



Sleep Deprivation and Associated Health and Cognitive Impacts in Commercial Fishermen

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This Presentation is Dedicated to Our Truly Remarkable Team:

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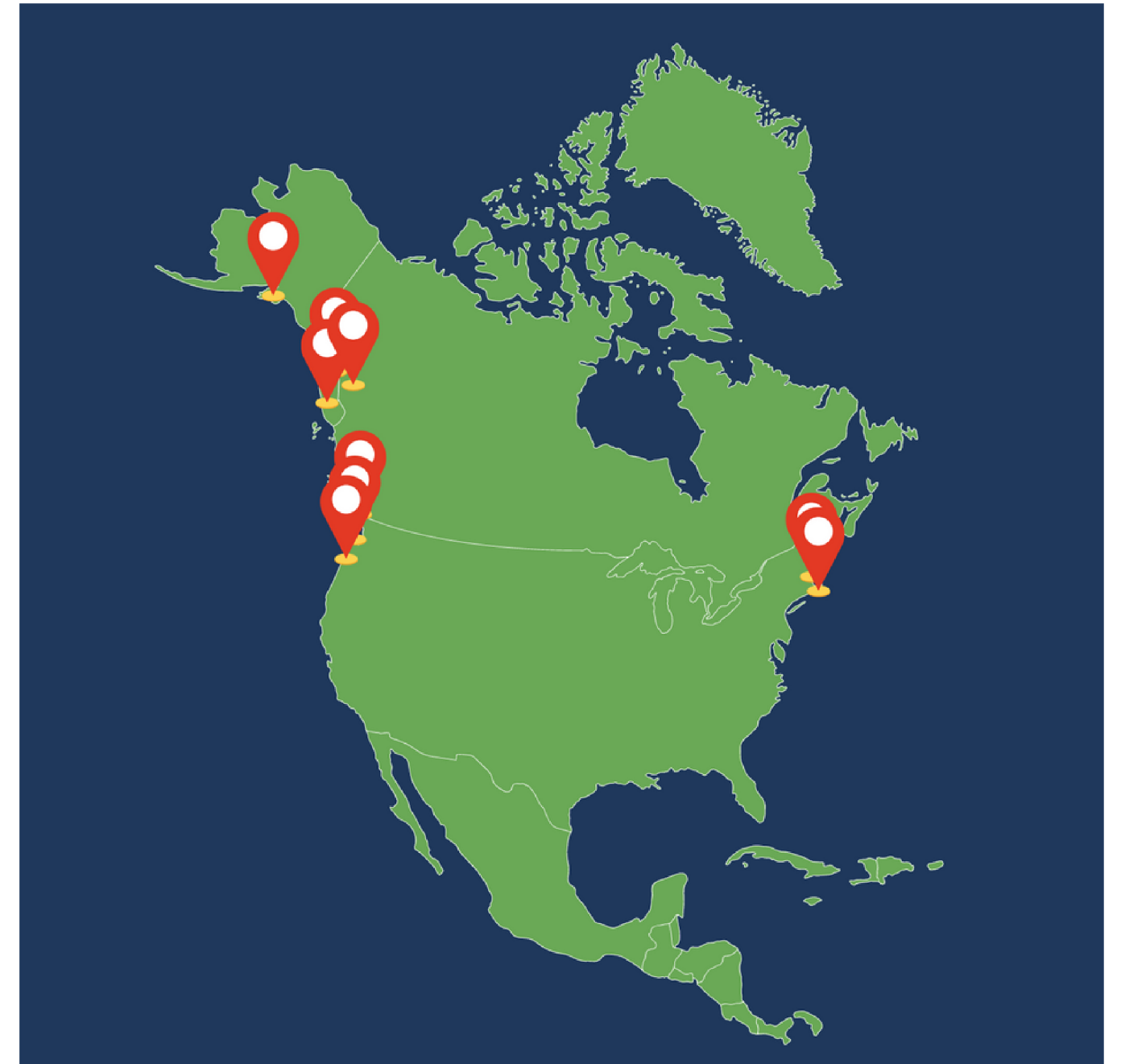
MEN WANTED

for hazardous journey, small wages,
bitter cold, long months of complete
darkness, constant danger. Safe return
doubtful, honor and recognition
in event of success.

Ernest Shackleton 4 Burlington st.

Study Fisheries

- AK: Salmon [Gillnets]
- OR: Dungeness Crab [Pots]
- MA: Scallop [Dredges]
- MA: Lobster [Traps]



Interviews with Fishermen

HEALTH CONCERNS

- » Physical Pain
- » Diet
- » Effects of Sleep Deprivation
- » Trauma/Other Medical Concerns

STRESS

- » Finances
- » Crew
- » Family/Social Life
- » Regulations

ENVIRONMENT

- » Noise, Emergencies, Equipment/Gear
- » Shift Work
- » Weather

Fishing Forward Podcast

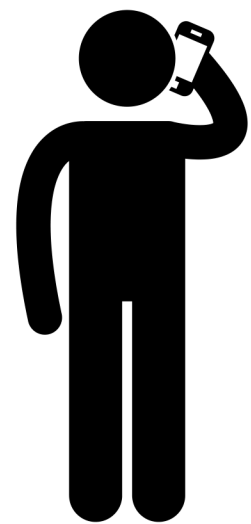
An 18-episode podcast inspired by fishermen, for fishermen, that focuses on health, safety, and staying shipshape in the commercial fishing industry.

