

Advocate Health - Midwest

SHARE @ Advocate Health - Midwest

Aurora GME

Barriers to 24/7 availability and emergent clinical capabilities of hyperbaric medicine facilities: A large-scale survey study

John McGlynn

Advocate Health - Midwest, john.mcglynn@aah.org

Sarah J. Riutta

Advocate Health - Midwest, sarah.riutta@aah.org

James Adefisoye

Advocate Health - Midwest, james.edefisoye@aah.org

Serena Messer

Advocate Health - Midwest, serena.messer@aah.org

Laurie Gesell

Advocate Health - Midwest, laurie.gesell@aah.org

Follow this and additional works at: <https://institutionalrepository.aah.org/auroragme>

Background

The paucity of Undersea and Hyperbaric Medicine (UHM) facilities that are able to provide critical care services and 24/7 availability has been a growing concern for the specialty. We conducted a nationwide survey-based study aiming to identify the barriers to 24-hour operation of these facilities. We hope to be able to utilize this gained knowledge to impact future access and availability of UHM across the country.

Methods

An online survey was composed and survey URL was distributed by the Undersea and Hyperbaric Medical Society (UHMS) via email listserv. Respondents were asked to select specific issues they perceive as barriers to 24/7 hyperbaric chamber operation. UHMS sent the initial survey invitation on February 21, 2023. The survey remained open until April 3, 2023.

