Accidental Drug Overdose.

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Introduction




Images taken from preliminary observations showing how people have to develop their own systems for their unique situations.

The objective for this project was to design a product that would address the problem of accidental prescription drug overdose. After doing some initial research it was determined that there were far too many stake holders involved and the topic of overdose was much too broad to successfully address in the time frame given for this project. I also discovered that there dozens of unique medications taken by all different ages groups in endless combinations. I determined that it would be impossible for me to design something that would solve overdose for all ages and be able accommodate all medications. I then decided, because of time constraints and available resources that scope of the project should be narrowed to **focus on accidental overdose in older adults.** This seemed to be the most logical direction given that the elderly population consumes the most prescriptions and is going to double in the next two decades. I also chose to focus specifically of **high risk medications** such as pain killers and nervous system depressants because these are the drugs most commonly misused in overdose cases. The time frame for this project was 16 weeks with the first 3 weeks being devoted to research. The final deliverable were to be a full scale appearance model, bound document, and large format poster showing the final product in context.

Every year in the U.S. approximately 3.7 billion dollars are spent on prescription drugs. Older adults consume over one third of prescriptions annually. Even though the elderly make up only 13% of the population they spend far more on prescription drugs than any other age group.

Myths About Prescription Drugs

It is related to income

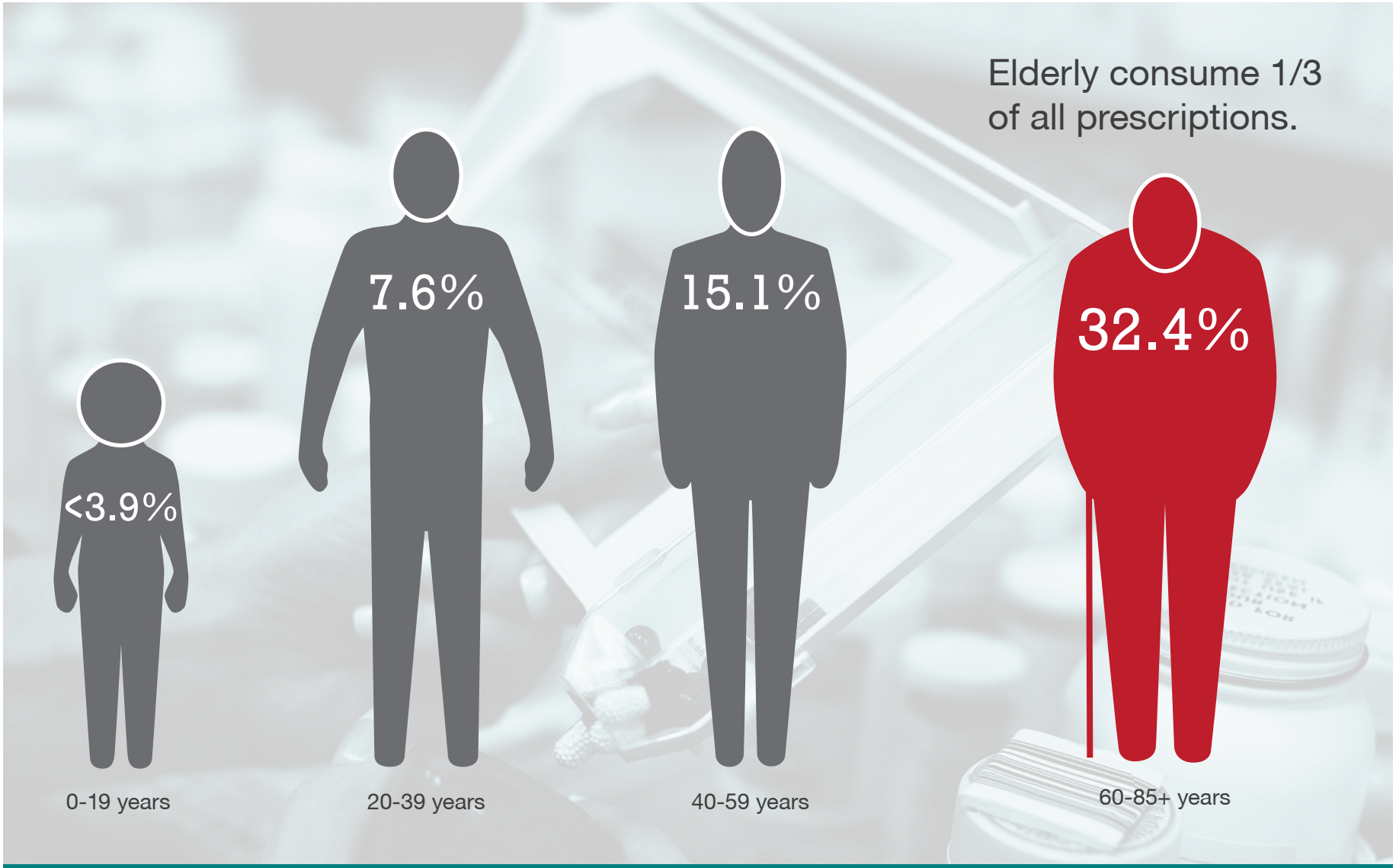
Many people believe that prescription drug abuse is something that is only a problem in low income areas or where people do not have access to health care and are forced to buy drugs off the street. The truth is that prescription drug misuse and has now become prevalent in every age and income level. Older adults are at particular risk because they often take multiple medications that can cause a decrease in mental function.