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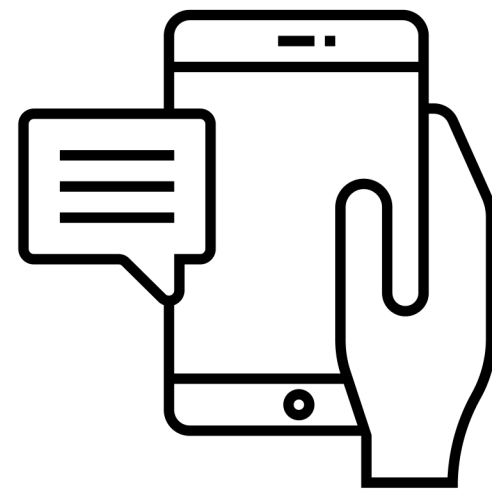


Survey Sampling and Recruitment

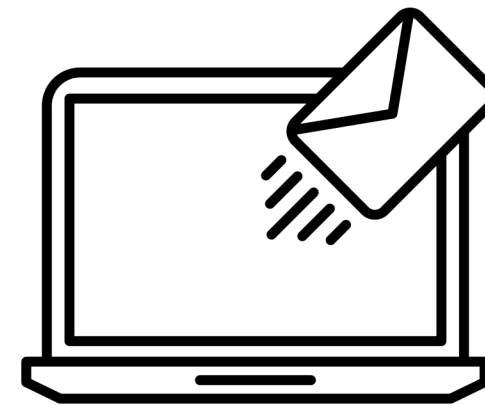
Fisheries Licenses, AMSEA lists, Distribution Through Settlement Houses



CALLS



TEXTS



EMAIL



POST

Survey Data Collection

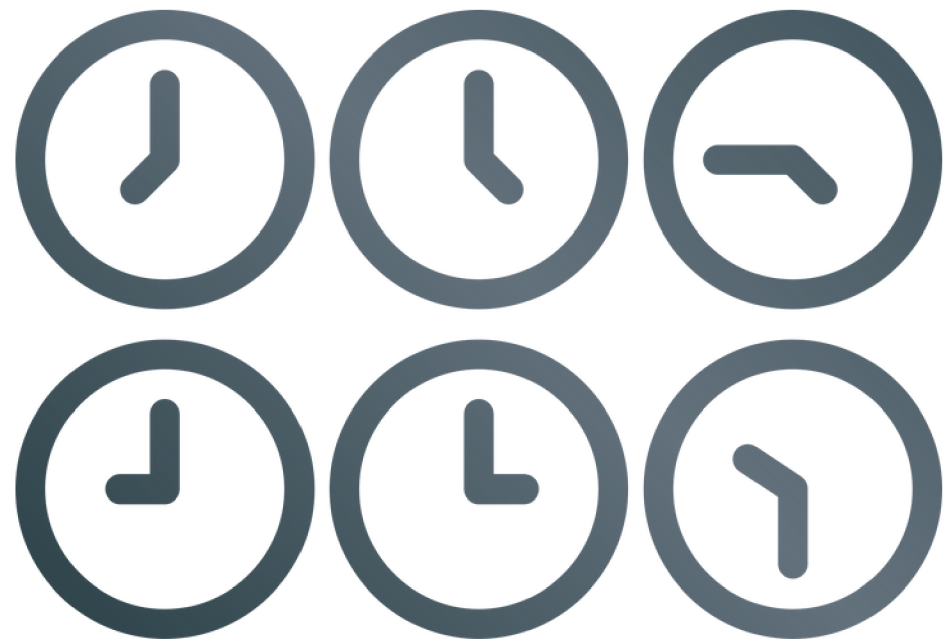
68 Survey Questions



- ✓ Demographics
- ✓ Boat/Fishery Info
- ✓ Work Role/Schedule
- ✓ Physical Health
- ✓ Diet
- ✓ Alcohol, Caffeine, Tobacco Use
- ✓ Emotional Health
- ✓ Sleep

Survey Challenges

n=262 surveys!



