Essay

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Community-based Research Projects: A New Educational Link Experience for Academia and Industry in Rio Negro, Argentina

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A preliminary community-based research program has been undertaken in General Roca, Rio Negro to explore the possibilities of integrating 'real experience' learning into future local undergraduate degree courses. The project involved the development of research methodology skills through the assessment of the health status of a regional population in Argentina using the elemental analysis of scalp hair. The project was carried-out by a 'professional training' undergraduate research student at the University of Surrey (UK) in collaboration with coordinators in Rio Negro (Argentina). Many problems needed to be solved, including cultural and language differences (English and Spanish), the preparation of a multi-functional questionnaire (in Spanish), a sample collection strategy, analysis and data reporting. Various strategies have been explored for the dissemination of the database for local health professionals, educational researchers and the community. This program illustrates how such community-based projects could be used in developing countries as cooperative education opportunities. (*Asia-Pacific Journal of Cooperative Education, 2004, 5(1), 50 - 59)*.

Keywords: Community-based research; professional training; cooperative education; Argentina

Cooperative education is not yet formally established in many South American universities where traditional degree programs are focused on academic learning with little or no 'real' integrated-learning or professional training in the community or industry. In many cases a stable economic climate is vital for such schemes to succeed such that local companies are able to provide co-operative education opportunities for local university students on a regular basis. In those universities that do some form of industrial placement within their academic units ('pasantíta'), only a few subjects have placement opportunities, for example, engineering, tourism, economics and journalism. At present medicine and environmental sciences are not generally covered within these programs. A typical 'pasantíta' is from three months to a year, and if the student is paid, this is based on less than the minimum wage of ca. 300 Argentine pesos or USD100. Furthermore, the work experience is basically routine with very little or no research challenges, is not assessed and rarely does the student have any academic support. As a result employers in such countries do not get access to a continuous stream of graduates who have 'real life' experience across most academic subjects, incorporating skilled, industrially or commercially trained and highly motivated young people.

The University of Surrey in the United Kingdom (UK) has for more than 40 years been involved in co-operative

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education activities, especially those involving both short and long term placements in professional workplaces (across most subject disciplines). Generally students spend the third year of their four-year degree program working as professionals in industry, the public sector or the professions, in the UK or abroad (University of Surrey, [UoS], 2003a, 2004b). Most students are paid by their employer and can be assigned to value-added projects by the company. This type of co-operative education program also provides an excellent platform for both the company and student to develop a relationship leading to enhanced graduate employment opportunities. However, the main emphasis is centered on 'professional training', with only a limited educational opportunity in developing research methodology skills. Moreover, recent surveys of UK employer's needs looked for during graduate recruitment clearly show that degree programs should integrate the learning of key skills (UoS, 2000a). In particular, communication (reading, writing, oral), numeracy, information technology, problem solving, interpersonal skills (especially working with others), an ability to recognize and adapt to cultural changes are all very important (UoS, 2000b).

A preliminary community-based research program was established in General Roca, Rio Negro, Argentina with a view to exploring how it would be possible to integrate 'real experience' learning projects into local undergraduate degree courses. Initial links were established through an international conference held in Buenos Aires which focused on establishing collaboration networks between European and South American academic and industrial groups. In particular, through a post-session discussion group meeting on exploring possible educational links between academia and industry it was decided with local academics to initiate a study using the University of Surrey professional training 'code of practice' in cooperative education. The resultant project was developed and carried-out by a 'professional training' undergraduate research student at the University of Surrey (reading for a MChem in Analytical and Environmental Chemistry) in collaboration with community and academic coordinators in Rio Negro. The main emphasis of the project was to provide the student with an opportunity to develop a personal working knowledge of undertaking research and incorporating all of the key skills listed above. The project covered a six month period from October 2002 to March 2003.

Community-based Research Project: General Roca, Rio Negro, Argentina

Research and Key Skills

This research project involved an assessment of the health status of a regional population in Argentina, including children and adults from a wide range of rural, small town and city community areas. The main assessment tools were the determination of the elemental content of human scalp hair samples in conjunction with a detailed statistical evaluation of the chemical data and the information from a multi-factorial questionnaire covering personal, socio-economic, dietary and medical details. The learning and development of the main research and key skills that were incorporated into the project design are outlined in Table 1.