It's only something teenagers do to get high.

Most of the public believes that prescription drug overdose and abuse is something only teenagers and young adults do to get high. While it is true that pharmaceuticals are most often misused by teens there is a growing epidemic of older adults as well as elderly citizens that have a problem with prescriptions drugs as well.

Prescriptions are safer than street drugs.

It is thought by many that medications are safer than hard core drugs like Heroin and Cocaine when in reality they can be just as dangerous if not taken under the careful supervision of a doctor. Many prescription drugs operate the same way street drugs do and can have the same addictive euphoric sensations that cause people to become hooked on these substances whether they intended to or not. If some one becomes addicted to their medications, the risk of overdose is much higher.



Although the elderly make up only 13% of the population they consume approximately one third of the prescription drugs sold in the U.S. This is due in part to the fact that as people age their immune systems and normal bodily processes can become compromised. This makes them more venerable to health risks. In addition to this as most older adults age they can experience a decrease in physical balance that could lead to falls and other injuries thus elevating their potential need for medications.

Prescription drugs claim more lives than Heroin and Cocaine combined.

Since 2007 the number of prescription drugs dispensed to people 60 and older increased 32%, double the rate of those 40-59.

In 2009 alone more than 37,000 people died due to drug overdose. Since the elderly portion of our population consumes more prescription drugs than any other age group they are at particular risk of drug overdose.

What causes an overdose?

Confusion

As many adults get older they can suffer from decreased cognitive function which can make it difficult to remember which medications to take and in what order. In addition to this many medications can cause a decrease in mental function exacerbating the situation.

