

EXPERIENCE EXCHANGE

Relocation and transfer of patients to a new hospital: Practical lessons

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ABSTRACT

Objective: We describe the practical aspects of planning for and executing the safe movement of patients and care teams from an existing tertiary hospital (Mafraq Hospital) to a new hospital (Sheikh Shakhbout Medical City) in Abu Dhabi, United Arab Emirates.

Methods: Field notes and measures taken during the planning and execution of this event were prospectively collated by the authors to inform the final manuscript.

Results: A central command structure similar to that used for major disaster management helped to guide the move of all inpatients, staff and support services from one hospital to the other. Five patient tracks (clinical teams) were established to move patients to the new facility concurrently along set and separate routes. Five additional support tracks were established to provide logistical support for the movement of essential non-patient resources. A total of 142 acutely ill general care and critically ill hospital patients were moved during a five-hour period with zero patient harm events.

Conclusions: The tools, processes used, and lessons learned in this exercise are shared in the hope that others who are required to move hospitals can learn from and use our experience.

Key Words: Hospital, Move, Relocation, Transfer, Patient safety

1. INTRODUCTION

1.1 Background

Moving from an old existing and familiar hospital to a brand new and different hospital is an exciting moment for the hospital community. This once in a lifetime opportunity has been described by Stichler as the ultimate change project.^[1]

New hospital constructions are a strategic solution to a point-in-time realisation that a dramatic change and investment is needed to respond to the changing demands.^[2] These

changing demands may relate to community demographics, population, infection control standards, workplace standards and patient experience expectations, as well as efficiency brought about by new technology, equipment, artificial intelligence, and newer products and designs that can improve the functioning and efficiency of the hospital.^[3,4]

Moving to a new hospital is not only exciting but is also dangerous and inherently fraught with risks that require careful consideration, planning, communication, supervision, and

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execution.^[5] The many parts of the development of a new hospital and the move involves builders, architects, project officers, civil engineers, regulatory authorities associated with building codes, hospital design requirements, professional regulatory requirements to name a few; and of course, the staff, patients and visitors.^[6] To explore and explain the full scope of requirements associated with a new hospital move is an enormously complex task. This article describes the planning and execution of the physical move and safe care of 142 patients from the old hospital to the new hospital. As world-wide hospital infrastructure ages out and advances in care models and facilities engineering drive the trend of retiring old facilities and replacing them with modern facilities, we believe the strategies, tools, frameworks, processes, and lessons learned should be shared so that other hospital leaders, privileged with a similar opportunity, may utilise our experience to inform their own.

1.2 Description

The old Mafraq Hospital (MQ) is the major trauma receiving hospital for the emirate of Abu Dhabi in the United Arab Emirates. Built in the early 1980s and having gone through many physical and functional changes over the years, the strategic investment plan of the government was to commence building a replacement hospital in the nearby vicinity in around 2012. In more recent times, Mafraq was a 400-bed tertiary referral and teaching hospital catering for most sub-specialties including but not limited to emergency/trauma/burns, medical/surgical, ICU, obstetrics, neonatology, paediatrics including PICU and a very large and comprehensive suite of ambulatory and outpatient services across an expansive campus.

MQ is part of the Abu Dhabi Health Service (SEHA) the public health system in the emirate of Abu Dhabi that has 14 hospitals of varying sizes across a region serving a population of over three million.

The new Sheikh Shakhbout Medical City (SSMC) is a contemporary, state-of-the-art 741-bed hospital completed and ready for full access in mid-2019. Towards the end of 2019, SEHA signed a joint venture agreement with Mayo Clinic (USA) to jointly commission and manage SSMC which would entail bringing all the MQ staff and patients to SSMC as the first step in a multi-year transition with the goal of creating a regional destination medical center in a unique partnership between SEHA and Mayo Clinic.

2. METHODS

2.1 Establishing a Macro-plan

The initial establishment of an SSMC commissioning steering committee comprised key administration, clinical, non-

clinical support, and technical experts from SEHA, Mafraq, and Mayo Clinic. The steering committee was formed to manage the component parts of the planning and preparation and to ensure connectivity so that everyone was aware of one another's roles, actions and progress, forever mindful of the interdependencies necessary to complete the many tasks coherently and on time.

The macro-plan for the move was established in May 2019:

- (1) A soft opening of SSMC outpatients, day surgery, and day procedure areas over November-December 2019.
- (2) Partial opening of support services (registration, radiology, laboratory, pharmacy, security, cleaning, etc.) at SSMC to support the soft opening.
- (3) 9 January 2020 – One day move of all inpatients and remaining support services from MQ to SSMC.

The soft opening was used to start testing processes, equipment, patient flows and to have a substantial presence in the new building while other preparation activities were occurring. After exhaustive reviews of the options, we recognized that it was safer and more efficient to minimise the length of time that we had a single hospital staff responsible for delivering essential services concurrently at 2 campuses (MQ and SSMC). This was especially true for the emergency services responsible for recognition and rescue, hence the desire to plan a one-day-only move of up to 220 inpatients.

The rationale for our approach was based on the collective experience of the leadership who had previously moved hospitals and what was deemed to be most efficacious and safest given our context and circumstances. We do not deny that other approaches could have been utilised however based on our collective input, analysis and discussion, the approach taken was considered “most right” for our situation.

2.2 Staff training and preparation

Staff training and preparation cannot be underestimated for a manoeuvre of this scale. The importance of this became increasingly apparent and clear as we progressed towards the move day and realised how detailed and how extensive the training and familiarisation needs of all staff were.

2.2.1 Policies and procedures

All policies for SSMC were based on MQ existing policies, reviewed by content experts/owners, updated, corrected, approved by the most appropriate executive owner(s), and uploaded onto a shared drive for all staff to access.

