LIQUID CONSUMPTION PATTERNS AMONG THE BLACK POPULATION OF CAPE TOWN

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EXECUTIVE SUMMARY

In the formulation of standards governing the concentration of drinking water constituents, population exposure to water constituents must be estimated. A prerequisite of this is a knowledge of the quantities of tap water the people drink, incorporating a differentiation between boiled and unboiled tap water. Furthermore the relative contribution of other fluids to total fluid intake should be ascertained to put the tap water consumption into perspective.

A detailed study of liquid consumption in Cape Town has been conducted (Bourne, et al 1987) but this did not include the Black population. Since this sector of the population has increased markedly since then with the accelerated rate of urbanisation, it was decided to investigate its consumption patterns. Furthermore since dietary intake is based largely on the traditional ethnic diet - it was expected that liquid consumption patterns might differ markedly from the other sectors of this urban population.

A cross-sectional study was designed incorporating a representative, stratified proportional sample to be drawn from the Black residential areas in the greater Cape Town area. The dietary study was built into a collaborative study by the Medical Research Council and University of Cape Town of risk factors for ischaemic heart disease (IHD); diet being one of the risk factors.

The fieldwork was carried out during the first quarter of 1990.

The mean total water intake per head for Blacks being 1,40 litres per day fell between that recorded for "Coloureds" at 1,26 litres per day and Whites at 2,16 litres per day in the previous study.

Thus the traditional 2 litres per head per day water intake which tends to be reported in the literature and which has been used by the World Health Organization (1971) and the Environmental Protection Agency (1976) remains a useful approximation for local use in the light of the Cape Town studies.

Liquid derived from commercially prepared drinks and foods consumed by Blacks exceeded that of Whites and "Coloureds". The mean intake for Blacks was 299 ml/head and for Whites and "Coloureds" 225 ml/head and 141 ml/head daily, respectively. This can be ascribed mainly to the increased consumption by Blacks of carbonated drinks and cordials, as well as commercial beer. Since carbonated drinks are relatively expensive to this generally poor sector of the population, there may well be an element of status symbolism behind this trend.

Blacks consume 83% of their total liquid intake at home. 52% of this is tap water. Of total tap water consumed 91% is consumed at home.

75% of tap water consumed is boiled.

Within the urban context, tap water intake and total liquid consumption are not affected by access to the water supply. Stratification of this data in terms of type of housing also reveals that this does not influence consumption patterns.

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Specific thanks are due to several people and institutions who assisted with various stages of the project:-

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CHAPTER 1

THE ROLE OF WATER IN THE HUMAN BODY - REQUIREMENTS AND INTAKE.

There is very little specific evidence on the human early physiological requirement for water. There tend to be ranges of figures used by researchers from unquoted sources - a reflection of the wide range in individual variation.

Newburgh and Mackinnon (1934) define the 24 hour requirement as being that amount that replaces losses which are of the order of 2000 to 3000 ml daily and possibly more under certain circumstances.

According to Lafontaine (1975) water is lost:

a) through urine (in general 1 000 to 1 500 ml/24h)

b) through bowel movements (in general 140 ml/24h)

c) through the lungs (300 to 400 ml/24h)

d) through the skin as perspiration (passive process) (600 to 800 ml/24h) and as sweat (active process) (from 0 to 1 500 ml depending on circumstances).

Newburgh and Mackinnon (1934) hold the view that ordinarily thirst is an accurate guide to meeting the physiological need for water. However this is disputed by Rolls and Rolls (1982) who report on experiments which indicate that the palatability of fluids, as well as the variety available influence intake. In the case of experimental animals these factors produce a phenomenon which they term "overdrinking", i.e. intake exceeding the amount required for homeostatic control.

Certainly social convention plays a significant role (Ellwood, 1974) in influencing intake, as almost every meal is associated with some form of beverage and almost every social gathering incorporates some type of liquid refreshment.

It is widely known that caffeine-containing drinks such as tea, coffee and colas have a diuretic effect on the body as do alcohol-based drinks. Thus such fluids actually promote water loss the body, and would therefore affect the homeostatic control of fluids and electrolytes - and indirectly, subsequent fluid intake.

Other factors which play a significant role in determining intake are summarized from Lederer (1971)

- age
- type of climate and season
- level of physical activity
- food intake
- in the case of females, pregnancy and breastfeeding
- certain infections and pathological states eg. gastro-

enteritis (accompanied by diarrhoea and vomiting), diabetes mellitis, some renal disorders.

Relatively few studies have been carried out to determine actual amounts and patterns of water intake (Gardner, 1976; Abu Seid, 1979; Comstock, Cauthen and Hesling, 1980). Of the studies conducted, few differentiate between tap water and other fluids and almost all do not take food consumption into consideration - a remarkable oversight since moisture is the principle constituent of almost all foods except for pure sugars and fats.

A comprehensive review of the literature is set out in a previous technical report. (Bourne et al 1987). In this previous Cape Town study conducted on Whites and "Coloureds" aged 1 - 55+ it was found that the daily rounded volume of 2 litres per person total 'fluid' intake which is usually taken as a working estimate from world-wide data, was a useful approximate measure for Whites (in this case being 2,192 litres) but not for the 'coloured' population (the mean per capita daily intake being 1,258). This gave a mean of 1,725 litres per capita daily intake of the combined population.

This latter combined figure agrees favourably with a subsequent nationwide study conducted by the U.S. Department of Agriculture (Ershow and Cantor, 1989) in which the mean of total daily 'fluid' intake was 1,897 litres for persons aged 1 - 65+. A ratio of approximately 0,5 was found for the ratio of tap water to total 'fluid' consumption in this study, similar to the approx. 0,5 calculated in the Cape Town study.

CHAPTER 2

1. BACKGROUND TO THE SURVEY

In the formulation of standards governing the concentration of drinking water constituents, population exposure to water constituents must be estimated. A prerequisite of this is a knowledge of the quantities of tap water the people drink, incorporating a differentiation between boiled and unboiled tap water. Furthermore the relative contribution of other fluids to total fluid intake should be ascertained to put the tap water consumption into perspective.

A detailed study of liquid consumption in Cape Town has been conducted (Bourne, et al 1987) but this did not include the Black population. Since this sector of the population has increased markedly since then with the accelerated rate of urbanisation, it was decided to investigate its consumption patterns. Furthermore since dietary intake is based largely on the traditional ethnic diet - it was expected that liquid consumption patterns might differ markedly from the other sectors of this urban population.

2. OBJECTIVES

To ensure comparability with the previous (Cape Town) study it was necessary to base the study on the same objectives. As in the previous case, this pointed to large-scale study of individuals or households, with questions to elicit information on the following:-

(i) type and quantity of drinks and foods consumed.

(ii) volume of water consumed, in fluids and foods, in the following three categories:-

(a) **local tap water** - e.g. in drinking, coffee, tea, soup, stew, porridge, etc.

(b) **non-local tap water** (commercial beverages) - e.g. commercial beer, soft drinks, mineral water, etc.

(c) *__water bound in food__ - e.g. milk, wine, citrus juice, meat, vegetables, eggs.

NB. Foods can be 'solid' and 'liquid.'

*This excludes absorbed tap water.

(iii) whether the food or drink item had been boiled or unboiled.

(iv) factors affecting the volume and type of drinks and foods consumed (i.e. age, sex, geographical area, socio-economic group)

(v) place of consumption (at home or elsewhere)

(vi) differences between consumption during the week, and at weekends

(vii) type of domestic water supply, since there is a variation in the modes of water supply in the Black townships not found in other areas (which in turn may affect intake patterns). These were categorized as follows:-

(a) **tap in house** (eg. home-owners or privately built houses; council houses, hostels

(b) **tap outside house** (eg. controlled squatting, where 1 tap is provided per shack)

(c) **shared tap (4 houses)** (eg. semi-formal core houses).

(d) **communal tap (5 or more houses)** (eg. large squatter camps where taps are provided around the perimeter, with a few in the centre.

As can be seen, the above categories reflect the various types of housing which are present - a good indicator of socio-economic status.

Because of considerable financial constraints and due to the unstable political situation precipitating sporadic outbursts of unrest, it was not feasible to survey both summer and winter intake patterns. The study was scheduled for the summer months to ensure that the fieldworkers worked before darkness fell and thus their safety was not unnecessarily compromised. (As with the previous study, the fieldwork had to be conducted after working hours, so that employed as well as unemployed respondents were included in the sample.)

In order to measure these variables, it was necessary to construct questionnaires for recording dietary consumption employing the same methodology - but with modifications to incorporate the unique characteristics of the 'ethnic' or more 'traditional' Black diet, as well as the practitioners of functioning within such diverse housing conditions.

Nevertheless, the same aspects which were tested in the previous study were to be evaluated in the drafts of the questionnaire which were to be drawn up. The aspects to be evaluated were as follows:-

(i) the response rate

(ii) quality of data obtained

(iii) the degree of detail which could reasonably be expected

(iv) the means by which "volume of utensil" data could be collected

(v) the way in which the questionnaires should be administered

(vi) the way in which information on alcohol consumption could be elicited.

3. RATIONALE FOR THEORETICAL DESIGN OF FIELD WORK

In order to model this study on the previous study it was crucial to attempt to base the dietary survey once more on the 24-hour recall method. However it must be mentioned that this choice was initially investigated objectively against other methods. For the same reasons, such as illiteracy and level of invasiveness which are problems inherent in the use of other methods, they were rejected, and the 24-hour recall method was again selected and tested successfully in the "pre-piloting" phases of the study.

A full review of the dietary survey methods in use can be found in the earlier technical report (Bourne et al., 1987.)

CHAPTER 3

METHODOLOGY

1. DESIGN OF FIELD WORK

A cross-sectional study was designed incorporating a representative, stratified proportional sample to be drawn from the Black residential areas in the greater Cape Town area. The dietary study was built into a collaborative study by the Medical Research Council (MRC) and University of Cape Town (UCT) of risk factors for ischaemic heart disease (IHD); diet being one of the risk factors. It was thus decided to administer a 24-hour recall to each respondent - the field workers selected, being qualified Xhosa-speaking nursing sisters who would best be able to handle the complexities of a dietary survey, and thus ensure the highest quality data possible under difficult circumstances. The fieldwork was carried out during the first quarter of 1990.