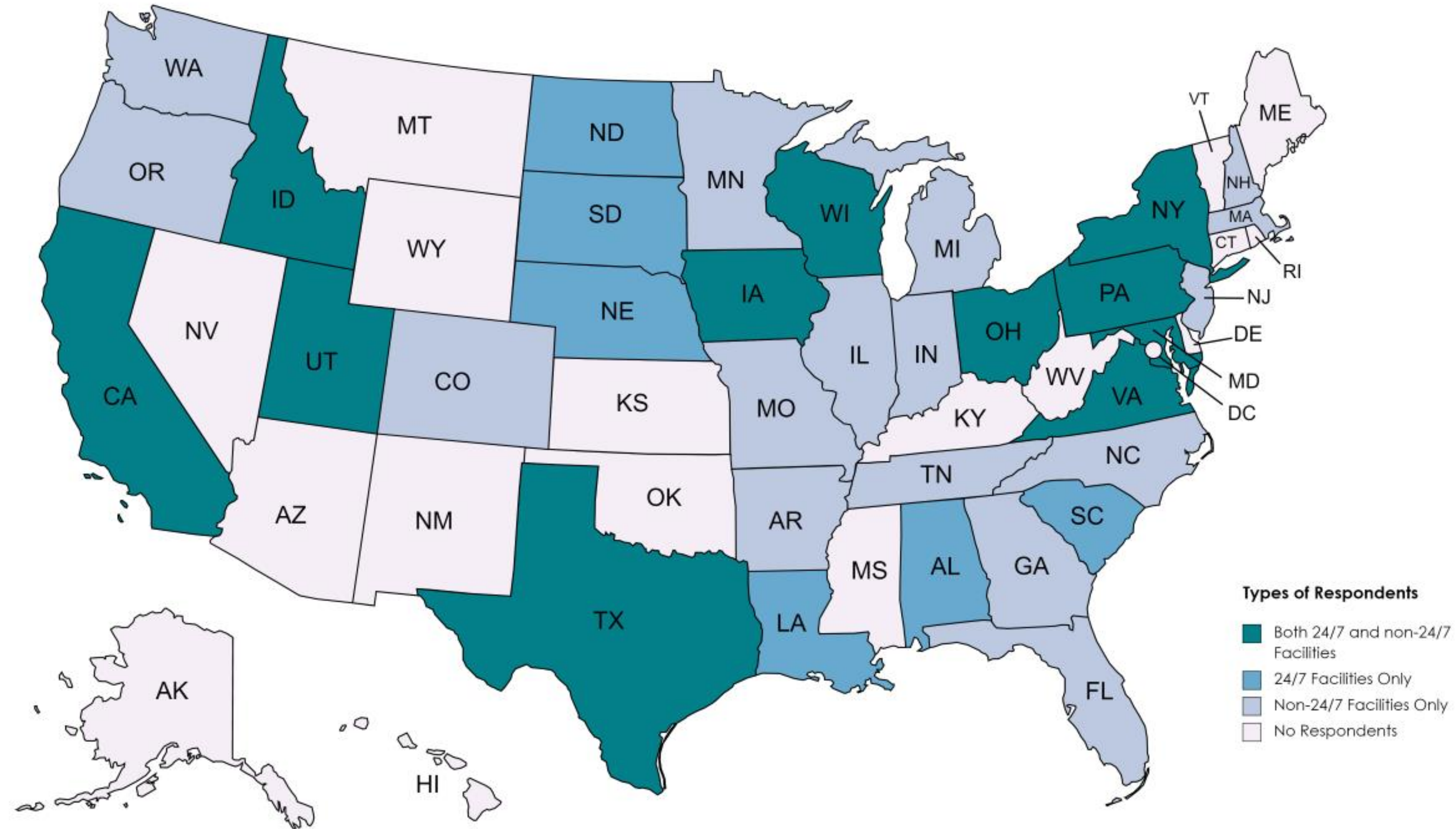
Results

Respondents from 122 UHM facilities answered the survey. Six respondents answered incompletely, while 116 completed the survey in its entirety. Sixty-four facilities (52.5%) reported current 24/7 operation, while 58 (47.5%) denied current 24/7 operation. Non-24/7 facilities were asked to select any perceived barriers to 24/7 operation. Fifty-five of the non-24/7 facilities (94.8%) identified multiple barriers to 24/7 operation. (See Table 2.) Of the non-24/7 facilities, 87.9% cited paying for an on-call team