TIME ZONE DIFFERENCE

12:1

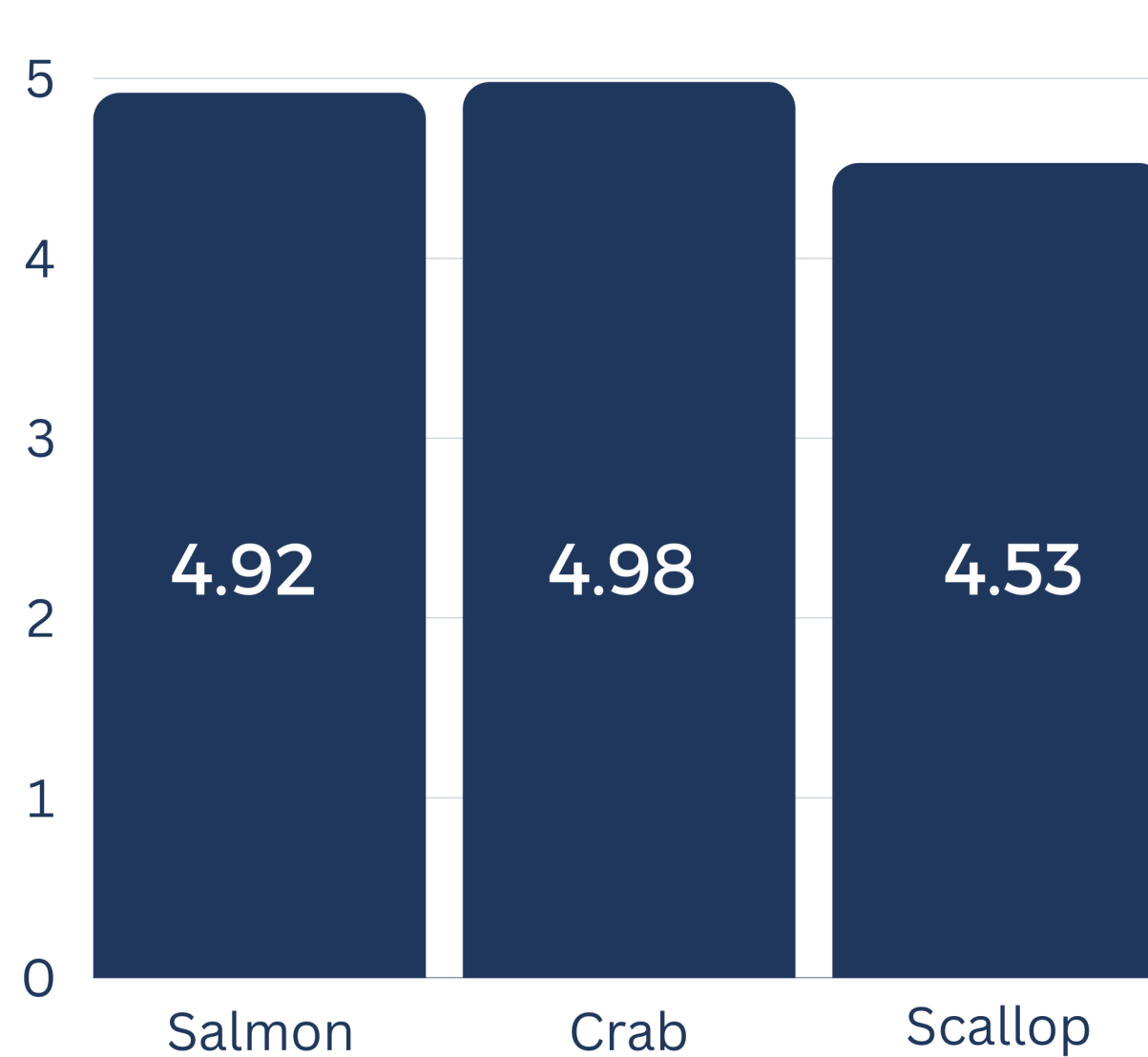
**# OF CALLS
REQUIRED**



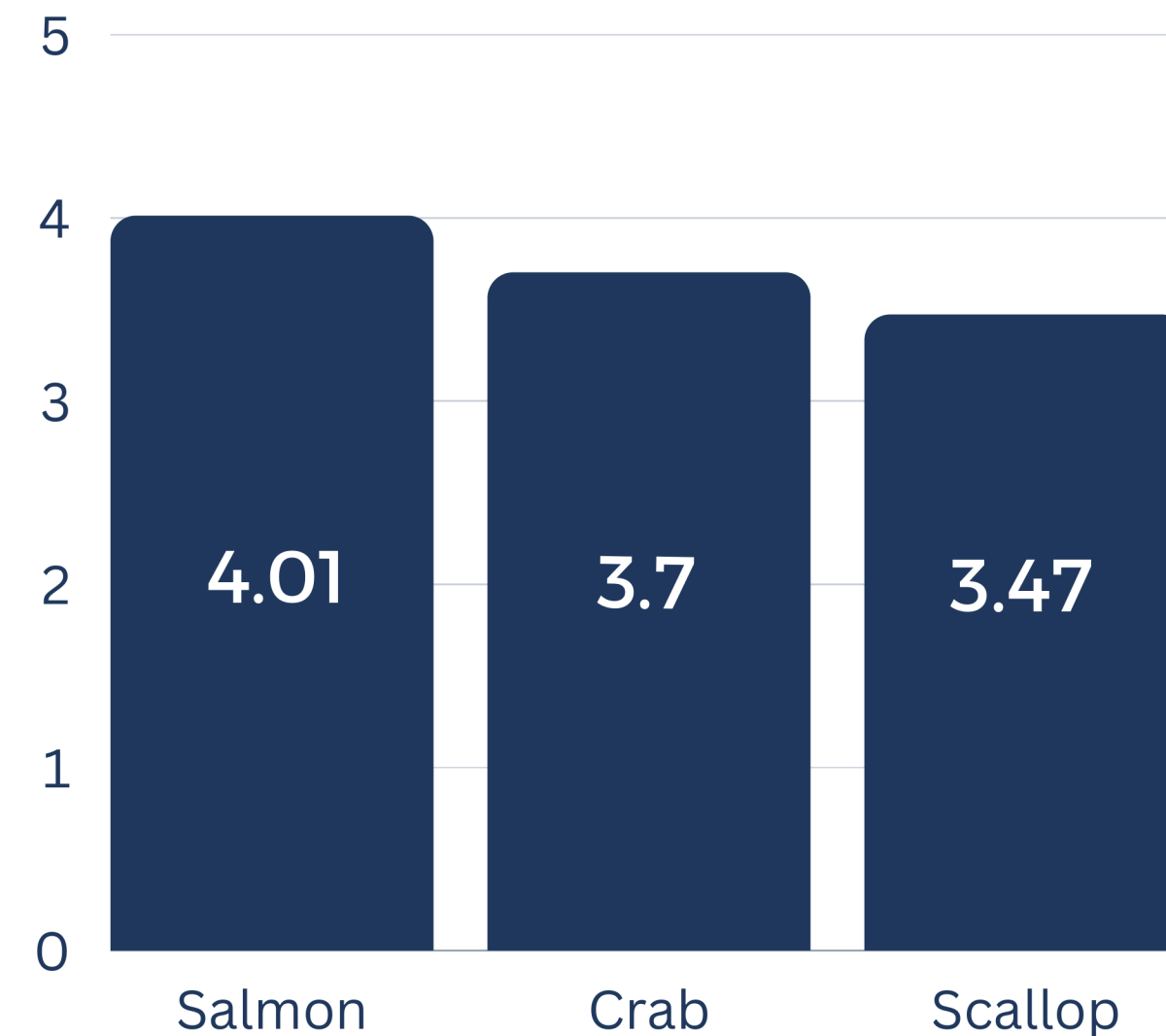
FISHING SEASONS

Sleep Survey Results

How Much Sleep are Fishermen Getting While Fishing?



Average Total Hours



Average Consecutive Hours