2. CONSULTATION AND CONTACT WITH THE COMMUNITY

To ensure that the study was accepted by Black residents, and because no other such study had ever been conducted in the Black townships (and it was impossible to predict its successful execution) a great deal of preliminary work was done.

The vast spread of the Black townships, the density of the population, the complexities within Black society and some potentially sensitive aspects of the study presented a somewhat daunting and time-consuming task. Furthermore sporadic outbursts of unrest made this role extremely difficult at times.

It was thus decided to adopt the following approach:-

- to identify key networks, organisations and individual leaders, particularly those in health-related fields.

- to establish contact within these, explaining the purpose of the study and the implications of the findings.

Having done this, opinions were sought as to:-

- how the survey content would be perceived by individuals

- how awareness could best be created without misconceptions

- where permission could be sought to work in certain areas without misconceptions (eg. squatter camp committees, hostel associations, political organisations and local authorities)

- which groups could provide support and assistance

during the field work.

In most cases this contact-making phase led to other contacts and the network grew in complexity. At this stage it became apparent that a one-page handout briefly outlining the study would make the task easier. For example, very often only a few members of a committee would be available during the day and these members did not feel they could speak on behalf of those absent; furthermore there was the potential problem of distorting the message. A one-page handout was thus drawn up, bearing the MRC and UCT logos, simply and clearly outlining the study in Xhosa and English (see Appendix) this proved to be extremely useful.

It also became apparent at this stage having consulted a variety of individuals and organisations, that the purpose of the study was well-received and that the study itself would be welcomed. Notes were made of potential problem areas where sensitivities could be offended, and if possible, avoided.

In the case of the dietary study a potentially sensitive issue was:- the perception of a nursing sister (being an 'official' person), asking relatively personal questions on alcohol intake and even on the feeding of the family. It must be borne in mind, that some of these field workers administered malnutrition clinics in the townships. The concept of confidentiality was thus highlighted.

Another important consideration was the interviewer/ interviewee burden, since the total interview was to be fairly lengthy and would take place after a day's work.

As the date for the commencement of the fieldwork drew nearer, three lists were compiled:-

(i) the most important/institutions/associations who were in a position to make available the pamphlets outlining the study just as the survey was launched, so that the awareness was fresh in everyone's minds.

(ii) groups and individuals from whom permission was to be sought to ensure that the fieldworkers would not be hampered in any way.

(iii) contact was made with the appropriate mass media and arrangements set up and appointments made.

At this final stage just prior to the launching of the survey, the contact list was as follows:-

a) **Health-related institutions in the townships**

* Regional Services Councils
* Clinics
* City Council Clinics
* Day Hospitals
* S.A.C.L.A. Clinics
* S.H.A.W.C.O. Clinics
* Health Worker's Forum

} All Sisters-in-Charge and in some cases Medical Officers as well as District Sisters were informed. Pamphlets were distributed to each clinic.

b) **Church groups**

* The Western Province Council of Churches (450 churches)
* The Western Cape Council of Churches (125 churches)

Each congregation received a pamphlet to be pinned up on the church notice board. In a covering letter, each minister/pastor was asked to announce the commencement of the survey during the services on the Sundays prior to the start of the survey.

c) **Local Authorities**

* Cape Town City Council. (This involved a phone call only. Support was granted on the proviso that participation in the survey was "not obligatory")
* Khayelitsha Town Council. (A meeting with the Mayor and Councillors was set up by the Town Clerk and they were addressed by the research team).

d) **Squatter Camp Committees**

A list of 4 had been drawn up. Ultimately only 1 (KTC) was approached and several members were addressed.

e) **Other Organisations**

The list included the U.D.F., the United Women's Congress, the Hostel Dwellers Association and the Western Province Taxi Association. (Ultimately only the Hostel Dwellers Association and the UDF were seen. In the case of the former, a few committee members from the Executive were consulted, and in the latter the President was approached personally.)

f) **Papers**

A pop star hailing originally from Langa, Brenda Fassie was finally chosen as "the media personality" to appear in a photograph accompanying press releases of the study. With some difficulty, a photograph of her having her blood pressure taken by one of the fieldworkers was set up. This appeared in the following newspapers:-

* "South"
* "The Argus"
* "IMVO"
* "City Press"
* "Grassroots"

g) **Radio**

Interviews with the most senior-ranking fieldworkers (a matron) were broadcast on the Xhosa channel of the S.A.B.C. She presented a synopsis of the study and then answered questions during a live broadcast. This was very successful in that it came across well.

h) **Other**

Two important resources backing the team were a doctor who had run Guguletu Day Hospital for some years, and "I..D.A.S.A." (Institute for Democratic Alternatives for South Africa). They provided good "sounding boards" for problem areas.

In retrospect it is difficult to evaluate the impact of this contact-making and awareness-creating aspect of the study. Nonetheless, the ability of local leadership to disrupt such a study must not be underestimated. Certainly the research team gained valuable, if confusing insights from it. The survey period was fortunately politically stable (although some notably positive events occurred just as it was launched 2nd of February 1990 speech of President De Klerk and release of Mr Nelson Mandela). Had this not been the case, a much stronger role of some of the "support network" might have been called for. It was unfortunately not possible to ascertain whether the information filtered down to the individual respondent. Certainly most of the respondents acted in "good faith" probably because they intrinsically identified with the purpose of the study in a very positive way. This is borne out by the very high response rate.

3. SAMPLING

The target population was the 3 - 64+ year old Black population of the greater Cape Town area. A stratified proportional sample was drawn in the Black residential areas, including squatter areas, during the first quarter of 1990.

The basis for the sample design was the 1988 Human Research Council (HSRC) census done for the Cape Provincial Administration in these areas. Strata considered were area (Guguletu, Langa, Nyanga, New Crossroads, KTC, Old Crossroads and Khayelitsha), type of dwelling (houses, hostels and shacks), and sex and age groups. Formal areas were subdivided into sectors and blocks. Plots within blocks were randomly identified and the fieldworkers had to obtain a fixed quota of subjects for each age and sex category in each block. Squatter areas were sampled by starting at random points in each area and completing the sex age quota. The final sampling unit was a household, defined as a group of people who cook and eat together. Only one subject was drawn from a household. (Steyn, Jooste and Bourne, 1991.)

4. DEVELOPMENT OF THE DIETARY QUESTIONNAIRE

In the course of developing the dietary questionnaires, several prepiloting phases had been conducted to determine:-

- the most appropriate method of collecting data
- the range of portion sizes
- types of meal patterns
- cooking facilities and how they influenced intake and food preparation
- the types of condiments added during cooking
- the basic items needed for the interviewers' kit

Much of this work was done in the townships - observing purchasing habits and cooking practices in people's homes.

On the basis of the information acquired, the 24-hour recall was chosen as the method of data collection, and considerable insight was gained into the food intake of Blacks in different types of housing with different socio-economic conditions.

The project leaders also arranged for over 20 food items to be prepared and discussions were held with the nutritionists, and the Nutrition Advisers of the Department of Health and subsequently the nursing sisters who participated in the formal pilot study. (All of these participants work in the Black townships). To serve as a basis for discussion a reference family was taken (Mother, Father, Son 14 - 16 years and Daughter 10 - 12 years) and portion sizes of each food item were determined per individual. It was necessary to do this in the context of the meal (i.e. breakfast, lunch, supper, snack) since some dishes are served at any meal or time of day, and portion sizes can vary accordingly. Concensus was also obtained as to "typical" proportions of ingredients eg. ratios of samp

to beans. These foods were then frozen so that it would be possible to use real foods during the training of the field workers for the actual study.

The final questionnaire consisted of a 24-hour recall with 6 time periods of the day built into the layout, and additional closed-response questions on habitual intake.

A detailed manual was drawn up with instructions as to how the dietary questionnaire was to be completed.

Both the questionnaire and training manual were refined into their final forms after a formal pilot study had been conducted by 4 nursing sisters.

5. INTERVIEWER SELECTION AND TRAINING

a) Selection

As has been mentioned it was necessary to select fieldworkers who were Xhosa-speaking, from the community being surveyed, and intellectually able to meet the demands of the intricacies involved in the recording of dietary data as well as the burden of the study as a whole.

For the risk factor study, it was essential that the fieldwork team had to be registered professional nurses, who could draw blood samples from the participants under the supervision of the medical doctors on the team. The professional nurses had to be willing to work after hours and over weekends to visit participants in their homes. It was essential to get permission from their usual employers for them to receive additional payment. Their personal safety had to be addressed by means of suitable insurance for them and the transport that would be used by them. In addition support for the project by local groups for their protection was also sought. The ladies worked in uniform and the personal safety of no fieldworker fortunately was ever seriously threatened throughout the study.

b) Training of Fieldworkers for the Diet Study

The training of the nursing sisters was conducted by two dieticians, with the assistance of a third. This served as a form of peer review for the training itself (as the content of the delivery was constantly subject to scrutiny by at least one other dietician).

The 15 fieldworkers were divided into two groups as one large group would have become unwieldy and contact with individuals would have been lost, thus sacrificing quality of training.

During training real foods were used in the form of cooked dishes; raw foods, as well as examples of commercial products were also displayed. The sequence in the manual was followed, and the fieldworkers' kit was used throughout to measure quantities so they became familiar with its correct usage.

