

TEAM #1
Dementia Detective
MED APP JAM 2015

- PORTFOLIO -

MEMBERS:

Hanna Alam, Computer Science

Robert Luo, Computer Science

Charlene Platon, Nursing Science

Jeremy Shankling, Informatics

Mahamadou Sylla, Computer Science

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Med App Jam 2015 – Team #1 Application Proposal

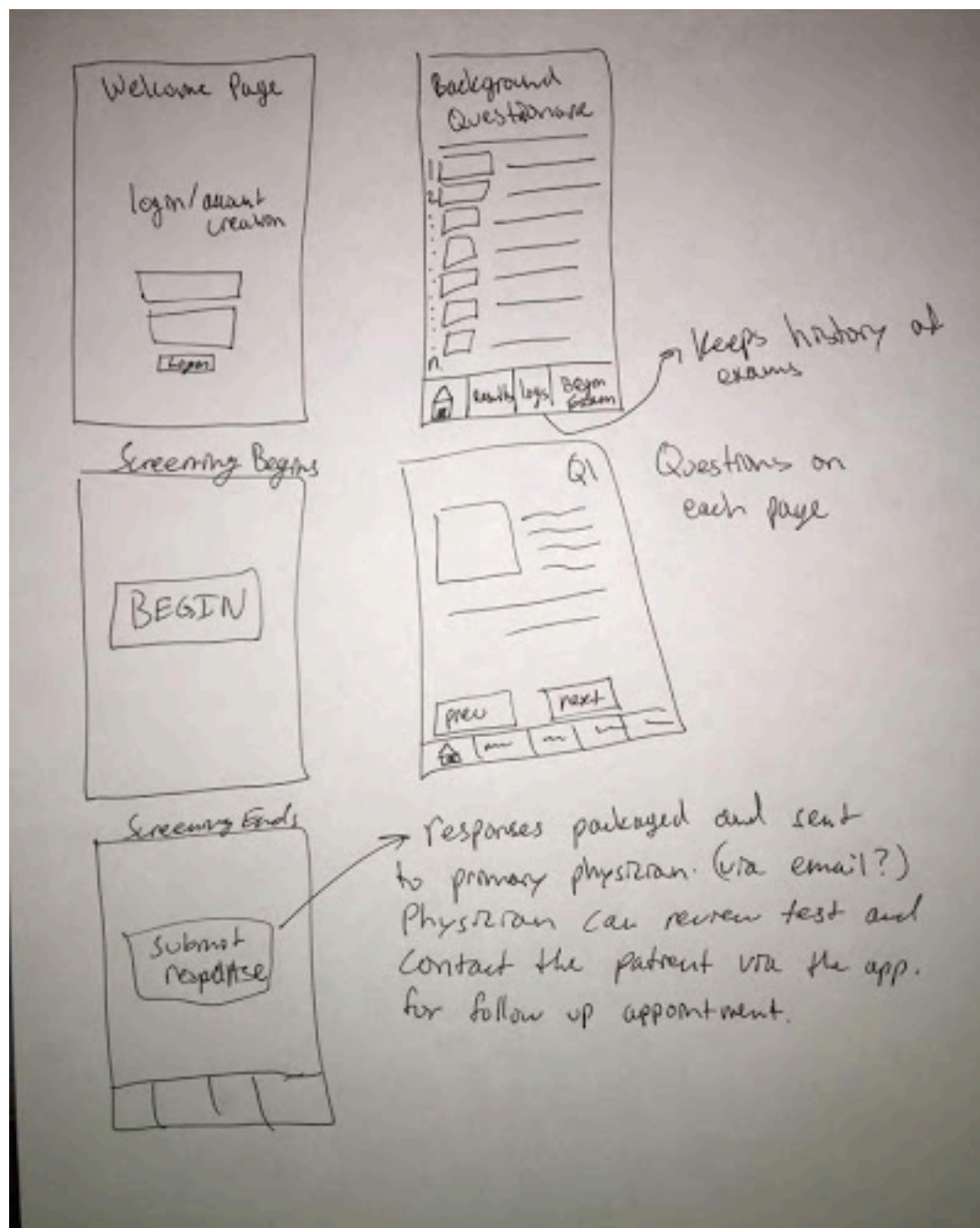
Members: Hanna Alam, Robert Luo, Charlene Platon, Jeremy Shankling, Mahamadou Sylla