2.2.2 Superusers

Key staff members were selected from MQ to move across permanently to SSMC from August 2019, in particular, se-

nior clinical nurses were the predominant workgroup to fulfill these critical roles. Starting with Assistant Directors of Nursing, key department managers, and clinical educators to progress and operationalise many of the policies, procedures, and staff training that would be necessary as well as making sure the many clinical and technical system interfaces were working as required. In November 2019, larger numbers of clinical leads were moved from MQ to SSMC including hospital supervisors, intensive care outreach nurses, and others who would be key leaders, especially after hours, that many staff would rely on to help them “find their way” through the new hospital in the early days and weeks of the move.

2.2.3 Staff orientation

A one-day generic orientation program was facilitated by the staff education departments which included information regarding: the mission, vision and values, familiarisation with SSMC layout, emergency response codes, etc. This one-day orientation was very similar to a new employee orientation. The clinical educators also provided structured staff orientation to new equipment, techniques, procedures, and protocols that would be relevant to staff in each speciality. As much as possible this type of clinical training was conducted on multiple occasions for the entire multidisciplinary team (MDT) so that group learning, familiarisation, and discussions could occur and challenges to the proposed processes could be made, responded to and if necessary, changed before execution. Staff orientation programs started 2-3 months before the staff move when not all elements were in place (e.g. some equipment had not arrived and some protocols had not been finalised). A second set of structured familiarisation sessions for all MDTs was planned within 1-2 weeks before the move to ensure maximum familiarisation and readiness of the staff before the move day.

2.2.4 Department simulations (Dry runs)

Simulation exercises were conducted at many levels. At the most basic level, individual departments would create their scenarios of “worst case” situations such as a fire, cardiac arrest, violent scene, and other clinical and operational emergencies specific to their department. These situations were scripted and guided by more senior managers/clinicians to observe the response of the team and the enactment of the policies, procedures, and equipment especially if different from what has been in place at MQ. More formal dry run simulations were pre-planned with many more complexities such as a scenario that would include many departments such as an obstetric emergency requiring labour ward, anaesthesia, portage, operating room, laboratory (massive blood transfusion), pharmacy, rapid response team, etc. These events were scheduled to ensure all “actors” (staff playing the role of patients and family) and participants (staff playing their usual

role) were available for their input. In addition, we would use third-party observers such as Mayo Clinic staff and Quality department staff to observe, take notes, and video the process to ensure a structured, formal debrief, learning, and discussion could take place. Identified challenges and concerns were assigned owners to follow up, correct, re-implement, and re-run so that all identified risks were addressed long before the move day.^[7]

2.2.5 Big Day Simulations (BDS)

Four Big Day Simulation events occurred on:

BDS 1: 3 October 2019 (7 patient actors)

BDS 2: 2 November 2019 (35 patient actors)

BDS 3: 14 December 2019 (63 patient actors)

BDS 4: 4 January 2020 (non-clinical support team familiarisation)

This was a strategic approach devised by the leadership based on the principles of team learning and rehearsal (practice makes perfect). We realised the importance of making these training sessions as large, complex and as close to the “real thing” as possible.

BDS1 – involved key personnel already seconded to SSMC with critical leadership functions simulating and timing the various moves that had been discussed and agreed upon during tabletop exercises. We discovered that having 4-5 inpatient tracks with a Doctor-Nurse lead for each track and a team of clinicians and staff assigned to each track would be manageable, and each track having homogeneous patient types. Issues and gaps in our interim planning were exposed, examined, and documented after the exercise. Some of the items requiring further analysis after the exercise were the flow/route for each track, ambulance compatibility (stretcher types are not interchangeable between some ambulances), trip hazards, equipment failures, communication challenges, etc. However, the exercise provided this core team with the confidence to organise a more detailed plan and conduct a much larger and more complex BDS with much more staff.

BDS2 and BDS3 - Approximately 150 and 400 staff respectively were involved in these 5-hour long exercises. All staff were invited to a team briefing 3 days before the BDS and then sent off to their track teams for further detailed briefings on how their track would coordinate the move of between 5-7 patients per track. We learned that 4 inpatient tracks would be most efficient and effective and a fifth “responsive track” for OR, ED, and Labour Ward would work best (see Table 1). Realising the complexity and scale of a whole hospital move in one day it became apparent that further non-patient tracks would be essential to support the patient tracks these being:

Track 6 – Patient experience: the local culture requires many patients to have a family/carer stay with them 24/7. This track focused on ensuring family and carers were informed and supported throughout the move process and was overseen by the Patient Affairs Department team.

Track 7 - Medical Equipment: Moving and circulating critical equipment was identified as a critical need and was overseen by the biomedical department team. We discovered 2 critical challenges for this track, 1. Moving equipment from the patient in MQ and transporting it before or after the patient as we did not have enough to duplicate such equipment on both campuses, eg pressure relieving mattresses, NG feed pumps, etc., and 2. Quick response to critical equipment failure or needs eg Ventilators, portable resuscitation equipment.

Track 8 - Clinical support: The Track was overseen by the Allied Health leaders that aligned services such as pharmacy, laboratory, imaging, and dietetics, to support the clinical tracks.

Track 9 - Non-clinical support: This included groups such as security officers, registration clerks, engineering, and IT and was overseen by the Operations Department.

Track 10 – Ambulance and transport: The value of the increasing scale of the BDS exercises resulted in continued learning, including the recognition that large patient movements required additional focus on guiding ambulance drivers, cleaning staff, porters, and lift operators, as many of these staff were available contract labour without English or Arabic primary language skills. The large scale BDS3 exercise identified the importance of this track and the critical need for the transportation and support groups to perform their tasks safely and efficiently. Do not underestimate the importance and the needs of this staff group in a hospital move!

BDS4 – Following the lessons learned in BDS3, we created a half-day exercise focused specifically on simulating activities for the support tracks (especially tracks 7-10) as these non-clinical tracks had not been the focus of earlier simulations. This proved to be a vital and very necessary “afterthought” which ensured this group of staff were confident and familiar with the focus on the safety of patient care and in their roles in supporting the total team effort.

2.3 Structure and strategy

A central command structure similar to that used by most hospitals to manage internal or external disasters was applied to the structure that would ultimately oversight the move.