as a barrier to 24/7 operation; this was the most commonly cited barrier. The second-most commonly cited barrier was lack of physician availability. (See Table 1.).

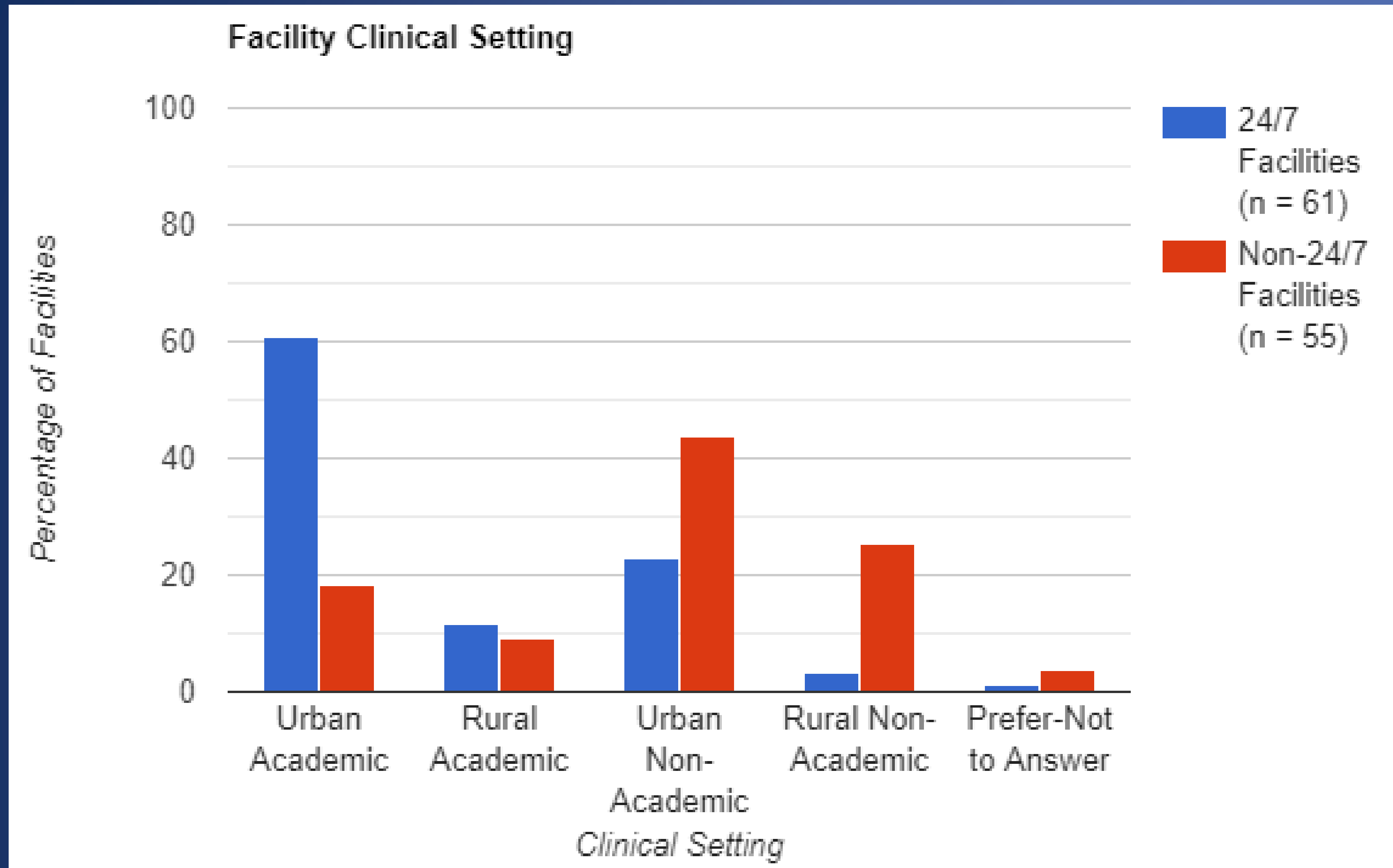
Twelve of the respondents identified both lack of physician availability and NP/PA inability to oversee HBOT as a barrier. Of these twelve, only one site identified lack of physician availability as their most important barrier to address 24/7 clinical care support. No facilities identified NP/PA inability to oversee HBOT as their most important barrier.