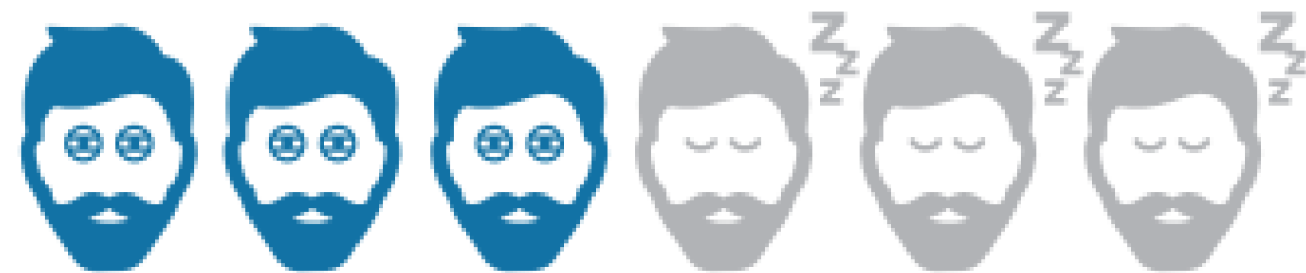
n=262

Sleep Survey Results

2 in 5 fishermen reported having pain so severe that it interferes with their sleep.



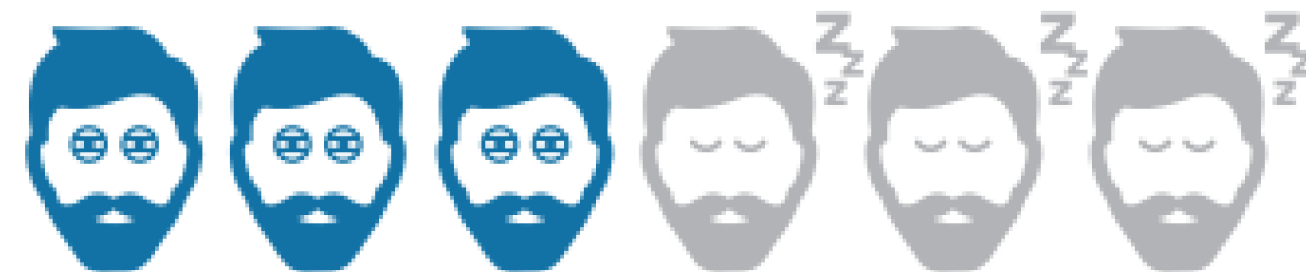
Nearly **half** of fishermen reported that they do NOT have great quality of sleep.



