Informatics Group Presentation

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Objective

- **Increase the proportion of adults, those 18 and older, who get sufficient sleep**

- Healthypeople.gov 2020 stated that 71.6 percent of adults got sufficient sleep (defined as 8 or more hours for those aged 18 to 21 years and 7 or more hours for those aged 22 years and over, on average, during a 24-hour period) ("Sleep Health," 2019)

- Their aim is to increase the average to 72.8 percent

Overall Sleep

Adequate Sleep	Inadequate Sleep
• Relatively uninterrupted • Sufficient Length to wake up feeling refreshed	• Difficulty staying asleep • Waking during the night, unable to resume sleep • Not feeling refreshed upon waking

Consequences of Reduced hours of sleep

- Tiredness: Mental fatigue, daytime sleepiness – lead to accidents, mood disorders and increased alcohol consumption
- Depression: Insomnia at baseline an indicator for depression within 1 to 3 years
- Comorbidity: Sleep disorders associated with development of hypertension, obesity, stoke and diabetes

Sleep health is a particular concern for individuals with chronic conditions such as:

Alzheimer's Anxiety Arthritis Attention deficit/hyperactivity disorder Autism Asthma Chronic pain	Cancer (breast, pancreatic, colorectal) Chronic obstructive pulmonary disease Dementia Down syndrome Epilepsy Fibromyalgia	Gastric ulcer Gastroesophageal reflux disease (GERD) Human immunodeficiency virus (HIV) Irritable bowel Kidney disease Multiple sclerosis	Neuromuscular disorders Parkinson's disease Depression Renal disease Spinal cord injury Substance abuse Tinnitus Tourette syndrome

Overall Sleep

- The 2006 Institute of Medicine (IOM) report, Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem, found the cumulative effects of sleep loss and sleep disorders represent an under-recognized public health problem and have been associated with a wide range of negative health consequences, including hypertension, diabetes, depression, heart attack, stroke, and at-risk behaviors such as alcohol and drug abuse (*Colten HR & Altevogt BM, 2006*).

- Adequate sleep is relatively uninterrupted and of sufficient length for one to wake feeling refreshed. Poor sleep is characterized by difficulty staying asleep, waking during the night or feeling restless, being unable to resume sleep, and not feeling refreshed upon waking. *(Saling and Haire, 2016).*

- Reduced hours of sleep and poor sleep quality cause tiredness, which includes mental and physical fatigue and daytime sleepiness; and may increase the probability of workplace and traffic accidents, mood disorders and excessive alcohol consumption *(Saling and Haire, 2016).*

- In a review of sleep studies, Riemann and Voderholzer (2003) found 8 studies in which primary insomnia at baseline significantly predicted an increased depression risk at follow-up one to three years later *(Saling and Haire, 2016).*

Nightcap - A Sleep Aid App
Home Page

NIGHTCAP

Sea Otters Hold Hands When They Sleep to Keep From Drifting Away From Each Other!

🌙 Sleep on Jan 30
went to sleep at 11:20 PM for 6 h 43 min

deep 1:08
light 4:52
awake 0:43

11:30pm 1 3 5 6:00am

85
sleep quality

94%   73 BPM

ENTER NIGHT MODE

- Registration with Age, weight & height and gender
- Inspiration & Fun Facts!
- History of sleeping patterns:

Times awake (Based on movement)
Length of deep & light sleep (HR & movement based)
Time required to fall asleep

- Current Vital Signs – SpO2, HR
- 'Enter Night Mode' - Ready to begin sleeping!

All tracked on the "CAP" when app is in Sleep Mode

Sleep pattern history

- Clicking the graph will bring up a weekly average of sleep health tracked via the "CAP"

- Based on historical averages of sleep and the current amount of projected sleep debt, the app will recommend a time to go to bed & wake up

- Averages and projected deficit graphed, with the option to set your alarm for the recommended times

The Cap

Track your sleep rhythm

- Actimetry sensors within The Cap measure are activated during "Sleep Mode"

  - Record and integrate the degree of limb movement activity over time. Using mathematical algorithms estimated sleep and wakefullness can be recorded.