A stark contrast in availability of chamber-compatible equipment was identified when comparing 24/7 facilities to non-24/7 facilities. The majority of the non-24/7 facilities (74.5%) did not possess chamber-compatible ventilators, IV pumps or cardiac monitors. In contrast only 14.8% of the 24/7 facilities lacked all three pieces of equipment. (See Table 4.).

Respondent Distribution by US State



Respondent Distribution by Clinical Setting



Facility Clinical Setting	Non-24/7 Facilities (n = 55)	Percentage of Non-24/7 Facilities	24/7 Facilities (n = 61)	Percentage of 24/7 Facilities
Urban academic	10	18.2%	37	60.7%
Rural academic	5	9.1%	7	11.5%
Urban non-academic	24	43.6%	14	23.0%
Rural non-academic	14	25.5%	2	3.3%
Prefer not to answer	2	3.6%	1	1.6%

- The vast majority (83.6%) of 24/7 facilities are found in urban clinical settings.
- The majority (69.1%) of non-24/7 facilities are found in non-academic clinical settings, both urban and rural.

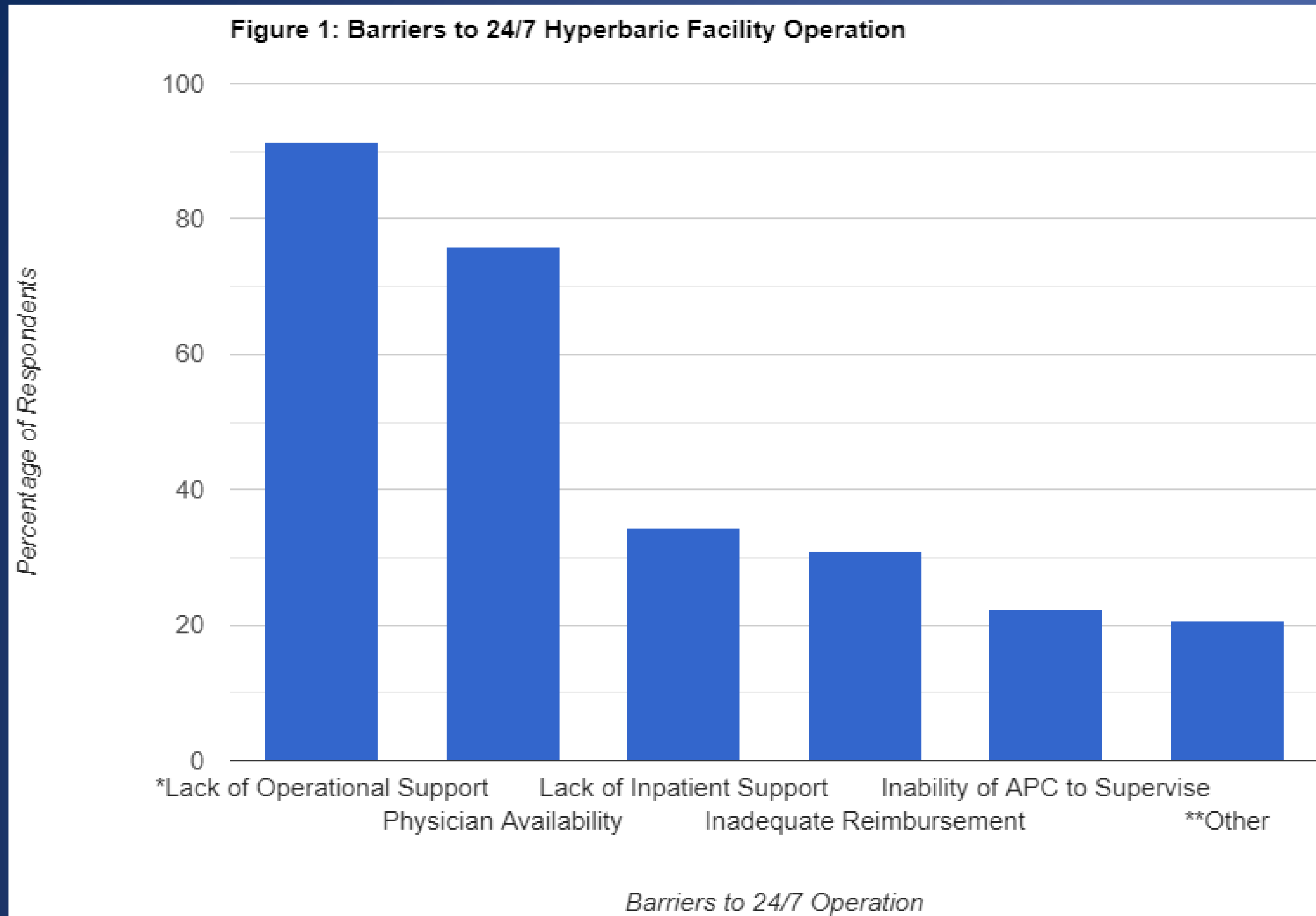
Barriers to 24/7 Hyperbaric Facility Operation

Facilities were presented a list of possible barriers to 24/7 operation and were permitted to select multiple barriers from the list. Nearly all facilities (94.8%) selected more than one barrier. Lack of operational support and physician availability for 24/7 coverage were the two most commonly chosen barriers in the multi-select list.

Notably, only 12 (20.7%) respondents selected both "physician availability for 24/7 coverage" and "inability of NP/PA to oversee HBOT". Only one site indicated that inability to augment clinical support with a NP/PA was the most important barrier to overcome lack of 24/7 availability. This suggests that augmenting physician call coverage with NP/PA clinical oversight will not independently resolve the shortage of 24/7 HBOT facilities across the nation.

**Free-text responses for the Other" (20.7%) barrier include: lack of ancillary staff, lack of critical care capability of hyperbaric chamber, department physical distance from main hospital building, and lack of patient demand for 24/7 operation.

Figure 1: Barriers to 24/7 Hyperbaric Facility Operation



*Lack of Operational Support includes responses of Inability to pay for "On Call Staff" and "Lack of Administrative Support".