The kit was comprised of the following:-

* a measuring jug (250ml)
* a ruler (to measure sizes of portions)
* an engraved ladle with a graduated scale of volumes
* 5 numbered sponge models of various sizes (to simulate pot bread, pieces of meat, fish or whatever)
* a packet of popcorn (to simulate servings of samp and beans, mealie meal etc.)
* a bowl
* a mug
* a tea towel

The training took approximately 13 hours spread over 4 days and the following aspects were covered:-

- the correct completion of questions with suitable methods of probing for information, without introducing bias

- the means of conducting the 24-hour recall linking foods and drinks consumed, to the previous day's time periods and activities

- the validation of information by observing cooking facilities, cooking and serving utensils, and by interpreting lables

- the standardization of portion sizes where appropriate, for "small", "medium", "large", and "thickly", "medium" and "thinly" spread

- the appropriate ways of measuring portions of regular and irregularly shaped food items, using the kit

- the implications of accurate reporting (a coding exercise was conducted to illustrate this).

The overhead projector was used a great deal during the training so that the fieldworkers became familiar with the layout of both the questionnaire and manual. Informal discussion and debate were encouraged throughout, and questions regarding any areas of confusion were invited.

Trial interviews were conducted in pairs at the training venue - and these were marked and errors corrected. Finally interviews were carried out in the field, also as a training exercise, to identify and correct problem areas in the practical situation.

6. PROCEDURE IN THE MONITORING OF DATA COLLECTION AND QUALITY CONTROL OF QUESTIONNAIRES

Each evening after the fieldwork had been completed, the following procedure took place at RIND, where the blood samples and questionnaires were delivered:-

- blood samples and questionnaires were collated and counted
- person numbers were checked, and all items entered into the log book
- the diet questionnaires were checked for completeness, and then separated from the rest of the questionnaires after the person numbers on each had been checked
- the dietary questionnaires were then thoroughly checked by any one of three dietitians for
  * completeness
  * clarity - especially of the 24-hour recall
- a separate log was kept by the dietitians, with comments on each questionnaire thus giving a more detailed record with respect to the dietary study
- day-to-day queries were dealt with in several ways:-
  * telephonically with the fieldworker in person
  * questionnaire sent back via supervisors to be corrected and returned. In this case a polite, clearly worded sealed letter was attached explaining the nature of the problem and requesting specifically how it could be corrected.

At the beginning 1, in 5 questionnaires had to be returned but towards the end of the study, this had been reduced to approximately 1 in 10.

- fieldworkers were visited individually in some cases
- some queries arose from unclear handwriting, or the use of unknown brand names or terminology and it was often possible to solve these problems by means of a second opinion or a concensus decision.
- in a general sense, problem areas were dealt with in the form of a "dietary newsletter". The aim of this newsletter was:-
  * to encourage and motivate the fieldworkers, as they found the open-ended 24-hour recall difficult to handle
  * to point out common mistakes in an attempt to halt queries, as this was mutually time consuming.

Although these methods of monitoring were explained to the fieldworkers during training and cleared with them, the queries were not always well received.

Because of the great variation in dietary intake ranging from nothing to large quantities, the completeness of a 24-hour recall cannot easily be determined, but in this case in particular, a sound knowledge of eating patterns was important to serve as a background.

7. CODING, PUNCHING AND ERROR DETECTION

Coding was carried out by a home economist who had previous experience of dietary coding and who had observed food being prepared and quantified in the Black townships and had been involved at relevant stages of the piloting of the study.

The 24-hour recall was coded on the questionnaire and checked by 1 of 3 people (1 home economist and 2 dietitians).

The coded information was checked and transcribed by any 1 of 4 people (3 dietitians and a medical student) on to data sheets.

The codes for each 24-hour recall consisted of:-

- the person number (6 digits)
- the interviewer and sequence number (5 digits)
- who reported self, or in the case of a child, mother or other (1 digit)
- day of week (1 digit)

Within the 24-hour recall, for each food item the following codes were assigned

* boiled or unboiled (1 digit)
* consumed at home or away (1 digit)
* food specification (eg. commercially prepared, home-prepared or fresh, raw) (1 digit)
* time of day (in which food was consumed)
* source of moisture content (i.e. tap, commercially incorporated or naturally bound) (1 digit)
* the food code (4 digits)
* the mass consumed in grams (3 digits)

The RIND Food Composition Tables as well as the Food Quantities Manual were used as a basis for coding and quantifying items. For certain items which could not be quantified during coding, practical exercises were carried out to determine weights - eg. sheep's head, ox heel, specific lengths of "vetderm".

Traditional dishes were "flagged" by means of a dummy code, so that their frequency could be ascertained. In computing nutrient values, an appropriate food code was assigned to each (eg. "amasi" was dummy-coded 9901; to compute nutrient values the 0006 code for whole milk was used in substitution).

Assumptions were used in instances where the fieldworkers were not specific in their description of food items. These assumptions were based on observed practices in the community and discussions during the prepiloting stages of the study. These assumptions were in general:-

- specific codes for fatty meat and lean meat
- specific codes for gravies
- ratios for samp:beans
- selection of alternative codes for items not yet included in the RIND Food Composition Tables.

The coding was completed in approximately 6 months. The rate per day of an experienced coder ranged between 16 - 20 questionnaires. The process of checking was more difficult to time since concensus had to be reached as to problem areas, but this took approximately 3 - 4 months. Transcribing coded, checked questionnaires took approximately 4 - 5 months at a maximum rate of 40 per day (minimum 25 - 30).

Coding and punching was completed just short of a year.

Punching was carried out at the MRC and the analysis at U.C.T.

Data was checked for invalid codes.

The distribution by weight of food consumed, by single food codes, was plotted using BMDP. Outliers were checked against the original questionnaires.

CHAPTER 4

RESULTS AND DISCUSSION

1. ANALYSIS OF TOTAL LIQUID INTAKE

The data on liquid intake was analysed in terms of the three categories of liquid as defined in Chapter 2, namely:-

(a) tap water (local)
(b) commercial water (non-local tap water)
(c) water bound in food

Analyses for total consumption of each of these categories for males and females combined are presented in Table 1. Tap water represents the largest component of total intake, followed by water bound in food and then by commercial beverages.

Table 1. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Males and Females of all ages.

All ages Male and Female N=1415

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	663,54	550,6	623,27	16,57
Commercial Beverages (Total) ml/hd.d	298,72	0	464,05	12,34
Water bound in Food (Total) ml/hd.d	442,20	345,3	478,77	12,73
Total liquid ml/hd.d	1405,47	1267,7	705,38	18,81

These trends were reflected in the previous studies on the White and "Coloured" population (Bourne et al, 1987). The consumption figures are generally higher than those of the Coloured population, but lower than the values derived for Whites - with the exception of commercial beverages where Black intake exceeds that of Whites and "Coloureds". This can be attributed to increased consumption by Blacks of carbonated drinks, cordials and commercial beer. (Home-brewed beer with a local tap water base would not be included in this category).

Tap water consumption amongst Blacks is consistently lower than amongst "Coloured" and "Whites" - reflecting possibly a tendency to underreport tap water specifically. This will be dealt with more fully at a later stage.

In Tables 2 and 3, intakes for Black males and females are juxtaposed. Generally male consumption exceeds that of females in each of the categories with one exception. This trend was also reflected amongst Whites and "Coloureds".

Table 2. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Males of all ages.

All ages Male N=650

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	700,80	578,8	681,58	26,73
Commercial Beverages (Total) ml/hd.d	335,98	0	534,89	20,98
Water bound in Food (Total) ml/hd.d	477,53	359,2	530,58	20,81
Total liquid ml/hd.d	1516,97	1381	783,17	30,84

Table 3. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Females of all ages.

All ages Female N=765

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	629,45	544,0	567,43	20,52
Commercial Beverages (Total) ml/hd.d	264,63	0	391,34	14,15
Water bound in Food (Total) ml/hd.d	409,87	337,9	427,76	15,47
Total liquid ml/hd.d	1303,58	1194,5	615,47	22,33

Tables 4 - 12 present the data stratified by the same categories of liquid, for males and females. The age breakdowns used are identical to those in the previous Technical Report (Bourne et al 1987). It must be noted that in the age category of 5-11 year olds, males and females are combined as there are no inherent sex differences.

Table 4. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Males and Females aged 5 - 11 yrs

5 - 11 yr Male and Female N=248

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	420,55	322,6	380,27	24,15
Commercial Beverages (Total) ml/hd.d	260,99	190,9	318,45	20,22
Water bound in Food (Total) ml/hd.d	342,58	287,6	354,54	22,51
Total liquid ml/hd.d	1024,82	989,3	409,83	26,13

Table 5. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Males aged 12 - 17 yrs.

12 - 17 yr Male N=82

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	582,04	489,3	526,13	58,10
Commercial Beverages (Total) ml/hd.d	302,11	92,1	382,43	42,23
Water bound in Food (Total) ml/hd.d	399,19	322,7	410,14	45,29
Total liquid ml/hd.d	1287,66	1233,3	479,07	53,56

Table 6. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Females aged 12 - 17 yrs.

12 - 17 yr Female N=86

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	530,83	512,3	499,17	53,83
Commercial Beverages (Total) ml/hd.d	380,50	265,6	439,81	47,43
Water bound in Food (Total) ml/hd.d	334,39	206,5	392,98	42,38
Total liquid ml/hd.d	1246,67	1183,1	501,83	54,43

In the 12-17 year olds presented above it can be seen that the females consume more commercial beverages than the males. This is probably an adolescent phenomenon (see Tables 7 and 8 below).

Table 7. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Males aged 18 - 30 yrs.

18 - 30 yr Male n=173

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	749,33	678,8	626,03	47,60
Commercial Beverages (Total) ml/hd.d	366,70	170,6	503,19	38,26
Water bound in Food (Total) ml/hd.d	426,54	322,8	462,72	35,18
Total liquid ml/hd.d	1542,57	1438,8	605,33	46,02

Table 8. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Females aged 18 - 30 yrs.

18 - 30 yr Female n=211

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	635,87	576,0	534,21	36,78
Commercial Beverages (Total) ml/hd.d	241,05	0	437,76	30,14
Water bound in Food (Total) ml/hd.d	439,40	389,0	465,53	32,05
Total liquid ml/hd.d	1317,22	1238,1	529,51	36,54

The trend is markedly reversed in the 18-30 year olds where the male consumption of commercial beverages is considerably higher than in the females.

In subsequent age groups presented in Tables 9-12 all male values exceed those of females.

