

AWARD NUMBER: W81XWH-12-1-0144

TITLE: A Translational Approach to Validate In Vivo Anti-Tumor Effects of Chloroquine on Breast Cancer Risk

PRINCIPAL INVESTIGATOR: Clifford C. Dacso, MD

CONTRACTING ORGANIZATION: Baylor College of Medicine  
Houston, TX 77030

REPORT DATE: July 2015

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command  
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release;  
Distribution Unlimited

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

**REPORT DOCUMENTATION PAGE**Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

<b>1. REPORT DATE</b> July 2015		<b>2. REPORT TYPE</b> Final		<b>3. DATES COVERED</b> 1 May 2012 – 30 Apr 2015	
<b>4. TITLE AND SUBTITLE</b>  A Translational Approach to Validate in Vivo Anti-tumor Effects of Chloroquine on Breast Cancer Risk				<b>5a. CONTRACT NUMBER</b> W81XWH-12-1-0144	
				<b>5b. GRANT NUMBER</b>	
				<b>5c. PROGRAM ELEMENT NUMBER</b>	
<b>6. AUTHOR(S)</b> C. Dacso  E-Mail: cdacso@bcm.edu				<b>5d. PROJECT NUMBER</b>	
				<b>5e. TASK NUMBER</b>	
				<b>5f. WORK UNIT NUMBER</b>	
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b>  Baylor College of Medicine One Baylor Plaza T100 Houston, Texas 77030-3498				<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>	
<b>9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b>  U.S. Army Medical Research and Materiel Command Fort Detrick, Maryland 21702-5012				<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b>	
				<b>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</b>	
<b>12. DISTRIBUTION / AVAILABILITY STATEMENT</b>  Approved for Public Release; Distribution Unlimited					
<b>13. SUPPLEMENTARY NOTES</b>					
<b>14. ABSTRACT</b> SUBJECT & PURPOSE: This translational epidemiologic study conducted online aims to confirm preclinical data on the chemopreventive potential of chloroquine (aminoquinoline), a well-characterized anti-malarial drug. BACKGROUND: Exposure to chloroquine, an off-patent anti-malarial drug with a 60-year history of use by millions, reduces the incidence of breast cancer in genetically programmed rats by 37%. METHODS & SCOPE: About 65% of Peace Corps volunteers received chloroquine prophylactically between 1965 and 1990. Therefore, we will collect chloroquine exposure, breast cancer risk, and breast cancer diagnosis data from returned volunteers who served during this period through an online application. We will characterize participants into chloroquine exposed and unexposed groups, based on country of service and self-reported exposure status. The cost and time efficiencies afforded by this study design will allow the translation of preclinical data on breast cancer chemoprevention into public health and potentially promote the repositioning of a well-characterized and inexpensive drug.					
<b>15. SUBJECT TERMS</b> Breast cancer, chloroquine, chemoprophylaxis					
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b>  Unclassified	<b>18. NUMBER OF PAGES</b>  66	<b>19a. NAME OF RESPONSIBLE PERSON</b> USAMRMC
<b>a. REPORT</b>  Unclassified	<b>b. ABSTRACT</b>  Unclassified	<b>c. THIS PAGE</b>  Unclassified			<b>19b. TELEPHONE NUMBER</b> (include area code)

## TABLE OF CONTENTS

---

<i>INTRODUCTION</i>	2
<i>BODY</i>	2
<i>KEY RESEARCH ACCOMPLISHMENTS</i>	5
<i>REPORTABLE OUTCOMES</i>	5
<i>CONCLUSION</i>	6
<i>REFERENCES</i>	6
<i>APPENDICES</i>	7

---

## INTRODUCTION

---

**SUBJECT & PURPOSE:** This translational epidemiologic study aimed to confirm preclinical data on the chemopreventive potential of chloroquine (aminoquinoline), a well-characterized anti-malarial drug. **BACKGROUND:** Exposure to chloroquine, an off-patent anti-malarial drug with a 60-year history of use by millions, reduces the incidence of breast cancer in genetically programmed rats by 37%. **METHODS & SCOPE:** About 65% of Peace Corps volunteers received chloroquine prophylactically between 1965 and 1990. Therefore, we collected chloroquine exposure, breast cancer risk, and breast cancer diagnosis data from returned volunteers who served during this period through an online application. We will characterize participants into chloroquine exposed and unexposed groups, based on country of service and self-reported exposure status. It was hoped that the cost and time efficiencies afforded by this study design would allow the translation of preclinical data on breast cancer chemoprevention into public health and potentially promote the repositioning of a well-characterized and inexpensive drug.

---

## BODY

---

The following is an update on tasks outlined in the proposed Statement of Work.

### **Task 1. Obtain human subjects regulatory approval of study (months 1-4)**

**Completed in Year 1.** The human subjects regulatory approval is complete for the study. Baylor College of Medicine's IRB (Appendix A) and Human Research Protection Office (HRPO) Office of Research Protections (ORP) U.S. Army Medical Research and Materiel Command (USAMRMC) have approved the human subjects application.

IRB renewal submission occurred on July 14, 2014. We requested renewal for one year.

### **Task 2. Create a breast cancer survey instrument (month 1-5)**

**Completed in Year 1.** Participant workflow documents were developed (Appendix B), and a questionnaire was written (Appendix C). We completed development of the application to collect the data using a web-based participant interface in Year 2 and launched the application in April 2014.

### **Task 3. Data Management System (months 1-18)**

**Year 1 milestones.** No existing system of which we are aware has all of the technical features this project requires, nor the ability to meet its statistical sampling needs. During year 1 of funding, we finalized technical documents, architected the data model for the database, and developed CorpsChronicles, a secure, database-backed web application developed to manage large, socially oriented epidemiologic studies. CorpsChronicles will be used to collect information from RPCVs to determine if chloroquine exposure in this cohort associates with reduced breast cancer incidence compared with the general US population.

CorpsChronicles was designed to (i) allow research subjects to securely answer dynamic questionnaires; (ii) manage electronic recruitment and referral workflows; (iii) send email reminders to participants to complete surveys; and (iv) provide feedback to end users on the overall progress of the study in a way that does not compromise the results. Because breast cancer known risk factors include family history, race, and lifestyle, the online survey elicits self-reported data on potential confounding variables which will be accounted for in the statistical analysis to maximize internal validity. Two hundred RPCVs were selected as initial seeds, with a goal of up to 18,000 respondents across all chains.

Because CorpsChronicles is a complex system that must support myriad workflows, be easy-to-use by a diverse body of respondents, be able to accommodate hundreds of simultaneous end users, and support usage outside of the primary intended workflows, we elected to be as cautious as possible in designing and testing the system. This choice was made because (i) any major issues not caught in the planning and testing phases may cause end users to not complete their surveys, (ii) these same issues would likely reduce the number of respondents making the study fall potentially short of its target accrual and (iii) we anticipate that accruals will be extremely rapid owing to the high level of enthusiasm from RPCVs for the project.

**Year 2 milestones.** During Year 2, we user-tested the CorpsChronicles application in (i) internal testing with Baylor faculty and staff and (ii) in think-aloud testing (Olmsted-Hawala and Murphy, 2013. Protocol and instrument attached in Appendices.) with five Returned Peace Corps Volunteers from different age cohorts from the study population who had different levels of familiarity with online applications, different experiences with breast cancer and, most importantly, no prior knowledge of how the system should function, thus making them excellent real-world test cases. Based on the feedback from this testing, we fixed bugs and revised the system to make it more responsive and user-friendly. Throughout Year 2 and in Year 3, in accordance with iterative software design, our application developer continues to develop iterative revisions of the system to refine existing features, add new features and address issues that arise through production use. This iterative design is informed by a database of participant questions and comments through the study toll-free telephone number and email help line.

**Task 4. Recruit a cohort of 14,000 to 18,000 female returned Peace Corps volunteers who served from 1961 through 1990 in both malaria-endemic and non-endemic parts of the world and data collection (months 3-18)**

**Year 1, Year 2, and Year 3 milestones.** We created a database of eligible potential volunteers who have expressed interest in participating in BCM research from an IRB-approved study “CREATING A DATABASE OF POTENTIAL PARTICIPANTS,” in which RPCVs were recruited at the Peace Corps 50<sup>th</sup> Anniversary conference in Washington DC in September 2012, a gathering of returned volunteers in June 2013 in Minneapolis, MN, and a gathering of returned volunteers in June 2014 in Nashville, TN.

**In Year 2**, this database served as the source of “seeds” for Respondent Driven Sampling. In April 2014, we began data collection by emailing all potential volunteers in the database an invitation to participate in the study with link to the online survey instrument with an embedded number to identify each responder. We sent the seeds a reminder email before sending them the link, to help them remember the study and their willingness to play a role in it.

Simultaneously, we launched an informational campaign in concert with the National Peace Corps Association (NPCA). This campaign includes: websites and blogs, including PeaceCorpsConnect.org, PeaceCorpsWorldwide.org, and the websites of independent and NPCA-affiliated RPCV member groups; NPCA’s monthly e-newsletter with 35,008 subscribers; mass emails or listserv posts to membership of NPCA, Peace Corps Worldwide, and independent and NPCA-affiliated RPCV member groups; and social media tools including Facebook.

Interim analysis performed at one month post-activation to ensure appropriate accruals with the sampling method, Respondent Driven Sampling (RDS), was encouraging enough to continue with the planned RDS methodology.

**In Year 3**, we performed a second interim analysis in July 2014. Subject accrual was not meeting our goals at that time, so we took steps to implement our back-up plan, traditional snowball sampling. We re-designed the online application, requested and received modification of our protocol with the Baylor IRB, and are prepared to launch traditional snowball sampling. At the time of this report, we are in discussions about whether traditional snowball sampling will yield the validated results that we need. *We plan to complete the study using other funding, and will report all results to the DOD and CDMRP.*

<b>Race/Ethnicity</b>	<b>Female</b>
All ethnicities	455
American Indian or Alaskan Native	4
Asian/Non Vietnamese	0
Black of African American	6
Hispanic or Latino	5
Mixed Race or Ethnicity	0
Native Hawaiian or Pacific Islander	0
Vietnamese	0
White	436
Unknown Race or Unknown Ethnicity	13

**Enrollment****TABLE 1: ENROLLMENT, FULL STUDY, AS OF MAY 23, 2014****TABLE 2: ENROLLMENT, THINK-ALOUD PILOT**

<b>Race/Ethnicity</b>	<b>Female</b>
All ethnicities	5
American Indian or Alaskan Native	0
Asian/Non Vietnamese	0
Black of African American	0
Hispanic or Latino	1
Mixed Race or Ethnicity	0
Native Hawaiian or Pacific Islander	0
Vietnamese	0
White	4

**Task 5. Identify the cause of death of deceased female returned Peace Corps volunteers who served from 1961 through 1990 (months 6-18)**

**Year 1 milestones.** In the original protocol and grant applications, we proposed using the National Death Index (NDI) to match the names of the deceased provided by study participants to those in the NDI to verify causes of death. However, it was determined that relying on participants to provide accurate identifying information on those potential participants who have died would yield an unrepresentative sample of those who died and may be upsetting to participants. Therefore, Network Scale-Up Method (NSUM) will be used to estimate the number of deceased RPCVs, eliminating both the need to ask for identifying information of those who have died from participants and the use of the National Death Index.

NSUM estimates the size of a hidden or hard-to-reach population (i.e., deceased RPCVs) by assuming that, in general, people's social networks are representative of the general population in which we live and move (HR Bernard, 2010). Using the questions already crafted for our primary sampling mechanism of

RDS, we will ask the respondents one additional question to determine the number of female RPCVs they know who have died. This number, along with the number of female RPCVs each respondent knew and the total number of female Peace Corps Volunteers who served between 1961 and 1990, will be used to estimate the number of deceased women. Implementation of NSUM eliminates the need for NDI, and thus we request that the funds intended for NDI be re-distributed.

**Years 2-4.** Analysis will begin once data collection is completed. We will complete the study using other funds and will report the results to the DOD and CDMRP.

**Task 6. Examine the association between chloroquine exposure and breast cancer in our cohort of RPCVs who served between 1961 and 1990 (months 18-21)**

Task 6 will occur in 2015-16 and will be funded through other sources.

**Task 7. Disseminate findings (months 21-24)**

We have presented posters on this project at two conferences and presented an oral presentation about the project at two conferences. See Reportable Outcomes section for references and Appendices for posters and manuscripts. Future results will be reported to the DOD and CDMRP.

---

## KEY RESEARCH ACCOMPLISHMENTS

---

- **Year 1:** Development of a Java Enterprise Edition 6 application that uses the model-view-controller architecture with the JBoss Seam framework to manage its various components. The application runs within JBoss 7 middleware and utilizes Oracle 11g for data persistence, though Hibernate makes it possible to swap out Oracle for other database management systems. Security is managed by enhanced Seam security, encrypted passwords, role-based permissions, Captchas, and unique “coupon” codes that serve as keys for respondents. Referrals of respondents are based on a novel social network sampling methodology, Respondent-Driven Sampling (RDS), in which initial respondents (“seeds”) identify members of their social network who may want to participate and these members in turn identify members of their network thus creating network “chains” for each seed. Data from links in each chain are compared back to their seed data using RDSAT freeware; demographic and clinical characteristic data is compared between groups using chi-square or Fisher’s exact test and t-test or Wilcoxon rank-sums. Multivariate logistic regression is used to assess associations between chloroquine exposure and breast cancer incidence, with the Network Scale-Up Method, a social networking method, applied to estimate the hard-to-count population of RPCVs.
- **Year 2:** Survey launched.