Table 1: Barriers to 24/7 Hyperbaric Facility Operation

Barriers to 24/7 Operation	Number of Respondents Reporting Given Barrier (n = 58)	Percentage of Total Respondents
Lack of Operational Support	53	91.4%
Physician availability for 24/7 coverage	44	75.9%
Access to inpatient support	20	34.5%
Reimbursement for service	18	31.0%
Inability of PA/NP to oversee hyperbaric oxygen therapy	13	22.4%
Other*	12	20.7%

Figure 2: Number of Barriers Selected by a Single Non-24/7 Facility

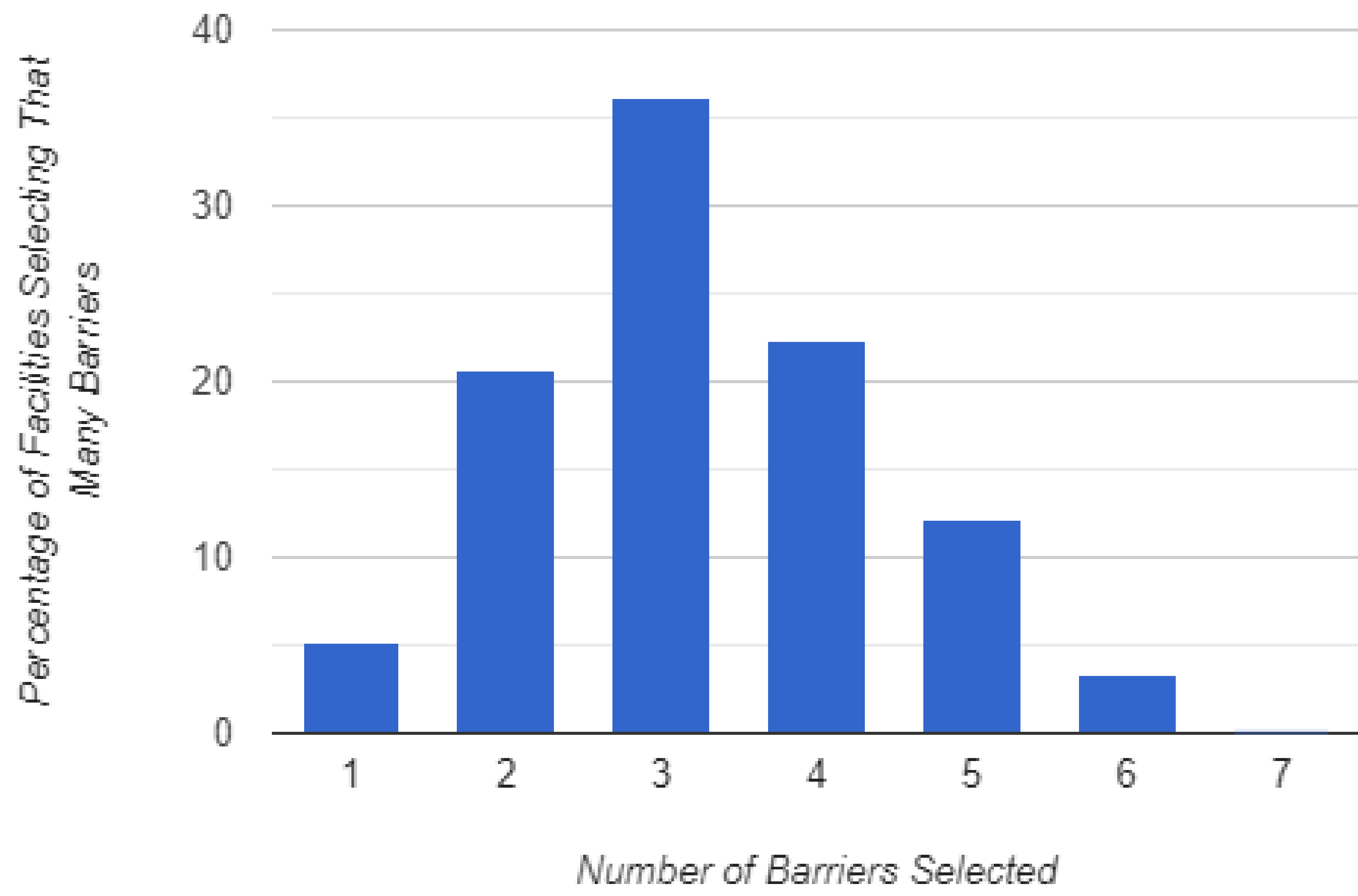
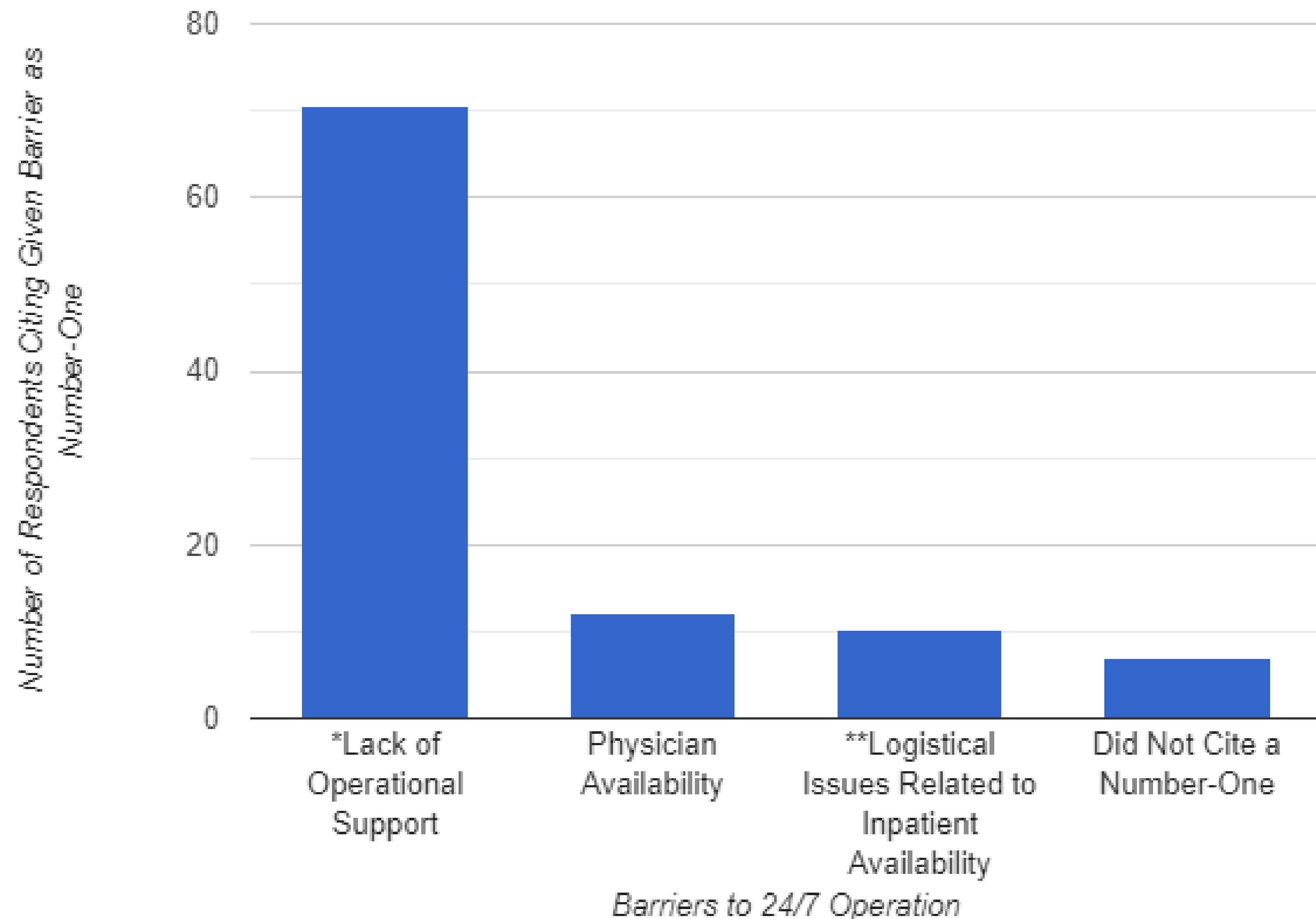