Table 9. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Males aged 31 - 54 yrs.

31 - 54 yr Male n=187

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	799,99	617,1	840,41	61,46
Commercial Beverages (Total) ml/hd.d	439,66	0	746,86	54,62
Water bound in Food (Total) ml/hd.d	570,95	379,4	691,63	50,58
Total liquid ml/hd.d	1815,30	1600,0	998,16	73,39

Table 10. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Females aged 31 - 54 yrs.

31 - 54 yr Female n=234

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	758,86	621,5	677,78	44,31
Commercial Beverages (Total) ml/hd.d	264,06	0	402,87	26,34
Water bound in Food (Total) ml/hd.d	469,92	375,6	459,67	30,05
Total liquid ml/hd.d	1495,70	1315,4	775,89	50,83

Table 11. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Males aged 55+.

55+ yr Male n=93

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	893,93	815,6	722,05	74,87
Commercial Beverages (Total) ml/hd.d	187,43	0	355,64	36,88
Water bound in Food (Total) ml/hd.d	610,03	520,6	503,11	52,17
Total liquid ml/hd.d	1691,49	1449,6	767,09	79,54

Table 12. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Females aged 55+.

55+ yr Female n=101

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	733,32	644,4	515,36	51,28
Commercial Beverages (Total) ml/hd.d	147,34	0	211,36	21,03
Water bound in Food (Total) ml/hd.d	388,88	317,0	353,12	35,14
Total liquid ml/hd.d	1256,68	1202,9	[illegible]	[illegible]

It can be noted that males consume substantially more water bound in food than females in the 55+ age group.

In the previous Technical Report (Bourne et al 1987) total liquid intake of males and females amongst Whites and "Coloureds" peaked in the 31-54 year old age group - as is the case with the Black population. In all groups, intake amongst the 55+ group declined.

The same trend occurred amongst all three population groups with tap water intake - a notable exception being the Black males aged 55+ (probably due to increased tea and coffee intake).

Commercial beverage consumption for both sexes peaked in Whites and "Coloureds" amongst 12-17 year olds (Bourne et al 1987) illustrating clearly an adolescent phenomenon. This trend is not reflected amongst Blacks. Males peak in the 31-54 year old group with only females in the 12-17 adolescent group with the highest consumption.

Trends in "water bound in food" are inconsistent in terms of age groups amongst all three population groups.

Tables 13, 14 and 15 present the same data for Blacks as appears above. However age categories have been condensed for the sake of clarity, so that data is expressed in terms of "Children, Adults and the Elderly".

Table 13. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Male and Female "Children" aged 5 - 14 yrs.

5 - 14 yr (Child) Male and Female n=333

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	464,84	386,1	414,97	22,74
Commercial Beverages (Total) ml/hd.d	277,08	194,7	347,53	19,04
Water bound in Food (Total) ml/hd.d	342,99	284,3	363,44	19,92
Total liquid ml/hd.d	1085,62	1025,6	446,49	24,58

Table 14. Liquid Consumption - Tap, Commercial and Water bound in Food and Total for Males and Female "Adults" aged 15 - 64 yrs.

15 - 64 yr (Adult) Male and Female n=983

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	721,92	608,9	664,09	21,18
Commercial Beverages (Total) ml/hd.d	320,72	0	507,04	16,17
Water bound in Food (Total) ml/hd.d	476,88	374,5	510,37	16,28
Total liquid ml/hd.d	1521,49	1382,8	738,35	23,63

Table 15. Liquid Consumption - Tap, Commercial and Water bound in Food and Totals for Male and Female "Elderly" aged 65+.

65 + (Elderly) Male and Female n=99

	Mean	Median	SD	SEM
Tap water (Total) ml/hd.d	792,88	676,2	640,47	64,37
Commercial Beverages (Total) ml/hd.d	158,66	0	308,95	31,05
Water bound in Food (Total) ml/hd.d	452,33	393,2	450,02	45,23
Total liquid ml/hd.d	1395,21	1256,3	734,10	73,78

2. TAP WATER - BOILED AND UNBOILED

Each item recorded in the 24-hour recall was classified as either boiled or unboiled, according to the following operational definition:-

A food or drink item is defined as "boiled" if its major components have been subjected to the boiling process during domestic - type preparation or commercial processing.

In this way, intake of tap water which had been boiled (eg via tea, coffee and dishes such as soups and stews) is compared with unboiled tap water (eg water consumed as such, and in cordials). Boiled and unboiled tap water intakes are presented in Tables 16 and 17 respectively.

Table 16. Tap Water, Boiled - Distribution by Age and Sex.

TAP WATER BOILED ml/hd.d

	n	Mean	Median	SD	SEM
5-11 M+F	248	323,80	293.3	346,09	21,98
12-17 M	82	374,24	325,4	382,50	42,24
12-17 F	86	351,94	302,3	378,51	40,81
18-30 M	173	555,30	457,3	582,43	44,28
18-30 F	211	438,41	328,1	453,02	25,49
31-54 M	187	644,09	538,4	753,71	55,12
31-54 F	234	563,63	438,8	533,04	34,85
55+ M	93	728,16	660,4	615,99	63,87
55+ F	101	597,92	498,1	467,40	46,51
All ages >5 M	650	541,47	436,7	603,60	23,67
All ages >5 F	765	456,46	360,7	468,50	16,94
All ages >5 M+F	1415	497,08	382,5	536,32	14,26

Table 17. Tap Water, Unboiled - Distribution by Age and Sex.

TAP WATER UNBOILED ml/hd.d

	n	Mean	Median	SD	SEM
5-11 M+F	248	96,75	0	214,30	13,61
12-17 M	82	207,79	0	395,29	43,65
12-17 F	86	178,89	0	359,20	38,73
18-30 M	173	194,02	0	432,97	32,92
18-30 F	211	197,46	0	370,23	25,49
31-54 M	187	155,90	0	462,89	33,85
31-54 F	234	195,23	0	515,25	33,68
55+ M	93	165,77	0	391,55	40,60
55+ F	101	135,39	0	243,38	24,22
All ages >5 M	650	159,32	0	401,35	15,74
All ages >5 F	765	173,00	0	388,29	16,94
All ages >5 M+F	1415	166,46	0	394,26	10,48

As can be seen, tap water intake in its boiled form is consistently higher than unboiled tap water for all ages. This, however, may be influenced by underreporting of tap water consumed casually. Respondents are more likely to remember consuming drinks such as cordials, tea and coffee than spontaneous drinking of water to quench a thirst.

The figure for mean boiled tap water intake for the Black population cannot be directly compared with that of the previous study, because of differences in the age structure. The previous study included 1-4 year olds which are incorporated into the mean, whereas the current study includes subjects from 5 years old and upwards. Nevertheless, with a somewhat "older" sample the mean for the current study being 497 m/head day is considerably lower than the 708 m/head day boiled tap water consumption for the previous study. (Bourne, Bourne and Hattingh 1988).

3. TAP AND TOTAL WATER - HOME AND AWAY

Each food and drink item was classified in terms of whether consumption occurred at home or away from home. The "at home" category was defined as being from the respondent's home or from a tap in the local residential area (ie local domestic water supply) and "away" was defined as being tap water consumed from a tap outside the local residential area (Effectively, the "at home" category in most cases, describes tap water consumed in the subjects own home).

The figures for tap water intake at home and away appear in Tables 18 and 19. Consumption at home is tenfold higher than that away from home. This is in marked contrast to Whites and "Coloureds" where home consumption is 5 times higher than away from home (Bourne, Bourne and Hattingh, 1988). This could be attributed to the high unemployment figures in the Black townships, as well as to the considerable presence of home-based industry e.g spaza shops, shebeens, and informal hairdressers, sewing circles and fast-food outlets. Furthermore, employed people may not have received beverages at work. It must also be noted that a packed lunch accompanied by a flask containing tea or coffee prepared at home, would be classified as "home" since the tap water source would come from the domestic water supply.

Table 18. Tap Water, Home - Distribution by Age and Sex.

TAP WATER, HOME ml/hd.d

	n	Mean	Median	SD	SEM
5-11 M+F	248	402,32	312,0	373,18	23,70
12-17 M	82	493,93	429,3	480,75	53,09
12-17 F	86	515,25	457,8	498,65	53,77
18-30 M	173	719,20	608,9	621,15	47,22
18-30 F	211	602,15	539,3	541,56	37,28
31-54 M	187	707,49	558,2	821,21	60,05
31-54 F	234	646,13	531,7	595,31	38,92
55+ M	93	829,80	756,1	864,40	88,89
55+ F	101	652,19	622,8	422,06	42,00
All ages >5 M	650	642,43	521,55	657,45	25,79
All ages >5 F	765	572,63	491,1	521,91	18,87
All ages >5 M+F	1415	605,98	505,2	588,89	15,65

Table 19. Tap Water, Away - Distribution by Age and Sex.

TAP WATER, AWAY ml/hd.d

	n	Mean	Median	SD	SEM
5-11 M+F	248	18.22	0	96.34	6.12
12-17 M	82	88.11	0	249.65	27.57
12-17 F	86	15.58	0	91.92	9.91
18-30 M	173	30.12	0	144.22	10.96
18-30 F	211	33.72	0	160.10	11.02
31-54 M	187	92.50	0	312.88	22.88
31-54 F	234	112.73	0	332.56	21.74
55+ M	93	64.1	0	242.99	25.20
55+ F	101	81.13	0	256.04	35.43
All ages >5 M	650	58.37	0	228.38	8.96
All ages >5 F	765	56.82	0	248.38	8.98
All ages >5 M+F	1415	57.56	0	239.32	6.38

Since all food items were classified as home or away it was possible to determine total liquid (ie tap + commercial + naturally found in food) in terms of these two categories. In this case, total liquid consumed at home is 5 times that consumed away. See tables 20 and 21.

Table 20. Total Water, Consumed at Home - Distribution by Age and Sex.

