



Appendix 1: Ministry of Health Ethics Committee Approval letter

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MINISTRY OF HEALTH
PRIVATE BAG 0038
GABORONE

REPUBLIC OF BOTSWANA

REFERENCE No: PPME: 13/18/1 Vol V11 (649)

11 October, 2012

Principal Investigator: Bontle Mbongwe

Department/ Organization: University of Botswana

Protocol Title: **DEVELOPING A CLINICAL ASSESMENT TOOL FOR SCREENING LEAD EXPOSURE LEVELS DURING PREGNANCY AND AFTER DELIVERY**

Review Type: Health Research and Development Committee

Review Date: 05 October, 2012

Approval Date: 11 October, 2012

Expiration Date: 10 October, 2013

This certifies that the continuing review request for the protocol above was reviewed and approved for a period of 1 year.

The research poses minimal risk to participants

The study has not been activated

Enrollment is still ongoing

Study is still open for data analysis and report writing

includes only collection of data from voice, video, digital, or image recordings made for research purposes

research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior)

Research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Continuing Review

In order to continue work on this study (including data analysis) beyond the expiration date, the Health Research and Development Committee (HRDC) must reapprove the protocol after conducting a substantive, meaningful, continuing review. This means that you must submit a Continuing Report form as a request for continuing review. To best avoid a lapse, you should



Appendix 2: University of Pretoria Ethics Committee Approval Letter

The Research Ethics Committee, Faculty Health Sciences, University of Pretoria complies with ICH-GCP guidelines and has US Federal wide Assurance.

- * FWA 00002567, Approved dd 22 May 2002 and Expires 13 Jan 2012.
- * IRB 0000 2235 IORG0001762 Approved dd Jan 2006 and Expires 13 Aug 2011.



Faculty of Health Sciences Research Ethics Committee
Fakulteit Gesondheidswetenskappe Navorsingsetiekkomitee

DATE: 26/06/2009

| | |
|-----------------|---|
| PROTOCOL NO. | 110/2009 |
| PROTOCOL TITLE | Developing a Clinical Assessment Tool for Screening Lead Exposure Levels During Pregnancy and After Delivery. |
| INVESTIGATOR | Principal Investigator: Ms B Mbongwe |
| SUBINVESTIGATOR | Not Applicable |
| SUPERVISOR | Prof K Voyi kvoyi@med.up.ac.za |
| DEPARTMENT | Dept: School of Health Systems and Public Health E-Mail: bm190460@gmail.com |
| STUDY DEGREE | PhD (Environmental Health) |
| SPONSOR | None |
| MEETING DATE | 24/06/2009 |

This Protocol and Informed Consent have been considered by the Faculty of Health Sciences Research Ethics Committee, University of Pretoria on 24/06/2009 and found to be acceptable

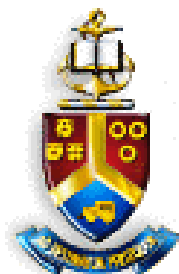
* Members attended & Feedback at the meeting .

- Prof A Nienaber (female) BA (Hons) (Wits); LLB; LLM (UP); PhD; Dip 1.Datometrics (UNISA)
- Prof V.O.L. Karusseit MBChB; MFGP (SA); MMed (Chir); FCS (SA)
- Dr N K Likibi MB.Ch; Med.Adviser (Gauteng Dept.of Health)
- Dr T S Marcus (female) BSc (LSE), PhD (University of Lodz, Poland)
- *Snr Sr J. Phatoli (female) BCur (Eet.A) BTec (Oncology Nursing Science)
- *Dr L Schoeman (female) B.Pharm, BA Hons (Psy), PhD
- *Dr R Sommers (female) MBChB; MMed (Int); MPharMed;
- Mr Y Sikweyiya MPH; SARETI Fellowship in Research Ethics; SARETI ERCTP; BSC (Health Promotion) Postgraduate Dip in Health Promotion
- *Prof TJP Swart BChD, MSc (Odont), MChD (Oral Path), PGCHE
- *Dr A P van Der Walt BChD, DGA (Pret) Director: Clinical Services of the Steve Biko Academic Hospital
- *Prof C W van Staden MBChB; MMed (Psych); MD; FCPsych; FTCL; UPLM; Dept of Psychiatry

DR R SOMMERS; MBChB; MMed (Int); MPharMed.
Deputy Chairperson of the Faculty of Health Sciences Research Ethics Committee, University of Pretoria

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Appendix 3: Client Consent Form



UNIVERSITY OF PRETORIA
&
UNIVERSITY OF BOTSWANA



UNIVERSITY OF BOTSWANA

PhD Research Topic:
Clinical Assessment Tool for Screening Lead Exposure
Levels during Pregnancy and After Delivery

Client Consent Form Information Sheet

For collection of blood, Environmental Samples and access to information after delivery.

PRINCIPAL INVESTIGATOR CONTACT DETAILS:

Bontle Mbongwe, University of Pretoria, **Contact telephone Numbers:** 3905809 (Home); 355 5238 (work)

Mobile Number: 718 01975 or 72301975

E-mail address: mbongwe@mopipi.ub.bw OR bm190460@gmail.com

THE PURPOSE OF THIS CONSENT FORM:

This consent form is meant to provide you with information and to invite you to participate in a research project intended to develop clinical assessment tool for screening lead exposure levels during pregnancy until two months after delivery

INTRODUCTION TO THE STUDY:

We invite you to participate in a study intended to assess lead exposure levels among pregnant women until they deliver. If you are within the ages of 15 and 49 you qualify for the study.

Lead is absorbed into the body following inhalation, ingestion and skin absorption. Once a person is exposed, lead is distributed throughout the body. Several studies have shown that lead levels increase in pregnancy rising overall by 20-30%. This therefore suggests your fetuses could potentially be exposed to significant amounts of lead during pregnancy. Short-term effects of lead include headache, fatigue, nausea, abdominal cramps and joint pains. Long-term effects include forgetfulness, irritability, tiredness, impotence and depression morbidity and mortality from exposure in *utero*. Other potential consequences for pregnant women include high blood pressure, still-births, pre-term births, etc. The potential effects of low-level lead exposure on reproduction in humans are a cause for concern.

In developed countries screening mechanisms have been put in place to safeguard the health of women, children and their babies. Such mechanisms include blood-lead test analysis. The tests are however, extremely

expensive and developing countries such as Botswana faced with competing health priorities can not afford to send every pregnant woman for blood lead tests.

This study therefore seeks to collect information that can be used to develop screening tool that can be used by health workers to identify lead exposure levels in pregnant women. The tool will enable the health workers to detect whether the blood lead test is necessary or not.

The specific objectives of the study are:

- a) To determine blood-lead levels in pregnant women aged 18-49 years in city of Gaborone and Serowe/Palapye villages.
- b) To estimate lead levels and related health outcomes during pregnancy and two months after delivery.
- c) To assess pregnancy related behaviours and practices that have an influence on the severity of lead poisoning among women of reproductive age.
- d) To identify environmental lead sources soil, water and paint and blood using stable isotopes of lead.

NUMBER OF PARTICIPANTS:

Approximately 500 women will participate in the study and data collection is expected to last 15 months (June 2009-September 2010).

WHAT WILL HAPPEN DURING THE STUDY?

Interested participants will be recruited from Government and private clinics with or without maternity. Once you have signed this form, you will be issued with a risk assessment questionnaire, which will ask you questions about yourself, personal behaviours, cultural practices, tobacco use, diet, type of energy used at home, etc. A trained and experienced phlebotomist will then collect blood samples from you three times during the your entire pregnancy. A final blood sample will be collected after you deliver your baby. During the study, a registered nurse will be engaged to make clinical observations throughout your pregnancy. This may include following you at your home.

You will be issued a unique identifying number at the time you sign the consent form. You will be requested to donate approximately a tablespoon of blood (15 ml) in two containers of 7mls each. The blood sample will be taken to the laboratories in South Africa for testing. We will only collect blood samples from through your permission. If you are not feeling well at the time of blood collection please inform the phlebotomist in order to decide whether to take a sample or not. The blood collection will be repeated during your 2nd and 3rd trimester and once after delivery.