Nearly **1 in 3** fishermen said they have trouble going to sleep.



Nearly **half** of fishermen said they have trouble staying asleep.



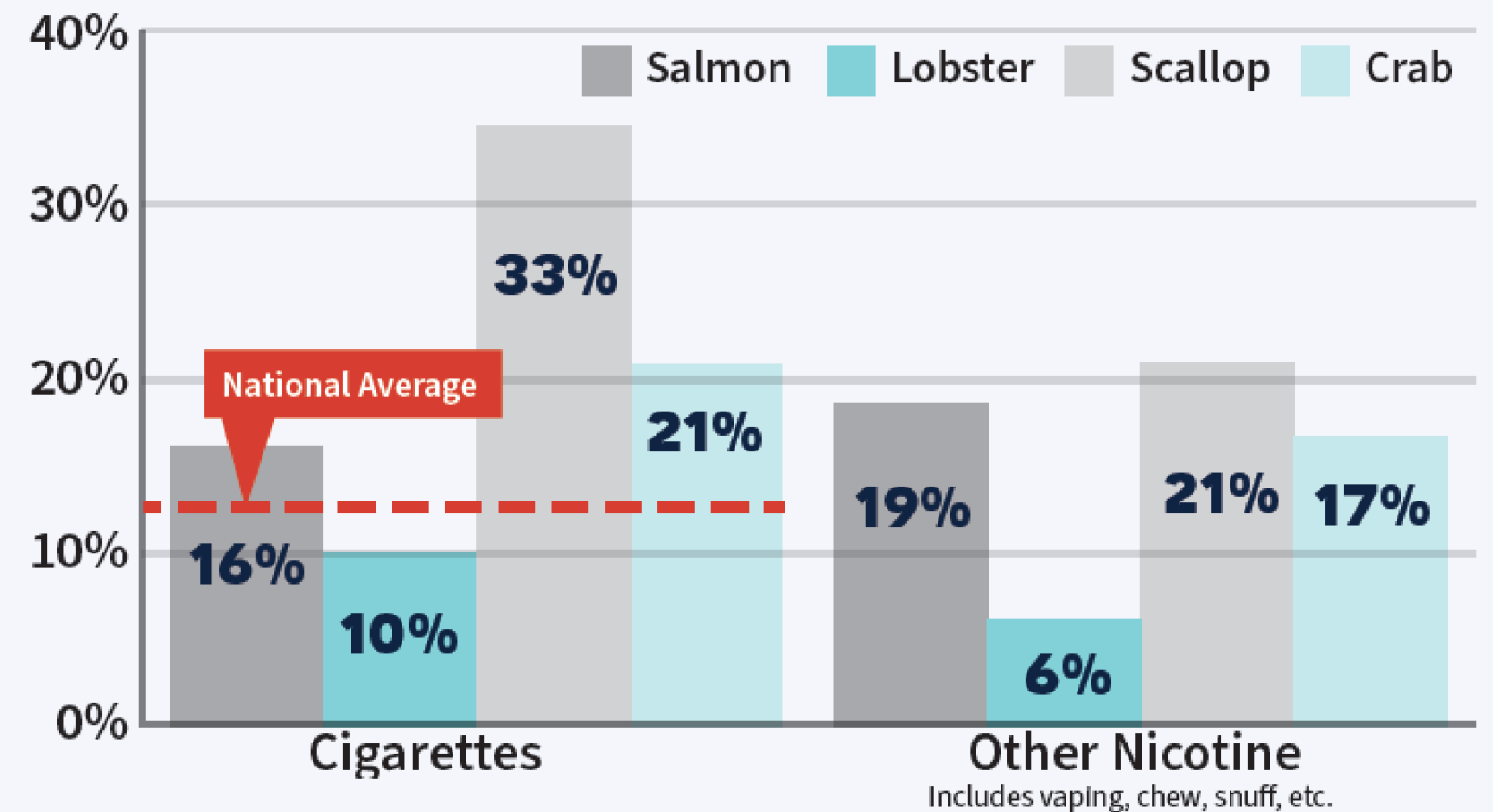
Sleep Survey Results

Nearly half of crabbers and scallopers drink energy drinks to stay awake.



Salmon: 15%
Lobster: 22%
Crab: 43%
Scallop: 49%

Do You Smoke?