The rationale for adopting this approach were many. It was a familiar structure to most of the key staff who would have significant responsibilities in supervising the move. It was a structure we rehearsed often for other disaster drills and real disasters. Position titles, assessment and checking tools, facilities and other processes used as part of disaster central command could be easily adapted to the hospital central command for the move.

2.3.1 Central Command

Central Command was established similar to the emergency command structure used for external disasters such as floods, essential services outage, or major casualty load from a bus crash for instance. Core members of the command included: Incident commander/Chief Nurse, Clinical Medical Director, Safety Officer, Operations Director, Logistics Director, Communications/Public relations officer, Liaison/scribe, and the Mayo Clinic Triad (critical partners from the Mayo Clinic Team learning and supporting concurrently). The primary role of Central Command was to oversee all activities on the day of the move, essentially assume command of both hospital campuses for all of 9 January and the 2 days following (weekend).

2.3.2 Volume reduction

One of the important tasks for the incident commander and team was to work with the department heads to identify when and how to reduce the total volume of patients that would be moved on the move day. Regular daily reports of bed occupancy census were followed and structured meetings with the department heads were held to identify what additional help they required from management to reduce the volume in their departments.

Surgery: All major elective surgery that would require inpatient admission was ceased 3 weeks before the move. Only critical and urgent cases continued. No elective day surgery was planned for the day of the move.

Outpatients: Outpatients activity was reduced on the 2 days before the move and ceased completely on the day of the move. Inpatients: Case managers actively sought opportunities to have long term care patients and other complex patients identified and discharged before the day of the move.

Critical Care: Critical care had no major elective surgery cases leading up to the move date but continued to manage all emergency admissions as per usual.

Obstetrics: A sister hospital 20 minutes away accepted a higher number of cases in the months of December and January which helped significantly.

Table 1. Tracks 1-10 used to structure work teams to support whole of hospital move

Patient Care Tracks		
Number	Track Name	Description
Track 1	Neonate/Pediatric Patient Track	Responsible for the safe transfer of all patients in the NICU, SCBU, and Pediatric units in Mafraq to SSMC
Track 2	Medical Units Track	Responsible for the safe transfer of all patients from the medical units in Mafraq to the Medical units in SSMC
Track 3	Surgical Units Track	Responsible for the safe transfer of all patients from the surgical units in Mafraq to the Surgical units in SSMC
Track 4	Critical Care Units Track	Responsible for the safe transfer of all patients from the critical care units (PICU, SICU, CICU, and Burns) in Mafraq to the critical care units in SSMC
Track 5	Emergency Track	Responsible for the safe transfer of all patients from the emergency department, labor ward, and operating rooms in Mafraq to inpatient beds in SSMC
Support Tracks		
Number	Track Name	Description
Track 6	Family and Caregivers Track	Responsible for transporting family members and caregivers from Mafraq to SSMC. Responsible for ensuring family members and caregivers do not interfere with the safe transport of patients from Mafraq to SSMC
Track 7	Medical Equipment Track	Responsible for ensuring the timely transportation of all necessary medical equipment from Mafraq and SSMC in coordination with the patient transfer schedules
Track 8	Clinical Support Track	Responsible for coordinating all clinical support, ensuring that services a time in coordination with the patient transfer schedules
Track 9	Non-Clinical Support Track	Responsible for coordinating all non-clinical support units, ensuring efficient transfer, discharge, and admission of patients to the new hospital
Track 10	Ambulance and Transport Track	Responsible for the safe transfer of patients from the units to ambulances Responsible for coordinating the smooth transportation of patients from Mafraq to SSMC via ambulances

2.3.3 Tracks

After multiple iterations of the structure, 10 main tracks led the operationalisation of the move. Tracks 1-5 being patient care tracks and Tracks 6-10 being specialist support tracks (see Table 1).

2.3.4 Department/Patient scheduled moves

Each patient care Track was led by a medical and nursing lead and were aligned by specialty homogeneity. Each Track had a hospital-specific exit and entry route with minimal cross over with the other Tracks to ensure a clear flow of patients. Also, the leaders identified which wards would go first and which patients would go first focusing on the principle that the ward with the sickest patients would go first and, in each ward the sickest patients would go first. This was necessary so that should any one of the sick patients be too unstable for transport, there was time to first stabilize the patient, and then send them later in the schedule after stabilization.

2.3.5 Transportation type and patient movement plan and pre-plan

The move sequence and anticipated time of each patient move from each MQ room to each SSMC room was to be confirmed by 4 pm Wednesday, January 8, 2020, and a master schedule prepared and followed the following day. A detailed patient assessment tool was completed in the 12 hours before the patient move and revised immediately before movement to ensure the patient physical and emotional readiness as well as all equipment, medication, belongings, and documentation were in place and appropriate before leaving the ward for the move (see Figure 1 – patient transition checklist form). All tracks started moving patients on Thursday, January 9, 2020, at 08:00 am; then every 5-10 minutes one patient would move from each unit which meant there would be 4-5 patients moving per track at one time in all tracks. A schedule of the approximate move times of each ward within each track was shared (see Figure 2). Each patient track had

identified the number of staff and type of ambulances for their track which had been rehearsed on several occasions (ie BDS 1-3 as well as some individualised dry runs). A total of 27 ambulances were commissioned for the exercise: 3 hydraulic incubator compatible ambulances for NICU, 1 Bariatric Ambulance as part of Track 5 (emergency standby), and 23 standard ambulances for all other patients. Each ambulance had a designated driver and a designated guide in the front seat. The designated guide was a registered nurse who could help guide and supervise the driver, keep watch in the back, and be an extra pair of hands for loading and unloading with the patient transport nurse/doctor in the back.

On the night before the move, the final list of patients to be moved on 9 January was scheduled in sequence for each ward. Appendix figure shows the template used to name the key personnel assigned to each major role in each ward and the list of patients by name and location as well as key requirements such as transportation needs, diet, special equipment, isolation (infective) status, assigned nurse and transport nurse. Also, the bed location to be transferred to in the new hospital and the assigned staff.