TOTAL WATER CONSUMED AT HOME ml/hd.d

	n	Mean	Median	SD	SEM
5-11 M+F	248	930.19	916.0	418.57	26.58
12-17 M	82	1052.51	1000.7	565.41	62.44
12-17 F	86	1083.14	1091.15	510.87	55.09
18-30 M	173	1253.41	1194.5	726.82	55.26
18-30 F	211	1135.78	1122.1	606.51	41.75
31-54 M	187	1361.12	1205.5	1032.01	75.47
31-54 F	234	1190.18	1045.5	823.36	53.82
55+ M	93	1464.51	1337.8	783.27	81.22
55+ F	101	1161.82	1108.0	473.73	47.14
All ages >5 M	650	1224.69	1113.4	800.43	31.39
All ages >5 F	765	1110.44	1049.1	634.46	22.94
All ages >5 M+F	1415	1165.03	1077.8	717.53	19.07

Table 21. Total Water Consumed at Away - Distribution by Age and Sex.

TOTAL WATER CONSUMED AWAY ml/hd.d

	n	Mean	Median	SD	SEM
5-11 M+F	248	93,92	0	224,95	14,88
12-17 M	82	230,82	0	376,44	41,47
12-17 F	86	182,57	0	356,60	38,46
18-30 M	173	289,15	0	477,02	36,27
18-30 F	211	180,54	0	404,70	27,86
31-54 M	187	449,48	0	772,95	56,72
31-54 F	234	302,66	0	467,11	30,53
55+ M	93	226,98	0	436,31	45,24
55+ F	101	107,72	0	372,55	37,07
All ages >5 M	650	289,61	0	550,26	21,58
All ages >5 F	765	193,50	0	397,14	14,36
All ages >5 M+F	1415	239,42	0	239,43	12,65

Thus it would seem that tap-water containing beverages are consumed very dominantly at home while other sources of fluid are to some extent more evenly spread between "home" and "away".

4. TAP AND TOTAL LIQUID - BY TYPE OF RESIDENCE AND ACCESS TO WATER SUPPLY

Tables 22 and 23 illustrate very clearly that intakes of tap and total water intakes do not vary to any real extent when the data is stratified in terms of house, shack and hostel. In other words biological requirement determines intake and that very crowded or less crowded housing makes no difference. This trend is further supported by data presented in Tables 24 and 25 where it is shown that access to water supply has no influence on consumption - even when it may involve walking some considerable distance with a very heavy bucket.

Table 22. Tap Water Consumed by type of Residence - Distribution by Age for Both Sexes Combined.

TAP WATER CONSUMED BY TYPE OF RESIDENCE ml/hd.d

	n	Mean	Median	SD	SEM
House					
Child (5-14) M+F	217	439,07	322,3	413,75	28,09
Adult (15-64) M+F	585	675,52	560,0	634,60	26,24
Elderly (65+) M+F	77	724,76	656,6	562,39	64,09
All ages >5 M+F	879	618,75	510,1	590,38	19,91
Shack					
Child (5-14) M+F	98	503,37	515,3	387,54	39,15
Adult (15-64) M+F	287	750,34	659,8	640,25	37,79
Elderly (65+) M+F	14	1142,86	792,4	940,67	251,43
All ages >5 M+F	399	700,37	620,1	616,31	30,86
Hostel					
Child (5-14) M+F	18	544,84	387,5	553,02	130,35
Adult (15-64) M+F	111	889,38	799,1	833,44	79,09
Elderly (65+) M+F	8	836,04	887,9	606,19	214,32
All ages >5 M+F	137	838,06	791,4	794,84	67,91

Table 23. Total Water Consumed by type of Residence - Distribution by Age for Both Sexes Combined.

TOTAL WATER CONSUMED BY TYPE OF RESIDENCE ml/hd.d

House		n	Mean	Median	SD	SEM
Child (5-14)	M+F	217	1080,10	1021,3	441,69	29,98
Adult (15-64)	M+F	585	1489,81	1346,4	736,25	30,44
Elderly (65+)	M+F	77	1324,67	1206,5	721,53	82,22
All ages >5	M+F	879	1368,93	1240,8	695,79	23,47
Shack						
Child (5-14)	M+F	98	1080,89	1026,1	443,57	44,81
Adult (15-64)	M+F	287	1552,42	1411,2	698,34	41,22
Elderly (65+)	M+F	14	1655,66	1493,1	741,37	198,14
All ages >5	M+F	399	1436,58	1301,3	681,35	34,11
Hostel						
Child (5-14)	M+F	18	1170,95	1119,4	518,29	122,16
Adult (15-64)	M+F	111	1580,57	1438,8	827,99	78,59
Elderly (65+)	M+F	8	1725,54	1463,4	636,60	225,07
All ages >5	M+F	137	1532,75	1390,1	793,57	67,80

Table 24. Tap Water - By type of water supply - Distribution by Age for Both Sexes Combined.

TAP WATER BY TYPE OF WATER SUPPLY ml/hd.d

Inside tap		n	Mean	Median	SD	SEM
Child (5-14)	M+F	203	440,92	322,2	423,87	29,75
Adult (15-64)	M+F	573	660,85	564,5	594,49	24,83
Elderly (65+)	M+F	73	722,11	656,6	567,47	66,42
All ages >5	M+F	849	610,99	515,2	564,18	19,36
Outside tap						
Child (5-14)	M+F	23	548,93	488,2	386,80	80,65
Adult (15-64)	M+F	86	805,28	473,2	1016,67	109,63
Elderly (65+)	M+F	7	1044,99	916,2	554,51	209,58
All ages >5	M+F	116	766,80	534,6	907,78	84,28
Communal tap						
Child (5-14)	M+F	107	490,03	499,4	403,11	38,97
Adult (15-64)	M+F	324	798,79	765,3	654,62	36,37
Elderly (65+)	M+F	19	971,89	676,2	874,00	200,51
All ages >5	M+F	450	729,45	652,55	631,43	29,76

Table 25. Total Water - by type of water supply - Distribution by Age for Both Sexes Combined.

TOTAL WATER BY TYPE OF WATER SUPPLY ml/hd.d

Inside tap		n	Mean	Median	SD	SEM
Child (5-14)	M+F	203	1074,58	1021,3	419,96	29,47
Adult (15-64)	M+F	573	1467,97	1346,7	715,88	29,91
Elderly (65+)	M+F	73	1322,82	1229,9	731,82	85,65
All ages >5	M+F	849	1356,35	1243,7	678,82	23,30
Outside tap						
Child (5-14)	M+F	23	1122,66	1126,0	445,77	92,95
Adult (15-64)	M+F	86	1590,55	1388,5	898,83	96,92
Elderly (65+)	M+F	7	1707,70	1721,7	586,43	221,65
All ages >5	M+F	116	1500,37	1281,9	830,99	77,16
Communal tap						
Child (5-14)	M+F	107	1095,48	1010,2	493,95	47,75
Adult (15-64)	M+F	324	1584,24	1443,1	720,19	40,01
Elderly (65+)	M+F	19	1603,35	1343,6	716,50	164,38
All ages >5	M+F	450	1464,47	1333,8	706,68	33,31

5. CONSUMPTION PATTERNS OF DRINKS - QUALITATIVE

The following table illustrates the relative choice of drinks - expressed as percentage mass of total dietary intake.

Table 26. Relative contribution of drinks to total dietary intake by % Mass.

RELATIVE CONTRIBUTION TO DIETARY INTAKE BY % MASS

	Children 3-14	Adults 15-64	Elderly 65+
Milk, Yoghurt	8,8	7,7	7,1
Tea/Coffee	10,2	13,2	22,4
Fizzies/Cordials	9,3	10,1	5,3
Beer	-	5,2	6,1
Wines	-	0,2	0,2
Spirits	-	0,3	0,6
Water	15,3	15,2	1,8

CHAPTER 5

CONCLUSIONS

The mean total water intake per head for Blacks being 1,40 litres per day fell between that recorded for "Coloureds" at 1,26 litres per day and Whites at 2,16 litres per day in the previous study.

Thus the traditional 2 litres per head per day water intake which tends to be reported in the literature and which has been used by the World Health Organization (1971) and the Environmental Protection Agency (1976) remains a useful approximation for local use in the light of the Cape Town studies.

It is possible that the lower intakes for Blacks and "Coloureds" are due to underreporting (an inherent problem of the 24-hour recall method) of casual or spontaneous drinking directly from the tap using the hand as a cup. Such intake would not be associated with a social event, such as a family meal or tea break at work, and may thus easily be forgotten in recalling intake during the previous 24 hours. It may even be termed subliminal drinking under certain circumstances. Reporting of alcohol intake may also be under-estimated because of the possible bias introduced by having nursing sisters in uniform as field-workers.

Consumption of tap water intake below the level of consciousness may thus account for the tap water intake for Blacks at 664 ml/head being even lower than the "Coloured" tap water intake at 846 ml/head. Tap water for Whites intake was markedly higher at 1338 ml/head.

Liquid derived from commercially prepared drinks and foods consumed by Blacks exceeded that of Whites and "Coloureds". The mean intake for Blacks was 299 ml/head and for Whites and "Coloureds" 225 ml/head and 141 ml/head daily, respectively. This can be ascribed mainly to the increased consumption by Blacks of carbonated drinks and cordials, as well as commercial beer. Since carbonated drinks are relatively expensive to this generally poor sector of the population, there may well be an element of status symbolism behind this trend.

Blacks consume 83% of their total liquid intake at home. 52% of this is tap water. Of total tap water consumed 91% is consumed at home.

75% of tap water consumed is boiled.

Both tap water intake and total liquid consumption are not affected by access to the water supply. Stratification of this data in terms of type of housing also reveals that this does not influence consumption patterns.

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APPENDIX A.