App Name: Dementia Detective

Description: Alzheimer's Dementia is a devastating disease that affects approximately 5.3 million Americans of all ages. The number of people affected continues to increase, and is expected to nearly triple by 2050. The Dementia Detective is a smart phone application that gives users the ability to perform a cognitive screening test (the Self-Administered Gerocognitive Exam) at the convenience of their own home, while also creating a platform for patients and clinical providers to connect and discuss test results. Once the tests are completed on the app, results will be sent immediately to providers, allowing them the ability to interpret those results from their office. From there, providers may interact with patients on the app to determine whether or not the patients need to come in for further cognitive evaluation. The SAGE tool is unique in that it allows physicians and providers to detect any early signs of memory or cognitive impairments, and alter therapeutic regimens as necessary to optimize the patient's memory as much as possible. Many people do not seek treatment for dementia until the symptoms are already advanced. The earlier the disease is detected, the more effective treatment can be. This app not only provides a means of early Alzheimer's detection, but it records test results and gives the patient and provider an extra measure of cognitive ability.

Target Audience: Everyone who is interested in learning if they have mild cognitive impairment, or are worried that they are at risk for cognitive impairment. If a person is experiencing changes in their memory or cognition, this app is a convenient way to let your provider or your loved ones be aware of whether or not a cognitive evaluation at the provider's office is necessary.

Med App Jam 2015 - Team #1
Low-Fidelity Mockup

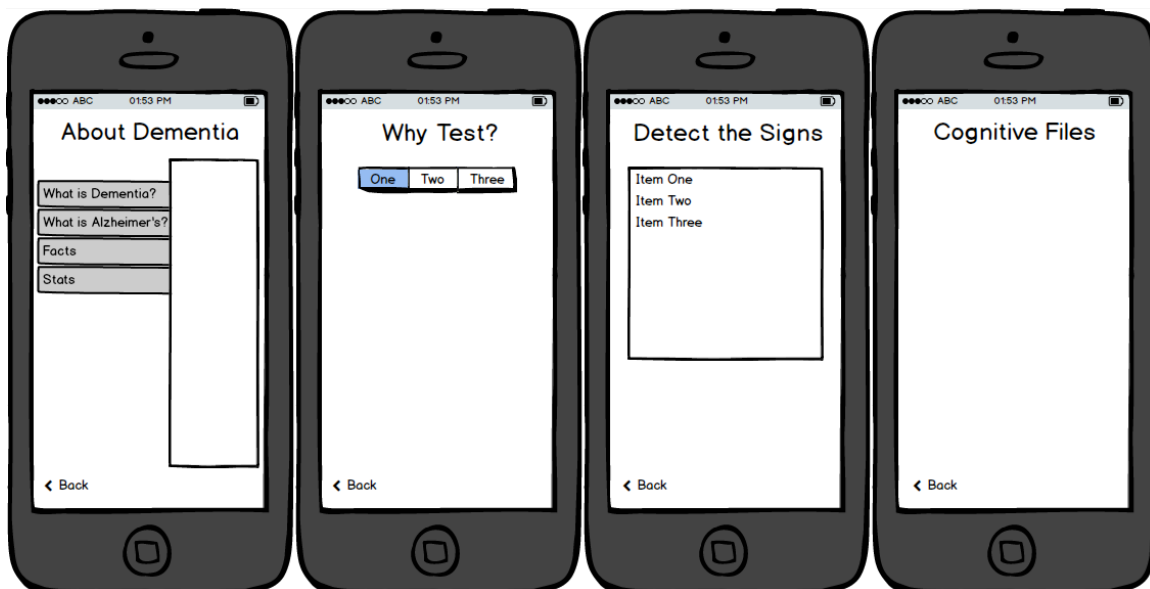


Med App Jam, Team #1 App: Dementia Detective High-Fidelity Mockup

Welcome/Interface:

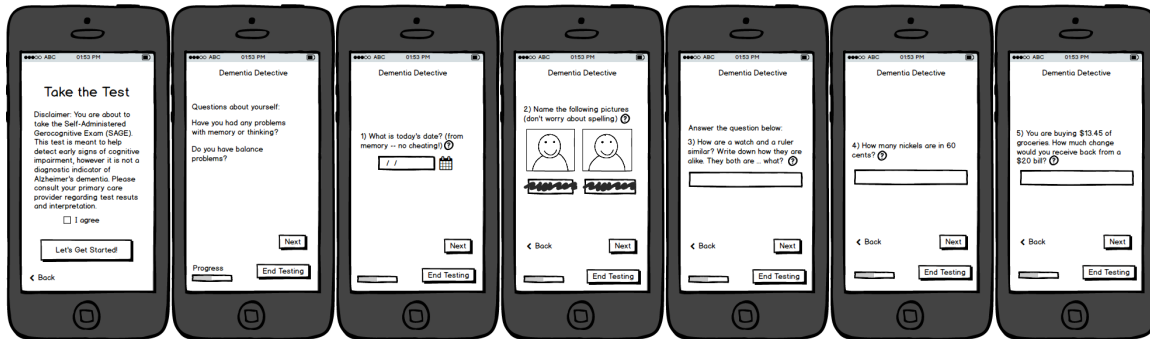


Pages:



Med App Jam, Team #1 App: Dementia Detective High-Fidelity Mockup

Taking The Test:



Completed Test / Contact Provider:



**Med App Jam, Team #1 App:
Dementia Detective
High-Fidelity Mockup**

Fight Dementia:



Dementia Detective

Requirements Specification

Team 1 - MedAppJam 2015

Overview:

The Dementia Detective is a smart phone application that gives users the ability to perform a cognitive screening test (the Self-Administered Gerocognitive Exam) at the convenience of their own home, while also creating a platform for patients and clinical providers to connect and discuss test results. Once the tests are completed on the app, results will be sent immediately to providers, allowing them the ability to interpret those results from their office. From there, providers may interact with patients on the app to determine whether or not the patients need to come in for further cognitive evaluation.

Target Audience:

Everyone who is interested in learning if they have mild cognitive impairment, or are worried that they are at risk for cognitive impairment. If a person is experiencing changes in their memory or cognition, this app is a convenient way to let your provider or your loved ones be aware of whether or not a cognitive evaluation at the provider's office is necessary.

Features and Scene by Scene Specifications:

Account Creation Page:

- Contains fields for First and Last name, Date of Birth, Gender, Ethnicity, Education level, email address, password, and primary care provider's email address.
- Login credentials will consist of email address and password provided in account creation.
- User data will be stored in remote server using PHP and a MySQL database.

User Profile:

- Allows user to edit data submitted via account creation page.

Welcome/Home Screen:

- Welcomes user by name and displays their profile picture.
- Labeled buttons with distinct icons link to various features of the app.

Begin Test/Questions Screens:

- Upon beginning the test, users are prompted with a disclaimer.
- Questions will display on screen with PREV and NEXT buttons to traverse the exam.
- Audio read-back of questions for visually impaired users implemented through a Play button.
- Questions will be based on and modeled after SAGE exam.

Test Completion Page:

- User prompted to choose between sending answers to provider or not.

Contact Provider/Messaging System:

- Screening responses sent to physician via email.
- Physician can contact user through email/Airbnb styled messaging system.

Additional/Tentative Pages:

- **Why Test? Benefits of Early Screening**
 - Testing is scary, but it doesn't have to be. There are many beneficial reasons to consider early cognitive screening:
 - <http://www.aplaceformom.com/blog/2-15-14-online-alzheimers-test/>
- **“Detect The Signs”**: Symptoms to look out for
 - Routine screening is not necessarily for everyone -- you may consider taking the test for yourself if you have been noticing any of these changes:
 - http://www.alz.org/alzheimers_disease_10_signs_of_alzheimers.asp
- **“Cognitive Files”**: Patient results history/logs
 - Since our app will not record the “result” of the test directly on the app, the history log will only show the date and time that the SAGE test was completed, and will also hopefully state whether or not the Doctor received and viewed the test (“Seen” or “Read”)
- **“More Questions? More Answers”**: Additional Resources page
 - CDC: <http://www.cdc.gov/aging/healthybrain/resources.htm>
 - Alzheimer's Association: <http://www.alz.org/>

Med App Jam, Team #1
App Name: Dementia Detective
Blurb

Dementia Detective gives users the ability to perform a cognitive screening test at the privacy and convenience of their own home, while also creating a platform to discuss test results with their primary care provider. Dementia Detective serves as a unique tool for early Alzheimer's detection, providing comprehensive information about the disease, as well as resources and strategies to fight it.