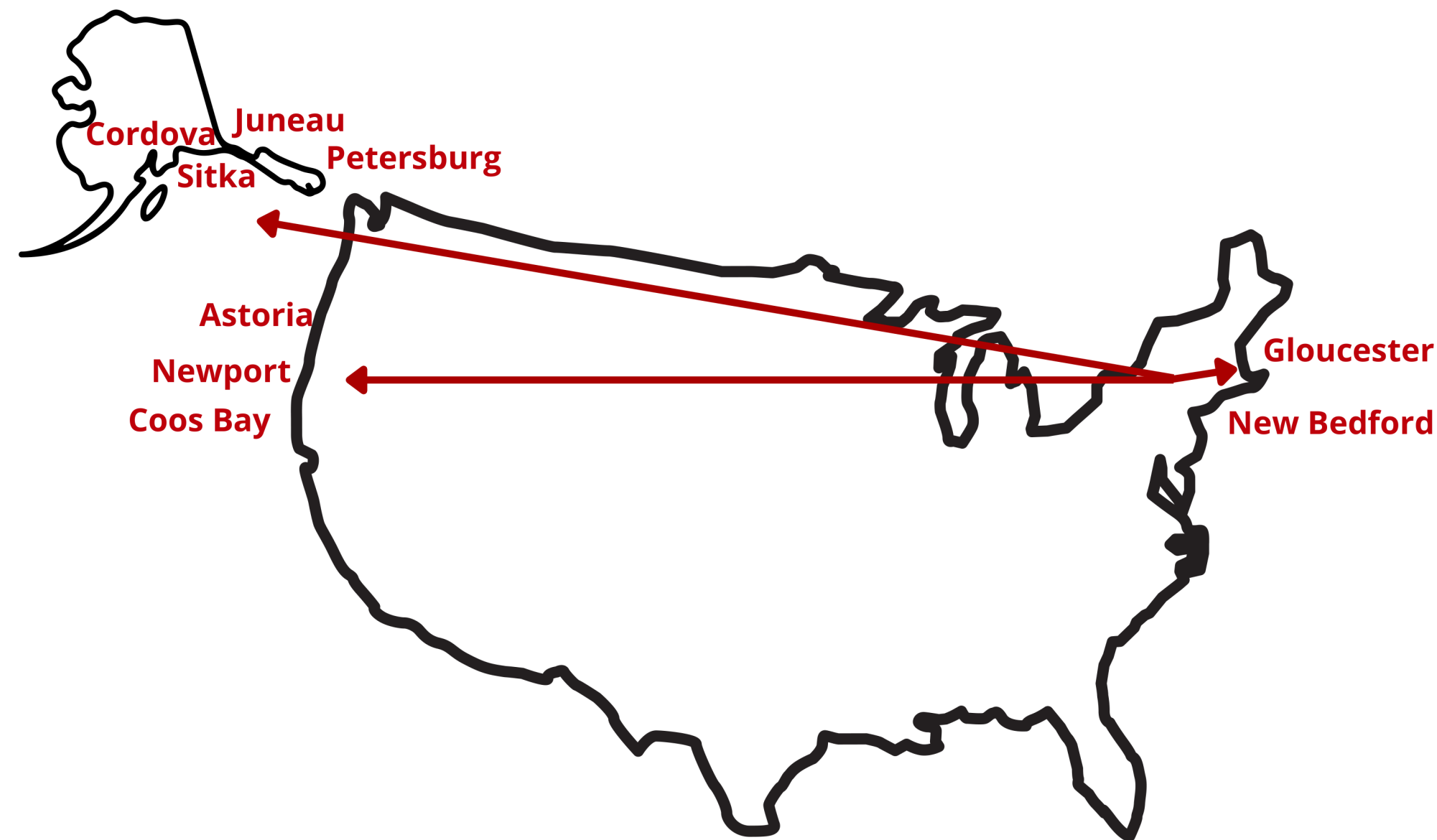


Health Assessments

Logistical 'Tour de Force':

- Screening equipment transported to 10 locations
- NEC staff travel to all clinics to recruit, give health assessments
- COVID rates, airline strike, staffing
- Recruited via calls, texts, promotion, dockside
- Participants living in remote areas, working around fishing seasons
- Referring fishermen for follow up

n=162 health assessments!



Health Assessments

DATA Collection:

- **Pre-Screening Form (Medical History)**
- **Occupational Tech Form (BMI, Vision, Respiratory Health, BP, Glucose, Cholesterol, Urinalysis, Framingham Risk Score, PTSD, ESS)**
- **Provider Screening (HEENT, Abdomen/Chest, Skin, Extremities, Neuro, MSDs, Cognition)**



Health Assessment Results

Body Mass Index (percentage of fishermen by category)

	A K S A L M O N	M A L O B S T E R	M A S C A L L O P	O R C R A B
U N D E R W E I G H T (<18.5)	1.8	0.0	0.0	0.0
N O R M A L (18.5-24.9)	29.1	21.4	30.0	22.4
O V E R W E I G H T (25-30)	50.9	39.3	46.7	42.9
O B E S E (>30)	18.2	39.3	23.3	34.7

Blood Pressure (percentage of fishermen by category)

NOTE: It is important to note that one blood pressure measurement cannot make a diagnosis. Numbers reported here are trending toward the listed categories, but repeated measurements are needed to accurately diagnose hypertension.