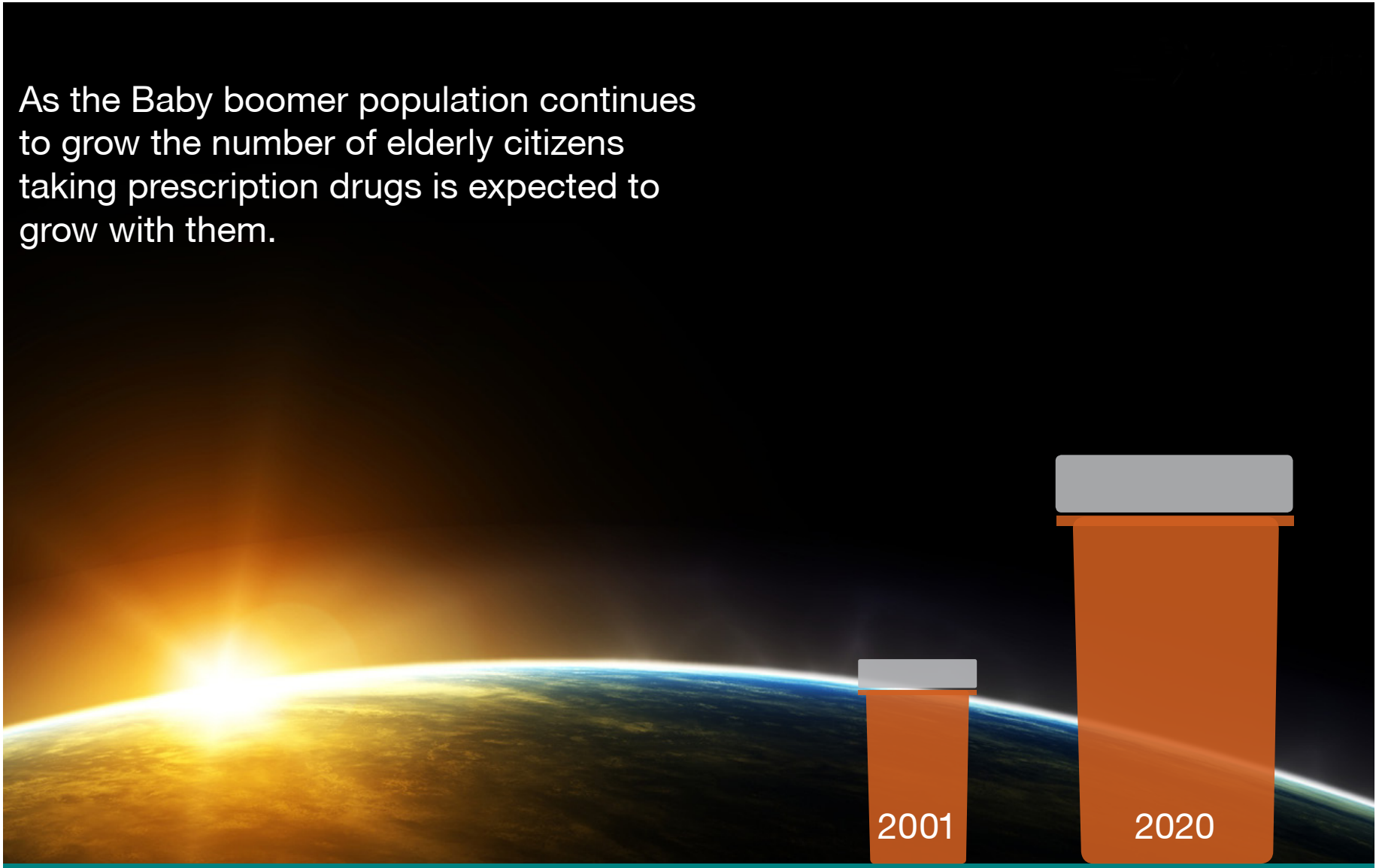
Memory lose

Many elderly have reduced mental ability making it difficult to remember which medications to take and when. Many times a person may forget that they have already taken their dose for the day and accidently take another one, causing an overdose.