For us to know where you could be getting you blood lead levels from, we will also collect soil, water and paint samples at your home or in the surrounding grounds only once during your pregnancy. A second sample may only be collected if you change locations during pregnancy. These samples will also be sent to the laboratories in South Africa for testing. If you eat soil or non-food items during pregnancy, we will also take such a sample for analysis.

An appointment will be made with you for a home visit prior to the collection of the environmental samples (soils, water, etc.). No activity will be undertaken at your home without prior arrangements.

WHAT ARE THE RISKS INVOLVED WITH BEING ENROLLED IN THIS STUDY:

Your safety in blood collection will be given the highest priority possible. This will be achieved through the employment of a qualified phlebotomists and a registered nurse who will be recruited and trained specifically for this purpose.

Drawing of blood is normally done as part of routine medical tests and presents a slight risk of discomfort. It may result with a bruise at the puncture site. You are assured of protection by the employment of experienced personnel to perform the procedure under sterile conditions.

WITHDRAWAL FROM THE STUDY:

You may refuse to take part in this study or, once in the study, you may decide to discontinue participation at any time.

The data collected from you before you discontinue participation will be used by the study sponsor. Data, which has already been collected, will be maintained with the research records.

DATA COLLECTION AND CONFIDENTIALITY:

Maintaining confidentiality is important to this study. Any personal information concerning you will be identified by a number (coded). Your name will not appear in any publications or reports produced from this study.

You have the right to know about the data being collected on you for the study and about the purpose of this data.

WHOM SHOULD YOU CALL WITH QUESTIONS ABOUT THIS STUDY?

You have the right to ask the Principal Investigator, Bontle Mbongwe any questions concerning this study at any time. Her contact details are at the very beginning of this document. You may also contact the Ministry of Health at this address:

Head of Health Research Unit

Ministry of Health
Private Bag 0038
Botswana
Tel: (+267) 3914467 Fax: (+267) 3914697

POTENTIAL BENEFITS OF PARTICIPATION

By taking part in this study, you will know your blood-lead levels and whether some interventions are necessary to reduce the levels either at home or workplace. Should your blood lead-level exceed the Centers for Disease Control action level of 10µg/dL, you will (should you so wish) be informed as well as receive information and advice on possible interventions for reducing exposure to lead. You are advised to indicate at the end of this consent form if you will be interested in knowing your blood-lead level. You may also be referred to a medical practitioner for further assistance should the levels exceed the recommended action level.

Other benefits include acquisition of knowledge on lead and how you can avoid possible or further exposure. The results of this project may also help researchers acquire more money to expand this study to other study groups such as infants and school children in Botswana as well as motivating the Government to make it mandatory for all pregnant and lactating women to have blood-lead level screening.

YOUR RESPONSIBILITY:

You are responsible for providing accurate information about yourself during pregnancy and after delivery. This will help us to determine whether blood samples should or should not be collected from you. By giving this consent, you are also giving us permission to consult you antenatal and postnatal cards. After delivery,

your baby will be examined by a qualified midwife for any abnormalities which could be associated with high lead levels.

CLIENT STATEMENT OF CONSENT:

I voluntarily consent to participate in this study. I understand the nature and the purpose of the study.

The information I have been given has mentioned both possible risks and benefits to consider before participating in this study.

I have been given time and an opportunity to read the information carefully, to discuss it with others and to decide whether to take part in this study.

I understand that I am free not to participate in the study or to withdraw at any time.

I confirm that I have informed the investigator and/or the project team to the best of my knowledge of my health status prior to the study.

I understand that I will keep a copy of the signed and dated consent form for my own records. By signing and dating this consent form, I have not waived any of the legal rights that I would have if I were not a participant in the study.

| | | | |
|-------------------|-----------|------|--------------|
| Head of Household | Signature | Date | Printed Name |
|-------------------|-----------|------|--------------|

| | |
|---------------------------|-----------|
| Your Name/ (Print Name/s) | Signature |
|---------------------------|-----------|

Your date of birth

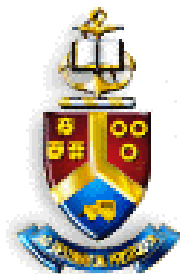
Would you like to know your blood-lead level Yes No

Contact Details:
 Postal Address _____ Plot number _____
 _____ Area/Kgotla _____
 _____ Tel: _____
 _____ Cell: _____

For Official Use Only: _____

Client ID Ref #.....

Appendix 4: Risk Assessment Questionnaires for Trimester 1, 2 & 3



UNIVERSITY OF PRETORIA

School of Health Systems and Public Health

PhD Research Topic:

**Developing a Clinical Assessment Tool for Screening Lead Exposure
Levels During Pregnancy and After Delivery**

Risk Assessment Questionnaire (First Trimester)

About this questionnaire:

This questionnaire is part of the research targeting women aged 18 to 49 years, who are pregnant and have consented to take part in this study. Women who are eligible to respond to these questions must have signed a consent form and have a full understanding of the requirements of the research.

A trained research assistant will ask the client questions and complete the questionnaire on her behalf.

The client/respondent is therefore requested to spend 30 to 45 minutes to complete the questionnaire. After responding to the questionnaire, a blood sample will be collected as soon as possible.

Date Interview Completed:

| | | |
|----|----|----|
| DD | MM | YY |
| | | |

Interviewer Contact details:

First and last Names:

| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Mobile Phone:

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| + | 2 | 6 | 7 | | | | | | | | | | | | | | | | |
|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Email address:

| For Official Use: | |
|---------------------------------|--|
| Client Ref ID Code # | |
| Date of first interview | |
| Date of first blood Test | |
| Date of water collection | |
| Water sample ref ID | |
| Date of soil collection | |
| Soil sample ref ID | |
| Pica material collected | |
| Pica sample Ref ID | |
| Soil field rapid test conducted | |
| Field soil ref ID | |
| Field Water rapid test done | |
| Field water ref ID | |
| Dust field rapid test done | |
| Field dust ref ID | |
| Hematocrit test done | |
| Hematocrit test ID | |

| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

SECTION A: CLIENT INFORMATION

All questions must be attempted.

1. Client ID REF. CODE # (As in Consent Form).....
2. Study Area Code #.....
3. Health Facility Code:
4. Current place of residence: village/town/.....
5. Length of stay at the present address:
 - Days (specify).....
 - Weeks (specify).....
 - Months (specify).....
 - Years (specify).....

6. Where did you live before you came to stay here? (Please fill as appropriate, you may tick more than one response)?

| Area | Name | Length of stay |
|------------------------|------|----------------|
| Urban area in Botswana | | |
| Rural Area in Botswana | | |
| Other | | |

7. Date of birth:

| | | |
|----|----|----|
| DD | MM | YY |
| | | |

8. Marital status (please tick as appropriate):

- Single
- Married
- Divorced
- Other (Please specify).....

9. Level of education:

- Primary
- Secondary
- Tertiary
- non-formal
- Other (please specify).....

10. Religion:

- Christian
- Islam
- Hinduism



- Buddhism
- Other (Please specify).....