COMPARISON OF BLACK LIQUID CONSUMPTION DATA FROM 'BRISK' STUDY WITH DATA FROM THE PREVIOUS CAPE TOWN STUDY

TABLE A1 TOTAL TAP WATER CONSUMED (mℓ/hd.d)
DISTRIBUTION BY SOCIO-ECONOMIC GROUP, SEASON AND SEX

	Winter Survey (1983)			Summer Survey (1984)		
	Male	Female	Both	Male	Female	Both
High Income White	882	1071	984	1184	1285	1237
Low Income White	1526	1533	1529	1513	1309	1404
High Income 'Coloured'	886	873	879	830	819	824
Low Income 'Coloured'	723	806	766	820	806	812
All Groups	1068	1124	1098	1127	1091	1108
Black	N/A			701	629	663

TABLE A2 TOTAL COMMERCIAL BEVERAGES CONSUMED (mℓ/hd.d)
DISTRIBUTION BY SOCIO-ECONOMIC GROUP, SEASON AND SEX

	Winter Survey (1983)			Summer Survey (1984)		
	Male	Female	Both	Male	Female	Both
High Income White	216	98	152	329	163	242
Low Income White	246	98	168	423	210	309
High Income 'Coloured'	141	95	115	224	115	165
Low Income 'Coloured'	208	112	159	154	93	120
All Groups	203	98	146	292	149	216
Black	N/A			336	265	299

TABLE A3 TOTAL WATER BOUND IN FOOD CONSUMED (mℓ/hd.d)
DISTRIBUTION BY SOCIO-ECONOMIC GROUP, SEASON AND SEX

	Winter Survey (1983)			Summer Survey (1984)		
	Male	Female	Both	Male	Female	Both
High Income White	827	629	719	858	634	740
Low Income White	530	398	461	683	510	591
High Income 'Coloured'	318	258	285	370	299	332
Low Income 'Coloured'	189	180	184	236	220	227
All Groups	531	411	466	572	435	499
Black	N/A			477	410	442

TABLE A4 MEAN TOTAL LIQUID CONSUMED (mℓ/hd.d)
DISTRIBUTION BY SOCIO-ECONOMIC GROUP, SEASON AND SEX

	Winter Survey (1983)			Summer Survey (1984)			Percent. Increase
	Male	Female	Both	Male	Female	Both	
High Income White	1925	1799	1857	2372	2083	2220	19.5
Low Income White	2303	2030	2160	2620	2031	2306	6.8
High Income 'Coloured'	1346	1226	1280	1425	1233	1322	3.3
Low Income 'Coloured'	1120	1099	1109	1211	1119	1160	4.6
All Groups	1803	1634	1712	1992	1677	1824	6.5
Black	N/A			1516	1304	1405	N/A

TABLE A5 TAP WATER CONSUMED AT HOME (mℓ/hd.d)
DISTRIBUTION BY SOCIO-ECONOMIC GROUP, SEASON AND SEX

	Winter Survey (1983)			Summer Survey (1984)		
	Male	Female	Both	Male	Female	Both
High Income White	704	962	844	869	1121	1002
Low Income White	1198	1355	1280	1172	1109	1139
High Income 'Coloured'	723	790	760	636	701	671
Low Income 'Coloured'	585	678	633	702	738	722
All Groups	852	1002	932	876	951	916
Black	N/A			642	573	606

TABLE A6 TAP WATER CONSUMED AWAY FROM HOME (mℓ/hd.d)
DISTRIBUTION BY SOCIO-ECONOMIC GROUP, SEASON AND SEX

	Winter Survey (1983)			Summer Survey (1984)		
	Male	Female	Both	Male	Female	Both
High Income White	177	108	140	315	163	235
Low Income White	327	178	249	340	200	265
High Income 'Coloured'	162	82	118	193	117	153
Low Income 'Coloured'	137	128	132	118	67	90
All Groups	216	122	165	251	139	191
Black	N/A			58	57	58

TABLE A7 TOTAL LIQUID CONSUMED AT HOME (mℓ/hd.d)
DISTRIBUTION BY SOCIO-ECONOMIC GROUP, SEASON AND SEX

	Winter Survey (1983)			Summer Survey (1984)		
	Male	Female	Both	Male	Female	Both
High Income White	1546	1613	1582	1813	1793	1803
Low Income White	1807	1748	1776	2031	1694	1851
High Income 'Coloured'	1071	1091	1082	1078	1021	1048
Low Income 'Coloured'	837	889	864	1013	1004	1008
All Groups	1426	1434	1430	1553	1435	1491
Black	N/A			1225	1110	1165

TABLE A8 TOTAL LIQUID CONSUMED AWAY FROM HOME (mℓ/hd.d)
DISTRIBUTION BY SOCIO-ECONOMIC GROUP, SEASON AND SEX

	Winter Survey (1983)			Summer Survey (1984)		
	Male	Female	Both	Male	Female	Both
High Income White	379	185	274	559	289	417
Low Income White	495	282	383	589	336	454
High Income 'Coloured'	275	135	198	346	211	274
Low Income 'Coloured'	283	210	245	198	114	152
All Groups	376	200	281	438	241	333
Black	N/A			290	193	239

APPENDIX B.

SPECIMEN QUESTIONNAIRE

UNIVERSITY OF CAPE TOWN AND MEDICAL RESEARCH COUNCIL

BRISK STUDY, 1990

All information is confidential and will be used only for research.

Office number [ ][ ][ ][ ][ ][ ] 6

[0][1]

1. Team [ ][ ]
2. Interviewer number [ ][ ]
3. Sequence number [ ][ ][ ] 15
4. Date (DD MM YY) [ ][ ] [ ][ ] [ ][ ]
5. Starting time ..... h ..... min [ ][ ] [ ][ ]
6. Area [ ][ ]
7. Sector [ ][ ]
8. Block/hostel/shack area [ ][ ][ ]
9. Site/number of hostel [ ][ ][ ][ ][ ]
10. No of houses (if more than one main dwelling) [ ]
11. Adjacent site number (if used) [ ][ ] 40
12. Status of site [ ]
13. If "other" (status=4), explain .....
    .....

Key to status (Use for both site and household)

1. Not at home
2. Refused
3. Proceed
4. Other
5. No-one in quota } for household only
6. Excluded }

Stop here unless status=3 ie "proceed"

14. Number of households on site [ ]
15. Number of household chosen [ ]
16. First household Status [ ]
17. Second household Status [ ]
18. Third household Status [ ] 46

19. If "other" (Status=4), explain .....
    .....
    .....

20. Sequence number of person in household (if more than 1 person interviewed in household) [ ]

21. Sequence number in family (if more than one person in family interviewed) [ ]

Blood sample (for adults over 15 years old)

Number of tubes [ ]

Code on tubes [ ][ ][ ][ ][ ] 54

Spare coding blocks [ ][ ][ ][ ][ ]

(Do not fill in) [ ][ ][ ][ ][ ] 64

Office number

BRISK 1990 [ ][ ][ ][ ][ ][ ] 6

[0][2]

I. GENERAL INFORMATION

1. Interviewer number [ ][ ] Sequence number [ ][ ][ ] [ ][ ][ ][ ][ ]

2. Index person: Postal address for results, if required.

Name and address: .....

.....

.....

.....

.....

2.1 Telephone number ..... (h)

..... (w)

3. Type of dwelling:

Built formal housing unit:	council or core house	1
	other (specify)	2
Informal shack-shelter:	on defined site (controlled)	3
	haphazard shacks (uncontrolled)	4
	backyard of formal house	5
Hostel		6
Tent		7
Other (specify)		8 [ ] 14

4. Is this dwelling:

Rented	1
Purchased (99 year leashold)	2
Squatting (no rent)	3
Other, specify	4
Don't know	5 [ ]

5. Do you have electricity available inside your household? Yes=1 No=2 [ ]

6. How is your water supplied?

Tap in house	1
Tap outside house	2
Shared tap (4 houses)	3
Communal tap (5 or more houses)	4 [ ] 17

7. What do you use for cooking?

	Yes	No		
Electricity	1	2		18
Gas	1	2		
Paraffin	1	2		
Wood	1	2		
Coal	1	2		
Other (specify)	1	2		

8. Do you have a fridge/deep freeze in your house? (in working order) Yes=1 No=2

9. Does any one or more persons in your household own a motor car? Yes=1 No=2

10. Do you listen to a radio in you household? Yes=1 No=2

11. Have you watched TV this week? Yes=1 No=2

12. Have you read a newspaper this week? Yes=1 No=2 28

II. DEMOGRAPHIC AND URBANIZATION INFORMATION

1. Sex — Male=1, Female=2

2. Age: date of birth [ ][ ] [ ][ ] [ ][ ] (Day, Month, Year) — Age at last birthday (yrs) [ ][ ]

Accurate=1 estimate=2

3. Place of birth ..... (Village/town) ..... (District) Office [ ][ ][ ]

3.1 Were you born in/on .....

rural village	1
a farm	2
a small town	3
a large town/city	4

4. Where did you spend most of your childhood? ..... (up to 10 years)

In a rural village	1
On a farm	2
In a small town	3
In a large town/city	4
Don't know	5

37

5. When was the first time that you came to a big city? (If born in city give year of birth)

Date: | 1 | 9 | | | year | 1 | 9 | | | 41

| | | month (new arrival) | | |

6.1 Have you spent any time periods away from the city, for at least a full year without a break, since you first arrived or since birth?

