

**MALARIA MEDICATION MOBILE APPLICATION**

Product Requirements Document

# DOCUMENT CHANGE CONTROL

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| 0.1 | 4/7/2014 | M. McAllister | Initial document |
| 0.2 | 4/8/2014 | R. Robinson | Edits |
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# DEFINITION

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| **Term** | **Definition** |
| PCV | Peace Corps Volunteer |
| RPCV | Returned Peace Corps Volunteer |
| PCMO | Peace Corps Medical Officer |
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# PROJECT MANAGERS

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# PLATFORMS FOR DEVELOPMENT:

iOS

Android

Web Backend

# BACKGROUND

## THE PROBLEM:

Many peace Corps volunteers serve for 27 months in communities where malaria is highly endemic , putting themselves at risk to work with those most in need. Peace Corps staff is committed to doing everything in our power to help volunteers protect themselves from this deadly disease. Malaria can be prevented by sleeping under an insecticide treated bed net, wearing protective clothing at dusk and dawn when the parasite carrying mosquitos are most active, using mosquito repellant, and taking a malaria prophylaxis. The problem arises from the fact that volunteers must maintain these practices over the entire 27 months. Forgetting to sleep under a net or take your meds for even one day can put them at risk.

Taking a malaria prophylaxis consistently is proven to be about 98% effective against infection. Peace Corps provides 3 types of medication to volunteers for free, and the volunteer is allowed to choose which medication to go on. Peace Corps usually starts the Volunteer on Doxycycline, due to its affordability. However, Volunteers also have the option of changing medications at any time.

Two of the medications are taken daily, Doxycycline and Malarone, and the third is taken weekly, Mefloquine.

In a survey, volunteers identify several reasons for stopping the medication. The top reason being they forgot to take the medication. This may because they were on travel away from their home village, or they just simply didn’t remember to take it.

The second highest reasons were due to social factors: their fellow volunteers are no longer taking the medication, or they see members of their local communities getting malaria frequently and being fine.

Thirdly, Volunteers also struggle with the side effects that come with the medication. Changing medication may help, though misinformation about the medicine and the corresponding side effects was also cited as an issue volunteer’s face.

## PURPOSE OF THE APPLICATION:

This mobile application is to help volunteers sustain protective practices against malaria. The two main features will include a reminder system to help volunteers take their medication on schedule, and also act as an information hub to get accurate information about the real risks associated with malaria and the practices used to avoid it.

## PROFILE OF A USER:

Volunteers spend 27 months in an assigned country with limited access to internet, electricity and other resources. The first 3 months are spent in training. Volunteers do a good job of sticking to their preventative measures and schedule when they first arrive and for their initial months in the field.

Volunteers will stop taking steps to prevent malaria if they do not believe the threat to be high (primarily due to social factors noted above or information about the real risk). They will also miss taking their medications if they travel on a trip, or anything that disrupts their normal routine, and forget to pack enough medications for the trip. Volunteers are likely not going to be able to purchase malaria medication on the road.

# GITHUB ORGANIZATION:

The Malaria App will have iOS, Android, and Web backend components associated with it. To support discussion on topics covering multiple environments there is a ReadMe repo as well. The ReadMe repo is purely for discussion on features common across platforms, it will not host code.

**Link to README Repo**: <https://github.com/PeaceCorps/malaria-app-readme>

Link to iOS Repo: <https://github.com/PeaceCorps/malaria-app-ios>

Link to Android Repo: <https://github.com/PeaceCorps/malaria-app-android>

Link to Web Server Support Repo: <https://github.com/PeaceCorps/malaria-app-web-server>

Mock-up and UI assets will be maintained on all repositories.

# FUNCTIONAL REQUIREMENTS:

## Application Scope:

* Needs to render correctly on a small phone-sized screen, as well as full sized tablets.
* Application should not require an internet connection to function correctly. Internet access for many volunteers is intermittent. The application would primarily use data to sync the info Hub, and potentially transmit and receive analytics data.
* Content and application is updated when an internet connection is available. Information is cached for offline use.
* Data is secured during transmission.
* Should have minimal impact on battery life
* Very light weight storage footprint to make it easy to download and update in a limited bandwidth environment.
* A web interface needs to be built for Peace Corps staff to update content on the info Hub portion of the application, and have that info pushed down to devices.

# DESIGN AND APPLICATION FLOW:

See both the PDF, “Malaria App Mock Up v9” and the PDF flow diagram “Malaria Application Flow Diagram.”