2.3.6 Staffing plan

A detailed staff plan for the days before and after the move were planned well in advance. Department heads significantly reduced staff annual leave approvals for the week before and after the move so that sufficient staff were available to assist on the most intense days. OR, Day Surgery, and OPD nurses were deployed to move teams and wards to add extra support to the numbers as required, all were given pre-orientation and training so that they were a help and not a hindrance to the allocated team. Those surplus to need were approved annual leave days.

The patient transport Tracks used two distinct staffing models to transport patients on the day of the move:

Critical Care Patients (including NICU): Each patient had one nurse assigned to the patient at MQ. When it was their turn, the assigned nurse and patient were greeted by the transport doctor and respiratory therapist (RT) to escort the patient from the bed in MQ to the bed in SSMC. Once the patient was in the SSMC bed the assigned nurse would stay with the patient at SSMC. The transport doctor and RT would return to MQ to fetch the next of their patients and assigned nurse. Each ICU at MQ and SSMC had a nurse and doctor in charge to supervise the remaining patients and staff.

General Ward Patients: The nurse on the MQ ward would stay on the ward with their patients (usually 3-4 patients per nurse) till the last had moved to SSMC. The MQ ward had a

porter team (senior nurse and porter +/- RT if tracheostomy in situ) who would take the patient from the MQ ward to the MQ Ambulance exit point. The ambulance had an experienced ICU nurse +/- RT to transport the patient to SSMC. At SSMC, an experienced ward nurse and porter would receive the patient at the Track entrance and escort the patient to the SSMC ward where the receiving ward nurse would admit the patient to the ward and settle the patient.

2.3.7 Checkpoint tracker scanning for each patient

Four specific designated check points were established on the patient journey for each patient Track: The checkpoints were: (1) Leaving the MQ ward, (2) Leaving MQ exit point, (3) Arriving at SSMC entry point, (4) Arriving at SSMC Ward (see Figure 3). In earlier BDS 1 and BDS 2, this action was done using paper charts and phoning through updates to the command centre. During this time, the IT department developed a Patient Journey Card with a unique QR code for each patient that could scan the patient as they moved through these four checkpoints and the data could be automatically uploaded and seen on a computer screen in the command centre (see Figure 4). This application of IT was very time-consuming to develop and test but ultimately led to a more time-efficient and precise recording system so that all key stakeholders could have visibility of the progress of each Track and patient in real-time. This product/tool can now be used for future hospital moves or similar events where large numbers of patient movements are being monitored.

2.3.8 Department-specific transition plan

Each department had a specific transition plan for their department. Many of the wards were mostly generic, however unique departments had very specific information that other departments could access such as ED, Pharmacy, OR, Laboratory, radiology, kitchen/dieticians, gastroenterology, renal dialysis, etc. These plans were made available to all other departments as a draft some weeks before the move so that if conflicting plans were being shared, these could be discussed, harmonised, and updated so that a coherent and aligned set of plans were published as “final” days before the move. Key information contained in the department transition plans included:

- Name of department
- Manager name and contact details
- Change in hours/location of service on move day
- Change in staffing arrangements
- Change in communication and request for service processes/phone numbers etc.
- Name and number whom to call if urgent services needed

PATIENT TRANSITION CHECKLIST			
Patient Information	Patient Name	MQ MRN/ patient label	SSMC MRN patient
	Unit:	MQ:	SSMC:
	Bed Number:	MQ:	SSMC
	Family informed (Y/N):	Contact person & number:	
	Diagnosis:		
Patient Movement	Triage Category		
	T1	Critical but unstable on vasopressor support/ ventilated/ respiratory failure with increased demand for FiO2. Brain injury with ongoing ICP monitoring	
	T2	Critical but stable. More than one organ failure	
	T3	Stable with single organ failure or resolving organ failure. May be ventilated	
	Move Order:		Move time:
	Patient Clean/ infected:		
	Type of infection:		
	Source of infection:		
Devices	Devices requiring changing need to be changed 24 hours pre move		
	Device days	Day No.	Action required
	ETT		
	Tracheostomy tube		
	Central line		
	Arterial line		
	ICP		
	NG tube		
	Urinary catheter		
	IV cannula		
ICD			
Other			
Staff required for transfer:		Physician <input type="checkbox"/>	RT <input type="checkbox"/>
		ICON <input type="checkbox"/>	Staff Nurse <input type="checkbox"/>
Equipment needed			For Transfer
			To be in SSMC for patient use
	Transport monitor		
	Transport ventilator		
	ICP monitor		
	CRRT		
	Haemodialysis		
	Infusion pumps & no.		
	Syringe pump & no.		
	Pressure mattresses		
Sequential compression device			
Feeding pump			
Pre Transfer	Pre transfer	Done Y/N	Comment
	Pre registration done		
	H&P done		
	Medications prescribed under pre reg.		
	Medication reconciliation done		
	Medication print out available		
	Discharge summary completed		
	Discharge summary printed		
	Pt passport/ ID copy available		
	General Consent for SSMC completed		
I&O summary for period pre transfer			
Time Out: Right patient <input type="checkbox"/> Right equipment <input type="checkbox"/> Right staff <input type="checkbox"/> Safe to move <input type="checkbox"/>			
Post transfer	Post transfer	Done Y/N	
	Full registrations completed		
	Medication prescriptions checked		
	H&P checked		
	Medication reconciliation done		
	Device present on admission documented		
	Device date of insertion documented		
	Intake intered for pre transfer period		
Output intered for pre transfer period			

Figure 1. Patient transition check list form



Figure 2. Planned patient/ward move schedule as displayed in Playbook

2.3.9 Stop-Start Services

7 a.m., Thursday, January 9, 2020, was the time we agreed to stop any new presentations/admissions to MQ and to accept all new presentations to SSMC. This was particularly important for areas such as OR, ED, Labour ward, Cath lab, etc., where emergency presentations may need to be accounted for. It was planned that MQ maintained services in these areas until the last patient left MQ hospital. Minimum staffing levels in these areas were maintained, that is, equivalent to the same staffing profile of a weekend day shift. 7 a.m. is

the time of a usual shift start in most patient areas, so it was deemed the most sensible time for this transition by all areas on the move day.

