Agglutination tests are used for early detection of communicable diseases [1]. C-Reactive Protein (CPR) is used as a general marker for inflammation or infection during agglutination assays [2]. These tests are not accessible to populations without access to health clinics. The price of conducting such assays also limits the accessibility. Costs of these tests can range from $1100-$3500 [3]. Recent discoveries of microfluidic technology have been integrated with agglutination techniques to produce a more portable and rapid diagnostic system [4]. A low cost method for quantitative analysis of these devices utilizing existing technology can be used to provide medical diagnostic solutions to developing countries. Statistics show that even in developing countries, more than one-third of the population own cell phones [6].

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INTRODUCTION

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METHODOLOGY

The goal of our design is to develop a low cost optical detection device utilizing smartphone technology to analyze images of agglutination assays for point of care diagnostics. Agglutination tests are used for early detection of communicable diseases [1]. C-Reactive Protein (CPR) is used as a general marker for inflammation or infection during in agglutination assays [2]. These tests are not accessible to populations without access to health clinics. The price of conducting such assays also limits the accessibility. Costs of these tests can range from $1100-$3500 [3]. Recent discoveries of microfluidic technology have been integrated with agglutination techniques to produce a more portable and rapid diagnostic system [4]. A low cost method for quantitative analysis of these devices utilizing existing technology can be used to provide medical diagnostic solutions to developing countries. Statistics show that even in developing countries, more than one-third of the population own cell phones [6].

Total sum of clumping for varying concentrations of CRP per unit area. Increasing concentrations demonstrate increasing sum areas of agglutination.

APPLICATION

At this point in time, the initial prototype will only be compatible with the Samsung Galaxy S2 smartphone. In the future we hope to further develop this device to be compatible with other smartphones on both Android and iOS platforms. Additional modifications to be considered include a Bluetooth camera to allow for image reproducibility when used with multiple cell phone devices.