## Initial Set Up (Launch screen only once after initial instillation of application)

* + See: malaria app mock up v9 page 1
  + Set up screen includes drop down menu allowing user to select one of the 3 medications Peace Corps provides:
    - Doxycycline
    - Malarone
    - Mefloquine
  + Set up screen allows user to set the time of day a reminder will go off. User should be given the option to turn the reminder off. The reminder will go off daily if the user selects Doxycycline or Malarone. It will go off weekly if the user selects Mefloquine.
  + Once the user completes data entry on this screen, the screen will no longer appear as the launch screen for the application. The way to access this set up screen going forward will be the gear icon on the main application screens.

## Smart Reminder Function:

* The application will trigger a notification to serve as a reminder to the volunteer to take their medication.
* Frequency of Reminders:
  + The frequency of the reminder will be based on if they are taking a daily or weekly medication.
  + The frequency of reminders will decrease over time to become less obtrusive. If a volunteer has a high rate of following their medicine regiment, the application will ask if they’ve taken the medicine less frequently.
  + The dampening of the frequency should prevent users from deleting the application if it starts to feel annoying.
  + Users should be able to disable the dampening effect of the reminders if they prefer.

## Notifications:

* The application will work with the mobile operating system’s native notification system to best serve up the medicine reminders in a fashion that can be adjusted by the user. (In iOS, user should be able to make the notification a pop-up, a banner, or turn it off, for instance)
  + Nice to Have: The notification reminder should be able to record if the user has taken the medication, without opening up the full application.

## Today’s Pill Tracker (Launch screen for application) (page 1)

* + See: malaria app mock up v9 page 2
  + This is the primary screen for the application.
  + There are 2 primary navigation icons at the bottom of every screen in the application. (Displayed incorrectly as 3 icons on the mock up) For the medicine tracking and analytics screen, the first icon, the hut, is selected.
  + The name of the day appears at the top of the screen, with the date smaller and below it.
  + The gear icon in the upper right will take you to the set up screen.
  + The pill icon in the center of the screen is a graphic, not a button.
  + There are two buttons to indicate if the user took the medication or not, a red X and a green Check.
  + If the user clicks one of the buttons, the color of the selected button changes slightly to indicate it has been selected. The other button will lose its color and become gray-scaled. For example, if I press the check mark, the X will become greyed out and the Check symbol will become a more vibrant green color.
  + Clicking each button will also trigger a unique sound file to play. The sound file will be a pleasing sound if the user took the medication and a negative sound if the X mark was selected.
  + If a user misses a day, and their medication should be taken daily, the application will record the missed day as a missed X data point.
  + **Conditional formatting logic for weekly medication only:**
    - If a user is supposed to take their medication weekly, the day of the week they are supposed to start taking the medication will initially be the day of the week they completed the set up screen, “DayX”.
    - If the initial set up day is DayX, the subsequent days they should take the medication is DayX+7, DayX+14, …, etc.
    - If the user fails to enter data on DayX, then the day of the week and the date text at the top of the screen will turn red (not currently depicted in mock ups). So: If DayX=Medicine Missed, then DaysX+1 through DayX+6 will all have red text for the day of the week and the date, reading the day and date values of DayX still to show the user that they haven’t entered data to indicate they took the medication. If the user was supposed to take their medication on Monday, and today is Wednesday, the screen will display Monday in red text.
    - If the user selects the Check mark mid-way through a week in which they were supposed to have taken the medication, say on a Wednesday when they were supposed to take the medication on Monday, the system should record that the medication was taken on the date of the data entry, Wednesday.
    - If the medication is taken late, on Wednesday, the system will now adjust so that the weekly medication should be taken on Wednesdays going forward. The system will adjust the reminders to be on Wednesdays instead of Mondays to keep the 7 day spacing moving forward.
    - If the user fails to take their medication mid-way through a week, and a full 7 days goes by without the medication being recorded, on DayX+7 the system will start again and allow the user to enter new data for that week. So if the user is supposed to take medications on Mondays, and next Monday arrives with no data entry, the day and date at the top will go back to black text, and the system will now record data for that new week and consider the previous week a missed week.

## Today’s Pill Tracker Analytics Screen (page 2)

* + If a user swipes the screen to the right from the Pill data entry screen, they will access an analytics dashboard. (See: malaria app mock up v9 page 3)
  + The initial version of the application will feature 3 data points. The idea of this screen is to appeal to a user’s desire to track their performance, similar to fitness tracking applications.
    - Medicine Last Take: Displays the date the user last recorded that they took medication.
    - Doses in a Row (Mock up shows different value): Shows the number of times the user correctly recorded the medicine in a row. Missing a day/week will reset this count.
    - Adherence to Medicine: This is the adherence to the medicine schedule to the entire time the user has been using the application, (# of doses taken)/(# of doses that should have been taken).
  + Additional data points may be considered in future versions of the application, included statistics that compare the user to other users in their geographic region. This is not a feature for the initial application, however designing this page should take that future design desire into account.