11. Number of Pregnancies including this one:

- None
- 1
- 2
- 3
- More than 3

12. Ages of Children:

| Child | Age |
|-----------------------|-----|
| 1 st child | |
| Last child | |
| N/A | |

13. Length of breastfeeding:

| Child Number | Months/years | Comments |
|-----------------|--------------|----------|
| 1 st | | |
| Last | | |
| N/A | | |

14. Do you plan to breastfeed this child?

- Yes
- No

15. Your last menstrual period:.....

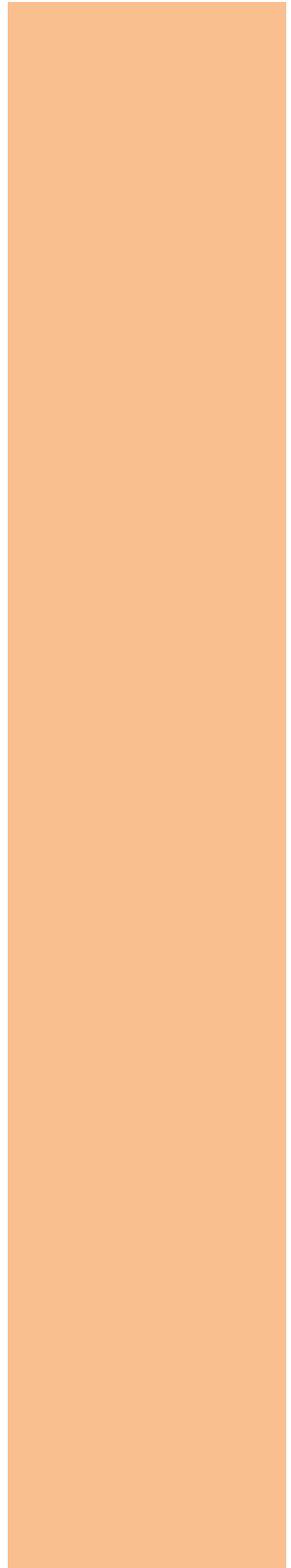
SECTION B: EMPLOYMENT AND YOUR OCCUPATION:

16. Are you employed:

- Yes
- No

17. Monthly income (in Pula):

- Less than 1500
- 1500-2500
- 2501-3500
- 3501-4500
- 4501-5500
- 5501-6500
- 6501-7500
- 7501-8500
- 8501-9500
- More than 9500





18. Occupation (Please tick as appropriate)- US Bureau of Labour Statistics Criterion):

| Occupation category | Job title | Yes | No | Years/months worked |
|----------------------------------|-----------|-----|----|---------------------|
| Management | | | | |
| Professional & related | | | | |
| Service | | | | |
| Sales & related | | | | |
| Office & administration support | | | | |
| Farming, fishing and forestry | | | | |
| Construction, trades& related | | | | |
| Installations ad repairs | | | | |
| Production | | | | |
| Transportation & material moving | | | | |
| Armed forces | | | | |
| Other | | | | |

19. Do you ever work with:

| Item | Yes | No | Years/months worked |
|--|-----|----|---------------------|
| Pigments | | | |
| Painted surfaces (house) | | | |
| Painted surfaces (bridge, other structure) | | | |
| Spray painting | | | |
| Solder material (new) | | | |
| Solder (old plumbing repair) | | | |
| Welding material | | | |
| Cleaning chemicals | | | |
| Cosmetics | | | |
| Television and radio repairs | | | |
| Car batteries | | | |
| Automobile radiators | | | |
| Pottery/ceramic glazes | | | |
| Scrap metal | | | |
| Bullets (lead shots) | | | |
| Lead glass | | | |
| Other (specify) | | | |

20. Is your spouse/partner employed

- Yes
- No

21. Spouse/partner income:

- Less than 1500
- 1500-2500



- 2501-3500
- 3501-4500
- 4501-5500
- 5501-6500
- 6501-7500
- 7501-8500
- 8501-9500
- More than 9500

22. Does your spouse/partner or other members of your family that you live with ever work with:

| Item | Yes | No | Don't know |
|--|-----|----|------------|
| Pigments | | | |
| Painted surfaces (house) | | | |
| Painted surfaces (bridge, other structure) | | | |
| Spray painting | | | |
| Solder material (new) | | | |
| Solder (old plumbing repair) | | | |
| Welding material | | | |
| Cleaning chemicals | | | |
| Cosmetics | | | |
| Television and radio repairs | | | |
| Car batteries | | | |
| Automobile radiators | | | |
| Pottery/ceramic glazes | | | |
| Scrap metal | | | |
| Bullets (lead shots) | | | |
| Lead glass | | | |
| Other (specify) | | | |

SECTION C: PERSONAL HABITS:

23. Do you wash your hands before eating/drinking?

- Never
- Occasionally
- Usually
- Always

24. Do you use any of the following tobacco products (Please tick as appropriate)?

| Tobacco product | Yes | No |
|-----------------|-----|----|
| Cigarettes | | |
| Rolled tobacco | | |
| Snuff | | |
| Chewing tobacco | | |



25. Do you wash your hands before using tobacco products?

- Never
- Occasionally
- Usually
- Always

26. Does anyone living with you smoke cigarettes?

- Yes
- No

27. Does anyone living with you smoke rolled tobacco?

- Yes
- No

28. Maternal Alcohol use during pregnancy:

| Alcohol use | Yes | No |
|------------------------------|-----|----|
| Not drinking at all | | |
| Binge drinking | | |
| One drink per day | | |
| Two drinks per day | | |
| Three or more drinks per day | | |

29. Did you drink alcohol before falling pregnant?

- Yes
- No

30. Have you used any recreational drugs:

- Yes
- No

31. At any time during your lifetime, did you eat any of the following non-food items (please tick as appropriate)?

| Item | Always | Usually | Occasionally | Never |
|---|--------|---------|--------------|-------|
| Soil | | | | |
| Clay (seloko) | | | | |
| Crushed pottery (nkgwana e e sidilweng) | | | | |
| Termite mounts (Seolo) | | | | |
| Crushed bone meal | | | | |
| Paint chips | | | | |
| Painted furniture | | | | |
| Matchsticks | | | | |
| Pencil | | | | |
| Other (Specify)..... | | | | |



32. If the answer is yes to any of the above, please indicate in the table below when you usually eat these items:

| Item | I started during this pregnancy | In all my previous pregnancies | Occasionally even when I am not pregnant |
|---|---------------------------------|--------------------------------|--|
| Soil | | | |
| Clay (seloko) | | | |
| Crushed pottery (nkgwana e e sidilweng) | | | |
| Termite mounts (Seolo) | | | |
| Crushed bone meal | | | |
| Paint chips | | | |
| Painted furniture | | | |
| Matchsticks | | | |
| Pencil | | | |
| Other (Specify)..... | | | |

33. Does anyone in your family have a history of eating soil, clay or anthill mounts (Please tick as appropriate?)

| Relative | Yes | No |
|----------|-----|----|
| Mother | | |
| Aunt | | |
| Father | | |
| Uncle | | |
| Sister | | |
| Brother | | |
| Other | | |

34. Have you renovated your home /place of residence recently (please tick appropriate answer:

| Renovation | Yes | No |
|-----------------------|-----|----|
| Less than a month ago | | |
| 1-3 months ago | | |
| 3-6 months ago | | |
| Over 6 months ago | | |

35. At any time during your lifetime did you use any of the following products to treat skin diseases/ringworm? (please tick as appropriate)

| Item | Yes (Specify ailment) | No |
|-----------------------------|-----------------------|----|
| Dry cell Batteries powder | | |
| Used Brake fluid oil | | |
| Other (Please specify)..... | | |

36. Have you ever used skin lightening creams?

- Yes
 No



37. How often do you dye your hair?

- Never
- Once a month
- Once every 3 months
- Other (please specify).....

SECTION D: DIET & HEALTH:

38. Have you recently experienced any of the following (Please tick all those that apply):

- Extreme tiredness
- Irritability or nervousness
- Metallic taste in your mouth
- Stomach aches or abdominal cramps
- Weak wrists or ankles
- Trouble sleeping
- Difficulty concentrations
- Muscle or joint pain
- Weight loss
- Headache
- Anaemia
- Constipation
- Nausea
- High blood pressure
- Low blood pressure
- Ringing of the ears
- Heart disease
- Type 1 diabetes mellitus (DM)
- Type 1 diabetes mellitus (DM)
- Other (please specify).....