Yes=1	No=2	

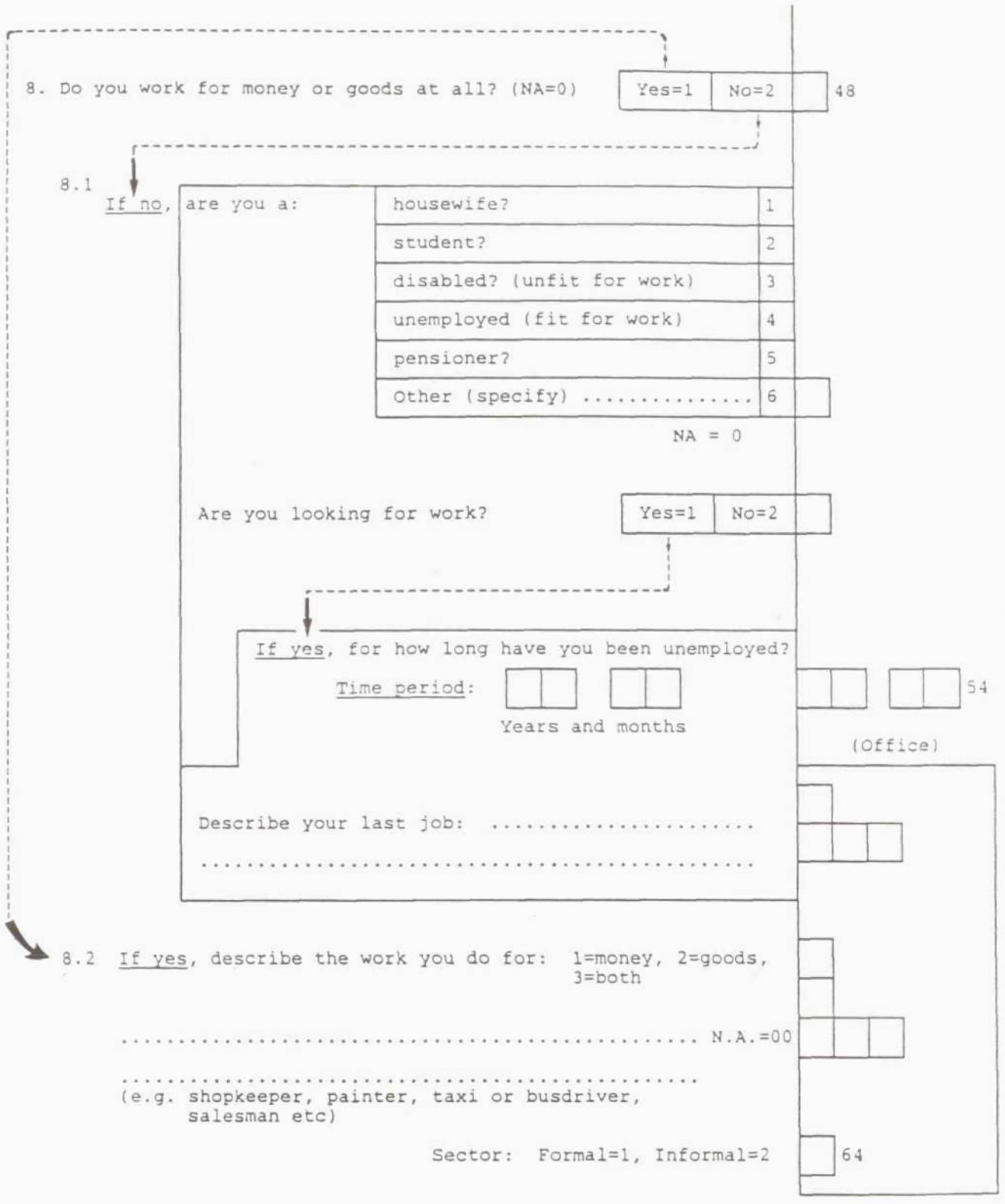
6.2 If yes:

Place	Length of time Years	Place	Length of time Years
1.		9.	
2.		10.	
3.		11.	
4.		12.	
5.		13.	
6.		14.	
7.		15.	
8.		16.	
TOTAL		TOTAL	

7. What is your home language?

Xhosa	1
Zulu	2
Sotho	3
Tswana	4
English	5
Afrikaans	6
Other (specify)	7
.....	

47


8. Do you work for money or goods at all? (NA=0)
Yes=1
No=2
48
8.1
If no, are you a:
housewife? 1
student? 2
disabled? (unfit for work) 3
unemployed (fit for work) 4
pensioner? 5
Other (specify) 6
NA = 0
Are you looking for work?
Yes=1
No=2
If yes, for how long have you been unemployed?
Time period:
Years and months
54
(Office)
Describe your last job: .....
.....
8.2 If yes, describe the work you do for: 1=money, 2=goods, 3=both
..... N.A.=00
.....
(e.g. shopkeeper, painter, taxi or busdriver, salesman etc)
Sector: Formal=1, Informal=2
64

9.1 What is the highest standard you passed at school?

No educational qualifications	01
Sub A	02
Sub B	03
Std 1	04
Std 2	05
Std 3	06
Std 4	07
Std 5	08
Std 6 or Form I	09
Std 7 or Form II, ETC	10
Std 8 or NTC I or Form III	11
Std 9 or NTC II or Form IV	12
Std 10 or NTC III or Form V	13

66

9.2 Do you have other training or education? Yes=1 No=2

If YES

Please indicate your highest qualification:

Formal training after school (eg NTC Diploma, IV or V nursing) - specify	1
Graduate training	2
Postgraduate training/education - Specify	3
Informal training - Specify	4
Other - Specify	5

68

Office No.

6

0 3

Person number

III. RISK FACTOR INFORMATION

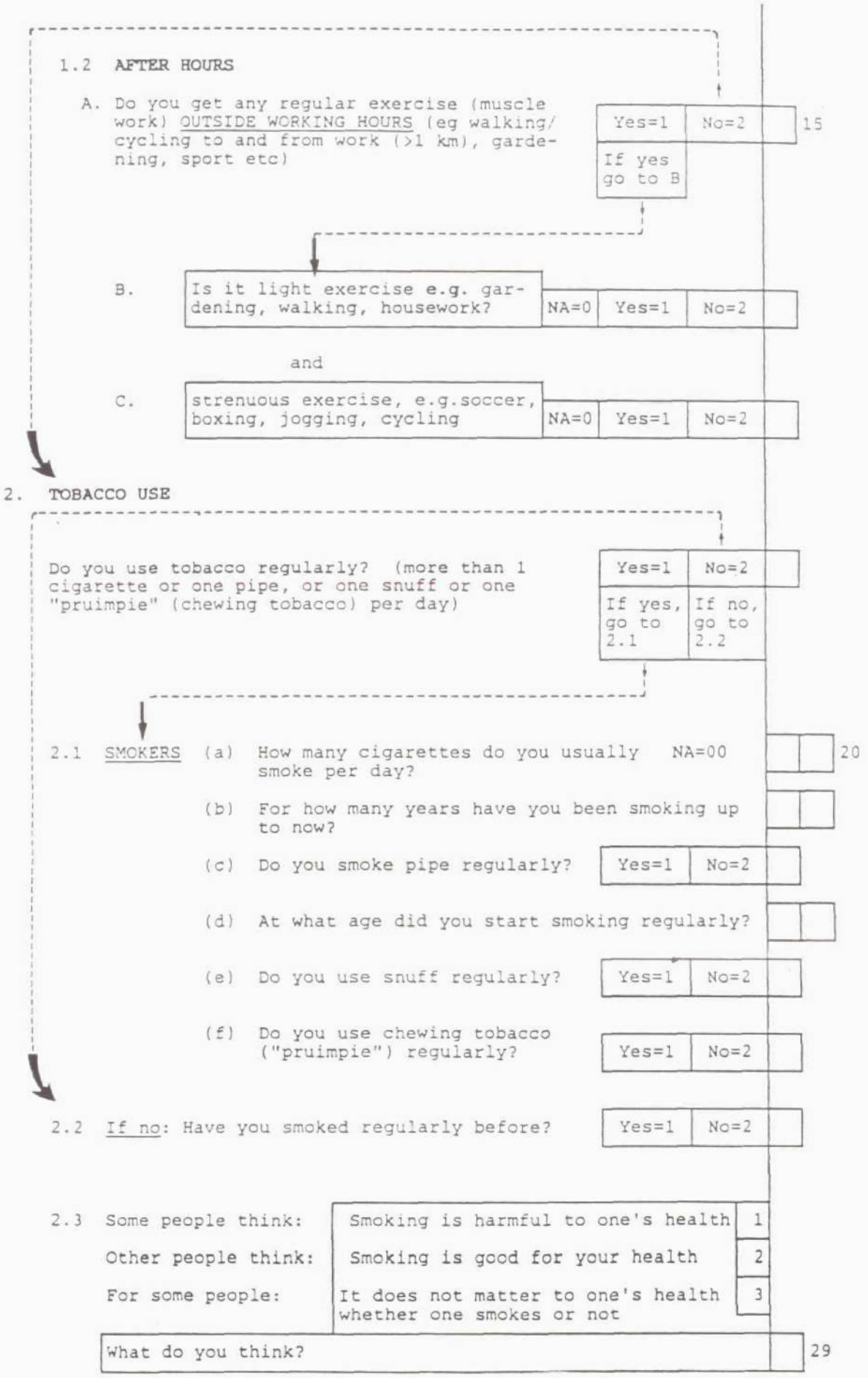
1. PHYSICAL ACTIVITY

1.1 WORKING HOURS

1.1 Does YOUR WORK involve mostly: Not working NA=0

	sitting and standing (minimal walking), e.g. office work, sewing, teaching	1
or	a lot of walking, e.g. postman, nursing, milkman, house cleaning	2
or	hard physical work (sweat work) e.g. building, digging, manual labour	3

14


1.2 AFTER HOURS
A. Do you get any regular exercise (muscle work) OUTSIDE WORKING HOURS (eg walking/ cycling to and from work (>1 km), gardening, sport etc)
Yes=1
No=2
15
If yes go to B
B.
Is it light exercise e.g. gardening, walking, housework?
NA=0
Yes=1
No=2
and
C.
strenuous exercise, e.g.soccer, boxing, jogging, cycling
NA=0
Yes=1
No=2
2. TOBACCO USE
Do you use tobacco regularly? (more than 1 cigarette or one pipe, or one snuff or one "pruimpie" (chewing tobacco) per day)
Yes=1
No=2
If yes, go to 2.1
If no, go to 2.2
2.1 SMOKERS
(a) How many cigarettes do you usually smoke per day?
NA=00
20
(b) For how many years have you been smoking up to now?
(c) Do you smoke pipe regularly?
Yes=1
No=2
(d) At what age did you start smoking regularly?
(e) Do you use snuff regularly?
Yes=1
No=2
(f) Do you use chewing tobacco ("pruimpie") regularly?
Yes=1
No=2
2.2 If no: Have you smoked regularly before?
Yes=1
No=2
2.3 Some people think:
Smoking is harmful to one's health
1
Other people think:
Smoking is good for your health
2
For some people:
It does not matter to one's health whether one smokes or not
3
What do you think?
29

3. **ALCOHOL**

Do you drink any alcohol?