Team #1 Elevator Pitch

App: Dementia Detective

Condensed:

Alzheimer's is the only leading cause of death in the United States that is currently *not* curable. Despite that, one of the biggest obstacles in preventing Alzheimer's decline is early diagnosis. By leveraging the ubiquity of smartphones we can move initial testing from an unfamiliar clinical setting to the comfort and privacy of one's home. There are already other apps out there that help prevent memory loss through games and exercises, but no apps are currently focused on aiding early diagnosis. By increasing access to the Self Administered Gerocognitive Exam (SAGE) to identify early signs of cognitive decline, we hope to have a significant impact on the toll that Alzheimer's can have on one's life. As a team of software developers and a healthcare professional, we have the drive and understanding to build an easy-to-use screening tool that is currently missing from the Alzheimer's toolkit.

Expanded:

Alzheimer's Dementia is a progressive and destructive disease that impairs memory and other vital mental functions. Currently, the disease affects more than 5 million Americans, and while that number is staggering, it is expected to nearly triple by the year 2050. If that is not surprising enough, Alzheimer's is the only leading cause of death that is currently not curable. That alone stresses the importance of research and prevention. On top of that, Alzheimer's is a hefty financial expense. In fact, it is considered the most expensive disease in America, costing the country an estimated \$226 billion in the year 2015.

One important issue surrounding Alzheimer's is that many people do not seek treatment until the symptoms have already advanced. There are multiple reasons for this, including fear, stigma, denial, and lack of routine screening. My team and I are developing an application called Dementia Detective that will have a colossal impact on Alzheimer's detection. Our application utilizes the Self-Administered Gerocognitive Exam (SAGE), designed to capture early signs of cognitive and memory impairments. By bringing this exam to the iOS platform, we will provide patients a simple way to screen for Alzheimer's from the comfort of their own home, without the pressures of a medical setting. Patients will also be able to discuss results privately with their primary care provider, and learn whether or not their results warrant further evaluation. Dementia Detective is an overall one-stop shop for anyone who is interested in learning about Alzheimer's, screening, as well as preventing the disease from taking its toll. My team consists of four software engineers, including myself (Mahamadou), Jeremy, Hanna, Robert, and one family nurse practitioner (FNP) student, Charlene.

Together, we hope to have created an app that will help bring awareness to, and combat against, Alzheimer's dementia – before it's too late.

Team #1 Cases
App: Dementia Detective

Case #1:

Bob is a 60-year old man. Bob's children have noticed that their father has become forgetful of the most simplest things. Bob picks up his daughter from school everyday yet he has forgotten how to get there. Bob has also been losing track of time and constantly forgets what day it is. One day Bob's oldest child, Charles, does some research on memory loss and decides to take his father to the doctor. Based on the information Charles gives to the doctor, the doctor recommends Bob download an application called Dementia Detective, that utilizes the Self-Administered Gerocognitive Exam that is designed to detect early signs of cognitive and memory impairments. A couple days later Bob downloads the Dementia Detective application from the iPhone app store and takes the test and sends the results to his provider through the app. His provider, worried by the test results, urge Bob to come see the doctor for further testing. They believe Bob may have some symptoms of Alzheimer's Dementia.

Case #2:

Stacy is in her late twenties and works two jobs. Stacy has always had great memory. Over the last few months, however, she had felt that her memory had been slowly diminishing. She forgets important dates, events, and even her work schedules. She has also been relying on memory aids to get familiar tasks done. She decides to take action and visit her provider. She lets her doctor know some of the issues she has been facing in her daily life. Her doctor advises her to download an application called Dementia Detective, which utilizes the Self-Administered Gerocognitive Exam that is designed to detect early signs of cognitive and memory impairments. Worried about her memory loss, she downloads the app from the app store and takes the exam the same night and sends the results to her provider. A couple days later her doctor gives her a call and informs her that her test results were spectacular and that she has no symptoms of Alzheimer's Dementia. He continues by saying her symptoms are most likely linked to stress and gives her information on how she can reduce her stress which will in turn help improve her memory.

