

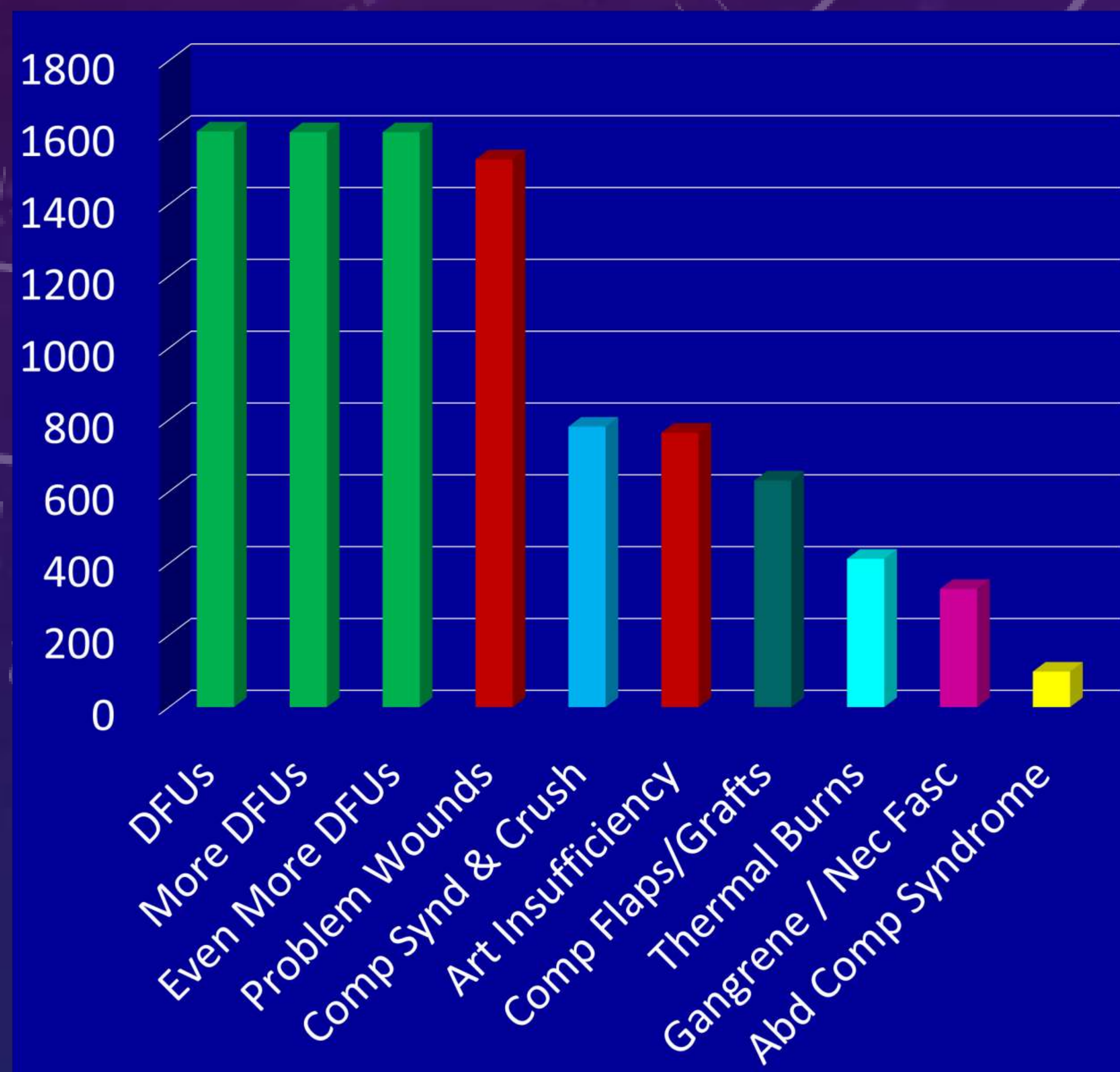


# "THE UTILIZATION OF HYPERBARIC MEDICINE CONSULTATIVE SERVICES: A SURVEY OF ADVOCACY AND POTENTIAL UTILIZATION IN A LARGE, URBAN LEVEL ONE TRAUMA CENTER." LeGros TL, Murillo I, Ulloa J, Murphy-Lavoie H, Harch P, and K Van Meter. Department of Emergency Medicine, LSU UHM Fellowship, New Orleans, Louisiana.