Yes=1	No=2		30
If yes, go to 3.1	If no, go to 4 (pto)		

DRINKERS

3.1 How much alcohol do you drink on average on weekends?

KEY

1 drink equals

one glass of wine
one tot (25 ml) of hard liquor (brandy, rum, gin)
one beer (340 ml)
one carton (1l) (2 x 500 ml)
1/3 "concoction"

Non-drinker	0	
No drinking during the week	1	
1-2 drinks per day	2	
3-4 drinks per day	3	
5 or more drinks per day	4	
Communal drinking	5	

3.2 How much alcohol do you drink on average during the week?

Non-drinker	0	
No drinking during weekend	1	
1-2 drinks per day	2	
3-4 drinks per day	3	
5 or more drinks per day	4	
Communal drinking	5	

4. **MEDICAL HISTORY**

4.1 PERSONAL

(a) Has a doctor or nurse told you that you had or have:

	Yes	No	Do not know		
High blood pressure	1	2	3		
Diabetes or sugar in the blood	1	2	3		
Heart attack/angina	1	2	3		
Stroke: muscle paralysis, sensory loss	1	2	3		
High blood cholesterol (fats)	1	2	3		37

(b) Do you take medication prescribed by a doctor (pills or injections) for:

	Yes	No	Do not know	
High blood pressure	1	2	3	38
Diabetes or sugar in the blood	1	2	3	
Heart disease	1	2	3	
Other (specify)	1	2	3	

4.2 FAMILY

Do you have a close relative (father, mother, brother, sister or child) who has or had any of the following conditions?

	Yes	No	Do not know	
High blood pressure	1	2	3	
Diabetes/sugar in the blood	1	2	3	
Heart attack/angina	1	2	3	
Stroke	1	2	3	
High blood cholesterol (fats)	1	2	3	46

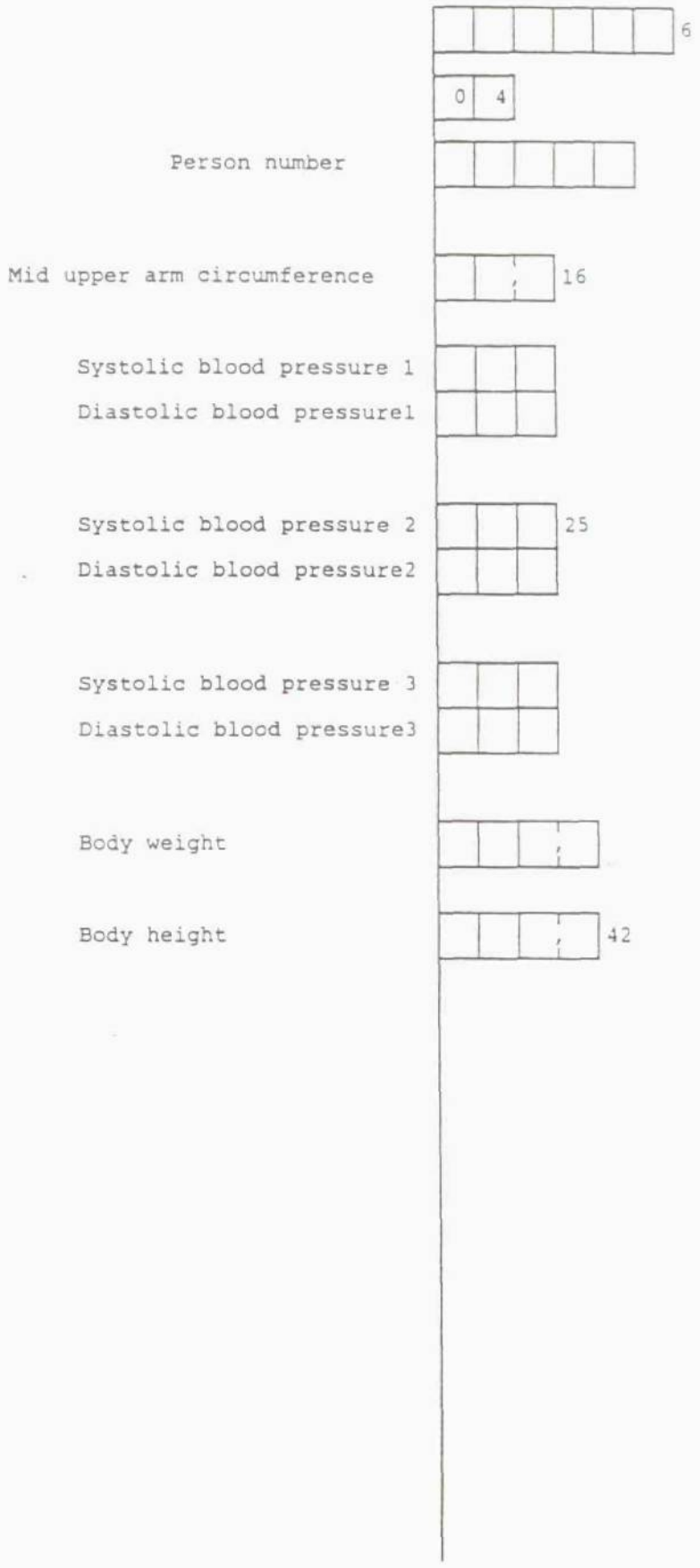
5. Have you attended any of the following health facilities in Cape Town during the past two weeks? (Read all the options)

	Yes	No	
Day hospital	1	2	
Clinic	1	2	
Private hospital/Provincial hospital	1	2	
Private doctor	1	2	
Chemist shop	1	2	
Christian faith healer	1	2	
Traditional healer or herbalist	1	2	
Health Services in the working situation	1	2	
Dentist	1	2	
Other, specify	1	2	

6. Are you covered by a Medical Aid or Medical benefit scheme? (Any scheme that helps you pay for health (drug services)

Yes=1	No=2		57
Do not know = 3			

BRISK MEASUREMENTS



IV. DIETARY INFORMATION

Office No. [ ][ ][ ][ ][ ][ ] 6

[0][5]

Interviewer: [ ][ ] Sequence number [ ][ ][ ] [ ][ ][ ][ ][ ] 13

Date:

We now change to questions on food.

1. Do you eat your food:

well salted?	1
OR lightly salted?	2
OR not salted?	3 [ ]

2. Do you add EXTRA SALT OR AROMAT/FONDOR to your serving of food?

No, I never add extra salt/Aromat	1
Yes, but TASTE FIRST and then add	2
Yes, even BEFORE having tasted the food	3 [ ]

3. Do you eat salty snacks more often than three times per week (i.e. luxuries such as chips, niknaks, salted peanuts, salty biscuits, biltong, dried sausage)

Yes=1 | No=2 [ ] 16

4. How many eggs do you usually eat per week (7 days)?

Do not eat eggs = [0][0] [ ][ ] 18

5. How are these eggs usually prepared, and at what meal are they usually eaten?

	N/A	Breakfast	Lunch	Evening meal	Between meals	
Fried in oil	0	1	2	3	4	[ ] 19
Fried in margarine	0	1	2	3	4	[ ]
Fried in dripping/butter	0	1	2	3	4	[ ]
Boiled	0	1	2	3	4	[ ]
Scrambled	0	1	2	3	4	[ ]
Egg dish (eg omelette, specify: .....)	0	1	2	3	4	[ ] 24

6. Do you usually eat the fat on meat? (Do not mention the options)

Yes=1 | No=2

Eat only lean meat 3

Do not eat meat 4 [ ]

7. Do you eat the skin of chicken (all poultry, duck, turkey)?

Yes=1 | No=2

Do not eat poultry = 3 [ ] 26

8. How often did you eat the following during the last week? (7 days)

Cheese	27
Fish (fresh and tinned)	
Chicken (excluding chicken feet)	
Beef, mutton, pork (including mince, sausage)	
Liver, kidney, brains	
Offal (including tripe, pootjies)	
Cold meats (polony, viennas)	
Peanut butter	
Dried beans, peas, lentils (excluding soup mix)	
Nuts (eg peanuts)	36

9. What fat is used <u>mainly</u> for:
Please tick appropriate column and supply brand name.

NO FAT = 0

	Butter (Brick)	Marg. (Brick)	Marg. (Tub)	Marg. (Tub) (Med.fat)	White Marg. (Holsum)	Oil	Lard Drip-ping	
Frying	1	2	3	4	5	6	7	37
Roasting and stewing	1	2	3	4	5	6	7	
Making cake and bread	1	2	3	4	5	6	7	
As spread	1	2	3	4	5	6	7	
In gravies	1	2	3	4	5	6	7	
With cooked vegetables	1	2	3	4	5	6	7	42

If in doubt, please comment .....

.....

.....

24 HOUR - RECALL - BRISK 1989

Person number

0	6

Record all food items consumed yesterday in ml or household measures accurately, and as neatly as possible
Use a new line for each item.

Yesterday was .....day

Time of day	Food Item	Amount	Preparation: Homemade, commercial, raw, canned, boiled, fried, baked	Home (H) or Away (A)
From waking up till ± 9 o'clock				
Midmorning (9-12)				
Lunch (± 12-2)				

Time of day	Food Item	Amount	Preparation: Homemade, commercial, raw, canned, boiled, fried, baked	Home (H) or Away (A)
Afternoon (2 pm - just before evening meal				
Evening meal				
After evening meal and during the night				
Comments (eg explain unusual eating pattern)				

As a check, please quickly run through yesterday's intake and activities again, to check for any left out items. Ask respondent how much water was consumed during this 24-hours:

Alone: (Fill in the appropriate column above i.e. time and quantity)

With pills: (how many times the day, how much water per time)

After brushing teeth: (how many times the day, how much water per time)

Time at end of interview: .....