Examples of specific project problems that needed to be solved by the research student included the cultural and language differences between the UK and Argentina, especially the need to communicate (orally and written) in English and Spanish. All Spanish translation was performed by the local General Roca research coordinators. Areas that needed to be continually assessed where those in which scientific instructions - sample collection requirements, questionnaire (Appendix) and "Trace Element Content of Scalp Hair and Human Health" dissemination documents (Table 2, this is presented here in English, but was translated into Spanish in the study). The reference population data (range and specific reference values for adults and children) are based on published literature values for UK populations, reviewed by the research student during the first month of the project. A further problem that needed to be resolved by the student was the design of the questionnaires. After many email communications with the local General Roca research coordinators it was decided to concentrate on establishing a database on people suffering from permanent or specific temporary health problems.

Research Project Outline

The Rio Negro area of Central Argentina is transected by a river system involving the Neuquén, Limay and Negro rivers. The first two rivers are formed in the mountain region (The Andes), then run through the foothills (ca. 50-100 km west to east), a region dominated by green prairies and low grass. Finally it reaches a plateau (ca. 300 m above sea level) consisting of an arid region with a great variety of slow growing plant species, especially low bushes. The Negro river runs through this desert region in a U shaped valley. In the Upper Negro River Valley there are varying sized communities and agricultural activities (mainly fruit growing orchards). In this Upper Valley, Neuquén is the main city (population of ca. 300,000) located precisely in the confluence of the Limay and Neuquén rivers. In addition, among the 20 other towns in the region, there is Cinco Saltos (on the low Neuquén River), Cipolletti and General Roca on the Negro River. As such the rivers have many sources of potential chemical pollutants from untreated sewage, effluents from the food industry (fruit packing plants) and chemical works (PVC plastics, tile/ceramics, etc). Only in urban locations is the river water treated for human consumption, and throughout several areas irrigation channels are used for recreational purposes. It is not necessary to enumerate the health risks that such a situation might bring and it was considered that the contaminants, if any, present in human scalp hair could lead to the identification of contaminants in the environment, especially in water.

During the first month of the project a network was set-up via email to establish the sample collection (based on a detailed review, carried-out by the research student, of the existing procedures outlined in published papers) and sample population selection criteria (based on regional maps

Table 1
Main research and key skills incorporated into the community-based project

Research Skills		Key Skills	
Research planning	Literature search Review 'normal' UK reference hair database Timetable	Communication (oral and written)	English and Spanish Regular email and reporting between (UK-Argentina)
Analytical methodology	Sample collection Pre-analysis preparation Quality control (CRMs)	Numeracy	Instrument calculations Literature data Significant figures/units
Questionnaire	Multi-factorial (English and Spanish) Type of questions and statistical relevance	Information Technology	email Word/Excel spreadsheets Graphics
Data analysis	Instrument (precision and accuracy) Internal standard correction Significant figures	Problem solving	English and Spanish translation Sample size and washing Analysis difficulties Calculation difficulties
Statistical analysis	Population analysis Significance tests Correlation analysis	Interpersonal/Team work	UK-Argentina networking Student – supervisor interaction
Report writing	Graphics Tables Literature review Interpretation and conclusions	Culture/Foreign language	English – Spanish Questionnaire interpretation Argentina – cultural variability
Data dissemination	Individual data sheets Workshops/small group presentations	Initiative/ Adaptability	Non-supervised periods

and regional/local government and community-based groups – ADECS). It was decided to obtain a good cross-section of both urban and rural populations, mainly because they have different water supplies – rural individuals drink mostly untreated well water whilst urban people consume treated river water. Several specific communities were selected, such as, Cinco Saltos (site of a major chemical industry, now closed), Lago Pellegrini which is twenty kilometers from Cinco Saltos, (site of a rural community located beside an artificial lake where the residents drink well water and consume the local fish), Cipolletti (beginning of the Negro river), Neuquén (main city and site of Cerámica Zanón tile works), General Roca (mixed urban and rural socio-economic families).

Various methods were used for approaching individuals in terms of project participation. In some areas local community-based workshops (ADECS) were used to talk to parents (mainly mothers), or through health centers where local nurses helped to identify families that may be at risk of poor health (malnutrition for example). Most samples were collected at the residence by a specifically trained person (to ensure the quality control of the project) and also involved a brief discussion covering the project outlines. Written consent was obtained for all cases included in the study and was followed-up by completing the research questionnaire shown in the Appendix. It was essential that the trained sample collector (three individuals in the study) completed the questionnaire so as to ensure traceability of the data recording and also provide assistance in special cases, like children. Furthermore, all individuals in the study could read and write, but because the questionnaire (Appendix) contained a mixture of written responses and multiple choice answers, it was decided that the trained sample collector (and/or a trained helper) completed the forms.