## INTRODUCTION

HBO<sub>2</sub> therapy is an efficacious, cost-efficient, and easily tolerable treatment for a variety of urgent and emergent medical and surgical disease processes and injuries. Hyperbaric physicians are consulted by numerous specialty services. The use of HBO<sub>2</sub> to treat traumatic injuries, infectious processes, DCS, AGE, as well as radiation-induced and hypoxic injuries, has increased substantially within the last 30 years. This is the result of highly rigorous and well defined studies delineating the pathophysiological basis of these injuries and the benefits of HBO<sub>2</sub> therapy.



Respondents Affirming Split Opinions on Referrals of Patients			
Specialty	#	Cases That WOULD Be Referred	Cases That WOULD NOT Be Referred
Medicine	1	Would refer for AGE cases related to Hemodialysis, Bronchoscopy and Percutaneous Hepatic Puncture; Would also refer for Mandibular Osteo, Radiation Injuries, Gangrene, Nec Fasc, and CO Poisoning	Would not refer AGE cases due to CPR, Arterial Lines, Central Lines or Mechanical Ventilation or Severe Blood Loss Anemia
Em Med	1	Would refer ALL types of cases to hyperbarics, but not every patient: Would refer 2/3 compromised flaps, 400/600 DFUs; 100/300 problem wounds; 10/100 burns; 10/25 AVN and 10/25 cases of arterial insufficiency; Would also refer 100% of DCS, AGEs, CO poisoning, gas gangrene, necrotizing fasciitis, compromised flaps or grafts, CRAOs and ISSHLs	Would refer 2/3 compromised flaps, 400/600 DFUs; 100/300 problem wounds; 10/100 burns; 10/25 AVN and 10/25 cases of arterial insufficiency; Would also refer 100% of DCS, AGEs, CO poisoning, gas gangrene, necrotizing fasciitis, compromised flaps or grafts, CRAOs and ISSHLs
Em Med	1	Would refer all patients except a ISSHL (84/85)	Would not refer a case of ISSHL (1/85)
Em Med	1	Would refer for DCS, AGE, CO or cyanide poisoning, gas gangrene, necrotizing infections, crush injuries, compartment syndrome, DFUs, select problem wounds, and compromised flaps or grafts	Would not refer patients with severe blood loss anemia, burns, AVN, arterial insufficiency, CRAO or ISSHL

## OBJECTIVES

To assess the potential volume of in-patient hyperbaric medicine consultations from medical & surgical subspecialties at a large, urban level 1 trauma center.

## METHODS

A survey was conducted of the attending physicians present within available clinics, the ED, the rooms adjacent to the operating theatres and hospital floors over a 2 day period. Participants were asked two questions: How many of these disease processes or injuries do you encounter in a calendar year? If provided high level evidence of benefit, would you consider a hyperbaric medicine consultation? Inclusion criteria included attending medical staff active in patient care.

## RESULTS

51 surveys were completed, representing 10% of the medical staff. Two surveys were excluded: one was filled out by a resident surgeon and another by a CRNA. The remaining 49 respondents reported 11,960 referable cases for hyperbaric consultation. The vast majority were related to hypoxic, traumatic and infectious disease states (10,653), followed by neuro or CV injuries (717), osteomyelitis (328), and radiation injuries (262). Surgical services accounted for 43% of respondents, medicine accounted for 22%. ED Physicians accounted for 35%. These potential case referrals were estimations from 17 surgical and medical services. The cases were fairly evenly distributed between surgery (6,439 = 54%) and medicine (5,521 =46%). ED physicians, which had the most available respondents, reported the largest potential referral base, with 4,209 cases. Anesthesiology reported 4,030 cases. Surgery reported 1,583 cases. Medicine reported 1,312 cases. Orthopedists reported 654 cases. The remaining surgical specialties had 1 - 2 respondents and reported the following cases: OMFS (81), Urology (50), ENT (27), and OB/GYN (14). In all, 100% of respondents reported that they would consult hyperbaric medicine specialists. There were 4 participants (1 medicine and 3 emergency medicine attendings), who would refer the majority of their patients.