---

## REPORTABLE OUTCOMES

---

**Publications:**

Mayfield P, McOwiti A, Barney J, Qu Shijing, Sexton KR, Harris AM, McArthur K, Hilsenbeck SG, Bondy ML, Conneely O, Spitz M, Dacso CC, Becnel LB. CorpsChronicles: An Application Leveraging Social Networks for Online Epidemiologic Survey Studies. Submitted to American Medical Informatics

Annual Symposium Washington, DC. November 16-20, 2013. (Appendix F)

Sexton K, Harris AM, McArthur K, Bondy M, Hilsenbeck S, Becnel L, Mayfield P, Conneely O, Spitz M, Queen C, Dacso C. Designing a translational epidemiologic study: Chloroquine and breast cancer chemoprevention in Returned Peace Corps Volunteers. 140th APHA Annual Meeting, San Francisco, CA. October 2012. (Appendix G)

Mayfield PK, McOwiti AM, Barney J, Darlington Y, Vanjani G, Becnel LB. C3PR, CODR & Corps Chronicles: case studies of clinical and epidemiological research databases within the DLDC. Dan L. Duncan Cancer Center 2012 Symposium. Baylor College of Medicine. Houston, TX. (Appendix H)

O'Brien J. Chloroquine and breast cancer chemoprevention in Returned Peace Corps Volunteers: Study Progress and Future Steps. National Peace Corps Association 2104 Annual Gathering. Nashville, TN.

Experience/training supported by this award: One undergraduate student, Adesola Oyewole, University of Houston, received summer training in clinical research, June – August 2012.

---

## CONCLUSION

---

We have begun to accrue subjects and gather data, but we have not yet analyzed the results. Since respondent Driven Sampling has failed to meet our recruitment goals, we have taken steps to implement our alternative plan: traditional snowball sampling from the National Peace Corps mailing list of over 35,000 people. Implementation of the alternate plan will take place in 2015-16, and will be funded via other sources.

---

## REFERENCES

---

Olmsted-Hawala E, Murphy B. Think-aloud protocols for website usability testing. Wednesday, January 23, 2013. <http://www.howto.gov/training/classes/think-aloud-protocols-for-usability-testing>.

Bernard HR, Hallett T, Iovita A, et al. Counting hard-to-count populations: the network scale-up method for public health. *Sex Trans Inf.* 86(Suppl 2): ii11-ii15, 2010.



## APPENDICES

---

- A. Baylor College of Medicine IRB Approval
- B. Participant Workflow Documents
- C. Questionnaire Text
- D. Screenshots of the CorpsChronicles Application
- E. Study Description Developed with the NPCA
- F. Mayfield P, McOwiti A, Barney J, Qu Shijing, Sexton KR, Harris AM, McArthur K, Hilsenbeck SG, Bondy ML, Conneely O, Spitz M, Dacso CC, Becnel LB. CorpsChronicles: An Application Leveraging Social Networks for Online Epidemiologic Survey Studies. Submitted to American Medical Informatics Annual Symposium Washington, DC. November 16-20, 2013.
- G. Sexton K, Harris AM, McArthur K, Bondy M, Hilsenbeck S, Becnel L, Mayfield P, Conneely O, Spitz M, Queen C, Dacso C. Designing a translational epidemiologic study: Chloroquine and breast cancer chemoprevention in Returned Peace Corps Volunteers. 140th APHA Annual Meeting, San Francisco, CA. October 2012.
- H. Mayfield, PK, McOwiti, AM, Barney, J, Darlington, Y, Vanjani, G, and LB Becnel. C3PR, CODR & Corps Chronicles: Case Studies of Clinical and Epidemiological Research Databases within the DLDC. Dan L. Duncan Cancer Center 2012 Symposium. Baylor College of Medicine. Houston, TX.
- I. Think Aloud Testing Protocol and Instrument
- J. Toll-Free Telephone Number and Email Help Line Statistics

June 03, 2015



CLIFFORD C DACSO  
BAYLOR COLLEGE OF MEDICINE  
MOLECULAR & CELLULAR BIOLOGY

Baylor College of Medicine  
Office of Research  
One Baylor Plaza, 600D  
Houston, Texas 77030  
Phone: (713) 798-6970  
Fax: (713) 798-6990  
Email: [irb@bcm.tmc.edu](mailto:irb@bcm.tmc.edu)

**H-31160 - A TRANSLATIONAL APPROACH TO VALIDATE IN-VIVO ANTI-TUMOR EFFECTS OF CHLOROQUINE ON BREAST CANCER RISK**

**APPROVAL VALID FROM 6/3/2015 TO 6/2/2016**

Dear Dr. DACSO

The Institutional Review Board for Human Subject Research for Baylor College of Medicine and Affiliated Hospitals (BCM IRB) is pleased to inform you that the research protocol named above was approved.

The study may not continue after the approval period without additional IRB review and approval for continuation. You will receive an email renewal reminder notice prior to study expiration; however, it is your responsibility to assure that this study is not conducted beyond the expiration date.

Please be aware that only IRB-approved informed consent forms may be used when written informed consent is required.

Any changes in study or informed consent procedure must receive review and approval prior to implementation unless the change is necessary for the safety of subjects. In addition, you must inform the IRB of adverse events encountered during the study or of any new and significant information that may impact a research participants' safety or willingness to continue in your study.

The BCM IRB is organized, operates, and is registered with the United States Office for Human Research Protections according to the regulations codified in the United States Code of Federal Regulations at 45 CFR 46 and 21 CFR 56. The BCM IRB operates under the BCM Federal Wide Assurance No. 00000286, as well as those of hospitals and institutions affiliated with the College.

Sincerely yours,

A handwritten signature in black ink that reads "V. R. Sutton".

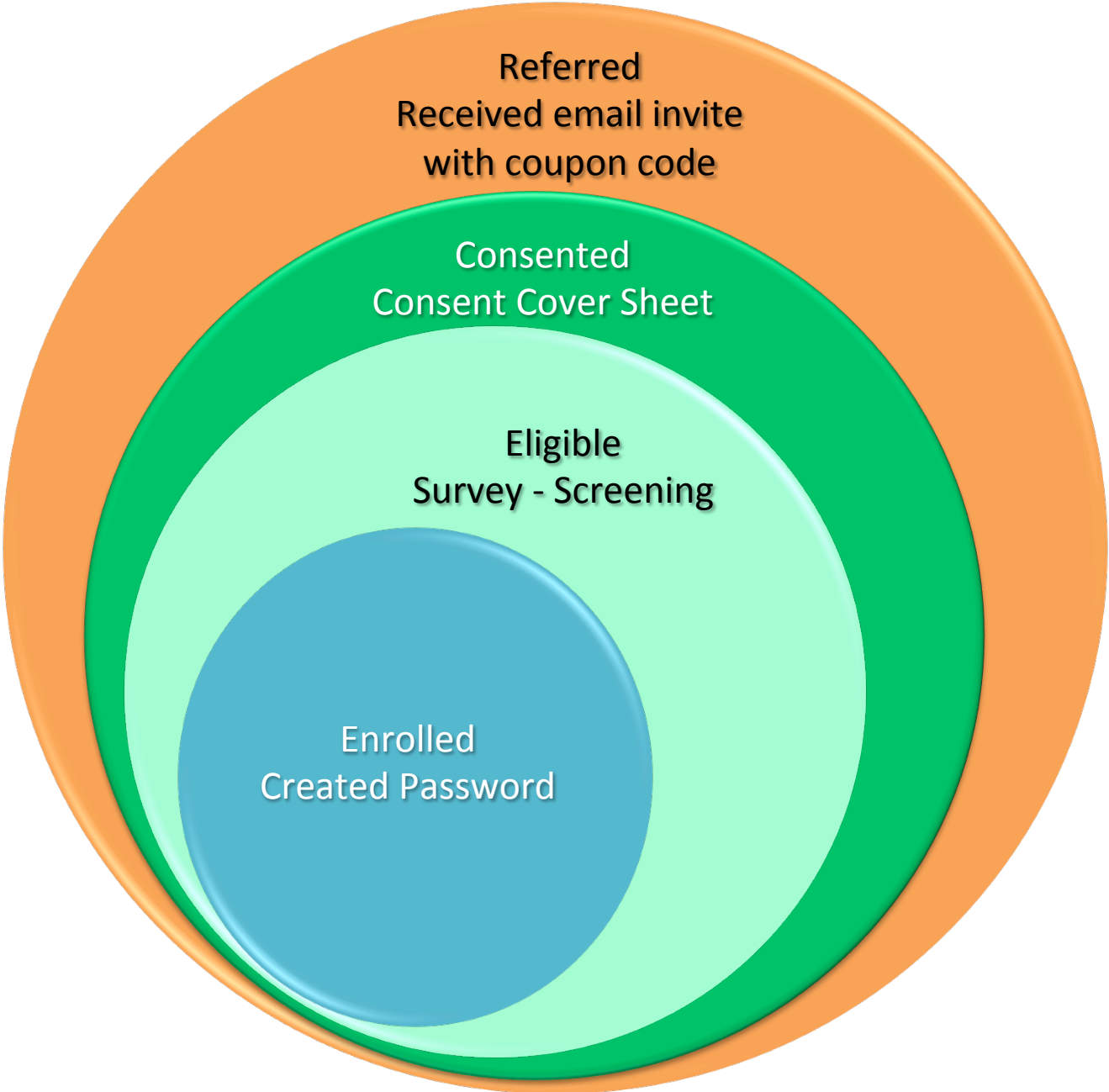
VERNON R SUTTON, M.D., B.S.

Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals



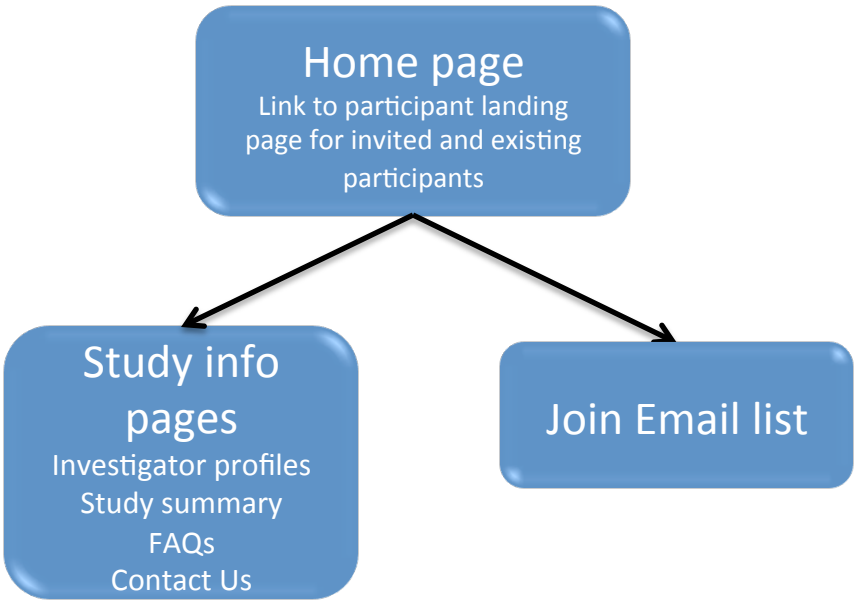
# PARTICIPANT WORKFLOW DOCUMENT

## Enrollment Process

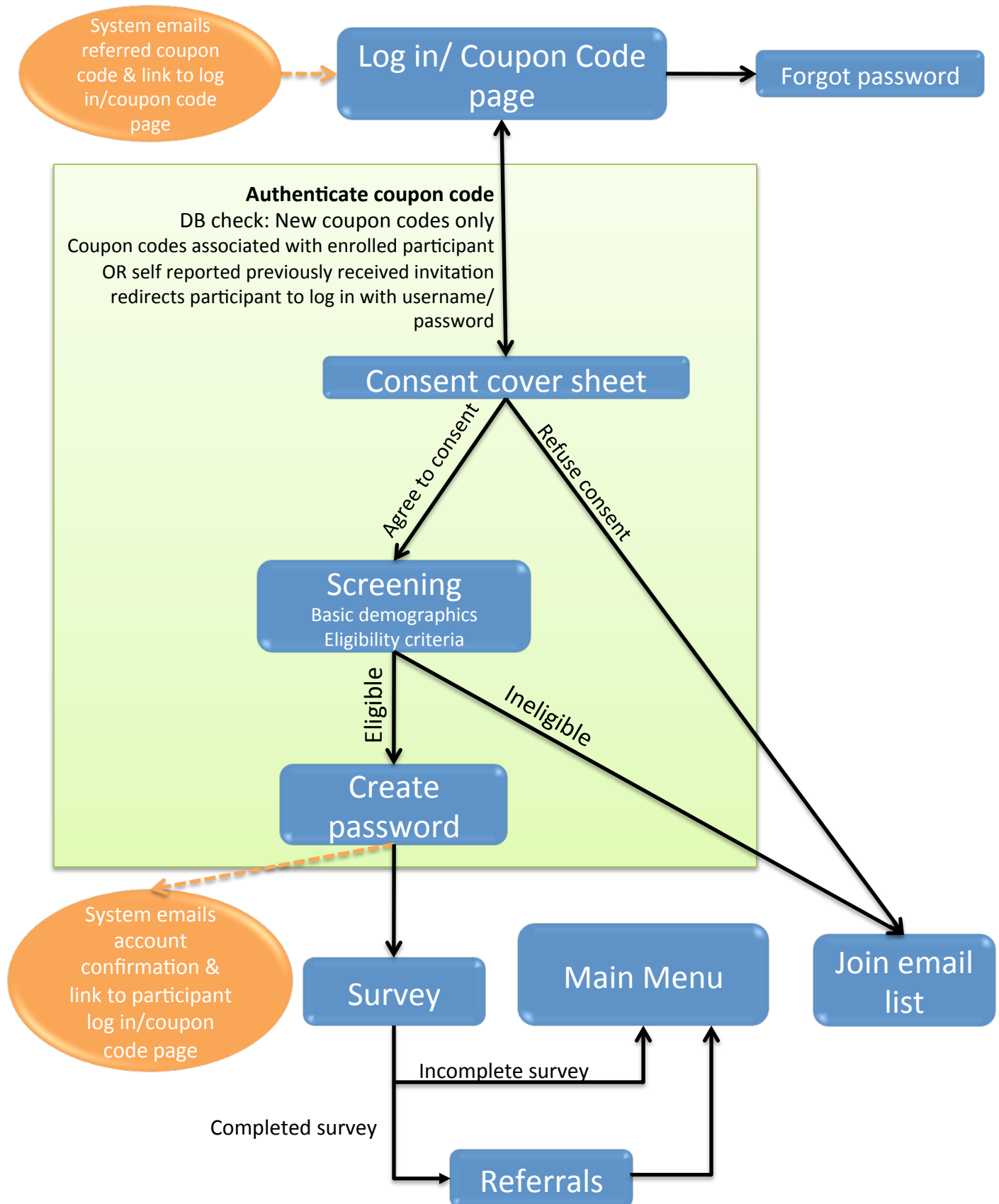


# PARTICIPANT WORKFLOW DOCUMENT

## Public Website Workflow

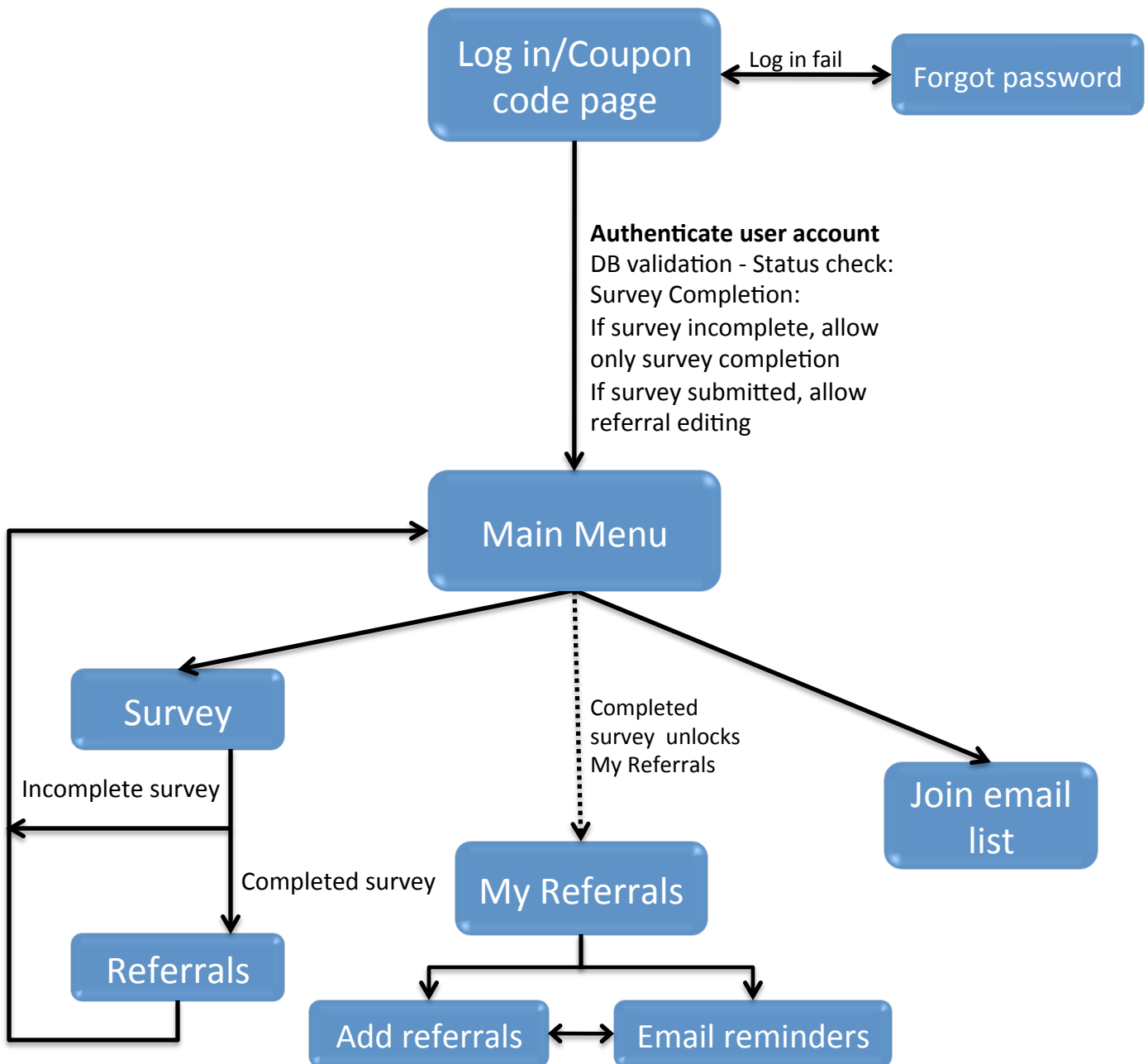


# New Referral Workflow



# PARTICIPANT WORKFLOW DOCUMENT

## Returning Participants Workflow



# PARTICIPANT WORKFLOW DOCUMENT

## Sample Screen: Log in/Coupon Code page

Project Name

BCM Logo

Need help? Contact the study team.  
Telephone: (713) XXX-XXXX  
Email: XXXXXX@bcm.edu

### Log In

Did you receive an email invitation to participate in the study?  
Please copy and paste the coupon code in your email into the box below to enter the study site.

### Returning participant?

Welcome back! Please log in.

Email:

Password:

[Forgot password?](#)

NPCA LOGO

This is a password protected site for enrolled participants of the study titled A Translational Approach. . . For information about the study please visit the public study website at [www.XXXXXX.edu](http://www.XXXXXX.edu).

# PARTICIPANT WORKFLOW DOCUMENT

## Sample Screen: Main Menu

The screenshot shows a web application interface. At the top left is a placeholder for a logo. To its right is the text "Project Name" and "Sub-Project name". On the top right is the "BCM Logo". Below the logo placeholder is a home icon and a "Log out" link. On the right side, there is contact information: "Need help? Contact the study team. Telephone: (713) XXX-XXXX Email: XXXXXX@bcm.edu". A navigation bar contains "Main Menu" and tabs for "My survey", "My referrals", "About us", "My account", and "Contact us". The main content area is titled "Thank you for completing the survey" and includes a message: "<Message here will be based on DB validation status check. Other headline options: Please complete your survey/Welcome back>". Below this is a paragraph: "You may log into this website anytime using your email address and the password to view the status of your referrals and add new referrals. Also, you can see how close we are to reaching our goal of reaching 18,000 RPCVs." Under "My Action Items", there are progress bars for "Survey: 70% Complete" and "Referrals: 70% Complete", with buttons for "Complete Survey" and "Update or email your referrals". A "Study Recruiting Status" section shows a "70% Complete" progress bar. On the right, there is a section titled "Your Peace Corps Volunteer Network" with a "Node graph of referrals" showing a line graph with three data points. Below the graph are links for "Partner of the National Peace Corps Association" and "Like us on FaceBook".

Project Name  
Sub-Project name

BCM Logo

Log out

Need help? Contact the study team.  
Telephone: (713) XXX-XXXX  
Email: XXXXXX@bcm.edu

Main Menu

My survey My referrals About us My account Contact us

Thank you for completing the survey  
<Message here will be based on DB validation status check. Other headline options: Please complete your survey/Welcome back>

You may log into this website anytime using your email address and the password to view the status of your referrals and add new referrals. Also, you can see how close we are to reaching our goal of reaching 18,000 RPCVs.

My Action Items

Survey: 70% Complete [Complete Survey](#)

Referrals: 70% Complete [Update or email your referrals](#)

Study Recruiting Status

70% Complete

Your Peace Corps Volunteer Network

Node graph of referrals

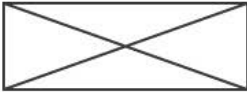
[Partner of the National Peace Corps Association](#)

Like us on FaceBook





# PARTICIPANT WORKFLOW DOCUMENT

## Sample Screen: Survey




**Project Name**  
Sub-Project name



 [Log out](#)

Need help? Contact the study team.  
Telephone: (713) XXX-XXXX  
Email: XXXXXX@bcm.edu



### Breast Health History

Have you ever had a mammogram?

Yes  
 No  
 Unknown / refuse to answer

When was your last mammogram?

Have you ever had a breast biopsy?

Yes  
 No  
 Unknown / refuse to answer

How many breast biopsies (positive or negative) have you had?

Have you ever had at least one breast biopsy with atypical hyperplasia?

Yes  
 No  
 Unknown or refuse to answer

Have you ever been diagnosed with breast cancer?

Yes  
 No  
 Unknown or refuse to answer

# PARTICIPANT WORKFLOW DOCUMENT

## Email Notifications

### **Study Site**

1. Invitation to Participate (Seeds and Referrals)
2. Account Creation Confirmation (Seeds and Referrals)
3. Reminder to Start Survey (Seeds and Referrals)
4. Reminder to Complete Survey (Seeds and Referrals)
5. Reminder to Start Referrals (Seeds and Referrals)
6. Reminder to Complete Referrals (Seeds and Referrals)

### **Public Site**

1. Mailing List Confirmation

# Questionnaire used in CorpsChronicles

---

## About You <Screening>

1. Name\* \_\_\_\_\_  
FIRST MIDDLE LAST
2. Email address\* \_\_\_\_\_
3. Confirm email address\* \_\_\_\_\_
4. May we contact you if we have further questions about your responses?  
 Yes       No
5. Date of Birth\* \_\_\_\_ / \_\_\_\_ / \_\_\_\_  
MM DD YYYY
6. Place of birth City \_\_\_\_\_ State \_\_\_\_\_  
or  
 Check box if not born in the United States  
If foreign-born, list country of birth: \_\_\_\_\_
7. Race (Check all that you MOST CLOSELY identify):  
 American Indian or Alaska Native  
 Asian  
 Black or African-American  
 Native Hawaiian or Other Pacific Islander  
 White  
 Unknown or refuse to answer
8. Ethnicity (Check one that you MOST CLOSELY identify):  
 Hispanic or Latino  
 Not Hispanic or Latino  
 Unknown or refuse to answer
9. Sex\*  
 Male  
 Female

## Your Peace Corps Service

10. Country of Service <drop down list of all PC countries>\*

Month / Years of Service: \_<drop down Jan – Dec>\_ / \_\_<dropdown list 1961-2015>\_ -  
\_\_<drop down Jan – Dec>\_ / \_\_\_<dropdown list 1961-2015>\_\_\_\_\_

\*Require response on years of service (Month of service not required.)

**BUTTON: Add another country/ year of service**

\*Repeat these questions as many times as the RPCV has tours of service.

Are you currently active duty military personnel?\*

- Yes
- No

## **Create Password**

Please create a password for this survey. With your email address and password, you will be able to log into this website to finish your incomplete survey, add RPCV referrals and see the status of previously submitted referrals, and view study updates.

Your username is the email address at which you received your emailed survey invitation. Please create a password below.

Password

Confirm password

## Your RPCV Social Network

The following questions are about your fellow volunteers in the Peace Corps. For the purposes of this study, the definition of knowing someone is that you know them and they know you by sight or by name and that you could contact them.

11. Approximately how many women do you know who served in the Peace Corps at any time between 1961 and 1990?

\_\_\_\_\_ women

12. Of those women you know/knew in the Peace Corps during that time period, about how many of them served at the same time and same country you served?

\_\_\_\_\_ women

13. Of those women you know/knew in the Peace Corps during that time period, about how many of them did you meet after you returned home?