2.4 Communication

Using the same principle of a central command structure to oversee the move, likewise, many of the communication structures and strategies used to control a hospital disaster scenario were deemed suitable for the hospital move plan for the same reasons as mentioned above, familiarity, similarity, existing tools and processes already in place.

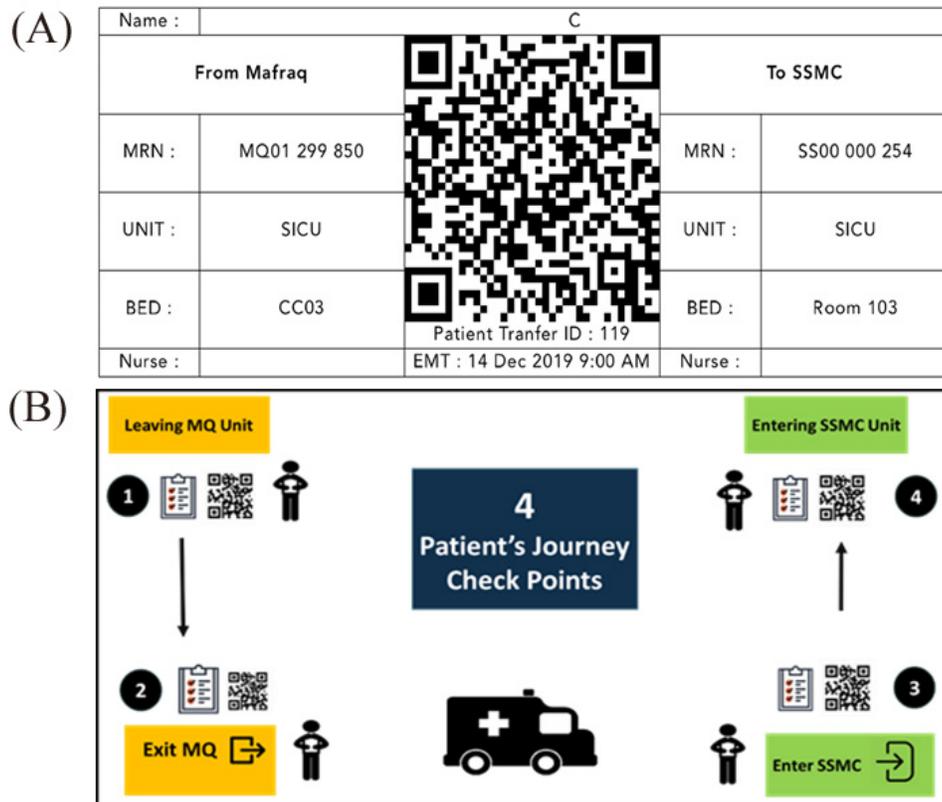


Figure 3. Patient Journey Card and QR Code assigned to each patient



Figure 4. Patient move tracker dashboard as displayed on overhead projector in Command Centre and updated every 3 minutes

2.4.1 Community information

Set government protocols were observed for community announcements of major events. The Media team arranged strategically placed posters inside and outside MQ, arranged radio announcements, and provided text messages to all patients on the existing database to inform them of the move

date and changes to be expected.

During the week before the move, the Patient Affairs staff met with all patients and, where possible, family members to encourage discharge before the move and/or how best to manage their needs during the move. Families were encouraged not to visit the hospitals till evening time on 9 January.

2.4.2 Health system engagement and ambulance bypass

Early communication with other major teaching hospitals in the public health system enabled everyone to be aware of the shared responsibility of an event of this magnitude. Ambulance bypass (to the extent possible) was planned from the night before the move until the evening of the move. As MQ/SSMC is the major trauma/burns receiving hospital for the region it was imperative that we minimise the disruption to normal systems operations in the least amount of time possible. 24 hours seemed a reasonable target and was agreed.

2.4.3 Central Command

Numerous methods of communication between the central command and the Track leads as well as between Track leads and one another and their staff were tested in BDS1-3. The following are the four primary communication systems that kept all parties informed of critical information throughout the move day: Walkie Talkie, WhatsApp, Mobile Phones, Automated Checkpoint tracker.

- Walkie talkies (WTs) – these were issued to the Track leads X 10, the Liaison/scribe X 1 (located adjacent to the command centre) and the Incident commander in the command centre. The WTs were used only for critical communication if there was a major incident or concern from the command centre or one of the Tracks. Pre-planned Track lead situation reports via WTs were scheduled for 07:45, 09:00, 10:00, 12:00, 14:00, 15:00. This ensured all Track Leads had situation awareness of how the total move was proceeding. From about 1500 all Tracks had safely moved all patients and staff to SSMC. At this point, WTs were ceased as all Track leads attended the Command Centre for a final debrief (Described later).
- WhatsApp – Each Track and the Command Centre established their own WhatsApp Group and orientated their group to this communication tool during BDS2-3 and in the weeks leading up to the move. This ensured all members were orientated to and familiar with this communication approach and communication etiquette and style were refined over time so that it was clear and precise on the day.
- Mobile phone – All other members used Mobile phones for one-on-one communication. A list of critical positions and their mobile phone numbers were issued in the Playbook (Described later).
- Automated Checkpoint tracker – as mentioned in 2.3.7, each patient had a bracelet with a unique identifier that was scanned at 4 strategic points along the Track journey. This simple yet effective capability allowed

the Command Centre to have virtual visibility of the progress of patient movement within each Track and could identify any delays as they were happening.