Survey Participants by Specialty							
Surgical Specialties				Medical Specialties			
Specialty	#	%	Cases	Specialty	#	%	Cases
Anesthesia	6	12%	4,030	Medicine	5	10%	1,312
Surgery	5	10%	1,583	Hem-Oncology	1	2%	
Orthopedics	4	8%	654	DM Specialty	1	2%	
OMFS	2	4%	81	Rheumatology	1	2%	
Urology	2	4%	50	Critical Care	1	2%	
ENT	1	2%	27	Gastroenterology	1	2%	
OB/GYN	1	2%	14	Neurology	1	2%	
TOTALS	21	43%	6,439 (54%)	Em Medicine	17	35%	4,209
				TOTALS	28	57%	5,521 (46%)

DISEASE AND INJURY CASE NUMBERS BY TYPE AND SPECIALTY										
SPECIALTIES	Anesth	Med	Ortho	OMFS	ENT	URO	OB	Surg	EMed	TOTALS
HYPOXIC / TRAUMATIC / INFECTIOUS CASE NUMBERS										
Diabetic Foot Wounds	1388	424	100					1130	1763	4805
Problem Wounds	408	138						170	809	1525
Comp Syndrome	502	12	25		2			87	153	781
Crush Injury										
Arterial Insufficiency	305	41						125	293	764
Comp Flaps/Grafts	373	4	9	26	3			45	171	631
Avascular Necrosis	52	47	195						196	490
Thermal Burns	35	6						10	362	413
Gangrene or Nec Fasc	214	12			3	4		3	93	329
Abd Comp Syndrome	45	24							30	99
Severe Blood Loss	12	8							30	50
C Retinal Art Occl	4	1							39	44
Idiopath Hearing Loss	3	1			6				32	42
All Indications	330	300				36	14			680
HYPOXIC / TRAUMATIC / INFECTIOUS INJURY TOTALS										10,653
OSTEOMYELITIS CASE NUMBERS										
Refractory Osteo	18	46	25	5	5				65	164
Mandibular Osteo	16	1		30					30	77
Sternal Osteo	39								1	40
Cranial / Spine Osteo	33				3				1	37
Malign OE Osteo	6				2				2	10
OSTEOMYELITIS TOTALS										328
RADIATION CASE NUMBERS										
Soft Tissue ORN	20	114		20				3	5	162
Hemorrhagic Cystitis	14	30				10			20	74
Laryngeal Necrosis	8				3					11
Rad Optic Neuropathy	3									3
Rad Scleral Necrosis	3									3
Mitomycin C Necrosis	3									3
Vaginal Necrosis	2									2
Rad Brain Injury	4									4
RADIATION INJURY TOTALS										262
NEUROLOGICAL / CARDIOVASCULAR INJURY CASE NUMBERS										
Traumatic Brain Injury	400	40						5	76	440
Carbon Monoxide	25	12						5	29	118
Decomp Sickness	6	5								45
Air Gas Embolism	45	1							8	54
Intracranial Abscess	44	15							1	60
NEUROLOGICAL / CARDIOVASCULAR INJURY TOTALS										717

## CONCLUSIONS

This is a preliminary survey that needs further participant inclusion. However, it highlights several points perhaps not previously considered:

- ❖ **Anesthesiologists:** may be a heavily underutilized referral source. Their patients are exclusively surgical and often emergent in presentation. They reported more cases of compartment syndrome, crush injury, arterial insufficiency, compromised flaps and grafts, gas gangrene, necrotizing fasciitis, abdominal compartment syndrome, sternal, cranial and spinal osteomyelitis, TBI, ICA, AGE, and rare radiation injuries than any other group,
- ❖ **Internists:** also see a surprising number of DFUs, problem wounds, AVN, abdominal CS, refractory osteomyelitis, radiation injuries, TBI and ICA than might be expected.
- ❖ **Overall:** 100% of participants reported that they would refer their patients for HBO<sub>2</sub> consultation.