Timing

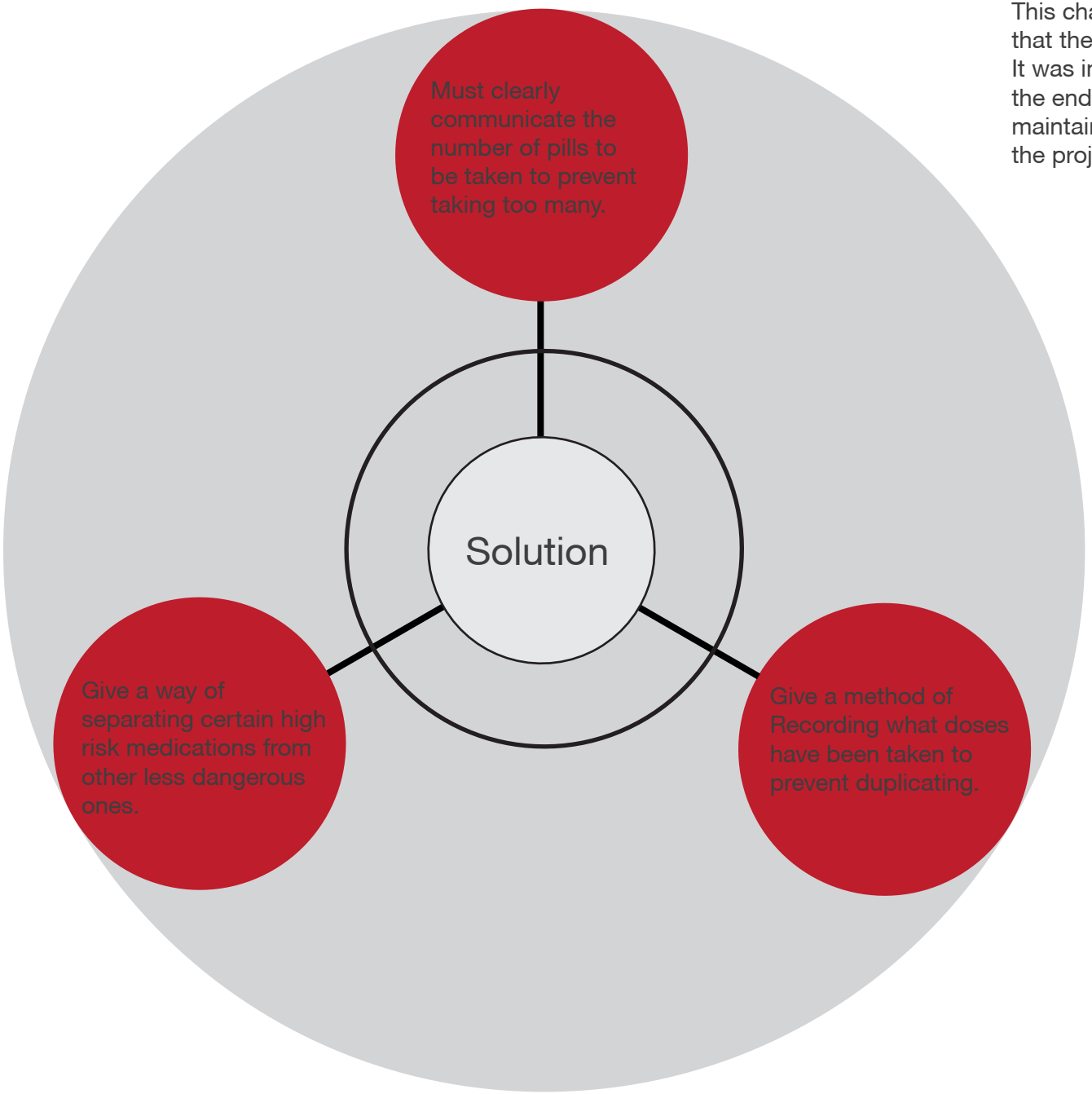
People that take multiple medications sometimes run the risk of taking their doses too close together. Certain prescriptions require the patient to space them out so that they do not interact causing an overdose.

As the Baby boomer population continues to grow the number of elderly citizens taking prescription drugs is expected to grow with them.



The number of elderly misusing prescription drugs is expected to double by 2020.

What Needs to be Done.



This chart shows the three key attributes that the final solution needed to address. It was important to define these areas at the end of the research phase in order to maintain a clear direction for the rest of the project.

Brain Storming

Colored post it notes were used in generating as many rough ideas as possible. Different colors identify different categories of information such as: **blue** for rough thumbnails, **green** for suggestions from classmates, **yellow** important research data points to keep in mind while brain ideating.

Key issues to address.