Human scalp hair samples were collected using the method generally accepted in the scientific literature, namely, from the nape of the neck, mid-point between the shoulders, and cut as close as possible to the skin. The hair fibers were then carefully placed on a clean surface (fresh tissue paper) and tied together with a strand of new cotton so as to ensure that the research student could correctly identify the recent hair growth end. All samples were stored in new self-sealing plastic bags and labeled with a code number. On completion of the sample collection, all hair material was delivered to the research laboratory at the University of Surrey by personal courier.

All hair samples were prepared and analyzed blind (that is no knowledge of any individual) using analytical methods developed by the research student. Although this report will not detail the analytical methodology developed in the

Table 2
Rio Negro elemental content of washed scalp hair: total and normalized population results

		Elemental Concentration (μg/g)			
Major		Reference Range	Reference Value* Adult	Child	Your Sample
	Calcium	300 - 1300	600	500	
	Iron	15 - 35	25	20	
	Magnesium	30 - 80	40	35	
	Potassium	40 - 150	70	70	
	Sodium	35 - 140	50	50	
Essential Trace					
	Arsenic	0.08 – 2.50	0.35	0.25	
	Chromium	0.5 – 2.5	1.5	1.0	
	Cobalt	0.05 – 1.0	0.3	0.25	
	Copper	10 - 35	18	15	
	Iodine	0.10 – 1.0	0.4	0.25	
	Manganese	0.10 – 4.5	1.5	1.25	
	Molybdenum	0.04 – 0.5	0.2	0.2	
	Nickel	0.1 – 2.0	1.0	1.0	
	Selenium	0.8 – 3.0	2.0	1.8	
	Vanadium	0.05 – 1.0	0.2	0.1	
	Zinc	120 – 200	170	155	
Non-Essential Trace					
	Aluminium	1.5 – 5	< 2.0	< 1.5	
	Cadmium	0.1 – 0.5	< 0.15	< 0.08	
	Lead	0.8 – 5.0	< 3.0	< 1.5	
	Rubidium	0.1 – 4.0	< 1.0	< 1.0	
Project Elements					
	Gold	0.002 – 0.125	< 0.050	?	
	Mercury	0.04 – 7.50	2.00	< 0.2	
	Silver	0.025 – 1.5	< 0.05	?	

* Reference values are dependent on several factors including age, sex

Table 3
Sample demographic based on location (N=144)

Location		n	Male / Female	Age range (years)
City	Neuquén	14	M (14); F (0)	25 – 59
	Cipolletti	12	M (2) ; F(10)	1.6 – 60
	General Roca			
	Bo. Nuevo (low socioeconomic)	11	M (3) , F(8)	2.5 – 44
	Centro (high socioeconomic)	9	M (2) ; F (7)	5 - 78
	260 viviendas	8	M(3) ; F (5)	6.3 – 63
Small City	Cinco Saltos	21	M (2) : F (19)	3.8 – 78
Rural	Cervantes	16	M (9): F (7)	1.45 – 44
	Traful	16	M (8) : F (8)	6 – 78
	GR- Bo. Masconi	17	M (5) ; F (12)	1.75 - 65
	C. Saltos – L. Pellegrini	20	M (5) ; F (15	0.6 – 45

project, it is important to state, that the student completed the various 'skills' outlined in Table 1. As an example, during the second month of the project (whilst samples were being collected in Rio Negro) the research student completed a detailed literature search of existing studies so as to select details on sample mass for good replicate analysis (precision requirements), hair washing to remove sources of external contamination, sample digestion for instrumental analysis, quality control procedures (to ensure high levels of accuracy and precision) and analysis (by

inductively coupled plasma mass spectrometry; ICP-MS). Having selected the methods to be used, numerous studies were undertaken in the laboratory to establish the analytical protocols for this project (Hammond, 2003). All of the hair samples from Rio Negro were prepared and analyzed during months 3-4. The sample demographic statistics are outlined in Table 3. Overall, there were 144 individuals, 53 males and 91 females, covering the age range of 0.6 to 78 years.

The study was designed to cover the three areas in the valley so as to show the general distribution of elements in scalp hair of the region. The cities of Cipolletti, General Roca and Cinco Saltos were selected. The first two are the bigger of the cities on the Negro River and Cinco Saltos is one of the main habitations on the Neuquén River. In the main city of the region (Neuquén) only samples from the Zanón company workers were taken. In each location at least two sites were visited, one rural and the other in the city, for they have different water supplies (well or river in that order). In all cases people were invited to participate. It was intended to get as many children as possible for their health status may be more at risk from the presence of chemical pollutants in the environment, especially the water supply. Everybody that offered participated regardless of age, sex or any other consideration.