39. Are you on anti-depressants

- Yes
- No

40. Are you on hypertension medication?

- Yes
- No

41. Periodontal care:

| Condition | Yes | No | Don't know | Don't Remember |
|--|-----|----|------------|----------------|
| Do your gums ever bleed? | | | | |
| Are your teeth loose? | | | | |
| Have your gums receded, or do your teeth look longer? | | | | |
| Have you seen a dentist in the last two years? | | | | |
| How often do you floss? | | | | |
| Have you had any adult teeth extracted due to gum disease? | | | | |



| | | | | |
|--|--|--|--|--|
| Have any of your family members had gum disease? | | | | |
|--|--|--|--|--|

42. Have you had spontaneous abortion/miscarriage?

- Yes
 No

43. If yes, to above question, how many?

- One
 Two
 More than two

44. At what months were the abortions/miscourages?

| Trimester | Yes | No |
|-----------------|-----|----|
| 1 st | | |
| 2 nd | | |
| 3 rd | | |

45. Do you normally have a good appetite?

- Yes
 No

46. How often do you eat the following (please tick as appropriate)?

| Food item | Response | | | |
|-----------------------------|----------|-------------------------------|-----------------------|------------------------|
| | Everyday | Often (at least twice a week) | Seldom (Once a month) | Other (please specify) |
| Green leafy vegetables, | | | | |
| Citrus fruits(oranges, etc) | | | | |
| Legumes | | | | |
| Whole grains | | | | |
| Peas | | | | |
| Peanuts | | | | |
| Breakfast cereals | | | | |
| Red meat | | | | |
| Fish | | | | |
| Poultry | | | | |
| Eggs | | | | |
| Dried fruits | | | | |
| Milk | | | | |
| Ice cream | | | | |
| Yogurt | | | | |
| Canned fish(salmon) | | | | |
| Canned foods in general | | | | |

47. Are you using any supplements during this trimester?

| Supplement | Yes | No |
|------------|-----|----|
| Iron | | |
| Calcium | | |

| | | |
|---------------------|--|--|
| Folate (folic acid) | | |
| Zinc | | |
| Vitamin D | | |
| Other (specify) | | |

48. Did you use supplements prior to pregnancy?

- Yes
 No

49. If yes please indicate which supplements you have used prior to this pregnancy:

| Supplement | Yes | No |
|----------------------|-----|----|
| Iron | | |
| Calcium | | |
| Folate (Folic acid) | | |
| Zinc | | |
| Vitamin D | | |
| Other (specify) | | |

50. Do you use over the counter drugs currently?

- Yes (specify).....
 No

51. Do you use traditional herbs during this pregnancy?

- Yes
 No

52. If yes on the above question, mention the condition you are using them for?.....

53. Do you use any pottery dishes for cooking or storing food?

- Yes
 No

54. Do you ferment mabele or phaleche on a clay pot?

- Yes
 No

55. Do you ever fast at any stage of pregnancy?

- Yes
 No

SECTION E: HOUSING:

56. Your home is:

- Owned
 Rented
 Other (please specify).....

57. How do you describe the home:



- House (cement and brick)
- House (mud and brick)
- Informal house (shack)
- Other (please specify).....

58. How many people live in this house?

59. Is your home painted, pigmented (Please tick as appropriate)?

| Type of paint, pigment | Yes | No |
|--------------------------|-----|----|
| Oil paint | | |
| Water-based paint | | |
| Both water and oil paint | | |
| Pigmented (Lokgapho) | | |

60. Is the paint peeling from inside walls, doors or window sills of your home?

- Yes
- No

61. How old is the home (approximately)?

.....Years,Months

62. Is your near a busy road (approximately 500 M)

- Yes
- No

63. Is your home near a rail road or a railway station?

- Yes
- No

64. What fuel is used most for cooking in your home?

- Electricity
- Paraffin
- Gas
- Wood
- Coal
- Car batteries
- Other (please specify).....

65. Have you ever used treated wood or gum poles for heating or cooking?

- Yes
- No

66. Do you use cold or hot tap water for cooking?

- Yes
- No

67. Where do you get your water most of the time?



- Indoor tap
- Outdoor tap
- Rainwater tank
- Borehole
- River/stream
- Other (please specify).....

68. What type of plumbing (water pipes) does your home have?

- Plastic
- Metal
- Other (please specify).....

69. Do you damp dust or use feather duster when cleaning?

- Damp dust
- Feather dust
- Both

70. Do you dampen the ground when sweeping outside to reduce dust?

- Yes
- No

71. Do family members take off their shoes when entering the house?

- All the times
- Sometimes
- Never

72. How many cars are owned by people living in your home?

73. Does anyone do regular car repair work at your home?

- Yes
- No

74. Do your neighbors do car repair work at home?

- Yes
- No

75. Does anyone regularly do spray painting at your home?

- Yes
- No

76. Does anyone in your hose do paint art?

- Yes
- No

77. Does anyone in the household do Tv/radio repairs

- Yes



No

78. Is your home near a waste dump site?

Yes

No

SECTION F: SOCIAL ASPECTS

79. How many people live in this house?

1-3

4-6

7-9

More than 9

80. With whom do you live (you may circle more than one answer)?

My partner/husband

Both parents

Mother only

Father only

Other (please specify).....

81. What is the highest education qualification of your husband/partner/father/mother?
.....

82. What type of job does your husband/partner/father /mother have?
.....

83. Please describe the hobbies of people living in the house

Home remodelling

Car/boat repair

Radio/TV repair

Oil painting

Making stained glass

Repairing old painted wooden or metal toys

Glazing/making pottery

Jewellery making

Re-loading/target shooting

Using pastel art pencils

Furniture re-finishing

Welding

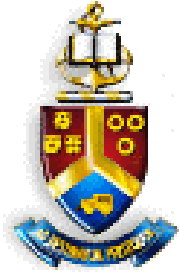
Other (please specify).....

84. Does your partner/husband/father/mother bring work clothes home for laundry?

Yes

No

END of Questionnaire, thank you for your time



UNIVERSITY OF PRETORIA

School of Health Systems and Public Health

PhD Research Topic:

Developing a Clinical Assessment Tool for Screening Lead Exposure
Levels During Pregnancy and After Delivery

For Official Use:

| | |
|------------------------------------|--|
| Client Ref ID Code # | |
| Date of 2 nd interview | |
| Date of 2 nd blood Test | |
| Ref ID for blood test | |
| Any follow up samples | |
| Hematocrit sample taken | |
| Ref ID for Hematocrit test | |

Risk Assessment Questionnaire (2nd Trimester)

This questionnaire is for follow up purposes when collecting blood samples during the second trimester.

The questionnaire is administered at the time of the second blood sample collection for lead analysis.

Date Interview Completed:

| | | |
|----|----|----|
| DD | MM | YY |
| | | |

Interviewer Contact:

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |

First and last Names Name:

| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Mobile Phone:

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| + | 2 | 6 | 7 | | | | | | | | | | | | | | | | |
|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Email address:

| | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

SECTION A: CLIENT INFORMATION:

1. Client ID REF. CODE # (As in Consent Form).....
2. Study Area Code #.....

3. Health Facility Code:
4. Current place of residence: village/town/
5. Is this the same place you lived at the last time you were interviewed?
 Yes
 No
6. Have your contact details changed since the first trimester:
 Yes
 No

7. If yes please provide the following:

| Physical address | Telephone contacts | Postal address |
|------------------|--------------------|----------------|
| | | |

8. Do you have a craving for any of the following non-food items at this stage (please tick as appropriate)?

| Item | Always | Usually | Occasionally | Never |
|---|--------|---------|--------------|-------|
| Soil | | | | |
| Clay (seloko) | | | | |
| Crushed pottery (nkgwana e e sidilweng) | | | | |
| Termite mounts (Seolo) | | | | |
| Crushed bone meal | | | | |
| Paint chips | | | | |
| Painted furniture | | | | |
| Matchsticks | | | | |
| Pencil | | | | |
| Other (Specify)..... | | | | |

9. Have you renovated your home /place of residence recently (please tick appropriate answer):

| Renovation | Yes | No |
|-----------------------|-----|----|
| Less than a month ago | | |
| 1-3 months ago | | |
| 3-6 months ago | | |
| Over 6 months ago | | |

SECTION B: DIET & HEALTH:

10. How do you feel this trimester? (Please tick all those that apply):
 Extreme tiredness
 Irritability or nervousness



- Metallic taste in your mouth
- Stomach aches or abdominal cramps
- Weak wrists or ankles
- Trouble sleeping
- Difficulty concentrations
- Muscle or joint pain
- Weight loss
- Headache
- Anaemia
- Constipation
- Nausea
- High blood pressure
- Low blood pressure
- Ringing of the ears
- Heart disease
- Type 1 diabetes mellitus (DM)
- Type 1 diabetes mellitus (DM)
- Other (please specify).....