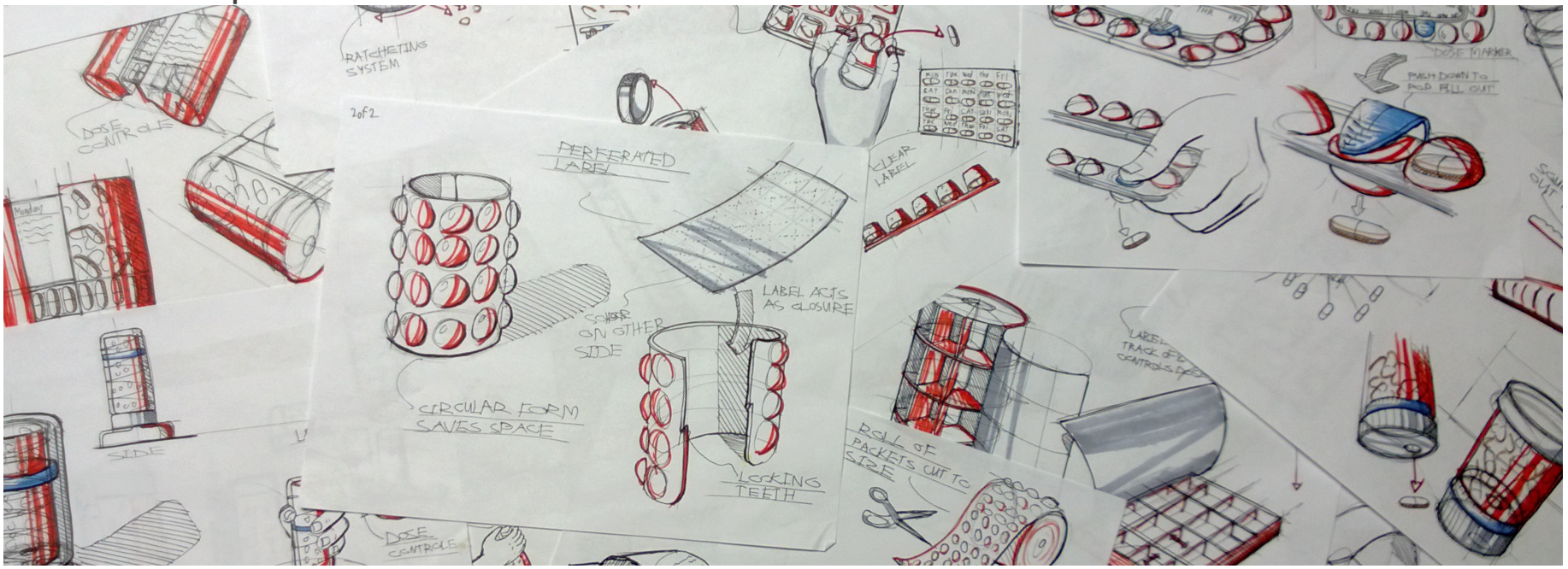
Record what doses have been taken and when to prevent duplicating doses.

Aid the user in knowing how many pills should be taken for each dose.

Solution should be relatively inexpensive and easy to produce.

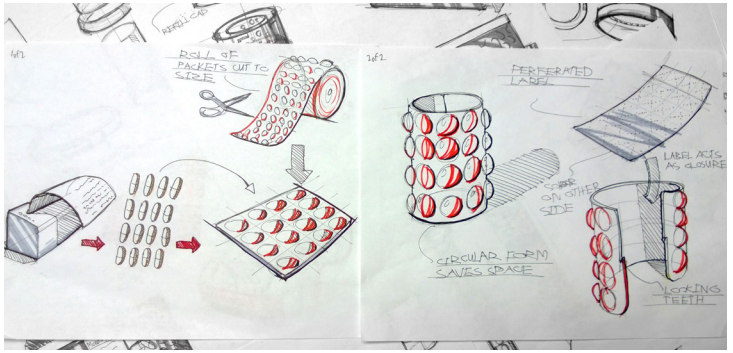
Final product should add as littler inconvenience to the current the Pharmacist as possible to allow for easy integration into the current system.

Initial Concepts



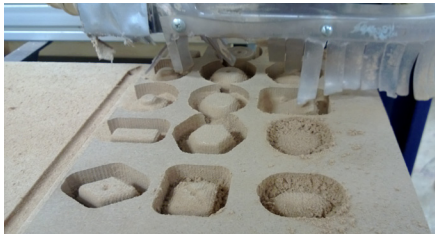
These initial concepts focused primarily on giving the user a way of knowing what doses they have already taken to prevent them from taking too many doses in a period. These concepts also explored ways of separating each dose to help prevent users from accidentally taking too many pills.

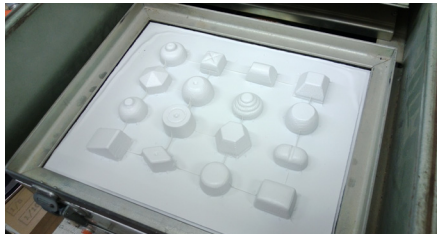
This concept was chosen for further explorations with physical mock ups because it offered the user the best means of recording what doses they have taken as well as visually separating each quantity of pills to decrease the chance of taking too many pills.