Analytical Quality Control – Skills Development

As previously outlined, one of the main objectives of this project was to enable the student to develop a personal working knowledge of undertaking research and incorporating many of the key skills outlined in Table 1. In this type of research combining the skill requirements for analytical method development and numeracy/IT is very important. Such training for the student may not be available in a traditional co-operative education industrial value-added project, as the company may have customer confidentiality or quality assurance requirements regulating the student input to the work program. Furthermore, most international companies work under a quality control program, such as ISO 9000, which means that the student normally only does routine laboratory work following the set procedures of the company. Such laboratories do not allow the student to gain competence in research method development practices. In this research-based co-operative education project the student can be fully trained to develop both the analytical methods and establish the necessary quality control data to establish the reliability (accuracy and precision) of the elemental results for the hair samples. As an example, the research student had to learn about the steps of undertaking the instrumental calibration for each element and then using Microsoft Excel to calculate the final elemental concentrations of each hair sample. Table 4 outlines this procedure for the determination of aluminium. It should be noted that the computer does not automatically report the elemental concentrations according to the correct number of significant figures. This has already been established by the research student through a set of experiments on the instrument to establish the elemental detection limit for the developed procedure. Only when this correction is made can the elemental result be placed in either the Excel spreadsheet for further statistical calculations or entered onto the individual case sheets. It is quite clear that just within this set of operations the student gains knowledge of using instrument software, commercial IT software for calculating data and a sense of significant figures and concentration units. All of these are important skills to be acquired for future career opportunities. The student also has to develop a level of independence as the supervisor was not permanently available during the project.

Results

It should be stressed that this report is not intended to provide a detailed overview of the results and interpretation of the research project. However, various components will be presented so as to illustrate the detail of the resultant data and how the student has acquired a working knowledge of both statistical and graphical methods of data presentation. This is important in terms of the dissemination of the data to the individuals who provided the samples and for the future exploitation of the database for local community health professionals, educational researchers or government officers.

Table 5 lists the elemental concentrations obtained for the Rio Negro population. More than 20 elements were determined in this study. The results are presented as mean values (ppm dry weight basis) and as minimum and maximum concentrations. Two population sets are listed; the total population data set reports all of the values for all the samples analyzed. However, in using this type of data for assessing the 'typical' values for the Rio Negro population those individuals with outlier (very low or high) elemental levels may be rejected from the database so as not to have a significant influence of the population mean. As such, the student had to learn about the different types of 'normalization' or rejection criteria used in the scientific literature. In this case the Chauvenets "Criterion Method" was adopted thereby producing the 'normalized' population database which can now be used for future studies to assess other health or environmentally-related problems in the study area. Furthermore, the Rio Negro database can also be compared with the UK database, also reported in Table 4, or any others published in the scientific literature using the same washing procedures.

The completed questionnaires also provided an opportunity to extend the student's knowledge of statistical calculation and interpretation, namely the use of significance testing (effect of gender or age). Table 6 reports those elements for the 'normalized' population shown to have a statistically significant difference between gender groups (based on a Student t-test).

Dissemination of Data

An important aspect of this community-based research project is the dissemination of the database to local health professionals, educational researchers and the community. In collaboration with the coordinators in Rio Negro, the student had to help develop a new individual case feed-back form, similar to that shown in the Appendix but

Table 4
Instrumental (ICP-MS) calibration and aluminium concentration calculation – combining research and key skills (numeracy/IT)

Sample	Mass	27 Al	Al*Inrat	Al-blank	Al*tmda	Al*df(ppm)	115 In	In ratio
10ppb std		36077	36527.26	18129.83	Average tmda		278511	1.01
20ppb std		49227	48820.32	30422.88	3369.64		284336	0.99
Tmda		1438351	1399950	1381552	410		289722	0.97
slrs-3		66775	64936.66	46539.22	13.81133		289970	0.97
71	0.2115	333300	317244.7	298847.2	88.68817	20.96647	296258	0.95
72	0.2624	456265	443657.9	425260.5	126.2035	24.04793	290000	0.97
73	0.2466	210128	206142.4	187745	55.71662	11.29696	287439	0.98
74	0.2227	488621	466003.9	447606.5	132.8351	29.82377	295673	0.95
75	0.2104	318902	321309.7	302912.2	89.89453	21.36277	279874	1.01