Case #3:

Kris is in his late 70s. He has lived with his daughter, Alice, and her two teenage kids for over 5 years. At times Kris either forgets the names of his grandchildren or mixes up their names. After months of this issue, Alice decides to bring it to her father's attention. Kris brushes it off and expresses that with age comes normal loss of memory and mild forgetfulness. Alice feels as though there may be something serious going on and urges her father to see his doctor. Kris and Alice go to the doctor's office the next day. Alice informs the doctor of what has been going on and the doctor advises her, on behalf of her father, to download an application called Dementia Detective, which utilizes the Self-Administered Gerocognitive Exam that is designed to detect early signs of cognitive and memory impairments. A day or so later, Alice downloads the app and has her father take the exam. When Kris finishes the exam Alice sends the results to the provider. A couple days later the doctor gives Alice a call and wants her and Kris to come in as soon as possible. The doctor informs them that based on Kris's test results, he may have symptoms of Alzheimer's Dementia and wants to take more tests.

Case #4:

Malcolm is in his early twenties and is currently a graduate student at Columbia University. He has an extremely hard workload and he is not sure if that is linked to his recent trouble remembering things. Malcolm has trouble remembering his class schedules, different class locations, assignment due dates, and what day of the week it is. After months of this he decides to make an appointment to see his doctor. When he sees his doctor Malcolm tells him of his troubles and the stress school has had on him. His doctor tells him to download an application called Dementia Detective, which utilizes the Self-Administered Gerocognitive Exam that is designed to detect early signs of cognitive and memory impairments. Malcolm decides to download the app and take the exam. He sends his results to his provider and a few days later receives a call from his doctor. His doctor informs him that his exam score was great and his recent forgetfulness is more than likely the effect of all the stress school has had on him. He advises some brain exercises he can do to help strengthen his memory.

Team #1: Dementia Detective Application Contents

ABOUT DEMENTIA:

(1) What is Alzheimer's?

Alzheimer's disease is a chronic, irreversible brain disorder that progressively impairs memory and mental skills. Eventually, Alzheimer's can affect a person's ability to perform simple tasks.

Alzheimer's is the most common type of dementia. Dementia is a general term for memory loss and impairment of other vital mental functions. Alzheimer's has no current cure, but treatments are available that can temporarily slow down the effects of dementia, especially with early diagnosis. Once diagnosed, those with Alzheimer's tend to live an average of eight years, however, it can range anywhere from four to twenty years. The earlier symptoms are detected the better the chance at fighting the disease and reaching regression.

Reference:

Alzheimer's Association. (2015). *What is Alzheimer's?* Retrieved November 2015, from <http://www.alz.org/>

(2) About Dementia: Myth or Truth?

- **Alzheimer's is not a common illness in America. False.**
 - In 2013, as many as 5 million Americans were living with Alzheimer's disease. The number of people with Alzheimer's disease doubles every 5 years beyond age 65. By 2050, this number is projected to rise to 14 million, a nearly three-fold increase.
- **Alzheimer's is the most common form of dementia. True.**
 - Alzheimer's disease accounts for 60-80% of dementia cases.
- **Alzheimer's is a disease of the elderly. False.**
 - As much as 5% of people with the disease have early-onset Alzheimer's (younger-onset), which often appears when someone is in their 40s or 50s.
- **Alzheimer's is considered the most expensive disease in America. True.**
 - In 2015, Alzheimer's and other dementias are projected to cost the country an estimated \$226 billion. Unless something is done, the cost of Alzheimer's will continue to rise, costing over \$1.1 trillion by 2050.
- **Alzheimer's is not a leading cause of death in the United States. False.**
 - Alzheimer's is the 6th leading cause of death in the United States, and is currently the only leading cause of death that is not preventable.

Reference:

Alzheimer's Disease. (2015, March 5). Retrieved November 2015, from <http://www.cdc.gov/>

KNOW THE SIGNS:

Know the Signs of Alzheimer's Dementia

The following items are signs that are commonly associated with Alzheimer's dementia. Have you noticed any of the signs throughout your daily life? Have they been interrupting your daily routine? If you notice any of these warning signs, be sure to consult your primary care provider and ask if now is the appropriate time to take a cognitive screening test.