\_\_\_\_\_ women

14. Of those women you know/knew in the Peace Corps during that time period, about how many of them have died since you've returned home?

\_\_\_\_\_ women

## Your History of Medications to Treat or Prevent Malaria

Chloroquine is a drug that is taken to prevent or treat malaria. When it is taken to prevent malaria it is taken once a week. Other names for chloroquine are: Chloroquine phosphate oral and Aralen phosphate. Malarone, Lariam, Paludrine, and Doxycycline are other drugs that are sometimes used for malaria prevention. They are not the same as Chloroquine.

15. Have you ever taken a drug to prevent or treat malaria at any time in your life?

- Yes  
 No  
 Unknown

If yes, please complete the box below beginning with any medications taken to prevent or treat malaria during your Peace Corps service. You can add as many drugs into the table as needed.

Drug Name	Peace Corps Use?	Country where Taken	Reason	Approximate Time Taken	How Often Drug was Taken
Drop Down (include Do Not Know and Other)	Y/N	Drop Down (Include Do Not Know and Other)	Prevention Treatment	Mm/yy-mm/yy	Daily Weekly Bi-Weekly Other

### BUTTON: ADD A DRUG

Did you take a drug that is not in this list? Please contact the study coordinator at XXX-XXX-XXXX.

16. Have you ever taken chloroquine for another reason?

- Yes  
 No **Skip to Question 18.**  
 Unknown **Skip to Question 18.**

17. If you took chloroquine for another reason, please complete the following:

Reason for Use: \_\_\_\_\_

Approximate Time Taken:  
 <dropdowns for MM> <Dropdowns for YYYY> - <dropdowns for MM> <Dropdowns for YYYY>Menstrual History

The next set of questions is about your menstrual periods.

18. How old were you when you started your first menstrual period?

\_\_\_\_\_ years

19. Have you reached menopause, that is your periods have stopped for 12 months or longer for reasons other than pregnancy, or you have no uterus?

- Yes
- No, but periods are irregular **Skip to Question 22.**
- No **Skip to Question 22.**
- Refuse to Answer **Skip to Question 22**

20. How old were you when your periods stopped?

\_\_\_\_\_ years or  Check box if you do not know or refuse to answer

21. Why did your periods stop?

- Natural menopause
- Surgical menopause
- Chemotherapy or radiation treatment
- Do not know
- Other \_\_\_\_\_



## Pregnancy History

22. Have you ever been pregnant? Please include live births, stillbirths, tubal or ectopic, miscarriage / termination.

- Yes  
 No **Skip to Question 25.**  
 Refuse to answer **Skip to Question 25.**

23. How many pregnancies in total have you had, including all live births, still births and tubal or ectopic pregnancies, miscarriages/terminations? Include current pregnancy if applicable.

\_\_\_\_\_ pregnancies

24. Are you currently pregnant?

- Yes  
 No  
 Unknown or refuse to answer

The next set of questions regards all of your pregnancies. Please include all pregnancies (live births, tubal or ectopic, stillbirths, and miscarriages/terminations), and all sons/daughters whether currently living or not. Please fill out the information for each pregnancy.

Repeat section for each pregnancy	Pregnancy # _____ (Please indicate pregnancy number)	
How old were you when you became pregnant?	_____ years <input type="checkbox"/> Don't recall/ refuse to answer	
What was the outcome of this pregnancy? <i>Circle one option</i>	<input type="checkbox"/> Full-term live birth <input type="checkbox"/> Preterm live birth <input type="checkbox"/> Stillbirth (>5 months) <input type="checkbox"/> Miscarriage(<5 months) <input type="checkbox"/> Induced/Elective abortion  <input type="checkbox"/> Refuse to answer  <i>Skip to next pregnancy if answer is stillbirth, Miscarriage, or a refusal.</i>	
Did you breastfeed this or any of these babies? <i>Select one option. If No, go on to the next question.</i>  <b>IF YES:</b> How long did you breastfeed?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't recall <input type="checkbox"/> Not applicable  <b>Number of:</b> <input type="checkbox"/> Weeks _____ <input type="checkbox"/> Months _____	

	<input type="checkbox"/> Don't recall _____	
--	---	--

## Breast Health History

25. Have you ever had a mammogram?

- Yes
- No **Skip to Question 27.**
- Unknown or refuse to answer **Skip to Question 27.**

26. When was your last mammogram?

\_\_\_\_ / \_\_\_\_ / \_\_\_\_  
MM DD YYYY

27. Have you ever had a breast biopsy?

- Yes
- No **Skip to Question 30.**
- Unknown or refuse to answer **Skip to Question 30.**

28. How many breast biopsies (positive or negative) have you had?

\_\_\_\_\_ biopsies

29. Have you ever had at least one breast biopsy with atypical hyperplasia?

- Yes
- No
- Unknown or refuse to answer

30. Have you ever been diagnosed with breast cancer?

- Yes
- No **Skip to Question 39.**
- Unknown or refuse to answer **Skip to Question 39.**

**Breast Cancer Diagnosis** <to be completed only if Question 30 is "Yes">

31. Approximate Date of Diagnosis: <dropdown> / <dropdown>  
MM YYYY

32. What imaging technique was used to detect the breast mass? (Check all that apply)

- Mammogram
- Ultrasound
- MRI
- Other: \_\_\_\_\_

The following questions are regarding markers that are important in your breast cancer treatment.

33. ER (estrogen receptor) status:

- Positive
- Negative
- Unknown

34. PR (progesterone receptor) status:

- Positive
- Negative
- Unknown

35. HER2 (human epidermal growth factor receptor 2) status:

- Positive
- Negative
- Unknown

36. How was your breast cancer treated? (Check all that apply)

- Mastectomy
- Lumpectomy
- Radiation Therapy
- Chemotherapy
- Hormonal Therapy, such as tamoxifen or aromatase inhibitors (Arimidex/anastrozole, Aromasin/exemestane, Femara/letrozole)
- Targeted therapy, such as Herceptin/trastuzumab, Avastin/bevacizumab
- Other: \_\_\_\_\_
- Unknown

37. Approximate Height at Diagnosis: \_\_\_\_\_ feet \_\_\_\_\_ inches

38. Approximate Weight at Diagnosis: \_\_\_\_\_ pounds

## Tobacco History

39. Have you smoked at least 100 cigarettes (5 packs) in your lifetime?

- Yes
- No, never **Skip to Question 42.**
- Unknown or refuse to answer **Skip to Question 42.**

40. Do you now smoke cigarettes?

- Not at all
- Some days
- Everyday

41. On average, how many packs do/did you smoke per day?

\_\_\_\_\_ packs

## Alcohol History

The following questions are about your consumption of alcoholic drinks. These include beer, wine, wine coolers, and liquor (cocktails, whiskey, tequila, gin, rum, etc).

42. In your entire life, have you had at least a total of 12 drinks of any type of alcoholic beverage?

- Yes
- No **Skip to Question 45.**
- Unknown or refuse to answer **Skip to Question 45.**

43. Approximately how many drinks per week do you consume?

- 1-3
- More than 3
- Unknown or refuse to answer

44. How many years have you consumed alcohol?

\_\_\_\_\_ years

- Check box if you do not know or refuse to answer

## Family History of Cancer

The next section is about the cancer history of members of your family. These include living and deceased family members. Please do not include half-siblings.

45. Are you adopted?

- Yes **Skip to Question 47**
- No
- Unknown or refuse to answer **Skip to Question 47**

46. Have any of your immediate blood relatives (parents, siblings, children) ever been diagnosed with cancer?

- Yes
- No **Skip to Question 47.**
- Unknown or refuse to answer **Skip to Question 47.**

For each of these family members, please tell us which of the above cancers they have/had and the approximate age of their diagnosis. Select “DK” if Don’t Know.

Family Member	Age Diagnosed	Type of Cancer
Drop Down	Number/DK	Drop Down

## Birth Control

The next section is about the use of birth control pills and hormonal contraceptives. These are taken for various reasons, including preventing pregnancy, irregular periods, etc.

47. Have you ever taken birth control pills or other hormonal contraceptives for at least one month for any reason? These include pills, injections, implants, and patches.

- Yes, I am currently using (within 6 months)  
 Yes, I used in the past (more than 6 months)  No **Skip to Question 50.**  
 Unknown **Skip to Question 50.**  
 Refuse to answer **Skip to Question 50.**

48. How old were you when you started taking birth control pills/hormonal contraceptives?

- Less than 30  
 30-39  
 40-49  
 50-59  
 60 or older

49. What type of contraceptives did/do you use?

Type	Ever Taken?	Total number of years OR total number of months
Birth control pills	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Birth control injections (ex. Depo Provera)	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Birth control implants (ex. Norplant)	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Birth control patch (ex. Ortho Evra)	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Vaginal ring (ex. Nuva Ring)	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall

## Hormone Replacement Therapy *(To be answered only if Question 19 is "Yes")*

The next section is about use of female hormones. These are often given to relieve menopausal symptoms such as hot flashes. These hormones may have been in the form of pills, shots, skin patches, creams, or vaginal suppositories.

50. Have you ever used hormone replacement therapy such as estrogen or progesterone? These include pills, shots, skin patches, creams, or vaginal suppositories. Do not include birth control pills or fertility drugs.

- Yes, currently use (within past 6 months)
- Yes, used in the past (longer than 6 months ago)
- No, never used **Skip to End.**
- Unknown **Skip to End.**
- Refuse to answer **Skip to End.**

51. In total, how long did you use replacement hormones? (years or months)

\_\_\_\_\_ years or \_\_\_\_\_ months

52. What type of hormone replacement therapy do/did you use? (Please complete table below)

Type	Ever taken?	Total number of years <u>OR</u> total number of months
Pills containing estrogen <b>only</b> (Ex. Premarin, Estrace, Estratest, Ogen)	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Pills containing progestin <b>only</b> (Ex. Provera, Cytrin, MPA)	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Pills containing estrogen <b>plus</b> progestin (Ex. Prempro, Premphase, Femhrt)	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Patches containing estrogen <b>only</b>	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Patches containing estrogen <b>plus</b> progestin (Ex: Combipatch)	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Type - Unrecalled	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall
Other: _____	<input type="checkbox"/> Currently <input type="checkbox"/> Formerly <input type="checkbox"/> No	___ <input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Don't recall



## My Referrals

In order to reach as many female RPCVs as possible, we are asking that you provide the names and contact information for up to 3 female RPCVs who served between 1961 and 1990.

We will email or mail a letter to each woman you refer to the study with a link to the secure study website and an explanation of the study.

Please fill out as much information as you can on each RPCV so that we may invite them to participate in the study.

### **RPCV Referral #1**

Full Name: \_\_\_\_\_  
FIRST MIDDLE LAST

Email Address: \_\_\_\_\_

Telephone Number (including area code): \_\_\_\_\_

Served in Peace Corps <Country drop down> From <Year drop down> to <Year Drop down>

Sex: Male/Female

When we contact this RPCV, may we please tell her that you referred her to us?  
Yes/no

**BUTTON: SAVE**

**BUTTON: ADD PERSONAL NOTE**

### **RPCV Referral #2**

Full Name: \_\_\_\_\_  
FIRST MIDDLE LAST

Email Address: \_\_\_\_\_

Telephone Number (including area code): \_\_\_\_\_

Served in Peace Corps <Country drop down> From <Year drop down> to <Year Drop down>

Sex: Male/Female

When we contact this RPCV, may we please tell her that you referred her to us?  
Yes/no

**BUTTON: SAVE**

**BUTTON: ADD PERSONAL NOTE**

**RPCV Referral #3**

Full Name: \_\_\_\_\_

FIRST

MIDDLE

LAST

Email Address: \_\_\_\_\_

Telephone Number (including area code): \_\_\_\_\_

Served in Peace Corps <Country drop down> From <Year drop down> to <Year Drop down>

Sex: Male/Female

When we contact this RPCV, may we please tell her that you referred her to us?

Yes/no

**BUTTON: SAVE**

**BUTTON: ADD PERSONAL NOTE**

## Appendix D: Screenshots of the CorpsChronicles Application

### Email Received by Study Participants:

Dear \_\_\_\_\_ ,

You have been referred by a fellow returned Peace Corps volunteer (RPCV) who thinks you might be interested in participating in an online study designed for RPCVs. This study is being conducted by researchers at Baylor College of Medicine to examine the relationship between certain medications taken by PCVs as part of their service and a reduced risk of health problems, such as cancer, later in life. In order to test this hypothesis, we need up to 18,000 female RPCVs who served between 1961 and 1990 to fill out a secure online questionnaire.

If you are a woman who served in the Peace Corps between 1961 and 1990, you are eligible to participate in this important study. We hope you will consider taking part, and can directly access your survey by clicking [here](#).

Alternatively, you may also copy and paste the survey URL, <https://corpschronicles-stg.research.bcm.edu/study/verify>, into your web browser then paste in your unique coupon code, **938b4489-8c5c-439b-bf27-f7bad4de43f6**, into the survey webpage.

*Each coupon code is unique, so forwarding this email will not allow another person to take the survey. You will have an opportunity to refer other RPCVs and automatically create coupon codes for them at the end of your survey through the CorpsChronicles RPCV site.*

If you need any assistance with the survey, please call the RPCV study team at (855)-869-0829 or email us at [corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu).