## Today’s Pill Tracker Analytics Screen (page 3)

* + If a user swipes to the screen to the right from the first Pill Analytics screen, they will access a second page of analytics. (See: malaria app mock up v9 page 4)
  + The user will see their adherence percentage by month, with each of the most recent four months depicted, including the current month. (# of doses taken)/(# of doses that should have been taken). The current month’s compliance rate could be 100% even if the month isn’t complete yet, assuming they had taken all required medications so far that month.
  + Each month label is clickable, and takes the user to a calendar view of that month. (Not depicted in pdf mock up files, but roughly indicated in animated Axure file and as a placeholder screen on the flow diagram)
    - The calendar view allows users to see their day by day, or week by week track record of taking their medication.
    - This calendar view should allow them to go as far back in the calendar as they have entered data for.
    - The calendar can show a smaller version of the X and Check buttons under the date values to create a visual of when medication was taken and not.
    - Clicking on an individual day should load the main Pill Tracking page with the X and Check mark buttons. This will allow the user to correct any inaccurate data, by jumping back to that day and changing which button was clicked.
    - The application’s database should be able to record if a value for a given date was changed, and when. Revision history should be recorded but not displayed.
    - Users need a way to click back from an individual data entry page to the calendar view, and then back again to the Analytics page.
  + Under the month adherence bar charts is a graph depicting adherence over time.
    - The start of the X axis is the date the user first entered data.
    - The end of the X axis is today. (Incorrectly displayed on malaria app mock up v9 page 4)

## info Hub:

* The info Hub is accessed by clicking on the “i” icon in the bottom navigation tray. (See: malaria app mock up v9 page 5)
* The information hub should be a user’s go-to tab for information about malaria and tools used to prevent it. The content of the tab will be provided by Peace Corps, and include text and images.
* The info Hub should be able to cache data for offline viewing and also receive updated information when the device has an internet connection.
* The hub will feature 6 buttons that link to 6 pages of information as follows (subject to change):
  + Peace Corps Policy
  + Percentage of Side Effects
  + Side Effects Reported by PCVs
  + Effectiveness Against Malaria
  + Volunteer Adherence Rates
  + Non-PCV Reported Side Effects
* The Peace Corps will provide the text and image content for each of these six sections.
* The design of the info Hub should be flexible, such that future sections could be added and the user can scroll down a list of menu buttons.
* Some information in the info hub will be in the form of the graph. The graph should be dynamic, such that the user can pinch-to-zoon to adjust the scale of the graph and interact with it, rather than have it just be a static image.

# PENDING ITEMS FROM PEACE CORPS:

* Audio files need to be created for the buttons sounds on the pill tracking page.
* Changes and additions need to be made to the adobe illustrator files used in the mock up document.

# POTENTIAL FUTURE ENHANCEMENTS:

These are ideas that are not intended to be included in the v1.0 release, but may be desired at future interactions of the application. To what degree it is possible, these desires should be considered as the data structure of the application is being conceived. This feature list is in the order that we would likely attempt to develop them.

1. Enhance the web backend with additional features and functionality.
   * Enhance the web backend to not only push data down to users for the info Hub, but to also collect and aggregate data from devices to determine compliance metrics for Peace Corps Staff in Country and HQ.
   * An enhanced web backend that’s collecting user data could also push down those metrics back to the end user, allowing them to see country-level metrics about how well their peers are doing taking their malaria medication. (Think game-fication)
   * Add additional field to the set up screen to track the users gender, age, location, email, and phone.
2. Game-ify the application by rewarding the user with points for staying on track with their medication. Points could be used to redeem virtual or real prize incentives. Actions that earn points could be extended to other sections of the application, like reading all of the info Hub material. Game-ification would allow users to compete against one another as well.
   * Every day you’re covered by malaria medication you earn 1 point. Streaks of compliance could act as a points multiplier.
   * Allow users to share on social media their malaria medication compliance statistics, or the points they’ve earned through game-ification within the application.
3. Allow the application to keep track of the amount of medication the user has on hand. The application could alert the user when they are going to run out of medication, and potentially connect to a system to order a refill of the medication.
4. Create an Admin version of the app that would allow a staff member in country or in the US to view medicine adherence metrics at a continent, country, or village level, on a mobile device.