Note:

1. Each aluminium standard solution (10, 20 ppb) ion count signal is corrected for instrumental drift by calculating the ratio of the elemental signal with the mean indium (In ratio) internal standard, to give (Al*Inrat). This value is then corrected for any instrumental blank signal (Al-blank). The quantitative level of aluminium in the individual hair samples (71 to 75) can then be determined by either using the calculated least squares line (produced by the Excel software) or by use of an external quality control standard (tmda reference material). In this case, the tmda solution was analyzed throughout the time period of operating the instrument, so the average ion count signal is calculated for tmda, the correction value is obtained using the known Al content of tmda (410 ppb) to produce the Al concentration in the prepared digested hair sample solution (Al*tmda). Finally, the Al concentration for the individual samples is calculated using the dilution factor, a correction for both the sample mass and the volume of sample solution used, to produce the final value (Al*df(ppm)).

incorporating the 'normalized' Rio Negro population data in Table 5. Furthermore, using the information gathered from the initial scientific literature search a "Trace Element Content of Scalp Hair and Human Health" document was produced in English and Spanish, so as to accompany the individual case feed-back form. This was designed so that the Rio Negro coordinators could carry out local workshops and small group sessions, especially in rural and inner-city low socio-economic areas whereby individuals could gain a better understanding of their own results and what courses of action to take to promote a higher standard of health. The health professionals involved in the group sessions were also responsible for helping the participants to understand their results and suggest courses of action for those individuals who were lacking certain essential trace elements.

Conclusion: Community-based Research Projects for Developing Countries

In general, this preliminary community-based research program undertaken in General Roca, Argentina has explored the possibilities of undertaking an integrated 'real experience' project within the framework of a possible co-operative education component of an undergraduate degree program. In many developing countries, especially in South America, Africa or Asia, co-operative education placements are not readily available due to: (1) a lack of industrial or commercial partners; (2) the instability of the national or local economy; or (3) a lack of academic support from traditional teachers who recognize only theoretical university taught degrees.

The community-based research project outlined here was undertaken by a 'professional training' student at the University of Surrey, so as to show that it is possible for a student to carry out such a research program. Secondly, the main emphasis of the project was to develop research methodology skills with strong training and implementation components covering both research and key skills (as listed in Table 1). Such research skills are not necessarily incorporated into many industrial-based 'professional training' placements due to company quality assurance or customer requirements. The main benefits for the student in undertaking such a type of co-operative education experience are: (i) gained knowledge of project organization and operation, including project design, problem solving, meeting deadlines and report writing; and (ii) developing personal competences (communication, numeracy, information technology, interpersonal and team work, cultural and language development, adaptability, etc). It should also be noted that there is the added benefit of the motivation factor when the student is working on real data and knowing the effect the results will have on the individuals and population under study (especially those people with a high risk of poor health due to poor nutrition and little access to medicine). The direct collaboration of local community coordinators, such as the co-authors and local groups (ADECS), can replace the traditional 'industrial employer' of more recognizable co-operative education arrangements. Unfortunately, student financial support has

Table 5
Rio Negro – Elemental content of washed scalp hair, total and normalized population results

Element	Reference Range: UK	Concentration (μg/g) Mean (Min:Max): Total population	Mean (Min:Max): 'Normalised' population
Major			
Calcium	300 – 1300	688 (80 : 3211)	579 (80 : 1688)
Iron	15 – 35	20 (0.3 : 71.8)	20 (0.3 : 71.8)
Magnesium	30 – 80	94 (11 : 441)	77 (11 : 230)
Potassium	40 – 150	96 (22 : 332)	89 (22 : 217)
Sodium	35 – 140	178 (17 : 849)	147 (17 : 493)
Essential Trace			
Arsenic	0.08 – 2.50	0.25 (0.08 : 1.14)	0.22 (0.08 : 0.55)
Chromium	0.5 – 2.5	1.07 (0.05 : 7.25)	1.04 (0.05 : 7.25)
Cobalt	0.05 – 1.0	0.35 (0.03 : 4.69)	0.28 (0.03 : 1.10)
Copper	10 – 35	20.3 (8.6 : 163.1)	19.3 (8.6 : 38.3)
Iodine	0.10 – 1.0	0.52 (0.14 : 1.23)	0.49 (0.12 : 0.92)
Manganese	0.10 – 4.5	2.11 (0.17 : 45.97)	1.46 (0.17 : 11.23)
Molybdenum	0.04 – 0.5	0.22 (0.02 : 0.83)	0.20 (0.02 : 0.47)
Nickel	0.1 – 2.0	0.96 (0.15 : 6.13)	0.80 (0.15 : 2.46)
Selenium	0.8 – 3.0	1.65 (0.89 : 3.58)	1.61 (0.89 : 2.39)
Vanadium	0.05 – 1.0	0.13 (0.009 : 0.82)	0.12 (0.01 : 0.36)
Zinc	120 – 200	165 (62 : 518)	164 (83 : 243)
Non-essential Trace			
Aluminium	1.5 – 5	8.4 (0.6 : 51.0)	7.0 (0.6 : 23.4)
Cadmium	0.1 – 0.5	0.09 (0.002 : 2.00)	0.07 (0.01 : 0.36)
Lead	0.8 – 5.0	3.54 (0.23 : 50.7)	2.89 (0.23 : 13.78)
Rubidium	0.1 – 4.0	0.14 (0.02 : 0.67)	0.12 (0.02 : 0.34)
Project Elements			
Gold	0.002 – 0.125	All <0.005	All <0.005
Mercury	0.04 – 7.50	0.02 (0.002 : 1.91)	0.004 (0.002 : 0.290)
Silver	0.025 – 1.5	All <0.001	All <0.001

