

# Taking upstairs care outside

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## EDITORIAL

Background: Critical care is a clinically complex and resource intensive discipline, the world over. Consequently, the delivery of these services has been compounded by the need to sustain a specialized workforce, while maintaining consistent and high standards.<sup>1,2</sup> The regionalization of critical care resources and the creation of referral networks has been one approach that has led to success in this area.<sup>2-7</sup> However, as steps have been made towards regionalization, so too has the need to transfer patients between facilities in order to access these services. The effects of this are already apparent, where estimates in the United States have found that 1 in 20 patients requiring intensive and critical care resulted in transfer to another facility.<sup>2</sup> The need for such transfers are equally varied as they are common and include: no critical care facilities at the referring facility; no staffed critical care bed availability at referring facility; requirements for expertise and/or specialists facilitates not available at referring site; and the repatriation of patients back to their original facility.<sup>6,8</sup> An increase in the number of patients requiring the continuation of critical care in-transit has led to a need to expand the borders of traditional intensive care beyond the confines of the hospital. Such a concept fits with the assertions of Peter Safar, a pioneer of modern critical care, who proposed that critical care should not be defined by geographic location, but rather

a set of principles designed to deliver appropriate and timely care to patients who need it.<sup>9</sup>

Specialised transfer services: The advent and implementation of critical care transfer and retrieval services has been the bridge to this divide, lying at the confluence of prehospital emergency care, in-hospital emergency medicine, and intensive care. Undertaking the transfer of a patient requiring the initiation or continuation of critical care is no simple task. Variations in patient type and severity of their medical condition, as well as the expectations of the transfer team are significant. Reports regarding the transfer of patients ranging from critical neonates, to the multi-comorbid geriatric; with complex underlying surgical and medical diagnoses; involving the concomitant administration of multiple vasoactive and sedative medications; with a variety of oxygenation and ventilation requirements, are commonplace in the literature.<sup>6,8,10–16</sup> Consequently, moving these patients from the safety and security of one facility to another is an immense logistical challenge and fraught with risks. In addition to the severity of the patients underlying condition, limitations in space, personnel and equipment, as well as an unpredictable operating environment are several of the potential hazards faced during the transfer of these patients.

These hazards are evident in the incidence of adverse events found in the literature. Incorrect referral triage; inadequate transfer team; patients requiring stabilization prior to transfer; equipment and/or technical failures; adverse drug events and medication errors are amongst the most common reported events.<sup>6,8,10–17</sup>

Further to this, the movement of patients alone has in itself been shown to have an impact on a patient's baseline status, without the occurrence of negative or untoward events.<sup>10,13,15,16</sup> As a result, patient safety

and quality of care have become essential components of modern critical care transfer and retrieval services, with the role of clinical audit central to their ability to learn and improve from previous cases and events.

The local solution: Despite the relatively small size of the State of Qatar, critical care transfer and retrieval has nonetheless become a necessity within the country's healthcare system. [Figure 1](#) highlights the locations of the main hospitals. Starting in 2014, a dedicated program was initiated to facilitate the transfer and retrieval of critical care patients across the country.<sup>18</sup> The Specialized High Acuity Adult Retrieval Program (SHAARP) is a joint initiative between the Hamad Medical Corporation Ambulance Service (HMCAS) and the Hamad Medical Corporation (HMC) Critical Care Network (CCN). It consists of a single dedicated purpose-built ambulance, manned and run 24 hours a day, seven days a week by a variety of staff from both HMCAS and the CCN and deployed primarily for the transfer and retrieval of critical care patients across Qatar.<sup>19</sup> The program was further developed in 2016 and formalized under the Transfer and Retrieval division of the HMCAS, with dedicated HMCAS and CCN staff receiving bespoke training and continued education,<sup>18</sup> the addition of specialized and dedicated communications staff for call taking, dispatch and monitoring; and focused governance and audit to maintain the highest quality of patient safety and quality of care.

Since then, the program has seen considerable success and uptake within the country's health system. The activity of the unit echoes much of what can be found in the literature and further reinforces the need for such a specialized service, regardless of setting ([Table 1](#)). It further highlights the importance of the relationship and cooperation between the HMCAS and CCN regarding the expertise and resources that each component adds to the overall service.