2.4.4 The Playbook

We developed a 94-page document containing all information necessary for all clinical and support staff to refer to concerning the move day. The document was slowly compiled over six weeks amassing many of the documents, tools, directions, and plans that were developed by various departments and brought together into a readily accessible comprehensive document. The following sections and subsections were contained in the Playbook:

- Introduction, purposes of the Playbook, and principles guiding the move
- Patient move plan and sequencing for the move day
- Staffing plans for the move day and other critical days either side
- Safety instructions
- Department-specific transition plans
- Detailed Track Plans 1-10
- Communication plans and instructions
- Command Centre structure, process, and outcomes
- Hospital handover instructions
- Appendices containing forms and tools to be used for various functions associated with the move:
 - o Patient move tracker
 - o Patient transfer checklist
 - o Patient reduction strategy
 - o Track 1-10 sign off checklists
 - o Ambulance checklist
 - o Phone directory

2.5 Planned supervision immediately following the move

In a similar vein to a hospital disaster response, there is a recovery phase during and after the hospital move. We anticipated needing to maintain the central command and control approach for at least the weekend and longer if ongoing concerns or safety risks continued after the move. Pre-empting all possible scenarios and the need for hypervigilance around patient and system safety, we planned for a recovery period of at least 3-7 days.

2.5.1 Department/Track Lead sign off checklist

Day of Move. It was pre-planned that each ward and support department would complete a sign off checklist providing feedback to their Track leads as soon as their last patients were settled or, in the case of the support tracks their last tasks associated with the move were complete (see Figures 5 and 6 – Sign off checklist forms).

2.5.2 Final Debrief, 16:00

Once each Track lead had received all ward and department sign off checklists, they assembled in the Command Centre and one by one each handed over a summary of their Track performance and any concerns or noteworthy incidents. After this session, a consensus to stand down all Track members no longer required for duty was agreed upon and approved by the Central Command team.

2.5.3 Weekend follow-up (Friday and Saturday)

The Central Command team scheduled to unman the Command Centre around 7 p.m. on 9 January if all was well and move to an on-call (virtual) central command model over-night. We allocated an extra Nursing supervisor and an extra ICU outreach nurse (ICON) for each shift over the first week to ensure maximum support for the staff. This team took over the role of the Central Command team who

remained on call for any critical issues should they arise. The Central Command team was scheduled to arrive each day of the weekend at 08:00 and stay till they were no longer needed or until around lunchtime, whichever was the longer of these two.

2.5.4 Central Command handover to Normal Operations

It was pre-planned that Central Command would handover to Normal Operations at 09:00 on Sunday 12 January 2020, i.e. the first working day of the next week and the first full working day of SSMC. The Command Centre team members would remain available till 4 p.m. on 12 January for a second briefing to ensure all normal operations were functioning so the Command Centre could then stand down. Many of the Central Command and Normal Operations members were the same which meant for a seamless transition.

Track 1 Sign-Off Checklist				
Unit Manager:		Track Lead:		
Cat.	Item	Yes	No	Comments
Patients	Patients arrived safely without harm			
	Any patients deteriorated on route and current status			
	Patients are stable			
Environment	All equipment on patients working			
	Issues with equipment during transfer			
	Stock items available			
	Medications available			
	Facilities functioning			
	Computer access, phones, printers/fax machines functioning			
Staff	Staff have settled into the environment			
	Staffing levels are safe			
	Education or training needs			
Challenges To Report to Command Center				

Steps for Completing Track Sign-Off:

1. Unit Manager will complete the Track Sign-Off Checklist when all patients are transitioned.
2. Unit Managers will handover checklist to the Track Lead for review.
3. Track Lead will bring to Command Center for final sign-off.

Figure 5. Patient Care Tracks (Track 1-5) Sign-Off Checklist

Task Force <Name> Sign-Off Checklist				
Unit Manager:		Track Lead:		
Cat.	Item	Yes	No	Comments
Operations	Systems and processes all functioning as planned.			
	Plan to resolve challenges identified during transition in place.			
	Staff settled into work areas and prepared to support operations.			
	Handover prepared for staff supporting any night shift activities.			
	Safety events or safety concerns			
	Facilities functioning			
Other				
Challenges To Report to Command Center				

Figure 6. Non-Clinical Support Track (Tracks 6-10) Sign-Off Checklist

3. RESULTS

3.1 Overview

All plans and methods were executed as described above with little or no variation. Measures were recorded concurrently and reviewed following the move day to ensure completeness and accuracy and are summarised under relevant heads:

3.2 Volume census

The total hospital census each week leading up to the move on 9 January are summarised in Table 2. A concerted effort by all clinical teams reduced the final inpatient census on the morning of the move to 151. During the day of the move, 13 of these 151 patients were discharged from MQ leading to a total of 138 inpatients needing to be moved to MQ and an additional three were admitted from MQ ER and one from MQ Labor ward to SSMC wards resulting in a total move of 142 patients from MQ to SSMC.

3.3 Patient profile

We assessed 57 patients to be high acuity/critical and 85 as requiring hospitalisation but not critical (see Table 3). A total of 115 required stretcher transfers while the remaining 27 were transferred via wheelchair and all transported via ambulance.

3.4 Patient equipment requirements

Patient equipment requirements were minimised to only the bare necessities, hence only 31 IV pumps were left in situ during patient moves and new IV lines and pumps were reassembled on arrival at SSMC; all other equipment requirements are summarised in Table 3.

3.5 Infection control precautions

Of the 142 patients moved, 1 required airborne precautions, 2 required droplet precautions, and 48 required contact precautions (see Table 3). These patients and the equipment and

transportation vehicles required special isolation and cleaning protocols which were well described and rehearsed with all relevant staff before the move day. The large number of patients requiring special isolation and cleaning requirements added to the total time taken to move these patients.

3.6 Total time taken

The last patient was moved into SSMC at approximately 13:27 or 5 hours and 20 minutes after the first patient left MQ (see Table 4).

3.7 Incidents/Injuries

There was zero reported patient safety event, and no reported incidents related to staff or visitors. (See Table 5 – Command Centre Performance Metrics).

3.8 Weather

Overnight low of 16°C, mild soft breeze, 28°C by around midday but dry and clear. . . . Almost perfect winter's day for Abu Dhabi.

3.9 Stand down

The Command Centre received completed handover reports from all Track leads around 15:00 p.m. and all Track leads were allowed to return to normal duties or go home after around 16:00 p.m. The Command Centre team was allowed home by 17:30 p.m. The executive leads handed over to the night supervisors and ICONs at 18:00 and then rounded on all patient wards and departments and left at around 21:00.