Table 6
Differences based on gender groups for the 'nomalized' population (student t-test)

Element	t calc value/DF [1]	Level of Significance	Trend: M (male); F(female)
Aluminium	3.53 (90)	S***	M > F
Arsenic	2.64 (91)	S**	M > F
Cadmium	3.35 (74)	S***	M > F
Calcium	-2.41 (128)	S**	M < F
Copper	1.93 (99)	S	M > F
Iron	6.43 (80)	S***	M > F
Lead	5.95 (70)	S***	M > F
Magnesium	-1.81 (127)	S	M < F
Manganese	2.68 (91)	S***	M > F
Molybdenum	2.94 (97)	S***	M > F
Sodium	2.51 (97)	S**	M > F
Vanadium	3.36 (98)	S***	M > F
Zinc	2.07 (113)	S*	M > F

[1] DF = degrees of freedom; level of statistical significance, S = 95%, p<.05, S* = 97.5%, p<.025, S** 99%, P<.01, S*** 99.9%, p<.001

not been possible within this project. But in the future it is proposed that such projects could be financed by local companies or government agencies, with the student taking full advantage of being directly involved in the fieldwork. For many developing countries community-based projects could be a useful method of establishing co-operative education opportunities within local university degree programs. Furthermore, such projects may also contribute to helping the local community establish a research base to be used in developing local health policies. Finally, there is also the benefit of offering a means for students to become familiar with community issues that could help them understand problems in their or other communities, and thereby enabling them to become better citizens.

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APPENDIX

WATER PROJECT – HAIR STUDY

Code Number: [ ] **Collection Date:** [ ]

Name: _

Address: _

_ _

_ _

Residence:	How long have you lived here?	_ _ _ _ _ _ _	years
	Where did you live before?	_ _ _ _ _ _ _	town/city
	Number of members of family	_ _ _ _ _ _ _	adults
		_ _ _ _ _ _ _	children

Personal Information: (For the sample code above)

Sex:	[ ]	Male	[ ]	Female
Age:	[ ]	Years	[ ]	Months
Height:	[ ]	Metres	[ ]	Centimetres
Weight:	[ ]	Kilograms		

General Health: _

_ _

Do you have any permanent illness? [ ] Yes [ ] No

If yes: _

_ _

What temporary illness have you had in the last 12 months?

[ ] None Or _

_ _

_ _

Diet : How many meals do you eat a day?

[ ] Number

What is your basic diet (sources and quantities)?

List main foods for each meal*

Meal

	_ _
	_ _
	_ _
	_ _

*Note: Include all sources of protein, carbohydrate, fruits/vegetables and fats.

Drinking water: What sources of drinking water do you use?

☐ Bottled ☐ Tap ☐ Other _ _ _ _ _ _ _ _ _ _

Do you consume commercial beverages? If yes....

☐ Name ☐ Quantity per day/week

Children only:

Does your child attend school? ☐ Yes ☐ No

If yes, School_ Grade_ _ _ _ _ _ _ _ _ _ _

How would you describe their academic achievement? _
_ _

Adults only:

Are you employed? ☐ Yes ☐ No

If yes: Where _

Type of work _

Do you smoke? If yes, how many per day? _ _ _ _ _ _ _ _ _ _