If you do not wish to receive any further emails or calls regarding this study, you may respond to this email with the word REMOVE in the subject line or call us at (855)-869-0829.

Sincerely,

Clifford C. Dacso, MD, MPH

Principal Investigator

'A Translational Approach to Validate in-vivo Anti-tumor Effects of Chloroquine on Breast Cancer Risk'

Departments of Molecular & Cellular Biology and Medicine

Baylor College of Medicine

Email: [corpsnews@bcm.edu](mailto:corpsnews@bcm.edu)

Phone: (855)-869-0829

First page seen when participant clicks on email:

Dear Jackie O'Brien,

We in the Department of Molecular and Cellular Biology at Baylor College of Medicine are interested in studying the long-term benefits of drugs you may have taken during your Peace Corps service. You may be eligible if you are a woman who served in the Peace Corps between 1961 and 1990.

The study is an online or phone-based questionnaire that contains questions about your Peace Corps service, lifestyle factors, and health history. If you fill out this questionnaire (survey), you are consenting or agreeing to take part in this research. At the end of the survey, we will ask you to provide the contact information of other female RPCVs who served between 1961 and 1990. We will contact those women and invite them to participate in the study as well. Using this referral method, we hope to include up to 18000 RPCVs in the study.

We will take all steps legally possible to keep this information confidential.

This study is funded by the Department of Defense (DoD) office of the Congressionally Directed Medical Research Programs (CDMRP). Research records, including personal health information, may be reviewed by representatives of the DoD.

You decide whether you want to take part or not. If you do not take part, you will lose none of your rights. It will not affect you badly in any way. You may decide to stop taking part at any time. Again, if you decide not to take part, it will not affect your rights or benefits. It will not change the health care you receive now or in the future.

It will not cost you to take part in this study. We will not pay you to take part.

If you have any questions about this survey or the study, please contact Dr. Clifford C. Dacso at (855)-869-0829 If you have additional questions about your rights as a research subject, contact the Institutional Review Board for Human Subject Research for Baylor College of Medicine & Affiliated Hospitals at (713) 798-6970

Thank you for your time.

Sincerely,  
Clifford C. Dacso, MD  
Principal Investigator, 'A Translational Approach to Validate In-vivo Anti-tumor Effects of Chloroquine on Breast Cancer Risk'.  
Departments of Molecular & Cellular Biology and Medicine  
Baylor College of Medicine

Email: [corpsnews@bcm.edu](mailto:corpsnews@bcm.edu)  
Phone: (855)-869-0829

I agree to participate  
 I do not agree to participate  
 I've have already been asked and I'm not interested or I've already completed the survey.

[Save and Next >](#)

[BCM Home](#) [BCM Intranet](#) [Privacy Notices](#) [Contact BCM](#) [BCM Site Map](#)

©1998-2014 Baylor College of Medicine®  
Biostatistics and Informatics Shared Resource  
1 Baylor Plaza Suite 529D Houston TX, 77030  
Mail: 1 Baylor Plaza MS-BCM 305 Houston TX, 77030

## About You:



*CorpsChronicles*  
Health Research

BCM  
Baylor College of Medicine

[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
[Email\\_corpsstudyquestion@bcm.edu](mailto:Email_corpsstudyquestion@bcm.edu)

### About You: Jackie

1. Full Name:
2. Email Address:
3. May we contact you if we have further questions about your responses?:  
 Y  
 N
4. Date of Birth:
5. Place of birth :  
   
 Check box if not born in the United States
6. Race (Check all that you MOST CLOSELY identify):  
 American Indian or Alaska Native  
 Asian  
 Black or African-American  
 Native Hawaiian or Other Pacific Islander  
 Unknown or refuse to answer  
 White
7. Ethnicity (Check one that you MOST CLOSELY identify):  
 Hispanic or Latino  
 Not Hispanic or Latino  
 Unknown or refuse to answer

8. Sex:

9. Peace Corps service

**You must have at least one Service record before 1990 to be eligible for this Study.**


Country	Years of Service		Action
	From	To	
<input type="text" value="Select One"/>	<input type="text" value="Select One"/>	<input type="text" value="Select One"/>	

No Peace Corps service


10. Are you currently active duty military personnel?\*

- Y
- N

If eligible, you can then register and create a password so that you can log back in to complete the survey and add referrals:



*CorpsChronicles*  
Health Research



BCM  
Baylor College of Medicine

[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
Email: [corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu)

---

**Account password setup**

Please create a password for this survey. With your email address and password, you will be able to log into this website to finish your incomplete survey, add RPCV referrals and see the status of previously submitted referrals, and view study updates.

Your username is the email address at which you received your emailed survey invitation.

Please create a password below. Password Guide

Username*	<input type="text" value="jlobrien@bcm.tmc.edu"/>
Password*	<input type="password" value="....."/>
Confirm Password*	<input type="password" value="....."/>

---

[BCM Home](#)   [BCM Intranet](#)   [Privacy Notices](#)   [Contact BCM](#)   [BCM Site Map](#)

## Your RPCV Social Network:

[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
[Email: corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as :jlobrien@bcm.tmc.edu ▾

Progress  
0%

### Your RPCV Social Network

The following questions are about your fellow volunteers in the Peace Corps. For the purposes of this study, the definition of knowing someone is that you know them and they know you by sight or by name and that you could contact them.

11 . Approximately how many total women do you know who served in the Peace Corps at any time between 1961 and 1990, including those who have died and those still living?

12 . Of those women you know/knew in the Peace Corps during that time period, about how many of them served at the same time and same country you served?

13 . Of those women you know/knew in the Peace Corps during that time period, about how many of them did you meet after you returned home?

14 . Of those women you know/knew in the Peace Corps during that time period, about how many of them have died since you've returned home?

Save

Save and Next >



## Your History of Medications to Treat or Prevent Malaria:

For Help, [get the Quickstart Guide](#)  
 Still need Help? Contact the study team:  
 Call Toll Free: (855)-869-0829  
 Email: [corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as :jlobrien@bcm.tmc.edu ▾

Progress  
16%

### Your History of Medications to Treat or Prevent Malaria

Chloroquine is a drug that is taken to prevent or treat malaria. When it is taken to prevent malaria it is taken once a week. Other names for chloroquine are: Chloroquine phosphate oral and Aralen phosphate. Malarone, Lariam, Paludrine, and Doxycycline are other drugs that are sometimes used for malaria prevention. They are not the same as Chloroquine.

15. Have you ever taken a drug to prevent or treat malaria at any time in your life?

- Yes
- No
- Unknown

If yes, please complete the box below beginning with any medications taken to prevent or treat malaria during your Peace Corps service. You can add as many drugs into the table as needed

Drug Name	Peace Corp Use?	Country where taken	Reason	Approx time taken		Frequency	Action
				Start(mm/yy)	End(mm/yy)		
Select One ▾ Don't know	Y ▾	Select One ▾	Prevention ▾	<input type="text"/>	Select ▾	<input type="text"/>	Select ▾
+ Add another record							

16. Have you ever taken chloroquine for another reason?

- Yes
- No
- Unknown

17. If you took chloroquine for another reason, please complete the following:

Reason for Use:

## Menstrual History:

[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
[Email: corpsstudyquestion@bcm.edu](mailto:Email_corpsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as jlobrien@bcm.tmc.edu ▾

Progress  
25%

### Menstrual History

The next set of questions is about your menstrual periods.

18. How old were you when you started your first menstrual period?

Check box if you do not know or refuse to answer

19. Have you reached menopause, that is your periods have stopped for 12 months or longer for reasons other than pregnancy, or you have no uterus?

- Yes
- No, but periods are irregular
- No
- Refuse to Answer

20. How old were you when your periods stopped?

Check box if you do not know or refuse to answer

21. Why did your periods stop?

- Natural menopause
- Surgical menopause
- Chemotherapy or radiation treatment
- Do not know
- Other

[← Back](#)

[Save](#)

[Save and Next →](#)

## Pregnancy History:



CorpsChronicles  
Health Research

BCM  
Baylor College of Medicine

[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
[Email: corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as :jlobrien@bcm.tmc.edu ▾

Progress  
33%

### Pregnancy History

22. Have you ever been pregnant? Please include live births, stillbirths, tubal or ectopic, miscarriage / termination


- Yes
- No
- Refuse to answer

23. How many pregnancies in total have you had, including all live births, still births and tubal or ectopic pregnancies, miscarriages/terminations? Include current pregnancy if applicable.

24. Are you currently pregnant?

- Yes
- No
- Unknown or refuse to answer

The next set of questions regards all of your pregnancies. Please include all pregnancies (live births, tubal or ectopic, stillbirths, and miscarriages/terminations), and all sons/daughters whether currently living or not. Please fill out the information for each pregnancy.

Pregnancy #	How old were you when you became pregnant?	What was the outcome of this pregnancy? 	Did you breastfeed this or any of these babies?	Action
<input type="text"/>	<input type="text"/> <input type="checkbox"/> Don't recall/ refuse to answer	<input checked="" type="radio"/> Full-term live birth <input type="radio"/> Preterm live birth <input type="radio"/> Stillbirth (>5 months) <input type="radio"/> Miscarriage(<5 months) <input type="radio"/> Induced/Elective abortion <input type="radio"/> Refuse to answer	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't recall <input type="radio"/> Not applicable	
<input type="button" value="+ Add another record"/>				

## Breast Health History:



[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
[Email: corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as :jlobrien@bcm.tmc.edu ▾

Progress  
41%

### Breast Health History

25. Have you ever had a mammogram?

- Yes
- No
- Unknown or refuse to answer

26. When was your last mammogram? (If you are unsure of the month and/or the date, please leave them blank and fill in the year.)

Select Month ▾ / Select Day ▾ / Select ▾

27. Have you ever had a breast biopsy?

- Yes
- No
- Unknown or refuse to answer

28. How many breast biopsies (positive or negative) have you had?

count

29. Have you ever had at least one breast biopsy with atypical hyperplasia (i.e. precancerous cells)?

- Yes
- No
- Unknown or refuse to answer

30. Have you ever been diagnosed with breast cancer?



- Yes
- No
- Unknown or refuse to answer

[← Back](#)

[Save](#)

[Save and Next →](#)

### Breast Cancer Diagnosis (This section is skipped if you answer no to question #30):



[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
[Email: corrsstudyquestion@bcm.edu](mailto:corrsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as :jlobrien@bcm.tmc.edu ▾ Progress 50%

#### Breast Cancer Diagnosis

31. Approximate Date of Diagnosis: (If you are unsure of the month, please leave it blank and fill in the year.)

Select Month ▾ / Select ▾

32. What imaging technique was used to detect the breast mass? (Check all that apply)

- Mammogram
- Ultrasound
- MRI
- Other

33. ER (estrogen receptor) status:

- Positive
- Negative
- Unknown

34. PR (progesterone receptor) status:

- Positive
- Negative
- Unknown

35. HER2 (human epidermal growth factor receptor 2) status:

- Positive
- Negative
- Unknown

36. How was your breast cancer treated? (Check all that apply)

- Mastectomy
- Lumpectomy
- Radiation Therapy
- Chemotherapy
- Hormonal Therapy, such as tamoxifen or aromatase inhibitors (Arimidex/anastrozole, Aromasin/exemestane, Femara/letrozole)
- Targeted therapy, such as Herceptin/trastuzumab, Avastin/bevacizumab
- Other
- Unknown

37. Approximate Height at Diagnosis:

38. Approximate Weight at Diagnosis:

← Back

Save

Save and Next →

## Tobacco History:



CorpsChronicles  
Health Research

BCM  
Baylor College of Medicine

[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
[Email: corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as :jlobrien@bcm.tmc.edu ▾

Progress  
58%

### Tobacco History

39 . Have you smoked at least 100 cigarettes in your lifetime?

- Yes
- No, never
- Unknown or refuse to answer

40 . Do you now smoke cigarettes?

- Not at all
- Some days
- Everyday

41 . On average, how many cigarettes do/did you smoke per day?

← Back

Save

Save and Next →



## Alcohol History:



CorpsChronicles  
Health Research

BCM  
Baylor College of Medicine

[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team:  
Call Toll Free: (855)-869-0829  
[Email: corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as :jlobrien@bcm.tmc.edu ▾

Progress  
66%

### Alcohol History

The following questions are about your consumption of alcoholic drinks. These include beer, wine, wine coolers, and liquor (cocktails, whiskey, tequila, gin, rum, etc).

42. In your entire life, have you had at least a total of 12 drinks of any type of alcoholic beverage?

- Yes
- No
- Unknown or refuse to answer

43. Approximately how many drinks per week do you consume? If you drink fewer than 1 drinks per week, please select '1-3' below.

- 1-3
- More than 3
- Unknown or refuse to answer

44. How many years have you consumed alcohol?

Check box if you do not know or refuse to answer

← Back

Save

Save and Next →

## Family History of Cancer:



### Family History of Cancer

The next section is about the cancer history of members of your family. These include living and deceased family members. Please do not include half-siblings.