11. Are you on anti-depressants?

- Yes
- No

12. Are on blood pressure medication?

- Yes
- No

13. How often do you eat the following this trimester (please tick as appropriate)?

| Food item | Response | | | |
|-----------------------------|----------|-------------------------------|-----------------------|------------------------|
| | Everyday | Often (at least twice a week) | Seldom (Once a month) | Other (please specify) |
| Green leafy vegetables, | | | | |
| Citrus fruits(oranges, etc) | | | | |
| Legumes | | | | |
| Whole grains | | | | |
| Peas | | | | |
| Peanuts | | | | |
| Breakfast cereals | | | | |
| Red meat | | | | |
| Fish | | | | |
| Poultry | | | | |
| Eggs | | | | |
| Dried fruits | | | | |
| Milk | | | | |
| Ice cream | | | | |
| Yogurt | | | | |
| Canned fish(salmon) | | | | |



14. Are you using any supplements during this trimester (please tick all that apply)?

| Supplement | Yes | No |
|---------------------|-----|----|
| Iron | | |
| Calcium | | |
| Folate (folic acid) | | |
| Zinc | | |
| Vitamin D | | |

15. Do you use any over the counter drugs during this trimester?

- Yes (specify).....
- No

16. What do you use them for?

17. Do you use traditional herbs during this trimester?

- Yes
- No

18. What do you use the herbs for?

19. Have you fasted during this or the previous trimester?

- Yes
- No

20. Are there any changes in your overall health this trimester?

.....

.....

.....

.....

.....

.....

SECTION C: FOLLOW-UP DETAILS:

21. Your expected date of delivery:.....

22. Do you plan to move from the current location before the end of the next trimester?:

- Yes
- No

23. If yes please give details of where you can be

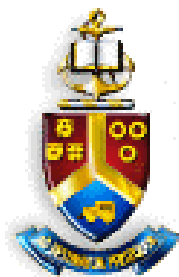
found:.....

.....

.....

END of Questionnaire, thank you for your time





UNIVERSITY OF PRETORIA

School of Health Systems and Public Health

PhD Research Topic:

Developing a Clinical Assessment Tool for Screening Lead Exposure Levels During Pregnancy and After Delivery

Risk Assessment Questionnaire (3rd Trimester)

This questionnaire is for follow up purposes when collecting blood samples during the third trimester.

The questionnaire will only be responded to strictly by clients who took part in the study during the first and second trimesters.

| | | | | |
|----------------------------------|----|----|----|---|
| Date Interview Completed: | DD | MM | YY | |
| Interviewer Contact: | | | | |
| First and last Names Name: | | | | |
| Mobile Phone: | + | 2 | 6 | 7 |
| Email address: | | | | |

SECTION A: CLIENT INFORMATION

- 24. Client ID REF. CODE # (As in Consent Form).....
- 25. Study Area Code #.....
- 26. Where do you stay currently

| | |
|------------------------------------|--|
| Client Ref ID Code # | |
| Date of 3 rd interview | |
| Date of 3 rd blood Test | |
| Hematocrit test | |
| Any follow up samples | |



27. Is this the same place you lived at the last time during the 1st and 2nd trimesters?

- Yes
- No

28. Have your contact Details changed since the first trimester:

- Yes
- No

29. If yes pleas provide the following in the table below:

| Physical address | Telephone contacts | Postal address |
|------------------|--------------------|----------------|
| | | |

30. Do you have a craving for any of the following (please tick as appropriate)?

| Item | Always | Usually | Occasionally | Never |
|---|--------|---------|--------------|-------|
| Soil | | | | |
| Clay (seloko) | | | | |
| Crushed pottery (nkgwana e e sidilweng) | | | | |
| Termite mounts (Seolo) | | | | |
| Crushed bone meal | | | | |
| Paint chips | | | | |
| Painted furniture | | | | |
| Matchsticks | | | | |
| Pencil | | | | |
| Other (Specify)..... | | | | |

31. Have you renovated your home /place of residence recently (please tick appropriate answer):

| Renovation | Yes | No |
|-----------------------|-----|----|
| Less than a month ago | | |
| 1-3 months ago | | |
| 3-6 months ago | | |
| Over 6 months ago | | |

SECTION B: HEALTH AND DIET:

32. How do you feel this trimester? (Please tick all those that apply):

- Extreme tiredness
- Irritability or nervousness
- Metallic taste in your mouth
- Stomach aches or abdominal cramps
- Weak wrists or ankles



- Trouble sleeping
- Difficulty concentrations
- Muscle or joint pain
- Weight loss
- Headache
- Anaemia
- Constipation
- Nausea
- High blood pressure
- Low blood pressure
- Ringing of the ears
- Heart disease
- Type 1 diabetes mellitus (DM)
- Type 1 diabetes mellitus (DM)
- Other (please specify).....

33. Are you on anti-depressants?

- Yes
- No

34. Are on blood pressure medication?

- Yes
- No

35. Are you using any supplements during this trimester (Please tick all those that apply?)

| Supplement | Yes | No |
|---------------------|-----|----|
| Iron | | |
| Calcium | | |
| Folate (folic acid) | | |
| Zinc | | |
| Vitamin D | | |

36. Do you use home remedies for illness or to improve health?

- Yes (specify).....
- No

37. Do you use traditional herbs during this trimester?

- Yes
- No

38. Have you fasted this trimester?

- Yes
- No

39. Are there any changes in your overall health this trimester?

.....

.....

.....

.....



.....

SECTION C: FOLLOW-UP DETAILS:

40. In which facility do you intend to deliver your baby:

| Facility Name | Village/town | Expected date of delivery |
|---------------|--------------|---------------------------|
| | | |

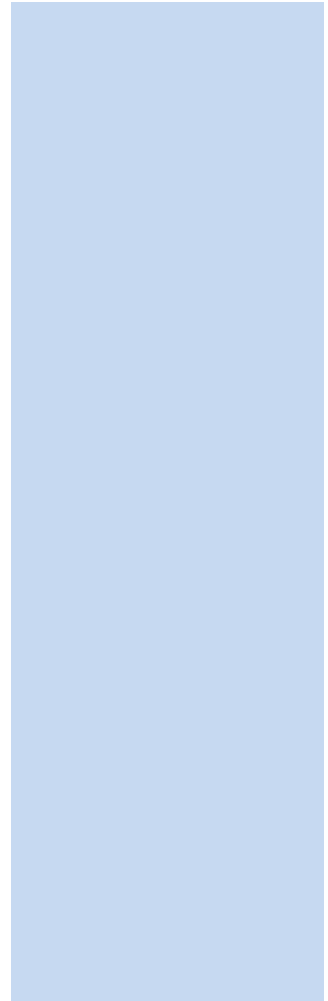
41. Do you plan to move from the current location before the end of the next trimester?:

- Yes
- No

If yes please give details of where you can be

found:.....

END of Questionnaire, thank you for your time





Appendix 5: Proof of Statistical Support



BIostatISTICS UNIT

Private Bag X385, Pretoria, South Africa,
No. 1 Soutpansberg Road, Pretoria
Tel: 012 339 8519, Fax: 012 339 8582
URL: www.mrc.ac.za/

Date: 28/05/2009

LETTER OF STATISTICAL SUPPORT

This letter is to confirm that the student, Bontle Mbongwe studying at the University of Pretoria discussed the Project with the title “Developing a Clinical Assessment Tool for Screening Lead Exposure Levels during Pregnancy and After Delivery” with me.

I hereby confirm that I am aware of the project and also undertake to assist with the statistical analysis of the data generated from the project.

Sample size issues have been addressed and data analysis will involve modelling, e.g. logistic regression.