Form = Function

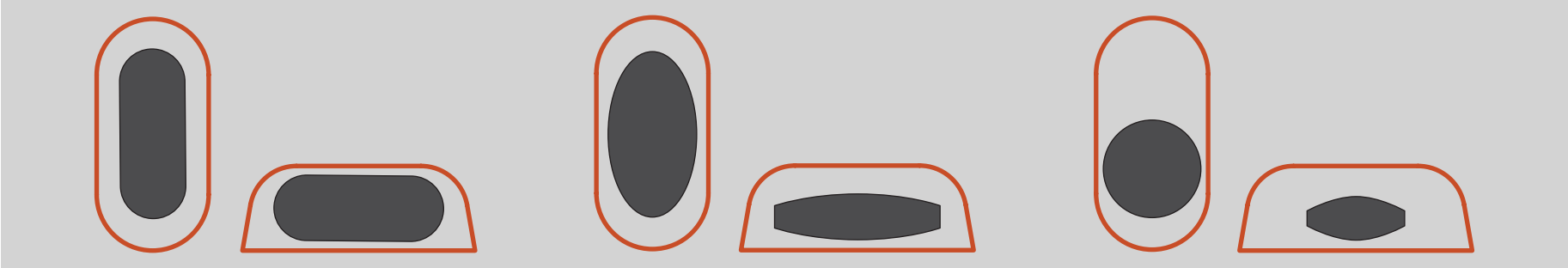
Dozens of mock ups were made in order to test the structure and usability of different shapes and materials. This was one of the most critical phases of the project because it dictated the final shape of the product as well as what material should be used and in what thickness.





Many different shapes were cut using a CNC machine. This allowed for quick and efficient exploration of what forms and materials were the most successful.

Refined mock up

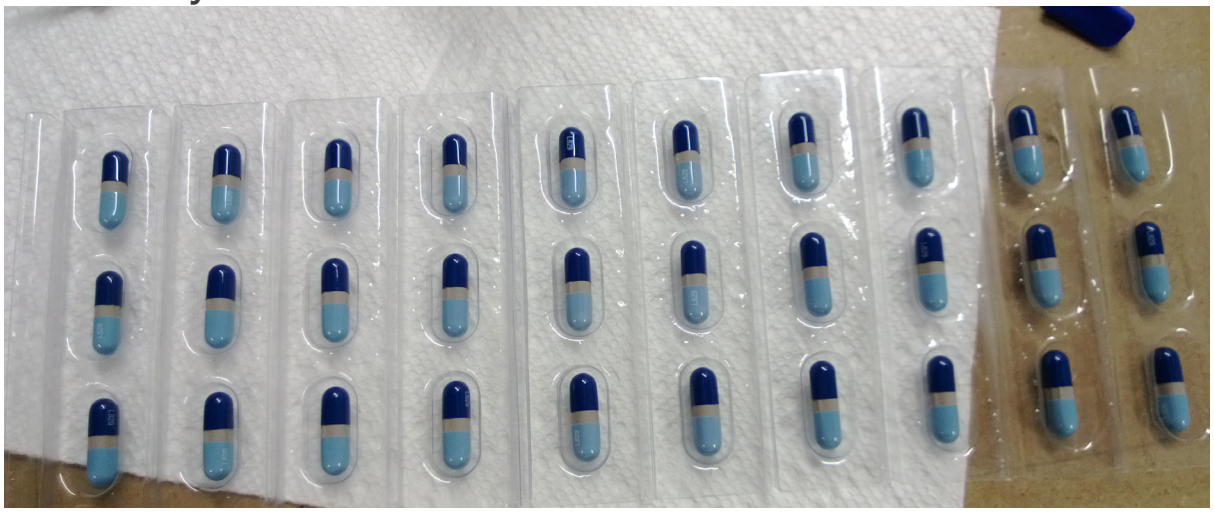


This shape was chosen for the final blister because it allowed for easy depression by the user. It also was able to accommodate the three most common types of pills

These gum packets were used to test lengths and configurations of the blister pack.

