PulseRide

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Develop Problem Statement

- Approx 40 million drivers admitted driving while drowsy over the past year.

- According to NHTSA (2017 – 2021) in the USA, 15k accidents (17% of 91k total accidents) occurred due to sleepy drivers.

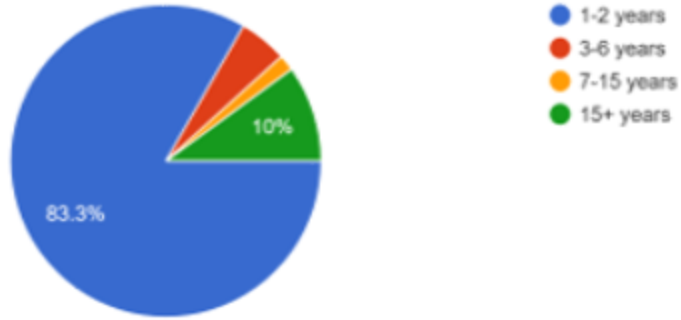- About 30% of teens and adult believe that drowsy driving would lead to death.

Identify Stakeholders

- Drivers

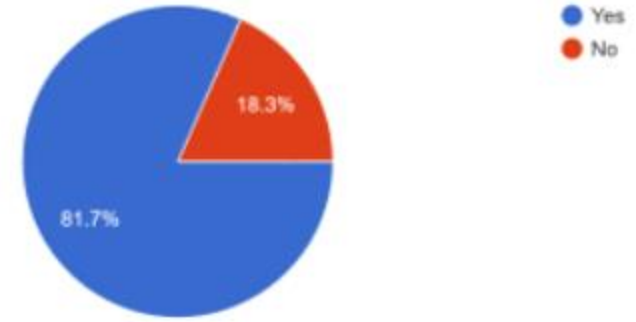- Truckers

- Early morning commuters

How long have you been driving?
60 responses
- 1-2 years
- 3-6 years
- 7-15 years
- 15+ years

83.3%
10%

Have you ever driven with a lack of sleep?
60 responses
- Yes
- No

81.7%
18.3%

Survey results

3

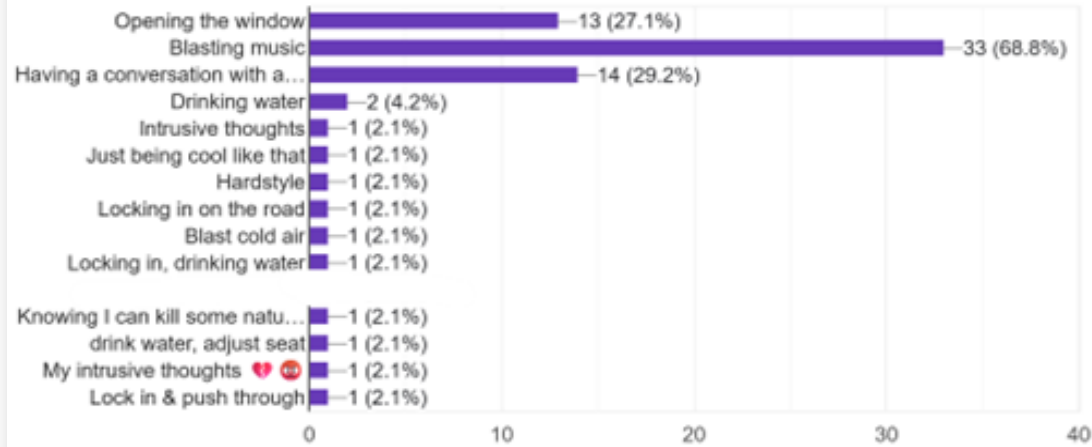Do you drive at night with low sleep?
49 responses
- Yes
- No
- Sometimes