Prof. PJ Becker

Appendix 6: Proof of Validation of Questionnaire by Scholars

Daily News does not publish on Saturdays, Sundays and public holidays. Please email your comments to DailyNews@gov.bw

From 6 July 2006, a graphic version of current edition is available at the [Daily News Online](#) web site.

[Return to main news index](#)

Next: [Magistrate extends Briton remand warrant](#)

Lead threatens human life

17 April, 2009

GABORONE - Scholars in the fields of public and environmental health have stated that any amount of lead in a human being is dangerous as opposed to the past when it was deemed beneficial.

Lead, a known toxicant, affects nearly every system in the body and relates to both adults and children. "Unborn and young ones suffer metabolic and developmental damage from exposure levels of lead previously thought safe," said Ms Bontle Mbongwe, PhD scholar with the University of Pretoria.

She said babies both lactating and those still in their mothers' wombs face a rage of the lead if it is present in their mother's bodies. Children born under such circumstances stand a good chance of being perpetrators of social ills.

Such children, Ms Mbongwe said, can exhibit aggression, delinquency and abuse.

Others are born hyperactive combined with anti social behaviours. The presence of toxic lead in the human body has long-term effects.

The low amounts will result in decreased performance of the functions of the nervous system. The victims will exhibit weaknesses in fingers, wrists and ankles. Ms Mbongwe said lead is a naturally occurring element, which is found almost everywhere in the environment. It can be found in many of the household equipment such as pottery and it can enter the human bodies through ingestion and inhalation.

Her findings reveal that, "there is a linear association between blood lead concentration and high blood pressure in adults." However, it is worth noting that lead is not the only cause of high blood pressure in adults.

The persistent toxicant element is said to have bad and far-reaching consequences

on humankind.

In reproduction, lead is "associated with sterility, spontaneous abortion, stillbirths and neonatal morbidity and mortality from exposure to utero," reveals the research. Pregnant and lactating mothers face the chances of spontaneous abortion and hypertension. Other worse results may be reduced gestational age, reduced birth weight and adversely delayed cognitive development. Pregnant and lactating mothers usually acquire lead through their habits and other factors such as equipment and environmental issues.

Pica behaviour has been identified as the pathway for pregnant women to get lead. These include intentional ingestion of non-food items.

Most of these women ingest soil, pottery parts, paint chips and others.

Ms Mbongwe highlighted that children and pregnant women absorb 70 per cent of ingested lead whilst the non pregnant absorb only up to 20 per cent. Though they absorb 70 per cent of ingested lead, only small amounts of it are excreted through faeces, sweat, hair and nails.

Ms Mbongwe is currently working on the effects of lead in pregnant and lactating mothers in Botswana. BOPA

[Return to main news index](#)

Next: [Magistrate extends Briton remand warrant](#)

Appendix 7: Proof of Training Health Workers at Conception of Project

Developing a Clinical Assessment Tool for Screening Lead Exposure Levels

During Pregnancy and After Delivery

Training Workshop for Participating Health Facilities

02 July, 2009, Cresta Botsalo Hotel, Palapye

1. In attendance:

| Name | Facility | Section | Contact Telephones |
|-------------------|--------------------------|--------------------------|--------------------|
| G. Mogorosi | Palapye Primary Hospital | Laboratory | 4920333/74012113 |
| K. Dongwana | Palapye Primary Hospital | Mataernal & Child Health | 4920333/71382827 |
| B. Mmutle | Palapye Primary Hospital | Maternity Ward | 4920333/72756002 |
| T. Gower | Palapye Primary Hospital | General Ward | 4920333/74616802 |
| J. setshego | Palapye Primary Hospital | Maternal & Child Health | 4920333/72296726 |
| I. Bontsheng | Serowe Memorial Hospital | Labour Ward | 4611000/72362793 |
| K. Serefentse | Serowe Memorial Hospital | Maternal & Child Health | 4611000/71489181 |
| Clemence Simango | Serowe Memorial Hospital | Laboratory | 4611000/71404289 |
| K. Rajemane | Palapye Primary Hospital | Theatre | 4920333/72166060 |
| Z. Busumane-Khiwa | Palapye Primary Hospital | Out-Patient Ward | 4920333/72235090 |
| L. Morotsi | Palapye Primary Hospital | Out-Patient Ward | 4920333/71431238 |
| G. Ntau | Research Assistant | Midfife | 4632081/72374289 |
| Tshego Badubi | Research Assistant | | 72927633 |

2. Introductions and Workshop Objectives:

Participants introduced themselves. The Principal investigator gave the following as the objectives of the workshop:

- a) To raise the level of awareness of the health workers in the participating health care facilities on lead and its impacts on human health.
- b) To familiarizes participating facility health professionals with critical study protocols and recruitment processes required for the study
- c) To agree on research logistics and identify contact persons for each facility
- d) To agree on the work program



Appendix 8: Proof of Pretesting and Validation (Clinical Assessment Tool, Policy Brief, awareness leaflet)



UNIVERSITY OF BOTSWANA

UNIVERSITY OF BOTSWANA
FACULTY OF HEALTH SCIENCES

Private Bag 0022
Gaborone, Botswana

Telephone: (+267) 355 000 (Switchboard)
(+267) 355 2917 (Direct)

Fax: (+267) 397 4538
Telegraph: University Gaborone
Telex: (+267) 2429 BD

E-mail: medical@mopipi.ub.bw

Date: October 2012

Validation of Screening tool & Policy brief

Briefing and pretesting Meeting – Ministry of Health

| Name | Division | Contacts | Signature |
|--------------------------|---|-------------|-----------|
| A. MAKWA | Nutrition & Food Control Division NFCD | 3632160 | |
| B. Petchengane-Mokhe | NFCD | 363 2136 | |
| J. Sibuya | NFCD | 3632163 | |
| Yvonne T. Chinyanga | NFCD | 3632186 | |
| DR. Nkomo BOENAPATE | Disease Control Division DCD – DPH | 363 2108 | |
| Mphahadimo Mogani | NFCD | 3632134 | |
| TSHAMO R. KEAKA BETSE | Sexual Reproductive SRH Health | 363 2170/68 | |
| MPODI KEBAFILWE | NFCD | 363 2159 | |
| Linett Phaeatlhale | NFCD/MOH | 3632263 | |
| Michael BASHEKE | NFCD | 3632162 | |
| H.H. T. TARIMO | MEH-NFA | 363 2121 | |



| | | | |
|-----------|------|---------|-------------------|
| P. Madabe | NFCD | 3637458 | Becker |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |



UNIVERSITY OF BOTSWANA

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(+267) 355 2917 (Direct)

E-mail: medical@mopipi.ub.bw

Fax: (+267) 397 4538

Telegraph: University Gaborone

Telex: (+267) 2429 BD

Date: 8 October 2012

Leaflet Pretesting Meeting - Women, Serowe

| Name | Village | Contacts | Signature |
|--------------------------|---------|----------|---------------|
| Ania Bosekeng | Serowe | 71279570 | A. Bosekeng |
| Gelly Gcamangwe | Serowe | 74352812 | G. Gcamangwe |
| Bonata Modikeng | Serowe | 74080378 | B. Modikeng |
| Godiramang S. Khetlathle | Serowe | 76513081 | G. Khetlathle |
| TSHIAMOKHUMONG | SEROWE | 71126021 | T. Khumong |
| SALEBETSE NFAU | SEROWE | 72374289 | S. Hkai |
| | | | |
| | | | |
| | | | |
| | | | |

Comments

Appendix 9: Proof of Journal article submission and conference Presentation:

Submission of Manuscript (Review Paper) to Journal of OEM - Email Confirmation

oemeditorial@bmjgroup.com via manuscriptcentral.com

2/20/
12

to me, mbongwe

20-Feb-2012

Dear Ms. Mbongwe:

Your manuscript entitled "Uncommon sources of lead poisoning: an emerging public health threat with life-long implications – A review of literature" has been successfully submitted online and is presently being given full consideration for publication in Occupational and Environmental Medicine.