Table 2. Number of patients per ward on December 5, 12, 19, 26, January 2, 9

		Patient Census								
Service	Units	Unit Description	Bed Capacity	Dec-19				Jan-20		
				5	12	19	26	2	8	9
MCH	1A	Pediatric Unit	22	22	18	20	20	22	20	11
	1B	Pediatric Unit	23	23	21	16	17	19	19	10
	1D	Post Natal	21	17	19	16	17	10	15	2
	NICU/SCBU	Neonate	22	16	16	11	16	15	13	14
Medical	3B	Medical Unit	26	26	22	26	26	25	18	11
	3C	Long Term	27	27	27	27	27	26		
	Ground D	Medical Unit	23	23	23	22	22	21	18	9
	Ground A	Isolation Unit	21	17	12	19	20	11		
	1C	Medical Unit	24	24	23	24	23	23	19	13
	VIP	VIP & Royal		4	2	1	2	0	0	0
Surgical	2A	Surgical Unit	24	24	23	24	24	24	21	14
	2B	Surgical Unit	25	25	25	25	21	24	8	5
	2C	Surgical Unit	25	25	24	25	0	0	0	0
	2D	Surgical Unit	23	23	22	23	21	20	17	16
CCA	Burns Unit	Burns ICU	15	9	9	10	10	13	11	9
	CICU	Cardiology ICU	20	20	17	15	14	12	16	12
	SICU	Surgical ICU	16	15	11	14	11	6	5	5
	MICU	Medical ICU	16	0	0	0	0	0	0	0
	PICU	Pediatric ICU	8	13	13	8	7	8	11	7
GRAND TOTAL			381	353	327	326	298	279	211	138

Table 3. Metrics of patient type, transfer needs, equipment needs and isolation precautions for patients moved to SSMC

Tracks	Track 1	Track 2	Track 3	Track 4	Track 5	Total
Total Number of Patients	37	33	35	33	4	142
High Acuity Patients/Critical Patients	17	4	3	33		57
Sick Patients but Non Critical	20	29	32	0	4	85
Patients' Ambulation Status						
a. Stretcher	20	26	30	35	4	115
b. Wheel Chair	7	12	8			27
Equipment Required during transfer						
a. Oxygen Cylinder	5	14	6	17		42
b. Pulse Oximeter	6	13	6	2		27
c. Oxylog Portable Ventilator		1				1
d. High Flow Oxygen	6			3		9
e. Transport Incubator	13					13
f. Portable Ventilator, Monitor				10		10
g. BiPAP, CPAP				4		4
h. Cardiac Monitor				35		35
i. IV Pumps	23			8		31
Patients on Isolation						
a. Standard	21	23	22	21	4	91
b. Contact	14	10	12	12		48
c. Droplet	2					2
d. Airborne			1			1

Table 4. Actual number of patients moved by area and total time taken

Tracks	Units	No. of Patients	First Patient Transfer Time	Last Patient Reach Time
Track 1	1A (Paed)	11	08:00:58 A.M.	10:13:20 A.M.
	1B (Paed)	10	10:04:46 A.M.	12:22:45 P.M.
	1D (Maternity)	2	12:58:22 P.M.	01:27:44 P.M.
	NICU/SCBU	14	08:23:44 A.M.	12:20:43 P.M.
Track 2	3B (Medical)	11	08:02:50 A.M.	09:34:14 A.M.
	1C (Medical)	13	09:29:44 A.M.	11:05:13 A.M.
	Ground D	9	11:03:51 A.M.	12:11:39 P.M.
Track 3	2A (Surgical)	14	08:01:48 A.M.	09:37:46 A.M.
	2B (Surgical)	5	09:46:36 A.M.	10:38:20 A.M.
	2D (Surgical)	16	10:31:22 A.M.	13:01:20 P.M.
Track 4	Burns Unit	9	08:30:19 A.M.	01:10:53 P.M.
	SICU	5	10:55:34 A.M.	12:09:04 P.M.
	Cardiac ICU	12	08:06:18 A.M.	11:17:19 A.M.
	PICU	7	08:01:42 A.M.	10:46:37 A.M.
Track 5	Emergency Dept.	3	10:39:03 A.M.	12:46:55 P.M.
	Labor Room	1	08:03:07 A.M.	08:51:07 A.M.
Total Transfer		142	08:00:58 A.M.	01:27:44 P.M.

Table 5. Performance Metrics – 9 January 2020

Performance Metric	Measure	Jan-09	Notes
Core Key Performance Indicators (KPIs)			
1. Significant Patient Safety Issues	No. of incidents	0	
Ambulance Diversions	No. of incidents	0	
Codes	No. of incidents	0	
Device/Equipment Malfunctions	No. of incidents	5	None were significant
2. Staff Safety Events	No. of incidents	0	
3. Significant Regulatory or Compliance Issues	No. of incidents	0	
4. Major Security Events	No. of incidents	0	
5. Number of challenges Escalated to the Command Centre	No. of incidents	11	None were signification
6. Completion of challenges Escalated to the Command Centre	No. of incidents	3	Those not resolved on the day were identified as safe to follow up in the following day(s)
7. Negative Media Coverage	No. of incidents	0	
Operational Metrics	Measure	Jan-09	Notes
Core Key Operational Metrics (KPIs)			
Total patients moved	# of patients	142	
Duration of the Move	Hours	5.5	08:00-13:30
Number of babies delivered during move	# of babies	1	Baby Girl
ED Visits from Midnight-7AM at Mafraq	# of visits		
ED Visits from 7AM to End of Day at SSMC	# of visits	68	from 7 A.M. till 3 P.M.
Number of ED Admissions to SSMC		10	

3.10 Command Centre re-assembly

Command Centre re-assembly occurred at 08:00 on 10 January 2020 to receive a handover from the night supervisors and reviewed the “action list” of issues needing follow up, these tended to be relatively minor building and system issues of relatively low consequence.

3.11 Unexpected disaster

Unfortunately, on 11 January 2020 the region was hit by a 1 in a 25-year flood that significantly damaged the hospital building and required the incident command team to stay in situ for another 5 days. These actives are beyond the scope of this report but validated the incident command team structure as a highly agile team, capable of pivoting to manage a hospital during a weather disaster.