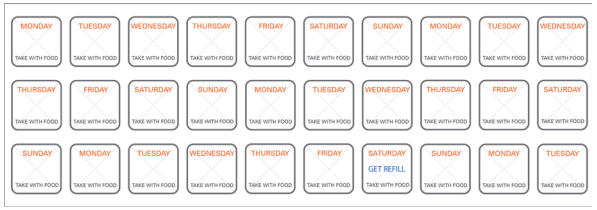
Walls to keep blisters from nesting and popping each other.

Assembly



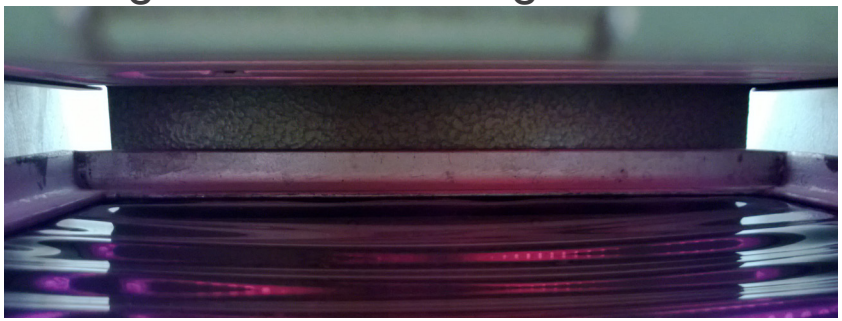
Getting blister pack ready sealing.
The challenge to this stage of the project was making sure each blister was free of grease and dirt left over from the mold and sanding.

The label that would be adhered to the back of the blister pack contains a schedule for each dose and any other important directions needed for that certain medication.



Styrene strap gives a place for the Pharmacy label and also fastens around the blister pack to keep it closed.

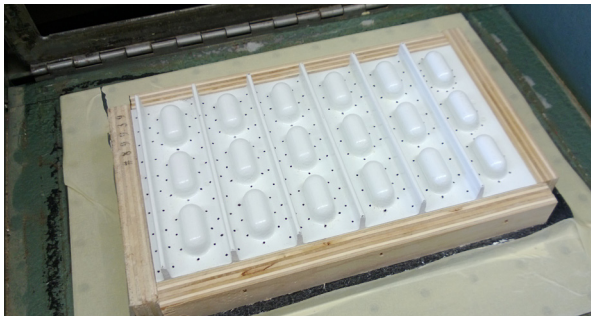
Tooling/ Vacuum Forming



Vacuum Forming was the primary method used for building the appearance model. This allowed me to get as close to production quality as possible, given that most blister packs are produced using this a process similar to this.

Machining the “Buck” that would be formed over.

Coating to fill in any small imperfections in the surface.



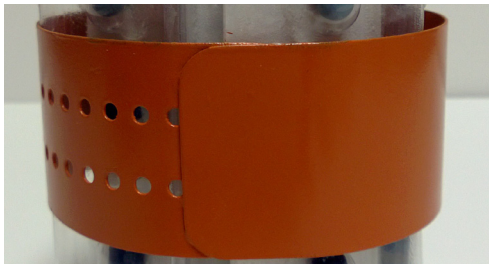
Hundreds of small holes were drilled into key areas of the “Buck” to insure that the material formed correctly around each detail.

Appearance Model

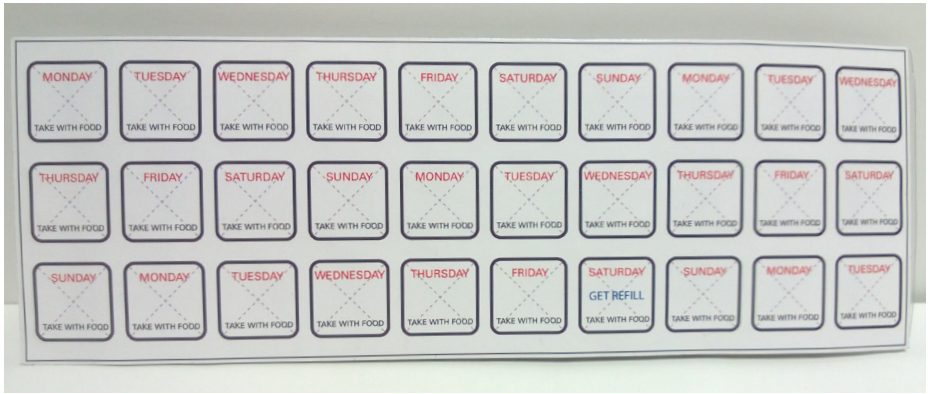
The final model holds 30 capsules and is 11.5 inches long and 4 inches tall.

The vertical walls in between each of the blisters help to prevent them from nesting into each other and popping accidentally.

Plastic strap attaches to small holes in the end of the blister pack via a snap fit. Strap can then be adjusted to fit different sized blister packs.



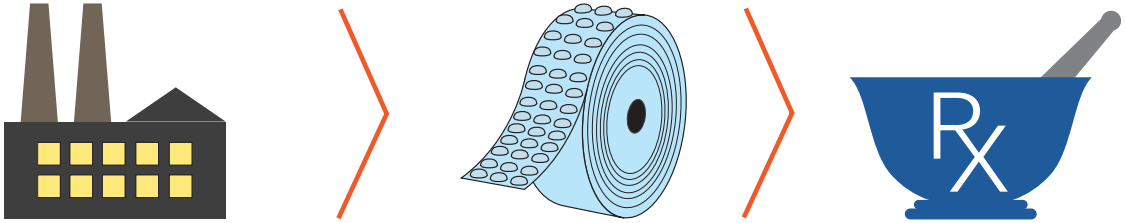
The label is one the key features of this blister pack. It not only seals the blister, but also acts as a calender that allows the user to record what they have taken and when. Additionally it gives the pharmacist a place to put helpful information, such as when a refill needs to be made



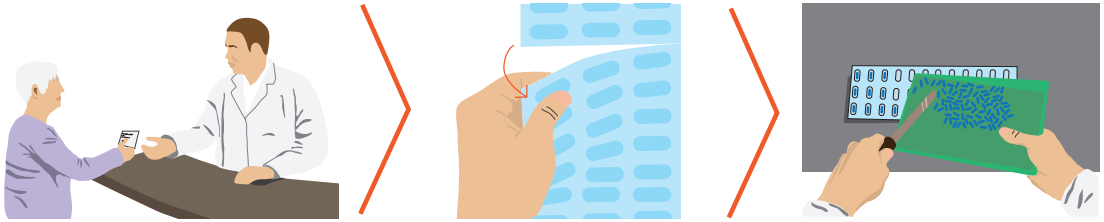
Final Render

A customizable blister pack for high risk medications.

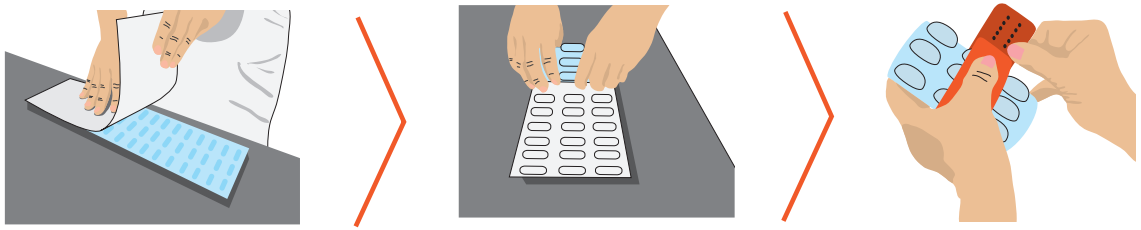
Use Scenario



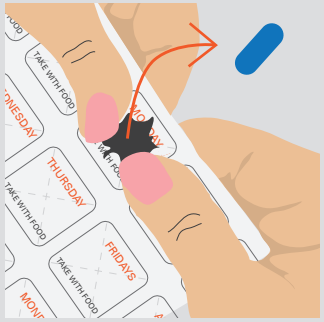
Factory manufactures a continuous roll of blisters. It is then shipped to the pharmacy.



Customer brings a prescription to the Pharmacist. The Pharmacist tears off the designated number of blisters, then pills are counted from the tray to the blister pack.



The Pharmacist then places a custom label on the blister pack, then rolls it up and fastens it with a strap.



Perforation helps blisters pop more easily.

Popped blisters give an indication of when the last dose was taken, preventing dose duplication.