Your manuscript ID is oemed-[2012-100738](#).

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at <http://mc.manuscriptcentral.com/oem> and edit your user information as appropriate.

FEES

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You can also view the status of your manuscript at any time by checking your Author Center after logging in to <http://mc.manuscriptcentral.com/oem> .

Thank you for submitting your manuscript to Occupational and Environmental Medicine.

Respectfully,

Editor Occupational and Environmental Medicine

Presentation of Paper (Chapter 3) at National Conference, Gaborone, Botswana



Republic of Botswana

MINISTRY OF INFRASTRUCTURE SCIENCE AND TECHNOLOGY

Inaugural RSTI Policy Launch, S&T Conference and Exhibition Programme



14-15 August 2012



GICC, Grand Palm Hotel, Gaborone

| Day 1: RSTI POLICY LAUNCH AND OFFICIAL OPENING OF THE CONFERENCE | | |
|--|--|--|
| MC: Mr Christopher Nyanga | | |
| Chairperson: Mr. Alan Boshwaen, Botswana Innovation Hub | | |
| Rapporteurs: | | |
| 7:30 | Registration and tea | |
| | Arrival of the Minister of Infrastructure Science and Technology | |
| 09:00 | Prayer | Volunteer |
| 9:05 - 9:15 | Introduction of guests | Ms. Lorato Plaatjie, <i>MIST DPS Corporate Services</i> |
| 9:15 - 9:30 | Welcome Remarks | Mr Dikagiso B. Mokotedi, <i>MIST PS</i> |
| 9:30 - 9:45 | Highlights of the RSTI Policy and Implementation Plan | Ms. Lesego M. Motoma, <i>Director Department of Research Science and Technology</i> |
| 9:45 - 10:30 | Keynote Address: STI for Botswana's economic development: a personal perspective | Prof. Nelson Torto, <i>Head of the Department of Chemistry, Rhodes University, RSA</i> |
| 10:30 - 10:40 | Entertainment | Ms. Keabonye T. Bareng, Poet |
| 10:40 - 11:10 | Launch of the RSTI Policy and the official opening of the | Hon. Johnie K. Swartz, <i>Minister of</i> |



| | | |
|---------------|--------------------------------|---|
| | RSTI Conference and Exhibition | <i>Infrastructure Science and Technology</i> |
| 11:10 - 11:20 | Entertainment | Kgabosereto Traditional Troupe |
| 11:20 - 11:35 | Vote of Thanks | Mr Godfrey Mosimaneotsile, <i>Botswana Technology Centre</i> |
| 11:35 - 11:45 | Entertainment | Kgabosereto Traditional Troupe |
| 11:45 - 12:00 | Group Photo | MIST PR and Journalists |
| 12:00 - 12:30 | Tour of the exhibition stalls | Minister and his entourage |
| LUNCH | | |

SESSION 1: PLENARY

MC:

Chairperson: Dr. Edson T. Selaolo

Rapporteurs:

| | | |
|---------------|---|--|
| 14:00 – 14:15 | Objectives of the S&T conference and exhibition | Mr. Tebelelo Tsheko, <i>Deputy Director DRST</i> |
| 14:15 - 14:35 | Presentation: Views on the implementation of the RSTI policy | Kalmari, A. <i>Aika (Pty) Ltd</i> |
| 14:35 - 14:45 | Discussion | |
| 14:45 – 15:05 | Presentation: Harnessing Botswana’s Natural Capital for Economic Development | Totolo, O. <i>University of Botswana</i> |
| 15:05 – 15:15 | Discussion | |

TEA

SESSION 2a: WATER RESOURCES

Chairperson: Prof. Wellington Masamba, Okavango Research Institute

Rapporteurs:

| | | |
|---------------|---|---|
| 15:30 – 15:50 | Presentation: The fate of inorganic contaminants in treated sewage water used for irrigation | Paphane, B.D and Mogopodi, D <i>Botswana College of Agriculture</i> |
| 15:50 – 16:00 | Discussion | |
| 16:00 – 16:10 | Presentation: Towards Improved Water Management Strategies for Botswana | Parida, B. P. Kenabatho, P. K. and Moalafhi, D. B., <i>University of Botswana</i> |
| 16:20 – 16:30 | Discussion | |
| 16:30 – 16:50 | Presentation: Biotechnology is an innovative technology that can mitigate climate change | George, D.G.M., <i>Department of Agricultural Research</i> |
| 16:50 – 17:00 | Discussion | |
| 17:00 | Wrapping up and closure of Day 1 | Chairperson |

SESSION 2b: ICT:

Chairperson: Dr. Audrey Masizana, University of Botswana

Rapporteurs:

| | | |
|---------------|--|---|
| 15:30 – 15:50 | Presentation: Implementing the M3 & E Model | Roodt, L. and Lubbe, S., <i>Chervil (Pty) Ltd</i> |
| 15:50 – 16:00 | Discussion | |
| 16:00 – 16:10 | Presentation: Alternative Livestock and Crops Diagnostic Technology System: a Case Project at Botswana College of Agriculture | Mabalane, D. and Hulela, K., <i>Botswana College of Agriculture</i> |
| 16:20 – 16:30 | Discussion | |
| 16:30 – 16:50 | Presentation: E-Government: My Stake as “Monana wa Motswana” | Morakanyane, R., <i>University of Botswana</i> |
| 16:50 – 17:00 | Discussion | |
| 17:00 – 17:20 | Presentation: E-Crime: Obligating A New Paradigm Towards A Cyber Secure Botswana Nation | Sekgwathe, V., <i>Directorate on Corruption and Economic Crime</i> |
| 17:20 – 17:30 | Discussion | |
| 17:30 – 17:50 | Presentation: Mobbo: Re-imagining and Monetizing Online Social Networking | Setuke, M, <i>Entrepreneur and software developer</i> |
| 17:50 – 18:00 | Discussion | |
| 18:00 | Wrapping up and closure of Day 1 | Chairperson |

SESSION 2c: SCIENCE, ENGINEERING AND TECHNOLOGY

Chairperson: Prof. Otlogetswe Totolo, University of Botswana

Rapporteurs:

| | | |
|---------------|--|--|
| 15:30 – 15:50 | Presentation: A Quantum Description of Space-time and Gravitation | Marongwe, S., <i>McConnell College</i> |
| 15:50 – 16:00 | Discussion | |
| 16:00 – 16:10 | Presentation: Impacts of Palm Wine Tapping on the Populations of <i>Hyphaene petersiana</i> in Shorobe, Northern Botswana | Sethebe, B., <i>University of Botswana</i> |
| 16:20 – 16:30 | Discussion | |
| 16:30 – 16:50 | Presentation: E-Waste Recycling: A Review of the Infrastructure and Technology Alternatives available for Botswana | Sethebe, K. M. and Molelekwa, T., <i>Rural Industries Innovation Centre, Barbus,V., Silogistic (Pty) Ltd</i> |
| 16:50 – 17:00 | Discussion | |
| 17:00 – 17:20 | Presentation: Interaction of Large Magnetic Fields and the Quantum Vacuum | Marongwe, S., <i>McConnell College</i> |
| 17:20 – 17:30 | Discussion | |
| 17:30 | Wrapping up and closure of Day 1 | Chairperson |