		A K S A L M O N	M A L O B S T E R	M A S C A L L O P	O R C R A B
N O R M A L	<120 <80	34.5	7.1	36.7	20.4
E L E V A T E D	120-129 <80	21.8	3.6	3.3	14.2
H Y P E R T E N S I O N 1	130-139 80-89	27.3	50.0	50.0	26.5
H Y P E R T E N S I O N 2	≥140 ≥90	16.4	39.3	10.0	38.8

Health Assessment Results

Cholesterol

Total cholesterol is the combined amount of low density lipoprotein (LDL/bad cholesterol), and high density lipoprotein (HDL/good cholesterol) in your blood. This measurement shows how your body is handling fats and can be used as an indicator for risk for heart disease and stroke.

Total Cholesterol (percentage of fishermen by category)

	AK SALMON	MA LOBSTER	MA SCALLOP	OR CRAB
<200 (DESIRABLE)	74.5	67.9	86.2	79.6
200-239 (BORDERLINE)	12.7	28.9	6.9	16.3
>240 (HIGH)	12.7	3.6	6.9	4.1

High Density lipoprotein (HDL- good cholesterol) moves cholesterol out of your arteries. A high HDL number lowers your risk for coronary heart disease. The majority of fishermen across all fisheries were in the 'desirable' category.

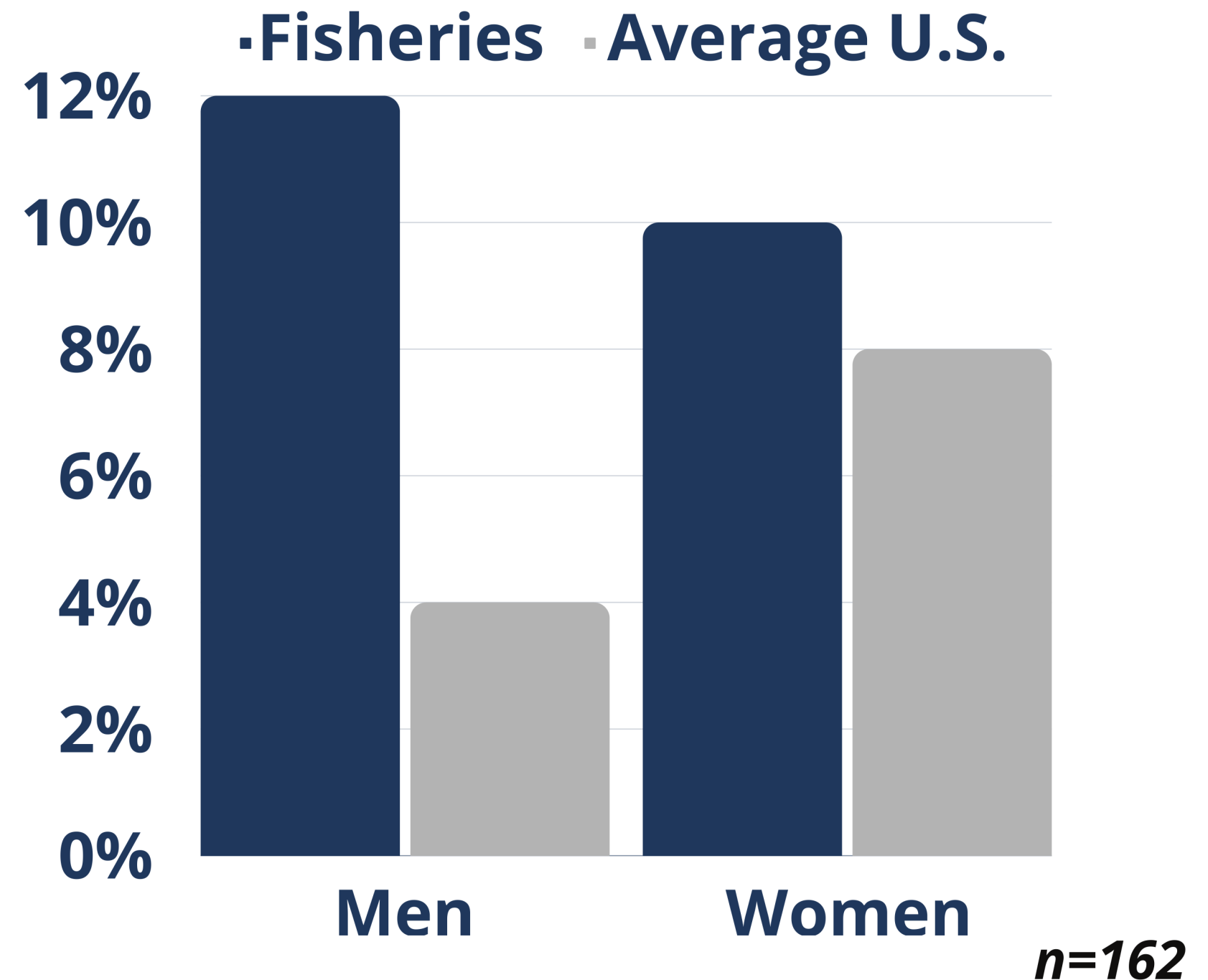
HDL Cholesterol (percentage of fishermen by category)

	AK SALMON	MA LOBSTER	MA SCALLOP	OR CRAB
<40 (AT RISK)	9.1	14.3	13.8	10.2
40-60 (DESIRABLE)	50.9	60.7	72.4	63.4
>60 (PROTECTS HEART)	40.0	25.0	13.8	26.5

Sleep Survey Results

PTSD rates in our sample of commercial fishermen (12%) were almost 3 times higher than the general male population (just under 5%).