45. Are you adopted?

- Yes
- No
- Unknown or refuse to answer

46. Have any of your immediate blood relatives (parents, siblings, children) ever been diagnosed with cancer?

- Yes
- No
- Unknown or refuse to answer

For each of these family members, please tell us which of the above cancers they have/had and the approximate age of their diagnosis. Select "DK" if Don't Know.

Family Member	Age Diagnosed	Type of Cancer	Action
Select One ▾ *	<input type="text"/> Don't know	Select One ▾ *	
<a href="#">+ Add another record</a>			

[← Back](#)

[Save](#)

[Save and Next →](#)

## Birth Control:



### Birth Control

The next section is about the use of birth control pills and hormonal contraceptives. These are taken for various reasons, including preventing pregnancy, irregular periods, etc.

47. Have you ever taken birth control pills or other hormonal contraceptives for at least one month for any reason? These include pills, injections, implants, and patches.

- Yes, I am currently using (within 6 months)
- Yes, I used in the past (more than 6 months)
- No
- Unknown
- Refuse to answer

48. How old were you when you started taking birth control pills/hormonal contraceptives?

- Less than 30
- 30-39
- 40-49
- 50-59
- 60 or older

What type of contraceptives did/do you use?

	Ever Taken?	Total number of years OR total number of months		
Birth Control pills	<input type="radio"/> Currently		<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> Formerly	<input type="text"/>	<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> No			
Birth control injections (ex. Depo Provera)	<input type="radio"/> Currently		<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> Formerly	<input type="text"/>	<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> No			
Birth control implants (ex. Norplant)	<input type="radio"/> Currently		<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> Formerly	<input type="text"/>	<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> No			
Birth control patch (ex. Ortho Evra)	<input type="radio"/> Currently		<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> Formerly	<input type="text"/>	<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> No			
Vaginal ring (ex. Nuva Ring)	<input type="radio"/> Currently		<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> Formerly	<input type="text"/>	<input type="text" value="Select One"/>	<input type="checkbox"/> Don't recall
	<input type="radio"/> No			

← Back

Save

Save and Next →

## Hormone Replacement Therapy:



CorpsChronicles  
Health Research

BCM  
Baylor College of Medicine

[For Help, get the Quickstart Guide](#)  
Still need Help? Contact the study team  
Call Toll Free: (855)-869-0829  
[Email: corpsstudyquestion@bcm.edu](mailto:corpsstudyquestion@bcm.edu)

Home MySurvey MyReferrals MyAccount Mailing List About Us Contact Us Help Signed in as jlobrien@bcm.tmc.edu ▾

Progress  
91%

### Hormone Replacement Therapy

The next section is about use of female hormones. These are often given to relieve menopausal symptoms such as hot flashes. These hormones may have been in the form of pills, shots, skin patches, creams, or vaginal suppositories.

50 . Have you ever used hormone replacement therapy such as estrogen or progesterone? These include pills, shots, skin patches, creams, or vaginal suppositories. Do not include birth control pills or fertility drugs.

- Yes, currently use (within past 6 months)
- Yes, used in the past (longer than 6 months ago)
- No, never used
- Unknown
- Refuse to answer

51 . In total, how long did you use replacement hormones? (years or months)

What type of hormone replacement therapy do/did you use? (Please complete table below)

	Ever Taken?	Total number of years OR total number of months	
Pills containing estrogen only (Ex. Premarin, Estrace, Estratest, Ogen)	<input type="radio"/> Currently <input type="radio"/> Formerly <input type="radio"/> No	<input type="text"/>	<input type="text" value="Select One"/> <input type="checkbox"/> Don't recall
Pills containing progestin only(Ex. Provera, Cyocrin, MPA)	<input type="radio"/> Currently <input type="radio"/> Formerly <input type="radio"/> No	<input type="text"/>	<input type="text" value="Select One"/> <input type="checkbox"/> Don't recall
Pills containing estrogen plus progestin(Ex. Prempro, Premphase, Femhrt)	<input type="radio"/> Currently <input type="radio"/> Formerly <input type="radio"/> No	<input type="text"/>	<input type="text" value="Select One"/> <input type="checkbox"/> Don't recall
Patches containing estrogen only	<input type="radio"/> Currently <input type="radio"/> Formerly <input type="radio"/> No	<input type="text"/>	<input type="text" value="Select One"/> <input type="checkbox"/> Don't recall
Patches containing estrogen plus progestin (Ex: Combipatch)	<input type="radio"/> Currently <input type="radio"/> Formerly <input type="radio"/> No	<input type="text"/>	<input type="text" value="Select One"/> <input type="checkbox"/> Don't recall
Type - Unrecalled	<input type="radio"/> Currently <input type="radio"/> Formerly <input type="radio"/> No	<input type="text"/>	<input type="text" value="Select One"/> <input type="checkbox"/> Don't recall
Other <input type="text"/>	<input type="radio"/> Currently <input type="radio"/> Formerly <input type="radio"/> No	<input type="text"/>	<input type="text" value="Select One"/> <input type="checkbox"/> Don't recall

# Study Description developed with NPCA

---

Peace Corps Connect home page sliding graphic headline:

**Are you a woman who served in the Peace Corps between 1961 and 1990?**

**You could be a part of an exciting new study examining breast cancer risk.**

(Graphic links to Study Info page)

## Study Info Page

### **Breast Cancer Risk Study for Returned Peace Corps Volunteers**

The National Peace Corps Association has partnered with researchers at Baylor College of Medicine to determine if there is a link between the risk of cancers, including breast cancer, and medications taken during Peace Corps service. The investigators have developed an online survey for RPCVs to measure health and health-affecting behaviors.

***Our goal is that EVERY woman who served in the Peace Corps between 1961 and 1990 is represented in this study.***

Studies in animals suggest that people who took a commonly used medication in the past to prevent or cure malaria may be at lower risk of developing some diseases today, such as cancer or heart disease. Baylor College of Medicine is developing studies to examine this link, beginning with this online survey to compare a large group of women who took the medication to a large group of women who didn't.

Female RPCVs who served between 1961 and 1990 represent an ideal group of people in whom to study this possible link, because about half of RPCVs took medication as part of their service and about half of them did not. Additionally, over 20 years has passed since their service and related medication use, so we can look at health changes over a long period of time.

The survey consists of about 50 questions and can be taken online or over the phone. Question topics include lifestyle risk factors for diseases and a brief medical history.

**ACTION: Please share this page with people you served with in the Peace Corps.**

## PAGE 2 (JUMP LINKS TO THESE HEADERS)

### How can I access the survey?

Identifying as many RPCVs who served between 1961 and 1990 as possible is critical to the study's validity; however, no exhaustive list of RPCVs who served during that time is available. To recruit a generalizable sample, the BCM researchers are using an innovative sampling method called Respondent-Driven Sampling. Based on social networks, this new approach works like a chain letter, in which participants answer the survey and invite their friends to answer the survey, adding onto the chain of RPCVs. The longer the chain of participants, the more representative the sample will be of the entire group of RPCVs. *You have to be referred to the study by another woman who served between 1961 and 1990 to take the survey.*

For more information on Respondent-Driven Sampling methodology, click here. [<Link to paper on RDS>](#)

This novel sampling method requires a small group of a few hundred RPCVs to start a movement that will grow to up to 18,000 RPCVs! Researchers have compiled a list of several hundred female RPCVs who will plant the seeds of the survey. Each of these women will invite up to 7 other RPCVs to participate. Those 7 women will each invite 7 more women, and so on.

**ACTION:** Watch your email for an invitation to fill out the survey and be sure to invite your friends to participate when you get one.

### Who can take the survey?

We would like every woman who served between 1961 and 1990 to be represented in this study. No matter where you served, what medications you took or did not take, or if you have even been diagnosed with cancer or not, if you are a woman who served between 1961 and 1990, then you can take the survey.

To get a complete picture of all the women who served between 1961 and 1990, the researchers also need to count those who have died since their service. If you served with women who have died, you can give the researchers their names and service dates and they can be counted as well. To submit the name of a woman who has died, [click here](#).

### What about men or those who didn't serve in the Peace Corps?

Although men will not fill out this RPCV survey, there will be studies in the future that include men. If you would like to learn about future studies, you can [join our mailing list](#).

Men or friends of the Peace Corps are encouraged to submit names of women who have died since their service. If you served with women who have died, you can give



the researchers their names and service dates and they can be counted as well. To submit the name of a woman who has died, [click here](#).

### **Why should I take this survey? Who benefits?**

While there are no direct benefits to the RPCVs who help with the survey, this survey may help researchers discover new uses for an off-patent (which means that no pharmaceutical company owns it) and inexpensive drug.

### **Who is paying for this study?**

In the early 1990s, a powerful grassroots advocacy movement campaigned for an increase in breast cancer research funding, and in 1993 the National Breast Cancer Coalition presented President Clinton with a 2.6-million signature petition for “a comprehensive plan to end the breast cancer epidemic.” Congress responded by appropriating funds targeted specifically toward winning what came to be known as “The War on Breast Cancer.” This appropriation marked the beginning of the Congressionally Directed Medical Research Program (CDMRP). The CDMRP is a unique partnership among the U.S. Congress, the public, and the Department of Defense to reduce bottlenecks and gaps in medical research. The project is funded by a grant from the Congressionally Directed Medical Research Projects administered by the US Department of Defense.

CDMRP is funded through the Department of Defense (DoD), via annual Congressional legislation known as the Defense Appropriations Act. For most programs, the DoD sends a multi-year budget request to Congress in the form of the President's Budget. However, dollars for the CDMRP are not considered part of the DoD's core mission, and are therefore not included in the DoD's requested budget. Rather, the dollars to fund CDMRP are added every year during the budget approval cycle by members of the House or Senate, in response to requests by advocates. This gives the CDMRP a unique ability to respond quickly to changes in science and public need. In addition to breast cancer, CDMRPs support research for diseases such as ALS (Lou Gehrig's disease), MS, and autism.

### **Are there any risks to participating in the study?**

The risks to you are minimal. Participation in research may involve some loss of privacy. However, your records will be handled as confidentially as possible. Access will be limited to the data manager and the researchers organizing the study and will require a password. No information will be used for research without additional permission. Your contact information will not be shared with anyone outside of Baylor College of Medicine.

### **Are there any financial considerations?**

There will be no cost or payment to RPCVs or their loved ones who respond to the survey.

### **How long will the study take?**

The online survey will take a participant up to 40 minutes. You will be able to save the survey at any time to return and log into the study website to finish it later.

**What about RPCVs who do not have Internet access?**

The study can be completed over the telephone.

**What is the National Peace Corps Association's role in this study?**

The National Peace Corps Association is assisting Baylor College of Medicine in raising awareness about this path-breaking study. The National Peace Corps Association will not have access to individual survey answers, but will help share the overall study results in a variety of ways. Because of the unique nature of this research and the potential for such a great benefit to society, NPCA is sharing its entire database with Baylor College of Medicine and helping to spread the word so that everyone within the greater Peace Corps community, including friends and family members of Peace Corps Volunteers, are informed about the study and encouraged to participate. *(You may control your preferences for such data sharing opportunities by selecting "profile update" accessible at <https://secure.peacecorpsconnect.org/npcassa>.)*

**When can I see the final results of this study?**

The survey results will be published in academic journals, on PeaceCorpsConnect.org, and will be emailed to people registered to receive information on future studies <[link to future studies registration](#)>. Because of the tremendous task of collecting surveys from up to 18,000 RPCVs, final survey results will not be collected, analyzed, and published until mid-2014.

**What do I do if I have questions, now or later?**

Contact the study team directly at [XXX@bcm.edu](mailto:XXX@bcm.edu).

## CorpsChronicles: An Application Leveraging Social Networks for Online Epidemiologic Survey Studies

<sup>1</sup>Mayfield P, <sup>1</sup>McOwiti A, <sup>1</sup>Barney J, <sup>1</sup>Qu Shijing, <sup>1</sup>Sexton KR, <sup>2</sup>Harris AM, <sup>2</sup>McArthur K, <sup>1</sup>Hilsenbeck SG, <sup>1</sup>Bondy ML, <sup>1</sup>Conneely O, <sup>1</sup>Spitz M, <sup>1,2</sup>Dasco CC, <sup>1</sup>Becnel LB

<sup>1</sup>Baylor College of Medicine and <sup>2</sup>The Methodist Hospital Research Institute, Abramson Center for the Future of Health, Houston, TX, 77030, USA

**INTRODUCTION:** Exposure to chloroquine, an off-patent anti-malarial drug with a 60-year history of use by millions, reduces the incidence of breast cancer in genetically programmed rats by 37%. To study whether such exposure may have a protective effect in humans requires a robust bioinformatics system. CorpsChronicles, is a secure, database-backed web application developed to manage large, socially-oriented epidemiologic studies. The first such study is of Returned Peace Corps Volunteers (RPCVs) who served from 1961-1990 in malaria-endemic areas who received chloroquine prophylactically. CorpsChronicles was used to collect information from RPCVs to determine if chloroquine exposure in this cohort associates with reduced breast cancer incidence compared with the general US population.