| Day 2: SESSION 3 PLENARY | | |
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| MC: | | |
| Chairperson: Mr. Malekantwa Mmapatsi, Private technology policy practitioner | | |
| Rapporteurs: | | |
| 8:00 – 8:05 | Prayer | |
| 8:05 – 8:10 | Recap | |
| 8:10 – 8:30 | Presentation: The role of the private sector in RSTI development: A case study of Dobi Foods | Motlhabane, R., <i>Dobi Foods</i> |
| 8:30 – 8:40 | Discussion | |
| 8:40 – 9:00 | Presentation: Promoting Science Technology and Innovation based businesses through the Botswana Innovation Hub | Tacheba, B., <i>Botswana innovation Hub</i> |
| 9:00 – 9:10 | Discussion | |
| 9:10 – 9:30 | Presentation: Sustainable Economic Development through Public Sector Innovation: The Case of Developing Economies | Agolla, J. E., <i>Botswana College of Distance and Open Learning</i> and Kolawole, I. O. <i>Limkokwing University of Creative Technology, Botswana</i> |
| 9:30 – 9:40 | Discussion | |
| TEA | | |
| SESSION 4a: SUSTAINABILITY | | |
| Chairperson: Dr. Haniso Motlhabane, Botswana International University of Science and Technology | | |
| Rapporteurs: | | |
| 10:00 – 10:20 | Presentation: Fodder potential of leaves and pods of planted <i>Leucaena diversifolia</i> and <i>L. leucocephala</i> species in semi-arid Botswana | Walker, K. P., <i>National Food Technology Research Centre</i> |
| 10:20 – 10:30 | Discussion | |
| 10:30 – 10:50 | Presentation: Social use of riverine resources within the Chobe Enclave: Botswana | Phuthologo, B., and Mmopelwa, G. <i>Okavango Research Institute</i> and Mtaolo, F. W, <i>University of Dar es Salaam Tanzania</i> |
| 10:50 – 11:00 | Discussion | |
| 11:00 – 11:20 | Presentation: Inter-linkages between ecosystems services and management of natural resources: an Analytic Hierarchy Process Modeling for Stakeholders' Preference in Botswana | Lepetu, J., <i>Botswana College of Agriculture</i> |
| 11:20 – 11:30 | Discussion | |
| 11:30 – 11:50 | Presentation: Review of Botswana's Industrial Property Act of 1996 | Maedza, B., <i>Soils Research and Testing Centre</i> and Motlhaping, T., <i>Botswana Technology Centre</i> |
| 11:50 – 12:00 | Discussion | |



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|---|---|---|
| 12:00 – 12:20 | Presentation: Food technologies for entrepreneurship development; the NFTRC'S approach | Kebakile, M., <i>National Food Technology Research Centre</i> |
| 12:20 – 12:30 | Discussion | |
| LUNCH | | |
| SESSION 4b: HEALTH: | | |
| Chairperson: Dr. Marape Marape, Botswana Baylor Children's Clinical Centre of Excellence | | |
| Rapporteurs: | | |
| 10:00 – 10:20 | Presentation: Characterization of <i>Lactobacillus fermentum</i> Kh09, a bacteriocin producing strain isolated from <i>madila</i> | Matsheka, M. and Wale, R. K., <i>University of Botswana</i> |
| 10:20 – 10:30 | Discussion | |
| 10:30 – 10:50 | Presentation: Natural product G-protein coupled receptor (GPCR) agonists: A new class of potential anti-parasitic and insecticidal drug candidates | Dube M., et al, <i>University of Botswana</i> |
| 10:50 – 11:00 | Discussion | |
| 11:00 – 11:20 | Presentation: Evaluation of aflatoxins in animal feed | Mogopodi, D., Paphane, B. and Motube, G., <i>Botswana College of Agriculture</i> |
| 11:20 – 11:30 | Discussion | |
| 11:30 – 11:50 | Presentation: Influence of the processing factors on pesticide residues in fruits and vegetables and its application in consumer risk assessment | Keikotlhaile B. M. et al, <i>National Food Technology Research Centre</i> |
| 11:50 – 12:00 | Discussion | |
| 12:00 – 12:20 | Presentation: Diet and cardiovascular disease risk factors in Botswana | Kwape, L., <i>National Food Technology Research Centre</i> |
| 12:20 – 12:30 | Discussion | |
| 12:30 – 12:50 | Presentation: Prevalence and Predictors of Risk Behaviours for Lead Exposure During Pregnancy in the Central District, Botswana. | Mbongwe, B., Voyi K. and Rollin, H., <i>University of Botswana and University of Pretoria</i> |
| 12:50 – 13:00 | Discussion | |
| LUNCH | | |

Appendix 10: Short Curriculum Vitae, Bontle Mbongwe

Education:

1. Education:

I hold an MSc. Degree in Biology with a specialization in Chemical and Environmental Toxicology obtained from the University of Ottawa, Canada in 2000. (**Thesis title:** Fate and Persistence of DDT and its Metabolites in the Okavango Delta, Botswana).

2. Professional Experience:

I am currently a Lecturer of toxicology and environmental health in the Department of Environmental Health, Faculty of Health Sciences, University of Botswana. I have previously worked for the Ministry of Health in different capacities (1985-2004) from junior to senior health officer. Before I left the Ministry of Health to join the University of Botswana in 2004, I was Head of the Environmental Health Unit responsible for policy development in areas of chemical safety, public health and tobacco control. I moved to the University of Botswana to start the Environmental Health program in the Faculty of Science, which is now a department in the Faculty of Health Sciences. My key areas of research are on heavy metals and persistent organic pollutants as can be seen from the publications below. I have collaborated with the South African Medical Research Council on lead research. I started my doctoral degree in the School of Health Systems and Public Health, University of Pretoria in 2009.

3. Selected Journal Articles of toxicological and environmental importance

1. **Mbongwe B**, Barnes B, Tshabang J, Zhai M, Rajoram S, Mpuchane S, et al. 2010. Exposure to Lead Among Children in the City of Gaborone. *Journal of Environmental Health Research*, Issue 10(1), pp 17-26
2. Mmualefe, L. C., Torto, N., Huntsman-Mapila, P., & **Mbongwe, B.** 2009. Headspace solid phase microextraction in the determination of pesticides in water samples from the Okavango Delta with gas chromatography-electron capture detection and time-of-flight mass spectrometry **Microchemical Journal** Volume 91, Issue 2, March 2009, Pages 239-244
3. Mmualefe, L. C., Torto, N., Huntsman-Mapila, P., & **Mbongwe, B.** , 2008 , Supercritical fluid extraction of pesticides in sediment from the Okavango Delta, Botswana, and determination by gas chromatography with electron capture detection (GC-ECD) and mass spectrometry (GC - MS). *Water SA*, 34(3), 405 - 410

4. **Mbongwe B.**, Mmereki B.T., Magashual A. 2007. Healthcare waste management: Current practices in selected healthcare facilities, Botswana. *Waste Management*, 28 (1), pp. 226-233

5. **Mbongwe, B.**, Legrand, M., Blais, J.M., Kimpe, L.E., Ridal, J.J. & Lean, D.R.S., 2003. "Dichlorodiphenyltrichloroethane in the Aquatic Ecosystem of the Okavango Delta", Botswana. *Journal of Environmental Toxicology and Chemistry* Vol. 22, No.1. pp 7-19.

4. Selected Conference Presentations of toxicological, behavioral and environmental importance

1. **Mbongwe B.**, Voyi K., Röllin H. 2012. Prevalence and Predictors of Risk Behaviours for Lead Exposure During Pregnancy in the Central District, Botswana. Inaugural RSTI Policy Launch, S&T National Conference and Exhibition, Gaborone International Conference and Exhibition Center, 14-15 August 2012, Gaborone, Botswana.
2. **Mbongwe B.**; Barnes B.; Mpuchane S.; Mathee.; Tshabang A.;2006. Elevated blood-lead levels among children in Gaborone – Conference paper: 9th World Congress on Environmental Health. Dublin, Ireland, 18-23 June, 2006
3. **Mbongwe B.** 2004. Lead Contaminated Soils and Children's Health – Are Botswana's Children at Risk? A paper presented at the 18th Environmental Health Conference and Exhibition, Boipuso Hall, Gaborone, Botswana
4. **Mbongwe B.** 2003. Chemicals and Their Impact on the Environment, in: National Workshop on the Standard on Classification, Packaging and Labeling of Chemicals, Tati-River Lodge, Francistown, Botswana. Ministry of Health.

Thesis

Mbongwe B. 2000. Fate and Persistence of DDT and its Metabolites in the Okavango Delta, Botswana. Thesis submitted to the School of Graduate Studies and Research, University of Ottawa in fulfillment of the Requirements for the M.Sc. Degree in the Ottawa-Carleton Institute of Biology.