POST TRAUMATIC STRESS DISORDER



Wearable Technology



Oura 2nd Generation



Hexoskin Smart



Fitbit Charge 3



Actigraph WGT3X-BT



Dreem 2

Wearable Technology

At Sea Trials of Wearable Devices: Take-aways

USER CONSIDERATIONS



DEVICE CONSIDERATIONS



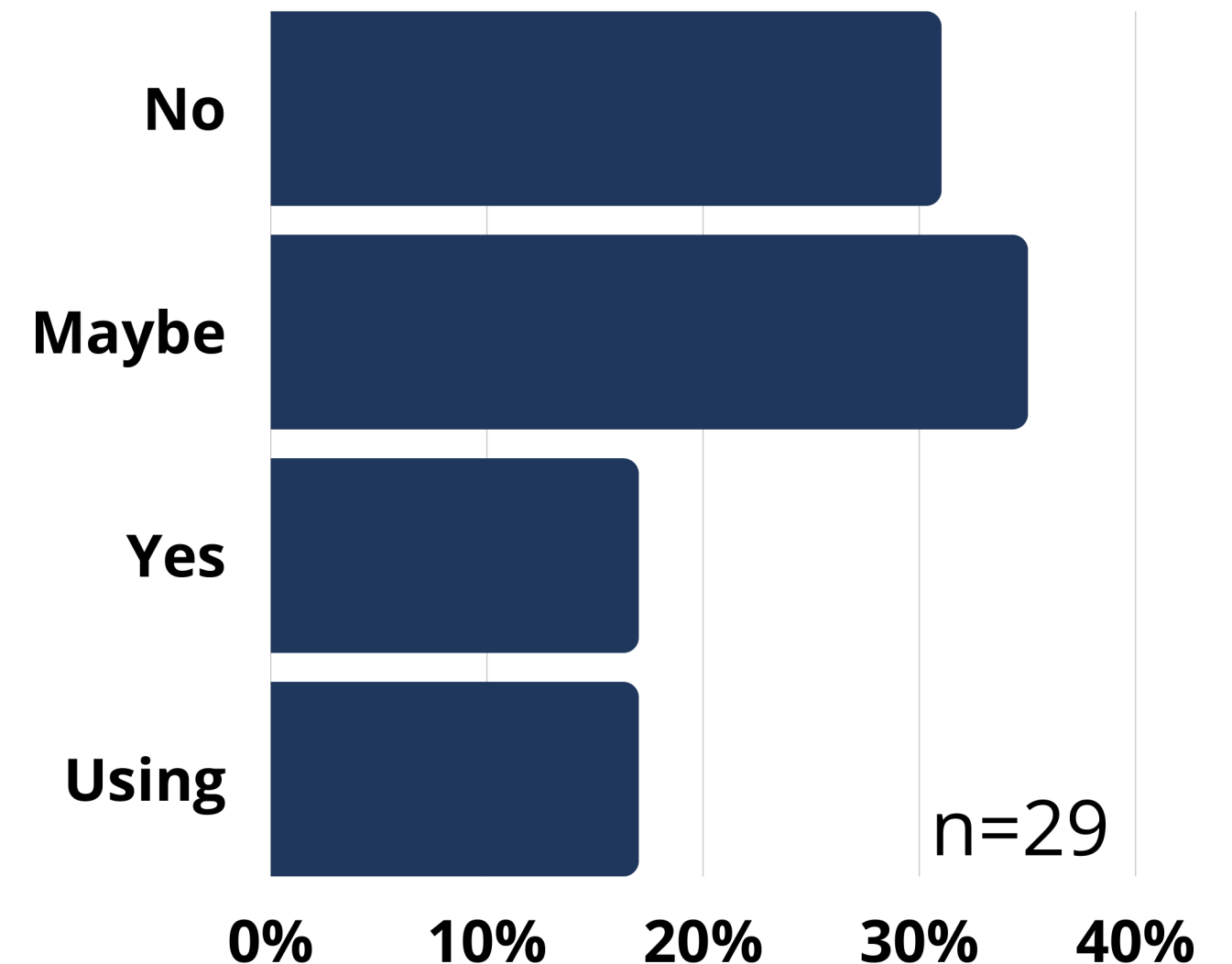
Wearable Technology

At Sea Trials of Wearable Devices: Take-aways

ACCURACY:

- Sleep time consistent across devices
- Sleep stages not consistent across devices
- Actigraphy - algorithm needed to compensate for boat movement
- Multi-sensor inputs provide more accurate sleep and sleep stage data

INTEREST:



Next Steps

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- **Summary report available online (necenter.org)**
- **Mailed out to all participating fishermen and stakeholders**
- **Identifies workable solutions**
- **'Health curriculum' being developed (to be released via social media)**