**METHODS:** CorpsChronicles is a Java Enterprise Edition 6 application that uses the model-view-controller architecture with the JBoss Seam framework to manage its various components. The application runs within JBoss 7 middleware and utilizes Oracle 11g for data persistence, though Hibernate makes it possible to swap out Oracle for other database management systems. Security is managed by enhanced Seam security, encrypted passwords, role-based permissions, Captchas, and unique “coupon” codes that serve as keys for respondents. Survey skip patterns are managed by Drools rules engine to allow independent, business-driven rules to be implemented for individual studies. “Friend recommendations” of respondents are based on a novel social network sampling methodology, Respondent-Driven Sampling (RDS), in which initial respondents (“seeds”) identify members of their social network who may want to participate and these members in turn identify members of their network thus creating network “chains” for each seed. Data from links in each chain are compared back to their seed data using RDSAT freeware; demographic and clinical characteristic data is compared between groups using chi square or Fisher’s exact test and t-test or Wilcoxon rank-sums. Multivariate logistic regression is used to assess associations between chloroquine exposure and breast cancer incidence, with the Network Scale-Up Method, a social networking method, applied to estimate the hard-to-count population of RPCVs.

**RESULTS:** CorpsChronicles (i) allows research subjects to securely answer dynamic questionnaires; (ii) manages electronic recruitment and referral workflows; (iii) sends email reminders to participants to complete surveys; and (iv) provides feedback to end users on the overall progress of the study in a way that does not compromise the results. Because breast cancer known risk factors include family history, race, and lifestyle, the online survey elicits self-reported data on potential confounding variables which will be accounted for in the statistical analysis to maximize internal validity. Two hundred highly-connected RPCVs were selected as initial seeds, with a goal of 17,000 respondents across all chains. Interim analyses were performed at one and two months post-activation to ensure appropriate accruals with RDS.

**DISCUSSION:** In this talk, sampling mechanisms, technical components of CorpsChronicles and preliminary results of the study will be discussed.

# Designing a Translational Epidemiologic Study: Chloroquine and breast cancer chemoprevention in Returned Peace Corps Volunteers

Krystal Sexton, PhD<sup>1</sup> Amy M. Harris, MPH<sup>2,3</sup> Kara McArthur<sup>2,3</sup> Melissa L. Bondy, PhD<sup>1</sup> Susan Hilsenbeck, PhD<sup>1</sup> Lauren Becnel, PhD<sup>1</sup>, Pamela Mayfield<sup>1</sup>, Orla Conneely, PhD<sup>1</sup> Courtney M. Queen, PhD<sup>3</sup> Margaret R. Spitz, MD<sup>1</sup> Clifford C. Dacso, MD, MPH<sup>1,2,3</sup>



(1) Baylor College of Medicine, (2) The Methodist Hospital Research Institute, Abramson Center for the Future of Health, (3) University of Houston

## INTRODUCTION

**This study represents a multidisciplinary approach for drug repositioning through translational research using novel sampling & analysis methods.**

### Background

- Drug Repositioning is a promising approach to reducing the cost and timeline of new cancer drug development (routinely >\$1 billion and 10-15 years for FDA approval).
- Agents with established toxicologic, pharmacokinetic, and pharmacodynamic profiles are redeployed for new conditions.
- Following-up laboratory screening of such drugs with well-designed retrospective cohort studies, rather than a traditional, prospective clinical trial, could greatly expedite the identification and testing of promising drugs.

**Chloroquine, an off-patent malaria prophylaxis with a 60-year history in millions of people, reduces the incidence of breast cancer in rats by 37%. [3-5]**

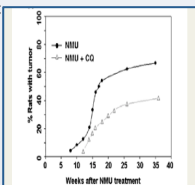


Fig. 1: Chloroquine reduces the incidence of NMU-induced mammary tumors in WT female Wistar-Furth rats (dark line), but shows no breast cancer protective effects in a BALB/c p53-null mammary epithelium model (light line). [5]

**The challenge**, particularly in the context of the dismal success rate of translational medicine [1], was to design an epidemiological study that *quickly and cost-effectively* determine chloroquine's effectiveness in humans.

### Challenges in designing the study

1. Time: Breast cancer can develop several decades after exposure to chloroquine.
  - A prospective study would require 10 - 50 years of follow up
2. Study population: This study requires a representative sample of a well-defined study population
  - The study population must include participants with and without breast cancer, including those who have died of breast cancer.
3. Risk factors: Breast cancer is a complex disease affected by family history of breast cancer, race, and lifestyle factors.

## OBJECTIVE

Design an epidemiologic study to quickly, safely, and cost-effectively evaluate the effect of chloroquine on breast cancer risk in humans.

## ACKNOWLEDGEMENTS

Apollo McOwity, Abramson Center for the Future of Health, Funded by the Department of Defense CDMPR program, National Peace Corps Association



## METHODS

**Study Design:** A retrospective cohort study

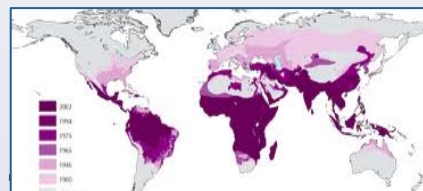
**Exposure of Interest:** Use of chloroquine as malaria prophylaxis before the year 1990.

- Timeline for exposure ends in the year 1990 because this is when the CDC revised its recommendations for malaria prophylaxis in resistant regions away from chloroquine.
- Timeline also takes into account the long latency of breast cancer.
- Chloroquine use measured by self-report and cross-referenced by Peace malaria prevention protocols by year and location.

**Outcome:** Breast cancer diagnosis (self-reported)



Fig. 2: Peace Corps countries



### Respondent-Driven Sampling [2,7]

RPCVs are a highly educated group of people who tend to have tight social relationships with other RPCVs.

- Large membership association (National Peace Corps Assoc) and 100s of small membership groups.
- Respondent-Driven Sampling (RDS) is a variation of snowball sampling that builds a broad representative sample.
- Uses a mathematical system for weighting the sample to compensate for its not having been drawn as a simple random sample.
- Allows for valid inferences about the characteristics of the population from which the sample is drawn.
- Starts with a sample of the target group (called "seeds") and expands through successive waves of recruitment, capitalizing on strong social ties among group members.
- RDS has never been done using Internet-based data collection on this scale

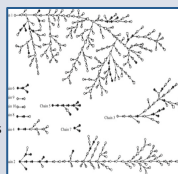


Fig. 4: RDS chains

## New Referral Workflow

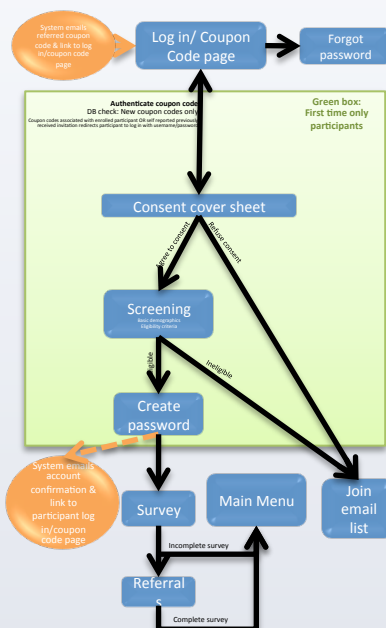


Fig. 5: New Referral Workflow

## DATA COLLECTION

### Online Data Collection Tool

Developing a proprietary data collection application, which will:

- Collect survey responses online with piping and skip patterns
- Allow participants to input referrals
- Track RDS chains of referrals
- Follow up with participants via email to increase response rate
- International and national standards compliance (CDISC BRIDG model, NCI EVS controlled vocabularies and data elements)
- Technology stack: Java Enterprise Edition 6, JBoss 7, RHEL 5, Oracle 11g, F5 proxy server

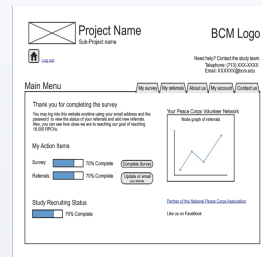
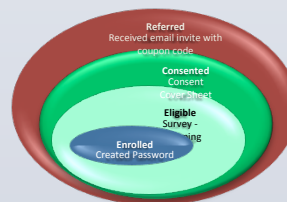


Fig. 7: Online Data Collection Tool Wireframe

## DATA ANALYSIS

- The online RDS data will be analyzed using the Respondent Driven Sampling Analysis Tool (RDSAT) (Ithaca, NY).
- Demographic and clinical characteristics will be compared between groups.
- Categorical variables (e.g., family history) - chi square or Fisher's exact test
- Continuous variables (e.g., age at diagnosis) - t-tests or Wilcoxon rank-sum.
- RDSAT will calculate RDS weights.
- Multivariate logistic regression model will be used to assess the association between chloroquine exposure and breast cancer, adjusted for confounders.
- Breast cancer incidence and survival rates from SEER database and CDC.
- Sample size & minimum detectable ORs estimated using  $\alpha=0.05$  and  $\beta=0.20$  and various response rates

Sample Size Calculators	95%	80%	30%
Population	1748.5	1489.4	1076.7
Final Respondents	4262.3	5023.9	3768.4
Expected Breast Cancer in Unexposed	217.2	173.8	136.3

Sample Size Calculators	95%	80%	30%
Group 1 p1	0.030	0.030	0.030
Group 2 p2	0.024	0.026	0.024
Outcome	0.177	0.151	0.118
Power (%)	80	80	80
n1	4336	5053	3796
n2	3368	4348	3011

**This is equivalent to changing "lifetime risk" from 1 in 9 to 1 in 12 with an associated number needed to treat of 36.**

## EXPECTED RESULTS

As in any retrospective study design, we must work to minimize bias and confounders. However, the gains in cost and time efficiencies allow the translation of preclinical data on breast cancer chemoprevention into the repositioning of a well-characterized and relatively benign drug to reduce breast cancer risk.

## REFERENCES

1. Contopoulos-Ioannidis DG, Alexiou GA, Couvras TC, et al. Life cycle of translational research for medical interventions. *Science*. 2008;321(5894):1298-1299.
2. Gile KJ, Handcock MS. Respondent-driven sampling: an assessment of current methodology. *Sociological Methodology* 2010;40:285-327.
3. Loeber CR, Thompson T, Kastan MB, Maclean KH, Edwards DG, Kittrell FS, Medina D, Conneely OM, O'Malley BW. Ataxia telangiectasia-mutated and p53 are potential mediators of chloroquine-induced resistance to mammary carcinogenesis. *Cancer Res* 2007;67:12026-33.
4. Swaraman L, Stephens LC, Markaverich BM, Clark JA, Krmack S, Conneely OM, O'Malley BW, Medina D. Hormone-induced refractoriness to mammary carcinogenesis in Wistar-Furth rats. *Carcinogenesis* 1998;19: 1573-81.
5. Swaraman L, Conneely OM, Medina D, O'Malley BW. p53 is a potential mediator of pregnancy and hormone-induced resistance to mammary carcinogenesis. *Proc Natl Acad Sci U S A* 2001;98:12379-84.
6. U.S. Peace Corps. Peace Corps: a comprehensive agency assessment. Washington, DC: The Corps; 2010.
7. Wejnert C, Heckathorn DD. Web-based network sampling: efficiency and efficacy of respondent-driven sampling for online research. *Sociological Methods Research* 2008. Published online before print June 10, 2008.

## DLDC

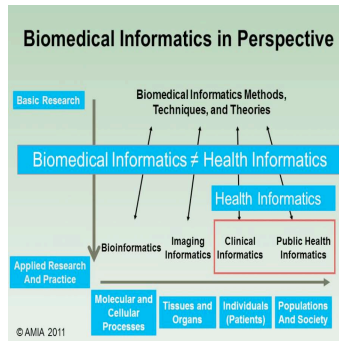
Pamela K. Mayfield, Apollo McOwiti, Jonathan Barney, Yolanda Darlington, Geetu Vanjani and Lauren B. Becnel

Biostatistics and Informatics Shared Resource (BISR), Dan L. Duncan Cancer Center & Lester and Sue Smith Breast Center, Baylor College of Medicine

### Abstract

The Biomedical Informatics Group (BIG) of the DLDC Biostatistics and Informatics Shared Resource provides services to Cancer Center members conducting clinical or epidemiologic research. BIG members were actively involved in establishing national and international data and object standards such as the NIH's standardized case report forms and components of the BRIDG model from the Clinical Data Interchange Standards Consortium (CDISC). Locally, we have implemented these standards in sister clinical research databases, C3PR and CODR. C3PR is a patient registration system created by the National Cancer Institute that BIG hosts to manage core study and patient data for all cancer clinical trials. Certain gaps in C3PR functionality (e.g. streamlined generation of Summary 4 and other reports, data management for PRMS and data review oversight committees) were addressed with the design/creation of a sophisticated, web-based companion application, CODR, which is tightly integrated with C3PR and provides an end-to-end view of clinical trial activity across all DLDC programs. In addition to the standards-based clinical research support, BIG is currently implementing Corps Chronicles, a system that allows tens of thousands of research subjects to securely answer questionnaires using rules engine-managed set of logic. As a result, this web-based system must be highly scalable, able to handle thousands of simultaneous connections, and incorporate workflow and business logic to manage numerous recruitments, accruals and both internal and external communications (eg, reminders to participants to complete surveys). Although the initial system is being built in support of a breast cancer prevention study involving Peace Corps volunteers, the system design will be generalized to allow addition of survey-based studies for other cancers in the future.