42.9%
26.5%
30.6%
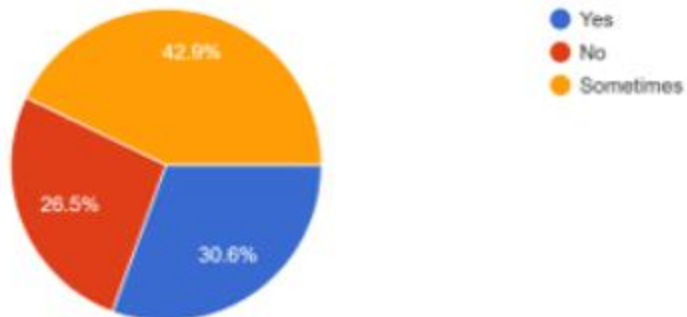
During the times when you drive with a lack of sleep, how many hours of sleep do you usually get?
49 responses
- 10+ hours
- 8-10 hours
- 4-7 hours
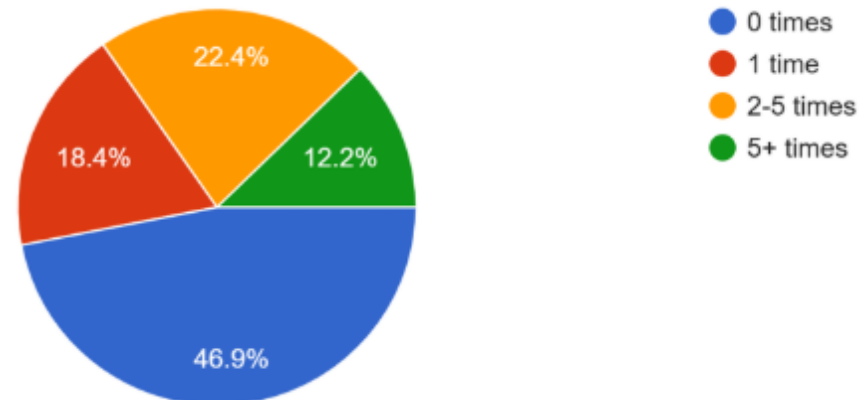- Less than 3 hours
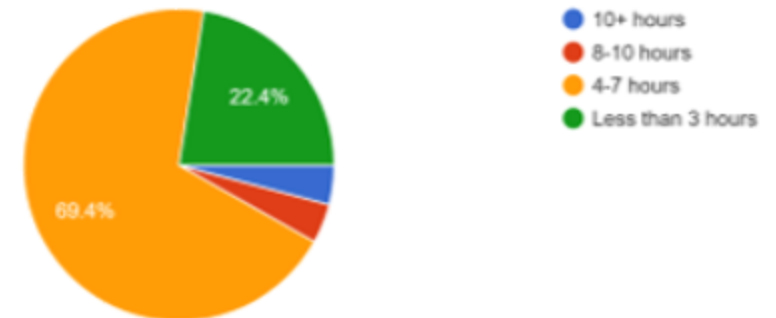
22.4%
69.4%
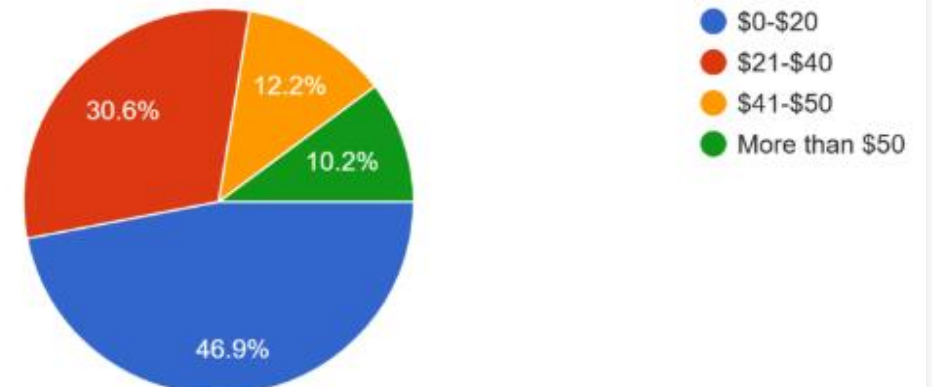
Survey Results

Interview

Are there any involuntary body signs that someone who is about to fall asleep will have?
Their eyes will roll from side to side and muscles of the spine will start getting weaker. So, you may see your head position change or even your arms dropping.

Are there any signs that are not body signs someone will show?
Heart rate and respiratory rate will decrease or become more erratic, even temperature will get lower.

What are the best ways to keep someone awake?
Consistent sleep period and enough breaks in between driving. Also ensuring they are not distracted but rather engaged in road. The worst way is high sugar/calorie food that affects blood sugar swings or overnights.