- Memory loss that causes disruptions in daily life
 - Have you been forgetting important dates?
 - Do you ask the same information over and over?
 - Do you rely on notes or other devices to help aid memory?
 - Do you need to ask your family members for help with tasks that you used to handle independently?
 - **Typical sign:** Sometimes forgetting names or appointments, and then remembering them later.
- Facing challenges in planning or solving problems
 - Are you experiencing changes or difficulty in developing a plan and following through with it?
 - Are you having trouble with a familiar recipe?
 - Is it difficult to keep track of monthly bills?
 - Are you having trouble concentrating and accomplishing tasks?
 - Does it take much longer now to complete tasks than before?
 - **Typical sign:** Making a few errors when balancing a checkbook.
- Difficulty completing familiar tasks
 - Are you having difficulty familiar daily tasks at home, work, or leisurely?
 - Do you have trouble driving to a familiar place?
 - Have you had trouble budgeting at work?
 - Have you forgotten the rules of your favorite game?
 - **Typical sign:** Occasionally needing help to use the settings on a microwave or to record a TV show
- Confusion with time or place
 - Do you lose track of dates, seasons, and passage of time?
 - Do you have trouble understanding something if it does not happen immediately?
 - Do you forget where you are or how you got there?
 - **Typical sign:** Getting confused about the day of the week but remembering it later
- Experiencing issues with your vision
 - Vision problems may be a sign of Alzheimer's for some people
 - Have you had difficulty reading?
 - Have you had difficulty judging distance and determining color or contrast?
 - Are you unable to recognize yourself in the mirror at times?
 - **Typical sign:** Vision changes related to cataracts
- New problems with communicating
 - Do you have trouble following or joining a conversation?

- Have you stopped talking in the middle of a conversation and have no idea how to continue?
 - Have you repeated yourself in conversation?
 - Do you struggle with vocabulary and recalling words?
 - **Typical sign:** Sometimes having trouble finding the right word
- Misplacing things and losing the ability to retrace your steps to find them
 - Do you put things in unusual places?
 - Do you lose things and are unable to find them again?
 - Do you accuse others of stealing items?
 - **Typical sign:** Misplacing items from time to time, such as a pair of glasses or remote control
- Decreased or poor judgment:
 - Have you experienced any changes in judgment or decision making?
 - Do you find yourself using poor judgment when it comes to dealing with money? For example, giving large amounts of money to telemarketers?
 - Do you spend less time grooming yourself or keeping yourself clean?
 - **Typical sign:** Making a bad decision once in a while
- Isolating and removing yourself from hobbies and social activities
 - Have you been starting to remove yourself from hobbies or social activities?
 - Are you having trouble keeping up with your favorite sports team or remembering how to complete a favorite hobby?
 - Have you been avoiding social events due to any changes you've experienced?
 - **Typical sign:** Sometimes feeling tired of work, family, and social obligations
- Mood and personality changes:
 - Have you been feeling confused, suspicious, depressed, fearful, or anxious?
 - Are you easily upset at home, work, with friends or in places where you are out of your comfort zone?
 - **Typical sign:** Developing very specific ways of doing things and becoming irritable when routine is disrupted

Reference:

Alzheimer's Association. (2009). Retrieved November 2015, from <http://www.alz.org/>

WHY TEST

(1) Why Test?

Alzheimer's is a frightening disease. For that reason, many people are reluctant to screen for cognitive impairment. It may be difficult to acknowledge the presence of memory problems or any changes in cognitive function. However, there are many benefits for considering early screening of Alzheimer's dementia:

1. **Avoid diagnosis uncertainty:** Although a diagnosis of dementia can be devastating, knowing what the problem is and what can be done to treat it can leave you with more certainty than not knowing the reason for changes in mental function.
2. **Early detection can improve treatment success:** One huge benefit is that some causes of dementia are in fact treatable and fully or partially reversible, depending on the cause of cognitive impairment. Conditions that fall into this category include but are not limited to: vitamin deficiencies, side effects of medications and certain brain tumors.
3. **Support from loved ones:** Apart from treatment, detecting the disease early has benefits not only to the one diagnosed, but to their loved ones as well. Early signs of cognitive impairments allows the patient's loved ones room to be more vigilant.
4. **Preparation for the future:** Another advantage of early diagnosis is the financial side of things. It gives the patient and their loved ones time to make decisions about future care, financial and legal matters.
5. **Enhancing detection:** Getting the right diagnosis early can help researchers and medical professionals further understand the potential causes of dementia and its risk factors. Better recognition of the disease is imperative for providing help and support for others who are affected.

Reference:

Benefits of early dementia diagnosis. (17 September 2015). Retrieved November 2015 from <http://www.nhs.uk/>

(2) About SAGE Screening

SAGE stands for Self-Administered Gerocognitive Exam. It is a screening test designed to detect early signs of cognitive, memory or thinking impairments. SAGE evaluates your brain's thinking abilities and lets your health care provider know how well your brain works.