### Types of Informatics



### BISR Contributions & Collaborations

#### LOCAL

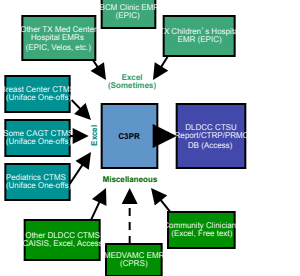
- Developed & hosted international and national standards-compliant online databases
- Clinical & epidemiological/population science research focus areas

#### NATIONAL & INTERNATIONAL

- Participated in the creation of standard case report forms for clinical trials
- Major co-developers of the NCI Life Science Business Analysis Model (BAM)
- Contributors to the Clinical Data Interchange Standards Consortium's (CDISC) BRIDG Domain Analysis Model & NCI Enterprise Vocabulary Services terminologies and data elements

### C3PR: Participant Registration & Reporting

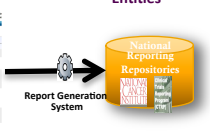
Sources of Participant Registration Data for the DLDC



#### Study & Participant Management in C3PR



#### Reporting to National Oversight Entities



#### Contributions to National Clinical Trials Management: Standard Case Report Forms

Form Name	Version	Status
Form 1	1.0	Active
Form 2	2.0	Active
Form 3	1.0	Active
Form 4	1.0	Active
Form 5	1.0	Active
Form 6	1.0	Active
Form 7	1.0	Active
Form 8	1.0	Active
Form 9	1.0	Active
Form 10	1.0	Active

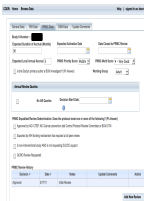
- Acknowledgements**
- CTSU Staff
  - Sarah McNeese, PhD
  - Martha Mims, MD PhD

### CODR: Clinical Trials Oversight

#### FEATURES

- Secure, online database for clinical trials oversight committee (IRB, DSM, etc.) management
- Provides reminders of studies with upcoming & overdue reviews
- Fully integrated with C3PR

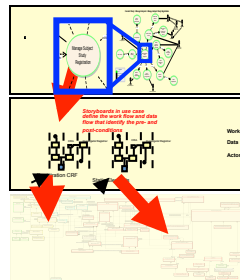
#### Oversight Committee Management & Reporting



#### CODR Data Model Using CDISC Standards



#### Contributions to National Clinical Trials Management: Data and Object Models



NCI Biomedical Research BAM UML Use Cases Are Used to Create BAM Activity Diagrams from which Components of the BRIDG Object Models Were Developed

Acknowledgements, See C3PR Section

### Corps Chronicles: Large Epidemiological Studies

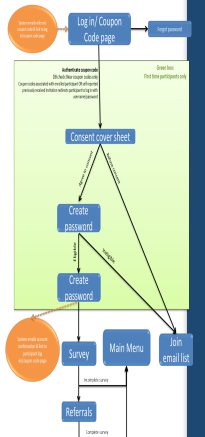
#### FEATURES

- Secure, online database for survey creation and collection & management of survey responses
- Utilizes cutting-edge statistical sampling methodology, RDS, and standard data elements and object s from NCI, CDISC, etc.
- "Social network" like features showing interpersonal network connectivity among participants
- First study investigating effects of chloroquine in breast cancer
- Useful for complex studies with thousands of participants where existing tools such as RedCap do not meet requirements

#### Survey and Referral Management



#### Study Participant Workflow



#### PARTICIPANTS

- Fill out online survey s with piping and skip patterns
- Input referrals
- Track RDS chains of referrals
- Receive follow up email reminders

#### Acknowledgements

- Amy Harris
- Kara McArthur
- Krystal Sexton, PhD
- Cliff Dasco, MD
- Melissa Bondy, PhD
- Margaret Spitz, MD
- Orla Conneely, PhD

## **Appendix I: Think Aloud Testing Protocol and Instrument**

### **Pre-Test of the Online Survey Document Protocol, Summary, and Instructions**

The Pre-Test of the Online Survey will consist of two parts: a Think-Aloud and a Debriefing.

**Number of Subjects:** 5

**Time commitment from subjects:** 1 hour

#### **I. Think Aloud**

Think Aloud is a method that allows researchers to understand, at least in part, the thought process of a subject as she completes a survey. The researcher listens while the user attempts to complete the survey and “narrates” her experience. Ideally, the observer speaks only to remind the user to “please keep talking” should she lapse into silence.

By thinking aloud while attempting to take the survey, users can explain their thought processes as they read the questions and complete the survey, and illuminate any difficulties they encounter or places they feel uncomfortable.

This Think Aloud will be done on the telephone with one subject and one or two CITI-trained research interviewers. Test subjects will be matched to the ultimate users of the survey on all dimensions, including age, sex, and study exclusion and inclusion criteria. The Think Aloud will take place in the actual environment where a user would need to complete the task; that is, the Think Aloud subject will be at home, taking the survey on her home computer, while the interviewer listens on the telephone.

Because the survey is web-based, the Think Aloud will be supplemented by objective data gathered by the survey program: response latency (how long it took the user to complete the entire survey, in minutes), backups (which questions the user back-tracked to complete), and entry errors (which questions provoked backspaces and changed answers).

#### **Think Aloud Protocol Steps**

##### **1. The interviewer will prepare the subject.**

- ◆ Describe the goal of the task, “we are pre-testing this online survey instrument to identify any problems, questions, or concerns users might have in completing it.”
- ◆ Briefly explain the Think Aloud procedure to your subject. “Please say aloud everything you think while you answer the questions in the survey.”
- ◆ Do a practice Think Aloud task to familiarize the subject with the procedure.
- § Ask the subject to open their Web browser, email, and navigate to the emailed survey, making sure that they are comfortable with describing their actions and thoughts in detail.
- ◆ Tell the user that:
  - § You are testing the instructions, not the user, and that any difficulties are your fault, not theirs
  - § They can stop the task at any time if they become uncomfortable.
  - § They may ask questions at any point in the process, but you may not answer them.

§ You will not tell them when they have completed the task; they must determine this on their own.

## 2. Think Aloud

- ◆ Verify that the subject has no remaining questions about the Think Aloud process.
- ◆ Ask the subject to begin the survey.
- ◆ Throughout, if necessary, prompt the user with “please keep talking.”
- ◆ Take extensive notes: everything the user says is relevant.

## 3. Thank the Subject and Prepare for the Debriefing

- ◆ When the subject believes she has completed the survey, thank her for participating and ask her to please answer 11 more questions about the survey as a whole.

## II. Debriefing Protocol Steps

Ask the subject the following questions. Write down their answers in as complete a form as possible.

1. Is there any question that you did not feel comfortable answering? Which one? Why? (repeat as often as necessary)

2. Do you have any suggestions for improving the questionnaire?

3. Would you feel comfortable forwarding this survey in its current configuration? Why not?

4. How did you feel about the length of the survey?

€ Too long

€ An appropriate length

€ Too short

5. I get the impression that this study comes from Baylor College of Medicine and is a legitimate academic study.

€ Strongly agree

€ Somewhat agree

€ Not sure

€ Somewhat disagree

€ Strongly disagree

6. I felt concerned about my privacy or confidentiality.

€ Strongly agree

€ Somewhat agree

€ Not sure

€ Somewhat disagree

€ Strongly disagree

7. I feel comfortable sending my answers to this survey to the research team over the Internet.

€ Strongly agree

€ Somewhat agree

€ Not sure

€ Somewhat disagree

€ Strongly disagree

8. I would be willing to submit contact information for up to 7 friends to invite them to participate in this study.

€ Strongly agree

€ Somewhat agree

€ Not sure

€ Somewhat disagree

€ Strongly disagree

9. I would be more likely to submit contact information of friends if \_\_\_\_\_ .

**Thank the subject for participating. Ask if she has any questions. Refer any questions you cannot answer to Dr. Dacso for follow up and response.**



## Appendix J: Toll-Free Telephone Number and Email Help Line Statistics

Table 1: User Queries and Investigator Responses

Coupon Code	Issue Raised	Date	Person Who Attended to Issue	Status
1ad296b7-ec5b-4c15-b9eb-c51cebc0d686	Unable to answer questions because they were greyed out. Went to pick up the phone. Came back and was logged out	3.26.14	K.M.	Escalated to bioinformatics. Determined issue was user error. Participant was able to answer survey on second attempt.
27bb4f5f-10c4-4289-a777-932ecd776f77	In filling out the study questions, there is no place to indicate if you breast fed your baby. I cannot move forward unless I answer but there is no place to say yes or no.	3.27.14	K.M.	Escalated to bioinformatics. Viewed subjects responses via participant assistance feature. Determined by bioinformatics to be user error.
52a154b9-2e70-4457-a916-3cca1f205907	REMOVE	3.25.14	P.M.	Designated "DO NOT CONTACT"
	REMOVE	3.31.14	C.L.	Designated "DO NOT CONTACT"
491a3d81-6e4f-4480-aefe-6ff249978adb	Complained about receiving too many emails after she submitted the survey	4.9.14	J.O'B.	Designated "DO NOT CONTACT"
fdebeeba-d8b0-4abb-bf5d-110b8dc2a608	Requested to join study via facebook page; concerned about source of invitation and confused about why info about sign-up not on facebook page	4.12.14	J.O'B.	Replied to email explain study methodology; offered that she could have friends email us if she is uncomfortable with referral. Thanked us for reply, but will not be participating.
c2766a3c-dc1e-42d5-8f85-7c78e1a2e8bd	Logged out of survey because the site wouldn't let her answer the breast feeding question and wouldn't let her proceed without answering.	4.16.14	J.O'B.	Replied with email; told her to log out & in again, and if that is not successful, contact us for participant assistance. She replied an hour later; was able to select the breastfeeding question when she tried a second time.
e84bb5ed-e2ed-45ce-8975-db4e675f4204	Emailed to say she signed up ages ago, and helped us with pilot. Also states she hasn't taken the real survey.	4.16.14	J.O'B.	Sent an email to clarify that this most recent email is her official invitation, and that she should use the link to take the survey and add referrals
e84bb5ed-e2ed-45ce-8975-db4e675f4204	Emailed with problem with breast feeding question. "...it won't let me put in a pregnancy until I say if I breastfed, but there is nothing to	4.17.14	J.O'B.	Sent email to tell her to try and log out, then log in again. Escalated to bioinformatics. Programming error identified, and then fixed.

	click to say yes/no"			
a52ae3c5-ee80-4db7-b009-a0487cec93f3	Emailed with request to amend her response	4.17.14	J.O'B.	Emailed to tell her we are working on figuring out how to edit responses. Will investigate with bioinformatics. Update: bioinformatics says it is not possible to amend. She emailed again on 4/30 to follow up, and I told her it is not possible to change her answers at this time.
8b199351-ff23-4f63-a0b2-7f828f375dd0	Could not get past questions 47-49. Also said, "the diagnostic doesn't make sense."	4.30.14	J.O'B.	Emailed to ask her exactly what the problem was, and what browser she's using. Told her she has to check a response to every row in the table. RESOLVED.
a3ed7cad-c183-4417-97f2-7f6c3c497ea2	Emailed because she completed the study, but got a reminder to start the study	5.6.14	J.O'B.	Somehow she has two invitations (two email address in system). Replied to her by email, and shut off email notifications for second account.
246bc734-8f0c-4b61-8ca8-3b32177d3f0f	Got kicked off of survey in the middle of taking it	5.7.14	J.O'B.	Emailed link to her; told her to let us know if it happens again
c6f7a58f-5f6f-4a39-9df0-d4fbd712c2a9	REMOVE	5.13.14	J.O'B.	Designated "DO NOT CONTACT"
f5444138-f3f0-4c52-b217-929de921753e	Has MS; says she is unable to complete survey	5.15.14	J.O'B.	Designated "DO NOT CONTACT". Offered to do survey over the phone, but she says she has no interest because she "cannot relate to the questions about how many women were doing what in her group." Commented that 52 years ago was too long ago to remember.
28c77102-135a-4e4c-b35c-3bd8e5e7002a	Reported that she could not log on again even with correct username and password	5.15.14	J.O'B.	Advised her to close browser and start again, and if not to reset password.
c384f6dc-adf1-42ae-9491-4634d27b3bd3	Requested email address change to her primary account	5.22.14	J.O'B.	Escalated to bioinformatics
8b199351-ff23-4f63-a0b2-7f828f375dd0	REMOVE	5.22.14	J.O'B.	Designated "DO NOT CONTACT"
ba6acdbd-cd4d-48fe-a5b8-35f2f0b9fce2	Sent blank email with subject, "a balky e-form"	5.22.14	K.M.	Requested clarification from participant of exact problem
979fefe3-b569-4c82-8a91-83b0e85e642	Emailed requesting account update, but email was blank	5.22.14	J.O'B.	Requested clarification from participant