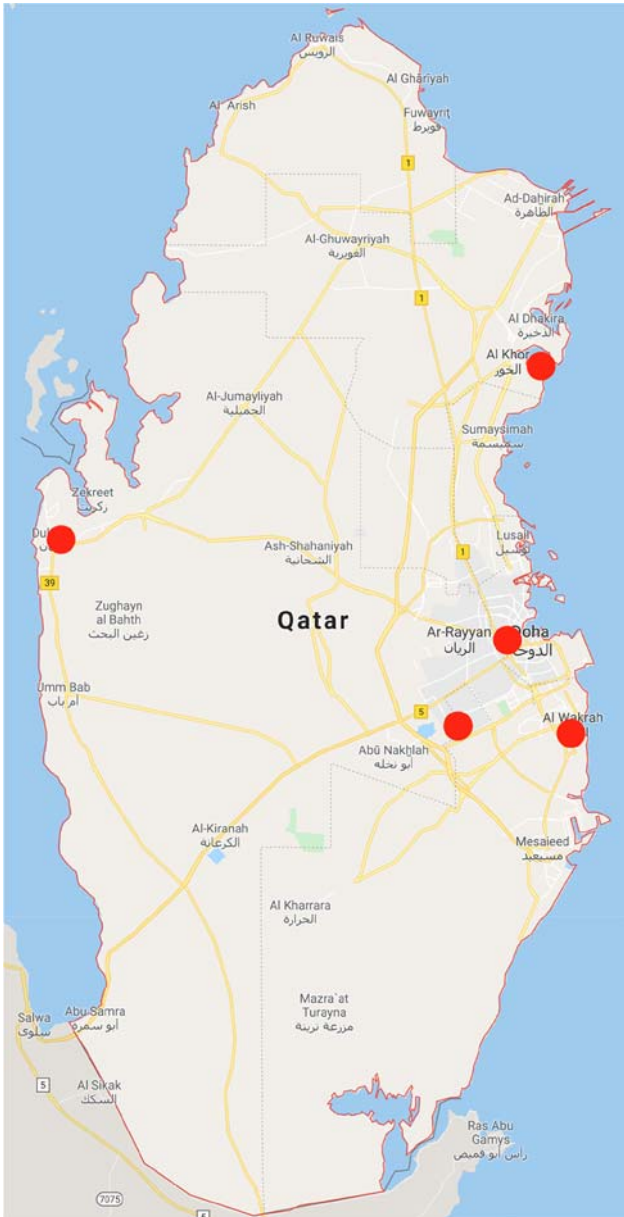


Figure 1. Location of main hospitals across Qatar.

Table 1. Overview of the transfers undertaken by the SHAARP team Jan 2017 – Dec 2018.

	n	(%)
Total cases included/analyzed	540	
Completed	513	95%
Cancelled at patient side	27	5%
Gender		
Male	348	64%
Female	167	31%
Not documented	25	5%
Age Category		
0 – 9	4	1%
10 – 19	16	3%
20 – 29	46	9%
30 – 39	83	15%
40 – 49	92	17%
50 – 59	78	14%
60 – 69	85	16%
70 – 79	77	14%
> = 80	34	6%
Not documented	25	5%
Case Category		
Medical	450	83%
Trauma	48	9%
Uncategorized	42	8%
Primary Pathology		
Burns	29	5%
Cancer	46	9%
Cardiovascular	74	14%
Chemical exposure/Drug overdose	6	1%
Gastrointestinal	24	4%
Neurological	65	12%
Other	28	5%
Renal	13	2%
Respiratory/Pulmonary	64	12%
Sepsis/Infection	133	25%
Trauma - Neurological	5	1%
Trauma - Other	11	2%
Uncategorized	42	8%
Crew details across all transfers		
Doctor	43	8%
Nurse	7	1%
Respiratory Therapist	7	1%
Critical Care Paramedic	540	100%
Ambulance Paramedic	502	93%

This is particularly evident in the expectations of the team regarding their duties of care whilst in transit. A significant proportion of the patients transferred by the program have required the maintenance of a high-level of care between facilities, under conditions that are far more challenging than that seen in any regular hospital ward or intensive care unit (Table 2).

Conclusion: In modern healthcare, to deliver a consistent and high-level critical care service in any setting, the movement of patients is inevitable. However, in order to ensure the continuum of this level of care and maintain the highest standards of patient safety and quality of care in-transit, specialized transfer services are a necessity. The multidisciplinary nature of critical care transfer and retrieval

**Table 2. Management and level of care provided to the patients transferred between facilities across Qatar Jan 2017 – Dec 2018.**

	n	(%)
<b>Airway &amp; Ventilation</b>		
No airway - Not ventilated	237	44%
No airway - Non-invasive ventilation	40	7%
Endotracheal tube	245	45%
Tracheostomy tube	18	3%
<b>Venous/Arterial Access</b>		
Arterial Catheter	140	26%
Central Venous Catheter	167	31%
Peripheral Venous Catheter	376	70%
Multiple Catheters	173	32%
<b>Sedative/Hypnotic</b>		
Dexmedetomidine	19	4%
Etomidate	1	0%
Ketamine	1	0%
Midazolam	63	12%
Propofol	63	12%
<b>Analgesic</b>		
Fentanyl	144	27%
Ketamine	1	0%
Morphine	3	1%
Paracetamol	6	1%
Remifentanyl	17	3%
<b>Inotrope</b>		
Dopamine	20	4%
Noradrenaline	68	13%
Phenylephrine	13	2%
<b>Medication Combinations</b>		
Hypnotic + Analgesic + Inotrope	48	9%
Hypnotic + Analgesic	122	23%
Hypnotic + Inotrope	52	10%
Analgesic + Inotrope	57	11%
<b>Presenting Rhythm</b>		
Sinus Rhythm	448	83%
Arrhythmia	36	7%
Not documented	56	10%

dictates the cooperation between multiple in-hospital and out of hospital specialties and is a fundamental underlying concept in the success of such services.

Keywords: prehospital care, critical care, patient transfers, retrieval, referral

### Ethical approval note

Permission to share the data presented in this editorial has been obtained from the HMC Ambulance Service Group Research Oversight Committee.

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