The Cap

Sleep disordered breathing is more common than you think (Hienzer, 2015). Be mindful of your oxygen saturation while you sleep with a built-in oximeter.

**Not to be used as a diagnostic tool.

FUN FACT:

SEA OTTERS HOLD HANDS WHEN THEY SLEEP TO KEEP FROM DRIFTING AWAY FROM EACH OTHER ❤️

(Robertson, 2016)

Sleep Sounds and Sleep environment

- Physical strain, stress, and negative social outcomes. (Halperin, 2014)

- Noise at night causes biological changes in the form of stress response and changes sleep structure, effecting sleep quality (Halperin, 2014).

- Lack of sleep, or lack of quality sleep is associated with stress, and the production of the traditional stress markers, such as cortisol (Akerstedt, 2006).

- People who struggle with nocturnal noise often suffer the next day from daytime sleepiness and tiredness, annoyance, mood changes as well as decreased well-being and cognitive performance (Halperin, 2014).

- Quality sleep is important for all ages. Sleep quality affects quality of life and is usually an undervalued part of "the human equation" (Tanaka, 2004).

# Sleep Sounds and Sleep environment - In App Application

- Once the user selects the, "Set alarm for recommended hours of sleep" prompt on the history screen or the home screen, you can accept the recommended wake time or adjust the time to wake preference

- After the alarm is set and conformed by pressing the moon icon in the alarm screen, the app will take you to the, "Z Sound" screen. This screen of the app interface will give options for the most popular sleep aid sounds, or "Z" sounds:

  - **White Noise**

  - **Ocean Sounds**

  - **Rain Sounds**

  - **Nature Music**

  - **No Z Sounds**

Recommended Wake time

8:00 AM

Z Sounds

White Noise

Ocean

Rain

Nature
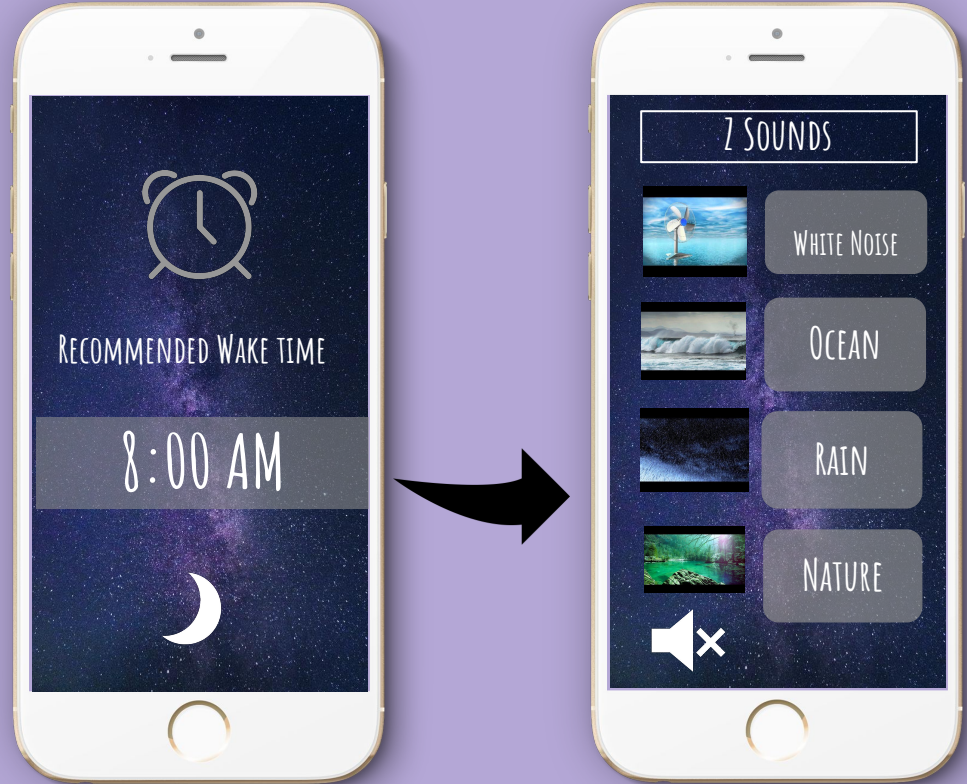
FUN FACT

Humans are the only mammals that delay sleep! 🛏️🛌
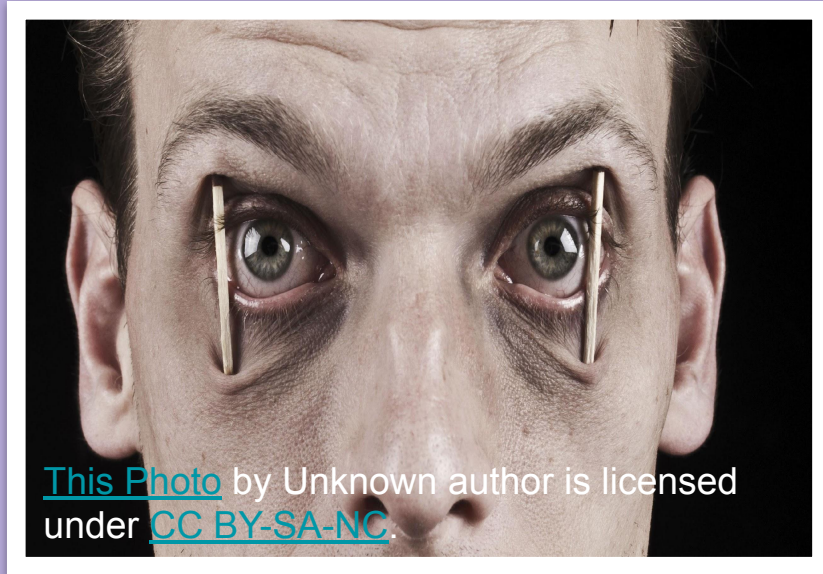
(Why Are we So Sleep Deprived and Why does it Matter, 2018)

# Screen time and effects on sleep – Why it's important

- 75% of adults are use text messaging into the night hours, an activity which was once thought to be an action exclusively of the young. (Saling and Haire, 2016)

- Heavy use of the internet and mobile phones is associated with insomnia, anxiety, and depression (Saling and Haire, 2016).

- High frequency of mobile phone calls at night predicted insomnia a year later (in men) (Saling and Haire, 2016).

- It was found that evening polychromatic light (both blue-enriched and white polychromatic light) resulted in a longer REM sleep latency in older participants after three evenings of light exposure (Saling and Haire, 2016).

Screen time and effects on sleep - In app Application

- When entering sleep mode, the app will automatically filter out blue and most white light, and dim the backlite

- Text messages and calls alerts will be shut off in this section, unless the caller has is designated an emergency contact

- The app will remain in "sleep mode" until the designated wake time occurs and sleep mode is shut off

Awake mode and sleep mode
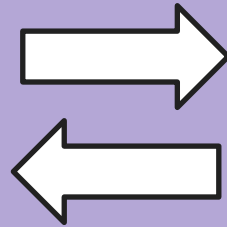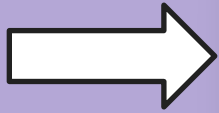
Fun Fact

As little as 17-19 hours with no sleep can have the same effects on the mind as a BAC of .05%! (Williamson and Feyer, 2000)

Periods longer than 19 hours can mirror the effects of a BAC of .10%! (Williamson and Feyer, 2000)

Conclusion

- Nightcap has the ability to track sleep quality, recommend sleep duration, incorporates sleep sounds, and mute disruptive light and notifications.

- With these features, we are able to increase the proportion of adults that get sufficient sleep.

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