Anything else we should know?
The United States IS SLEEP DEPRIVED. The real key is understanding that medicated sleep or medicated wake period is not a replacement for sleep itself.

DR. Baughn Psychologist

Tampa, FL 33606

Interview
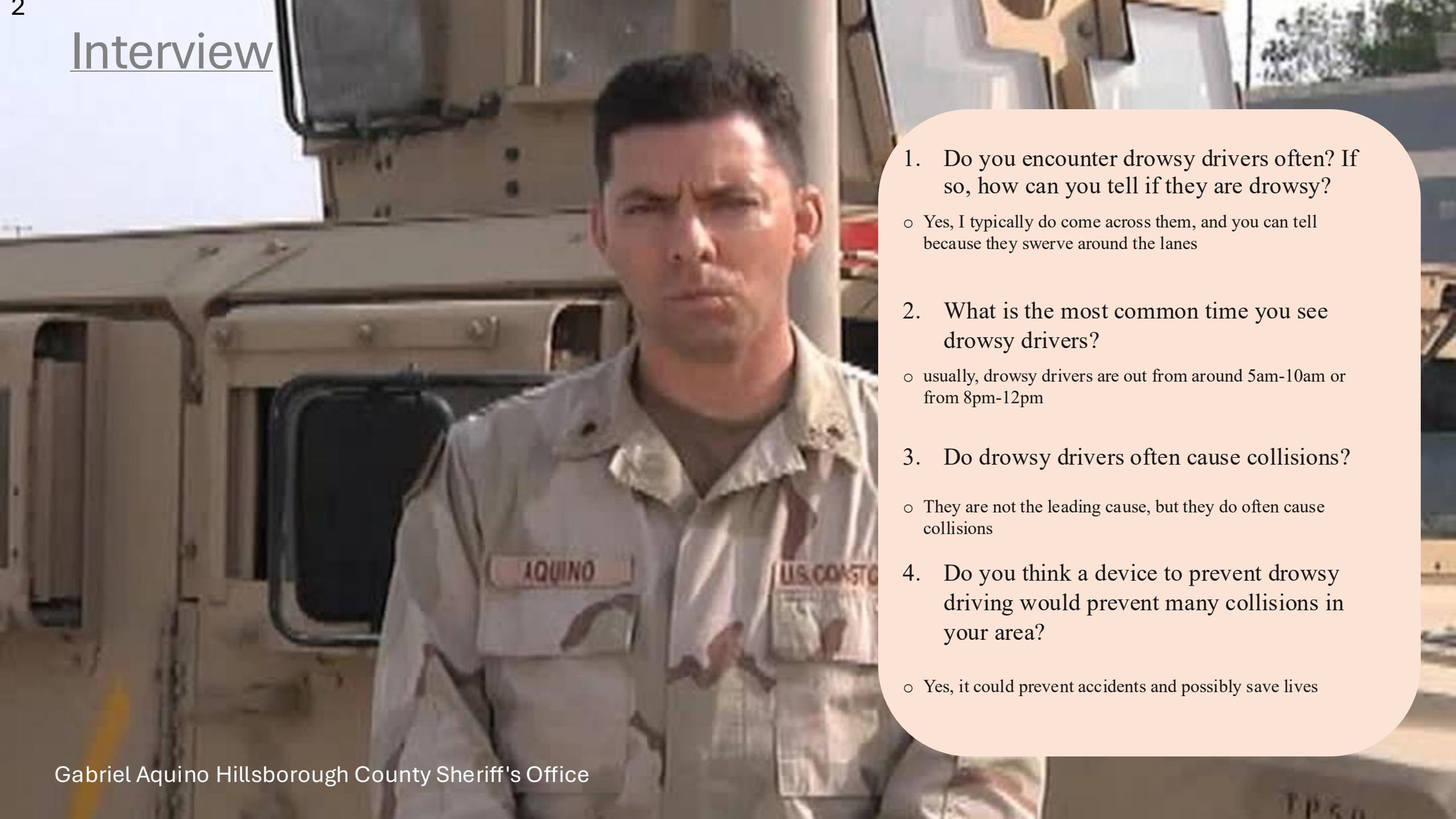
1. **Do you encounter drowsy drivers often? If so, how can you tell if they are drowsy?**
   o Yes, I typically do come across them, and you can tell because they swerve around the lanes

2. **What is the most common time you see drowsy drivers?**
   o usually, drowsy drivers are out from around 5am-10am or from 8pm-12pm

3. **Do drowsy drivers often cause collisions?**
   o They are not the leading cause, but they do often cause collisions

4. **Do you think a device to prevent drowsy driving would prevent many collisions in your area?**
   o Yes, it could prevent accidents and possibly save lives

Gabriel Aquino Hillsborough County Sheriff's Office

Analyze Prior Solutions

1

Ear device that
beeps when
head
droops $8.27

2

Small device that shines
blue light, plugs in
car $399

3

Reads face detects eyes
sleepiness and sounds
an alarm, plugs in car
$118.92

4

Clips on to ear and uses ancient
Chinese techniques to detects
head dropping and shocks
you $25.49

Analyze Prior Solutions

Vibrating, beeping, shocking ear device that detects head dropping $39.99

Gatorade Energy Chews, Cool Blue, Caffeine Free (16 Pack) ($31.97)

Drive ID Cell Control iPhone Android Device Stop Distracted Driving 2016 30$

Uses ai to trace face and sound alarms when sleepy small dashboard device 40$

5

7

8

9

Identify Preliminary Design Goals

PRODUCT	PRICE 0-5	EFFECTIVENESS OF HOW MUCH IT WAKES YOU 0-10	EASINESS TO INSTALL 0-5	HOW WELL IT DETECTS YOU ARE SLEEPY 0-10	HOW LONG IT LAST 0-3	SCORE X/33
1	1	4	1	7	3	16
2	5	7	2	10	1	25
3	5	4	2	3	1	15
4	2	6	4	10	2	24
5	3	5	2	7	2	19
6	3	6	4	10	2	25
7	3	6	1	10	3	23
8	3	8	2	10	1	24
9	3	10	2	3	1	19

Lowest scores are best

Patents
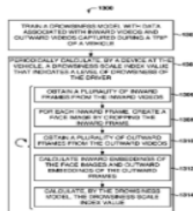
This device monitors a driver's gaze behavior and patterns if it deems a driver distracted it makes the driver put in a response to keep awake

Detects how sleepy you are with in car sensor and car sensor to detect

This device uses a camera and monitors a drivers face to detect if they are distracted

Identify Critical Design Goals
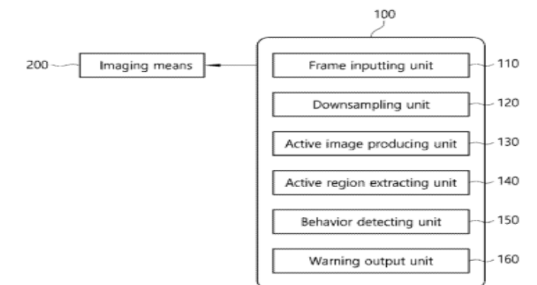
- **Design must be able to be used in the dark**
- **Must be efficient at waking up driver**
  - Wake up in timely manner
- **Must be efficient at detecting drowsy drivers**
  - Less than 5 second detection
- **Must not impair driving abilities**
  - As well as turning signals
  - Must be able to work around turning
- **Easy install**
  - Average person could install
  - Doesn't take up a lot of space
- **Easy use**
  - An average person can use
  - A new driver can use

Gantt Chart

	sks	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2	Brainstorm Possible Problems									
3	Develop Problem Statement									
4	Identify Stakeholders									
5	Justify Problem									
6	Analyze Prior Solutions									
7	Identify Preliminary Design Goals									
8	Identify Critical Design Goals									
9	Generate Multiple Solutions									
10	Select Solution Path									
11	Application of STEM									
12	Design Viability Analysis									
13	Create Drawings and Schematics									
14	Identify Expert Craftsmen									
15	Identify Materials and Tools									
16	Create Prototype									
17	Refine Prototype									
18	Develop Testing Plan									
19	Test Prototype									
20	Testing Analysis									
21	External Evaluation									
22	Designer Reflection									
23	Designer Recommendations									
24	Prepare Final Presentation									
25	Final Defense of Project Steps									
26	Portfolio Completion									

Questions?