Table 2: Number of Barriers Selected by a Single Non-24/7 Facility

Number of Barriers Selected That Impeded Ability for 24/7 Coverage	Number of Non-24/7 Respondents (n = 58)	Percentage of Non-24/7 Respondents
1	3	5.2%
2	12	20.7%
3	21	36.2%
4	13	22.4%
5	7	12.1%
6	2	3.4%
7	0	0.0%

- 94.8% facilities selected two or more barriers that prevented 24/7 operations.
- The most frequent number of barriers selected by facilities was three.
- 58.6% of facilities selected three or four barriers.

Figure 3: Barriers to 24/7 Hyperbaric Facility Operation Cited as Being Number-One for a Facility



The number one most important Barrier to 24/7 clinical operations

Table 3: Barriers to 24/7 Hyperbaric Facility Operation Cited as Being Number-One for a Facility

Barriers to 24/7 Operation Cited as Being Number-One	Number of Respondents Reporting (n = 58)	Percentage of Total Respondents
Lack of operational support	41	70.7%
Physician availability for 24/7 coverage	7	12.1%
Logistical issues related to inpatient availability	6	10.3%
Did not cite a number-one barrier	4	6.9%

- Facilities were asked to describe the most important barrier to 24/7 clinical operations. Most of the facilities (70.7%) stated "lack of operational support" as the number one barrier to address to achieve 24/7 operation in their department. However, "lack of operational support" was multifaceted and included responses of "inability to pay for on call staff" and "lack of administrative support".
- "Logistical Issues Related to Inpatient Availability" includes responses related to physical distance from main hospital building and outpatient-only status.

Hyperbaric chamber-compatible Equipment availability for 24/7 and non-24/7 facilities