Dementia Detectives provides you the ability to perform the SAGE test in the convenience of your own home, without the pressures of a busy medical setting. Once you click "Take The Test" on the Dementia Detective home menu, you will have the ability to take the screening test and send the results to your healthcare provider.

While SAGE is not diagnostic of Alzheimer's disease, research studies demonstrate that the test is accurate in its detection of mild cognitive impairment or dementia. The test

results will allow your healthcare provider to determine whether or not treatment or further evaluation is necessary. Consult your primary care provider regarding test interpretation and further information about SAGE. Otherwise, please refer to our “Fight Dementia” and “Resources” page for a comprehensive overview of strategies to further protect against Alzheimer’s.

Reference:

SAGE: A Test to Detect Signs of Alzheimer’s and Dementia. (2010). Retrieved November 2015 from <http://wexnermedical.osu.edu/>

FIGHT DEMENTIA

Alzheimer's Disease Prevention

- Exercise regularly
 - Aim for at least 30 minutes of moderately intense exercise each day, or 150 minutes each week
 - Utilize a mix of cardio exercises and strength training
 - Any activity that brings up your heart rate is a good start
 - **Weight and resistance training:** for those 65 years and over, adding 2-3 sessions to your weekly routine may cut your risk for Alzheimer's in half
- Have a well-balanced and healthy diet
 - Eat a Mediterranean diet: Mediterranean diets are rich in vegetables, beans, whole grains, fish, and olive oil -- these ingredients are associated with a reduced risk of cognitive impairment and Alzheimer's disease
 - Avoid trans fats and saturated fats: These fats can lead to inflammation and produce free radicals, which are damaging to the brain. Focus on consuming healthy fats to reduce Alzheimer's risk
- Perform activities that promote mental stimulation
 - Learn new things, such as studying a foreign language or learning how to play a musical instrument
 - Practice memorization: try to memorize something that involves more effort, such as the 50 U.S. state capitals, or create rhymes and mnemonics to enhance memory
 - Try new activities: Take a new route, eat with your non-dominant hand, rearrange your computer file system. Vary habits regularly
- Get enough sleep according to age group
 - Establish a regular sleep schedule, going to bed and waking up at the same time
 - Do your best to reach the following sleep goals:
 - Younger adults (18-25): Sleep range is 7-9 hours
 - Adults (26-64): Sleep range is 7-9 hours
 - Older adults (65+): Sleep range is 7-8 hours
 - Create a relaxing bedtime ritual: Habits for bedtime will send a signal to your brain that it's time for deep restorative sleep
- Manage stress levels
 - Chronic stress can affect the brain and memory function, increasing your risk of Alzheimer's disease
 - Perform techniques to manage stress levels:
 - Practice deep restorative breathing to reduce stress and increase oxygen flow to your brain
 - Keep stress under control with daily relaxation activities, such as yoga, walking in the park, or a soothing bath
 - Make fun a priority: Make time for leisure activities -- constantly working can negatively affect your stress levels and your brain
 - Remember to laugh: being able to keep a sense of humor and laugh it off can help your body fight stress
- Maintain an active social life

- Social isolation can cause our memory to deteriorate. Research shows that remaining socially engaged can protect against Alzheimer's disease and dementia later in life
- Keeping a strong network of friends and having in-person, face-to-face interaction is helpful for maintaining memory and cognition

The more you strengthen each of these strategies, the healthier your brain activity will be. The healthier your brain, the longer it will last.

References:

- Smith, M., Robinson, L. & Segal, J.. (2015). *Alzheimer's and Dementia Prevention*. Retrieved November 2015, from <http://www.helpguide.org/>
- How Much Sleep Do We Really Need?. (2015). Retrieved November 2015 from <https://sleepfoundation.org/>

RESOURCES

- Centers for Disease Control and Prevention:
 - <http://www.cdc.gov/aging/aginginfo/alzheimers.htm>
- Alzheimer's Association:
 - <http://www.alz.org/>
- Alzheimer's Association Support Group:
 - http://www.alz.org/norcal/in_my_community_support.asp
- Alzheimer's Association Caregiver Support Group:
 - <https://www.alz.org/care/alzheimers-dementia-support-groups.asp>
- U.S. Department of Health & Human Services:
 - <http://www.alzheimers.gov/>
- HelpGuide.org:
 - <http://www.helpguide.org/>

**Team #1: Dementia Detective
Graphics**

Main Logo:



Application Icon:



