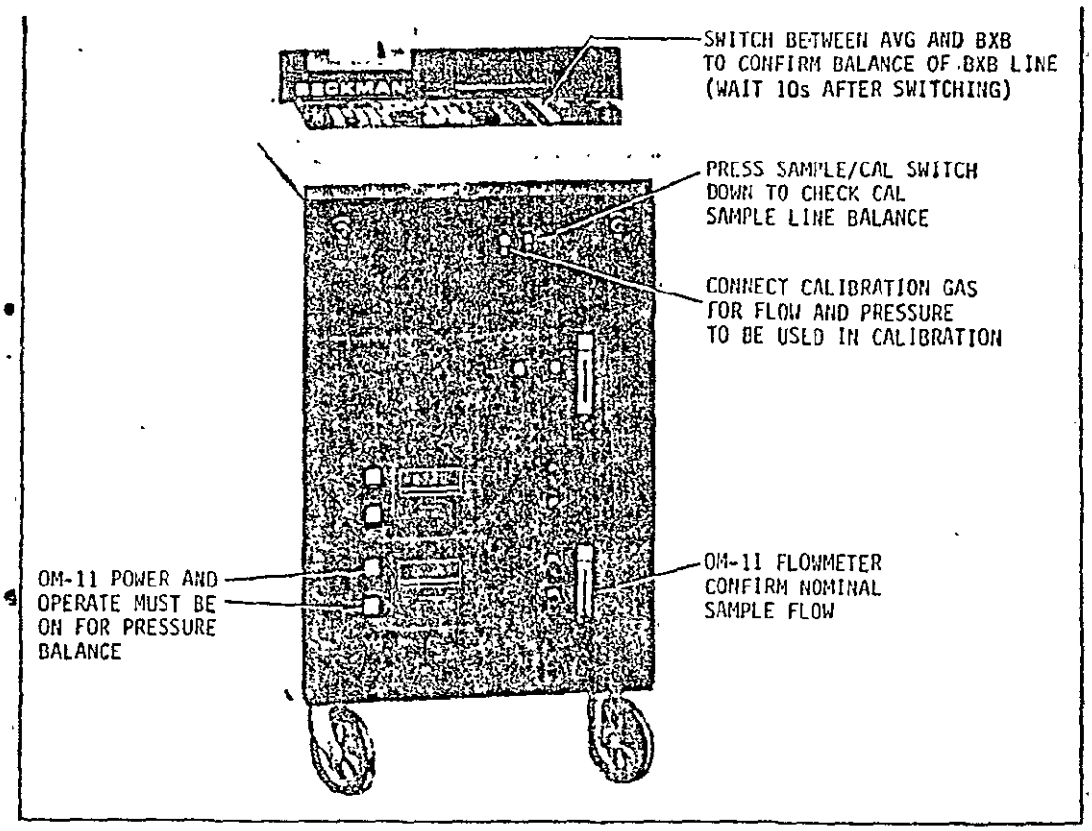

Figure 3-7. Balancing AVG and BXB Sample Lines

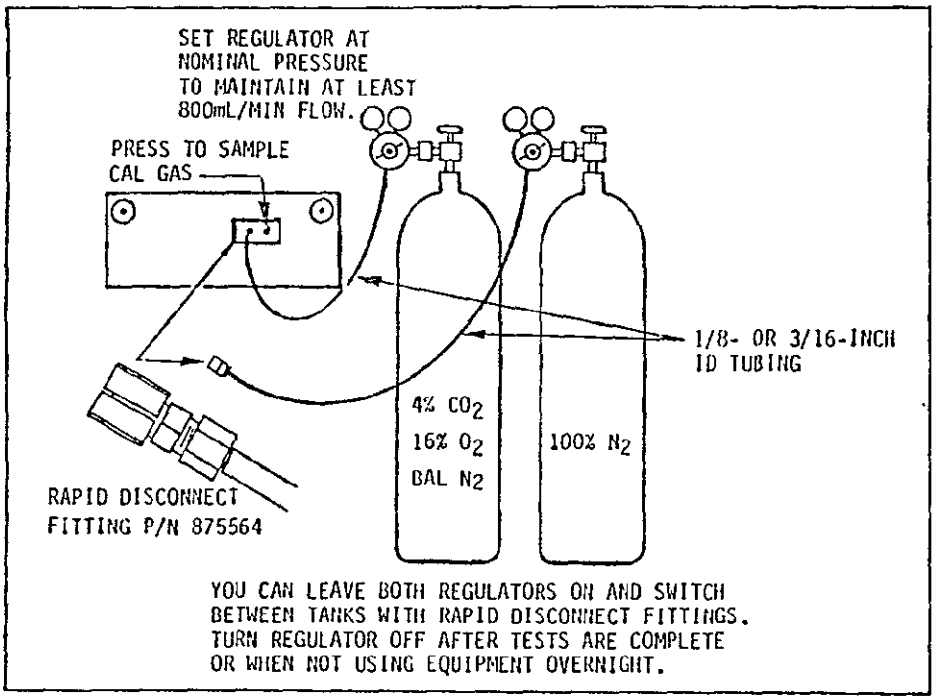

Figure 3-8. Direct Connection with Rapid Disconnect Fittings

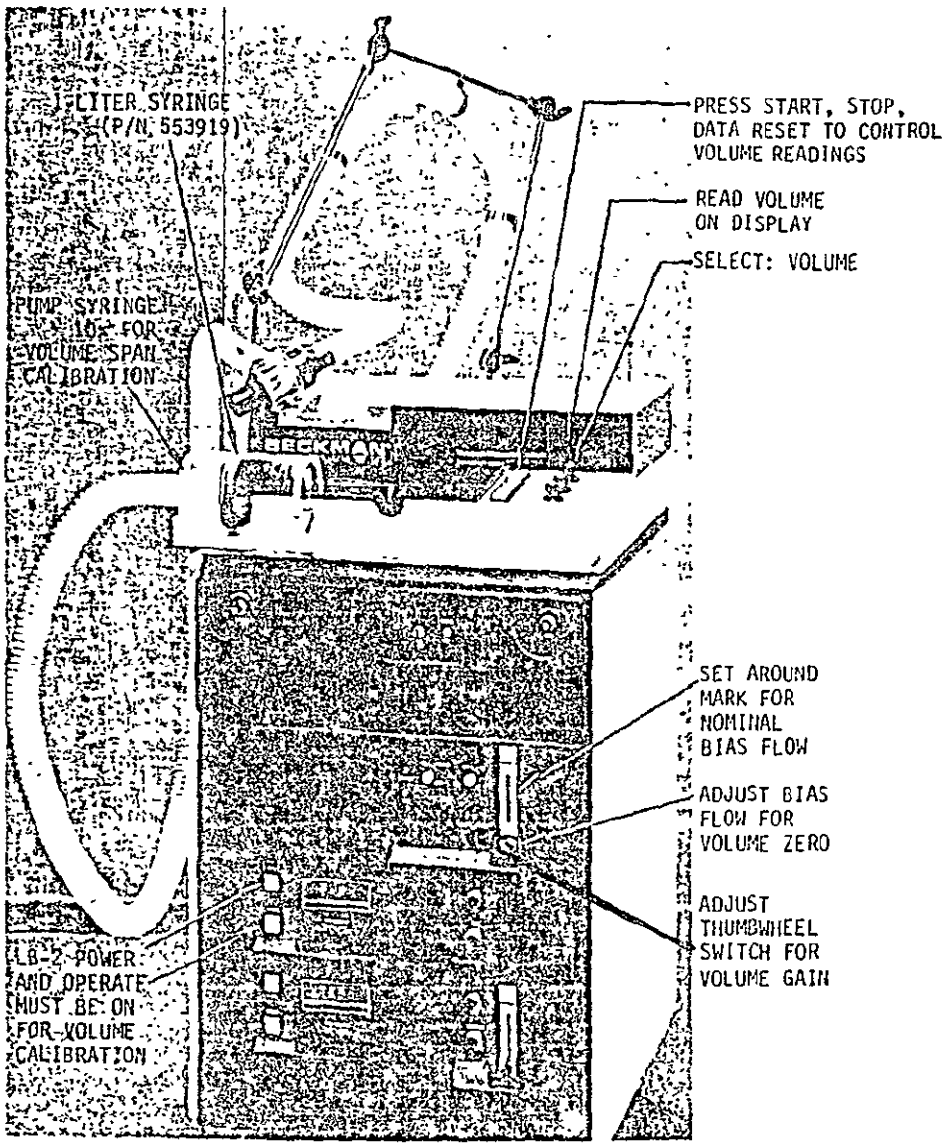

Figure 3-12. Volume Calibration

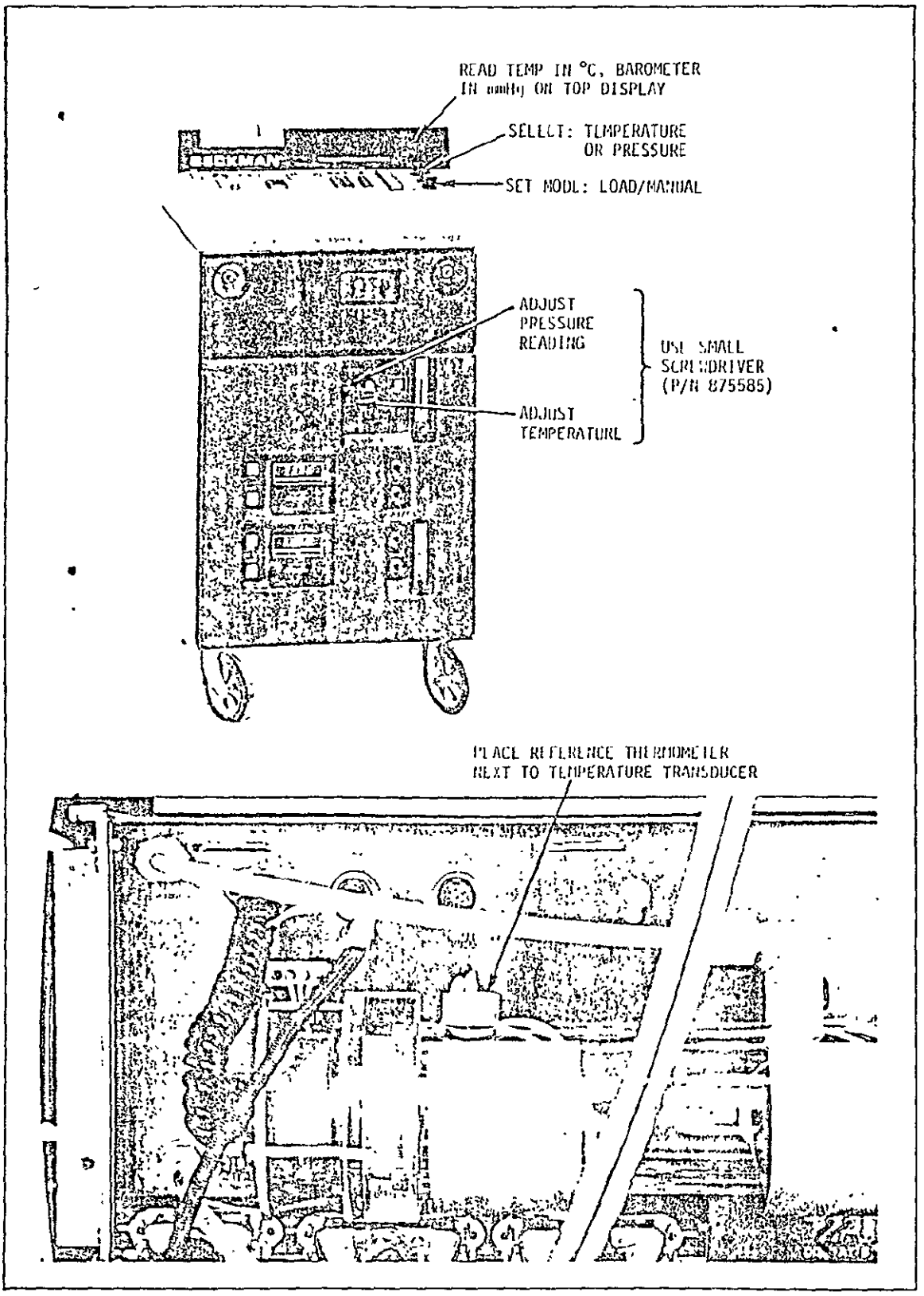

Figure 3-13. Temperature and Pressure Calibration

Appendix 2

Resting Metabolic Rate - Explanation of Data Collection

The following information should be recorded for each subject:

1. Print full name of the subject to be tested (NAME)

2. Place the corresponding 3-digit I.D. number on the blanks provided (a master list will be available) (RID)

3. Sex of the individual (1 = male; 2 = female) (RSEX)

4. Obtain the month/day/year of birth for each subject and place 6-digits on line provided (RBIRTH)

5. The section code is a 2-digit number and is 1 4 (RSECTION)

6. Always place a 1 on the blank provided for (RCOUNTRY) 1 = Egypt

7. The following should be filled out according to a master list:

   a. RLOCATION Number for village
   b. RCURRHH Number of household
   c. RHHTYPE Number for types of household
   d. RMEMBER Code from 1-9 dealing with relationship to lean male and lean female

8. The month/day/year of the test for each subject should be placed on 6 spaces provided (RDAT).

9. The 3-digit number of the tester should be filled out (ROBS)

10. The weight of each subject should be obtained with a minimum of clothing and recorded to the nearest kilogram (RWT)

11. The height of each subject should be obtained without any footwear and recorded to the nearest centimeter. (RHT)

12. The number of kilocalories per day for each subject should be recorded from the printout (RKCALDAY)

13. The number of kilocalories should be divided by the weight of the subject (RKCALWT).

14. The number of kilocalories should be divided by the height of the subject (RKCALHT).

15. The following are derived from the Beckman MMC printout

    a. (RVO2) - is the VO2 ml/min
    b. (RVCO2) - is the VCO2 ml/min
    c. (RRQ) - is the VCO2/VO2
    d. (RBSA) - is the body surface area in M^2

16. The (RRMR) is obtained by the following equation

$$RMR = ((VO2)/1000) = VO2 \text{ L/min}$$
$$= ((VO2 \text{ L/min}) (291.72))/M^2$$

Resting Metabolic Rate

Name:_____ RID:_ _ _ RSEX:_ RBIRTH:_ _ _ _ _ _

RSECTION:1 4 RCOUNTRY:1 RLOCATION:_____ RCURRHH:_____

RHHTYPE:_____ RMEMBER:_____ RDAT:_ _ _ _ _ _ ROBS:_ _ _

RWT:_ _ _ RHT:_ _ _ RKCALDAY:_ _ _ _ RKCALWT:_ _ _ RKCALHT:_ _ _

RVO2 1:_ _ _ _	RVCO2 1:_ _ _ _	RRQ 1:_ _ _	RBSA 1:_ _ _	RRMR 1:_ _ _ _
RVO2 2:_ _ _ _	RVCO2 2:_ _ _ _	RRQ 2:_ _ _	RBSA 2:_ _ _	RRMR 2:_ _ _ _
RVO2 3:_ _ _ _	RVCO2 3:_ _ _ _	RRQ 3:_ _ _	RBSA 3:_ _ _	RRMR 3:_ _ _ _
RVO2 4:_ _ _ _	RVCO2 4:_ _ _ _	RRQ 4:_ _ _	RBSA 4:_ _ _	RRMR 4:_ _ _ _
RVO2 5:_ _ _ _	RVCO2 5:_ _ _ _	RRQ 5:_ _ _	RBSA 5:_ _ _	RRMR 5:_ _ _ _

RVO2 A:_ _ _ _	RVCO2 A:_ _ _ _	RRQ A:_ _ _	RBSA A:_ _ _	RRMR A:_ _ _ _

Coard.

Purpose:

The trip to Egypt (12/15/83 to 1/4/84) was undertaken to achieve the following objectives:

1. To train Egyptian personnel on how to use the necessary physiological equipment and obtain reliable data needed for the study.

2. To conduct a pilot study relative to the feasibility of collecting the core data dealing with BMR/RMR.

3. To finalize the protocol for collecting the data needed for the study.

Results:

1. Training of Personnel

In order to collect the BMR/RMR data, selected personnel were trained on how to collect the data needed. The personnel included: eight medical doctors, three nutritionists, and four physical educators. Due to difficulty in expediting equipment out of customs, the Ergo-Oxyscreen (Erich Jaeger) was used to assess BMR/RMR. However, the Beckman Metabolic Cart will be used in the future to collect the core data dealing with BMR/RMR. Dr. Ismail presented a detailed explanation of the operating procedures for the Ergo-Oxyscreen to the trainees. After allowing adequate time for the trainees to familiarize themselves with the equipment, several dry runs were performed in order to obtain reliable data with the procedure adopted for data collection. Furthermore, detailed explanation on how to operate the Beckman Metabolic Cart was presented to the trainees (See appendices 1 and 2).

2. Conducting the Pilot Study on BMR/RMR

The following information was provided to each subject and it was requested that they adhere to these specific aspects, in order to obtain reliable BMR/RMR data:

A. Inform the subjects to come to the test without breakfast. Or, meals can be precluded for several hours prior to the test.

B. Instruct the subjects to limit their activity levels prior to the test. Also, allow the subject to rest comfortably before the collection of data.

C. An explanation of the test should be provided, as well as any demonstrations (i.e., insertion of mouthpiece), prior to the test, in order to reduce the anxiety level of the subject.

D. Immediately prior to the test, pulse rate and oral temperature should be obtained to ensure that the subject does not have an infection, as a fever will invalidate the RMR estimation.

E. Two factors should be observed carefully during the test:

1. Ventilatory response - hyperventilation will increase the respiratory quotient (R.Q.), while hypoventilation will decrease the R.Q.

2. Respiratory quotient (R.Q.) - this should range between 0.75 and 0.90; however, it will vary depending upon the nutritional status and the anxiety level of the subject.

Prior to preparing each subject for the data collection, the following information was obtained:

1. Name - full name of the subject

2. Subject number - continuous number of subjects tested on a given day (i.e.: first subject = 1).

3. Subject I.D. number - this will be provided from a master list.

4. Subject Height - record the height of each subject to the nearest centimeter (cm) without shoes.

5. Subject Weight - record the weight of each subject to the nearest kilogram (kg) with a minumum of clothing.

6. Age - write the age of the subject on the line provided (to the nearest year).

7. Birth - write the birthdate of the subject on the line provided (mo/day/yr).

8. Sex =(1 = male; 2 = female)

9. The following should be obtained from a master list:
   a. Current Household (CURRHH)
   b. Household Type (HHTYPE)
   c. Member of the household (MEMBER)
   d. Location (number for village)

After recording the above information, the following were performed for collecting the data on BMR/RMR:

1. The subject was taken to the room devoted for testing and lied down on one of the beds.

2. Three EKG electrodes were placed for recording the heart rate and the mouthpiece and noseclip were put in position in order to acquaint them.

3. After the subject lied down quietly for 30 minutes, he/she was hooked to the Ergo-Oxyscreen.

4. Needed information about the subject were fed into the data keyboard input which is a part of the Jaeger Ergo-Oxyscreen. Information such as date, ID, age, height, weight, barometric pressure and other calibration procedures.

5. The Ergo-Oxyscreen system is composed of units for measuring minute ventilation (MV), respiratory gases (CO_2 and O_2), and heart rate input (EKG amplifier and monitor). This instrument is an ergospirometric measuring unit in the "open system." The expiratory flow measured via a pneumotachograph is integrated to the expiratory volume and assessed every 30 seconds. At the same time the expiratory air is collected in a semi-open breathing bag of which a continuous gas sample is taken. The gas analysis for CO_2 is based on the infra-red absorption principle, and the O_2 concentration is determined by the paramagnetic susceptibility of oxygen.

6. Using a Y-valve, while the individual is resting comfortably for 10 minutes on a bed, the following data were obtained every 30 seconds for a ten minute period:

a. minute ventilation	(MV l/min)
b. breath frequency	(BF/min)
c. expired O_2	(Vol O_2%)
d. expired CO_2	(Vol CO_2%)
e. respiratory quotient	(R.Q.)
f. heart rate	(HR/min)
g. oxygen uptake	(VO_2 l/min)
h. carbon dioxide production	(VCO_2 l/min)
i. oxygen pulse	(VO_2/HR/ml)
j. oxygen uptake	(VO_2/ml/min/kg)
k. metabolic units	(MET)

Twenty recordings could be obtained on each subject and by inspecting the data recorded, one can easily notice the replicability as well as the reliability of the data obtained.

Data were recorded on 16 subjects who consisted of 5 children (8-15 years) and 11 adults (21-43 years). Both sexes were represented in each age division. The results are presented in Tables I-IV. Proper interpretation is made under each table.

Table I

Anthropometric Measures for Children (8-15 years)

Variables	Male (n=2) $\bar{X}$ ±	S.E.	Female (n=3) $\bar{X}$ ±	S.E.	Total (n=5) $\bar{X}$ ±	S.E.
Age (yrs.)	11.00	1.00	10.67	2.17	10.8	1.24
Height (cm)	125.35	3.35	131.67	14.40	129.14	8.11
Weight (kg)	27.35	1.35	33.33	11.57	30.94	6.52
Body Surface Area (M^2)	0.973	0.039	1.088	0.249	1.042	0.140
Basal Metabolic Rate (BMR (Kcal/hr/M^2)	41.85	2.81	38.53	2.63	39.86	1.88

Comments on Table I:

As reported in the first pilot study, the anthropometric measurements for both male and female children are similar to the data reported in the literature. Also, the BMR for both sexes was found to be within the normal limits, as established by Boothby et al. (1936). For both sexes the test-retest reliability for $\dot{V}O2$ uptake ranged from .93 to .94 which suggests consistency of the data collected. It is interesting to observe that there was no significant correlation between the BMR and $\dot{V}O2$ uptake for those children. One of the reasons for this finding may be due to the limited number of cases.

Table II

Resting Respiratory Measurements for Children (8-15 years)

Variable	Male (n=2) $\bar{X}$ ±	S.E.	Female (n=3) $\bar{X}$ ±	S.E.	Total (n=5) $\bar{X}$ ±	S.E.
Minute Volume (L/min)	5.75	2.17	5.11	0.78	5.37	0.82
VO2 (L/min)	0.14	0.02	0.14	0.03	0.14	0.02
VCO2 (L/min)	0.12	0.02	0.11	0.02	0.12	0.01
Non Protein Respiratory Quotient (R.Q.)	0.86	0.06	0.79	0.00	0.82	0.03

Comments on Table II;

The respiratory measurements for both male and female children are in agreement with the literature. Although the males exhibited a higher RQ than the females, it was found that the test-retest reliability of the RQ ranged from .93 to .95. Again, the above findings must be interpreted with caution since the number of subjects for both sexes is small.

Table III

Anthropometric Measurements for Adults (21-43 years)

Variables	Male (n=4) $\bar{X}$	± S.E.	Female (n=7) $\bar{X}$	± S.E.	Total (n=11) $\bar{X}$	± S.E.
Age (yrs)	37.25	3.12	31.43	2.64	33.55	2.12
Height (cm)	170.93	2.55	155.64	2.44	161.20	2.90
Weight (kg)	78.43	7.62	63.14	4.42	68.70	4.38
Body Surface Area (M^2)	1.900	0.089	1.619	0.054	1.721	0.062
Basal Metabolic Rate (BMR) (Kcal/hr/M^2)	30.65	3.50	31.10	1.02	30.94	1.32

Comments on Table III:

In observing the mean values of height and weight for both males and females, it is apparent that their body weight exceeded the weight range for a given height, according to the norms reported in the Fogarty Centre Table (Bray, 1979). Thus, it is assumed that this excessive weight for both sexes represents an increase in body fat. Although the BMR correlated (r=.72) with the mean VO2 uptake for both sexes, both males and females exhibited lower mean BMR values than that of the normal limits established for their age (Boothby et al., 1936). This finding is likely to reflect a marginally malnourished state for both sexes, particularly for male subjects. However, the results for the males should be interpreted with caution due to the small number of subjects.

Table IV

Resting Respiratory Measurements for Adults (21-43 years)

Variables	Male (n=4) X ±	S.E.	Females (n=7) X ±	S.E.	Total (n=11) X ±	S.E.
Minute Volume (L/min)	5.53	0.38	5.03	0.32	5.21	0.25
VO_2 (L/min)	0.20	0.02	0.17	0.01	0.18	0.01
VCO_2 (L/min)	0.16	0.02	0.13	0.00	0.14	0.01
Non Protein Respiratory Quotient (R.Q.)	0.79	0.01	0.77	0.02	0.78	0.01

Comments on Table IV:

The respiratory measurements obtained on the male and female adults are representative of the data reported in the literature, as indicated by the mean minute volume and RQ for both sexes. In addition, the test-retest reliability coefficients for the RQ ranged between .97 to .98 for both sexes.

Summary:

The anthropometric measurements obtained on both the children and adult groups reflect the BMR of each respective sex. Although the correlation coefficients between BMR and $\dot{V}O2$ uptake for the adults suggest consistency of the data, the coefficients for these same measurements on the children were relatively lower which may be due to the small number of subjects in this group (n=5). It is interesting to observe that the BMR for the children was within the normal limits established for a given age and sex, while the adult males and females were below their respective normal limits (Boothby et al., 1936). The lower BMR for the adults could be due to malnourishment (Knoebel, 1976). Consequently, it may be speculated that with increasing age from childhood to adulthood, those individuals become malnourished.

The respiratory measurements obtained on male and female groups of children and adults reflect reliable RQ data for each respective sex and group of subjects. The test-retest correlation coefficients for the RQ measurements testify to that effect.

3. Finalizing the protocol for collecting data

The protocol for collecting the BMR/RMR data will be finalized based on the proper procedures adopted in the pilot study using the Beckman Metabolic Cart rather than the Ergo-Oxyscreen.

In conclusion, it is feasible to obtain reliable data from children and adults in Kalama, particularly when the generator and stabilizer will be used to provide a constant and stable source of electricity at the site in Kalama.

References

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