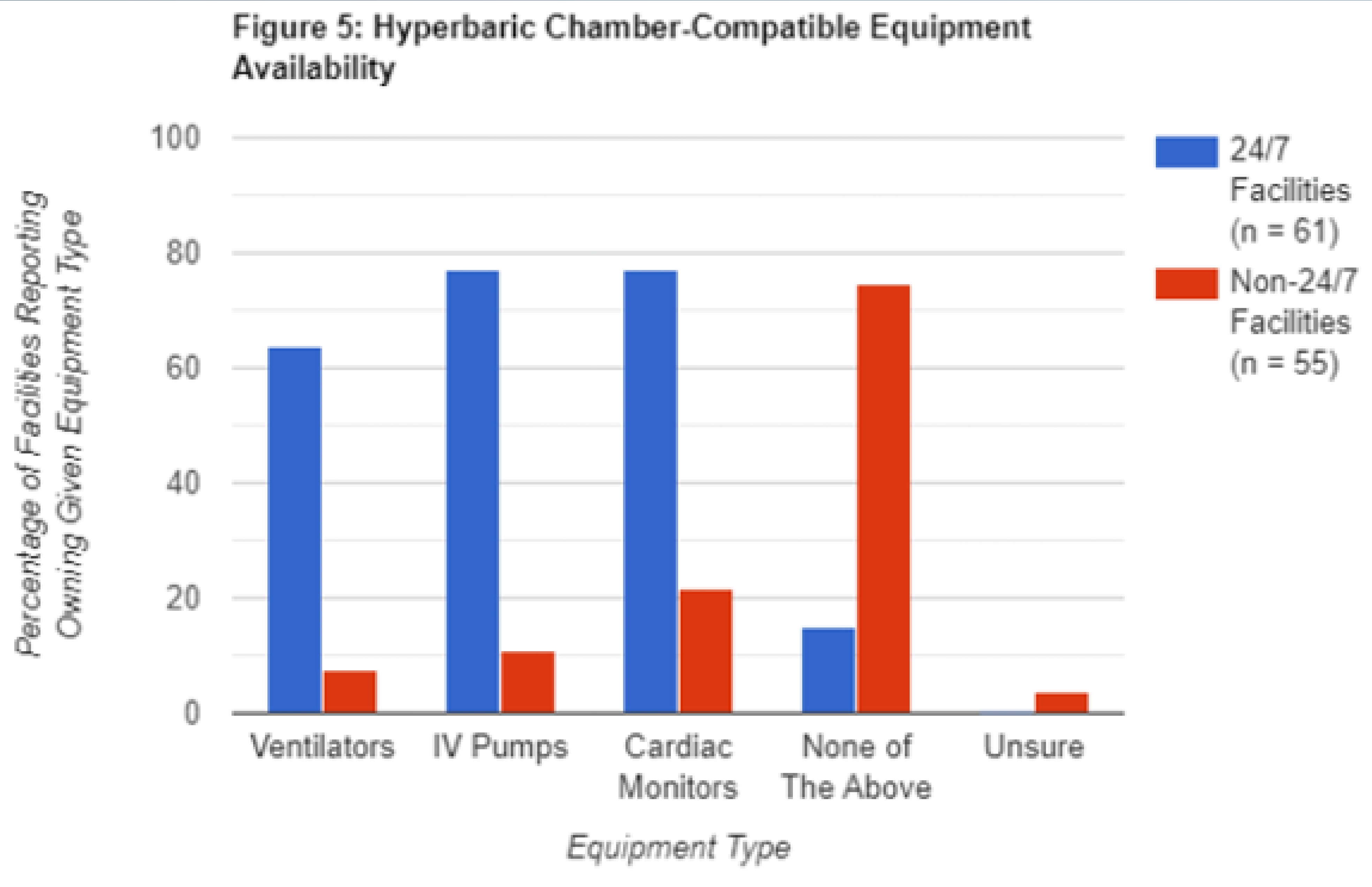


Table 4: Hyperbaric Chamber-Compatible Equipment Availability

Hyperbaric Chamber-Compatible Equipment	Number of Non-24/7 Facilities Reporting Owning Given Equipment (n = 55)	Percentage of Non-24/7 Facilities Reporting Owning Given Equipment	Number of 24/7 Facilities Reporting Owning Given Equipment (n = 61)	Percentage of 24/7 Facilities Reporting Owning Given Equipment
Ventilators	4	7.3%	39	63.9%
IV Pumps	6	10.9%	47	77.0%
Cardiac Monitors	12	21.8%	47	77.0%
None of The Above	41	74.5%	9	14.8%
Unsure	2	3.6%	0	0.0%

Overall, the 24/7 facilities more consistently reported availability of chamber-compatible ventilators, IV pumps, or cardiac monitors. 74.5% of non-24/7 facilities reported the lack of any chamber-compatible equipment. Interestingly, 9 (14.8%) 24/7 facilities also reported not having access to any chamber-compatible equipment.

J McGlynn, S Riutta, J Adefisoye, S Messer, L Gesell

Conclusions

The data obtained from this survey suggest that the relative lack of 24/7 UHM facilities is multifactorial in cause. Nearly all of the responding facilities cited two or more barriers. Lack of operational support and physician availability were the most commonly cited barriers in the multi-select section of the survey. However, of the facilities that cited physician availability and NP/PA inability to supervise HBOT as a barrier, only one center identified physician availability as their number-one most important barrier; none noted NP/PA inability to supervise HBOT as their number-one barrier. Multiple barriers would need to be resolved for a site to be able to provide 24/7 care. There is great potential for future investigation to identify solutions to these multifactorial causes. This ultimately would allow for broader delivery of emergent hyperbaric oxygen therapy.

J McGlynn, S Riutta, J Adefisoye, S Messer, L Gesell

AFFILIATION:

Aurora St. Luke's Medical Center
Department of Undersea and Hyperbaric Medicine
Aurora St. Luke's Medical Center; Aurora Health Care

Aurora Sinai Medical Center
Aurora UW Medical Group
Center for Urban Population Health
Milwaukee, WI

CONFLICT OF INTEREST:

None declared.

The authors would like to thank UHMS for distributing the survey.