4. DISCUSSION

The movement of 142 acutely ill general care and critically ill patients from one hospital location to a new hospital location in a little over 5 hours exceeded our expectations. Having planned for up to 220 patients on move day, we were “over-prepared” and ready for this move. The critically important principles were to: (1) minimise the amount of time that we staffed, operated, and cared for patients at two hospitals, and (2) to move the fewest number of patients possible through

census reduction efforts (and therefore shorten the move time and risk). McKenzie has described the importance of moving a major children’s hospital in one day also as it minimised the period in which critical specialists receiving services are unavailable to the system.^[8] The fact that we did not encounter any patient, staff, or visitor harm events or incidents suggests our key training strategy to prioritize safe movement of patients over speed/pace of movement was one key to our success. The other key training strategy was a systematic rehearsal in real-life simulated large-scale exercises (the Big Day Simulation).

Consideration of weather and the choice of dates worked in our favour. Specifically, winter in a hot desert climate is preferable and although we could see the inclement weather forecast for 11 January, all indications were that the 9 January was always going to be a good move date... Al hambdulillah! Had the weather forecast changed significantly, serious consideration to changing the move date would have been necessary and the central command team had already thought through how they would change plans if events had necessitated a change. Furthermore, we deliberately chose a Thursday (Friday and Saturday being a weekend). Most support staff and a strong complement of clinicians are regularly scheduled for weekdays so we could depend on a good number of staff to be available for the move day. Weekends tend

to have reduced clinical demands and this would allow the staff on the new wards time to adjust to the new environment.

One alternative argument in favour of having the move date on the weekend came from the ambulance service as Thursday is generally a busy day for their service and a day on the weekend would have allowed them to free up ambulances more easily. However, with forward notice of the ambulance service was able to plan the release of the 27 ambulances required for the move day. We had explored the use of using military ambulance and personnel which was trialed on BDS3 but feedback from staff and the ambulance service suggested that it was more complex trying to accommodate the military service into the plan than simply managing the risk of having 27 ambulances from the regular ambulance service join us for the day. However, we did ask the military to be available as a contingency on the move day should an unexpected event necessitate their support.

It took us 3 major simulation exercises to confirm the precise number and profile of the 5 patient Tracks and 5 support Tracks. We believe the level of simulation training and planning was critical to our success and critical to informing the final plan and “Playbook” that was documented so that all participants knew their roles and responsibilities and had visibility of the roles and responsibilities of others and a view of the “big picture plan”. Simulation and rehearsal have been widely endorsed by others who have undertaken hospital moves also.^[3,9] Ensuring staff the opportunity for re-familiarisation to the move procedure and the new work environment close to the move date was highly valued by those who could avail themselves the opportunity and we recommend building such opportunities into any planned hospital move.

Finding the balance between standardised approaches and allowing individualised approaches is a very difficult balance to juggle. To the extent possible we tried to standardise as many elements to the move plan as we could, so it is easier to communicate and remember, however, their empowerment of local leaders and capable teams to create unique solutions supported a culture of solving problems in real-time without the need for constant central oversight. A good example was the difference in the way critical care move their patients (each nurse escorted their patient in the ambulance) compared to the wards (each ambulance had a designated escort nurse). Others have described variations of such arrangements with equally satisfying results.^[3,10] Our teams had thought through what was going to work best for them and had simulated both models and this was the outcome that suited the teams and was endorsed by the Central Command. We do not have a preference for either model but allowing this variance worked well for us.

The checkpoint scanner developed by our IT team was a great success, however before BDS3, we had used a paper chart checkpoint method with regular phone calls from each checkpoint to the Track lead and Central Command (via the Liaison/scribe team, situated in a separate room next door to the Central Command), the latter approach being cumbersome but do-able. We would recommend investing in the development of a scanning checkpoint method for anyone planning a large-scale hospital move.

Concerning walkie-talkies, we were limited to only one channel and hence communication traffic was congested with more than 12 users. This is why we limited the deployment to only critical leads. If WTs are to be used, we would recommend allowing more channels so that each Track had its channel in addition to the mobile phone and WhatsApp.

We realised the need to give significant time and attention to the support staff, the cleaners, porters, and ambulance drivers in particular. Our last BDS4 was essential to ensure we focused on this group, their techniques, understanding, and competency to complete the tasks necessary and to the standard expected. We believe our decision to run BDS4 was a critical step to avoid unnecessary incidents and anxiety with this staff group.

Finally, one significant limitation that challenged us in our preparation was the dearth of detailed literature on the topic of moving a hospital. For instance, there are no conceptual frameworks, structures and process or detailed analyses of approaches that can and should be used in different scenarios and contexts. This fact was in part, an important motivation for us to share our experience in the literature so that others can apply and adapt what we have done to their situation. We would encourage others who have, or who intend to move a hospital, to publish their experience to help build a stronger evidence base for the models and methods to be used in the future.

Limitations

Clearly, there are many possible variations to a hospital move of this scale and we did try many different scenarios and approaches before settling on the final approaches documented. We cannot say our approaches are better than any others, but we can say these approaches worked well for us in our context. We have focused on the practical and pragmatic actions that worked well in this hospital move. There are also many other elements that we have only touched on that deserve significantly more attention especially elements such as cultural change, change management, community, and staff engagement processes all of which were part of our planning but beyond the scope of this paper.

5. CONCLUSIONS

The opportunity to execute large scale acute hospital patient movement into a new hospital facility is both exciting and risk-laden... While small unit moves are common, very few have experienced this large of a hospital movement. Extensive and detailed planning, simulation training at multiple levels, and well-documented tools and processes to guide the behaviours and actions required of the teams is essential. We have shared the practical elements of a 142 patient, five-hour hospital move scenario that was successful based on pre-defined goals of zero patient harm or serious staff/visitor incidents.

You cannot buy experience, but you can learn from the ex-

perience of others. We trust much of the information in this article is reproduceable and adaptable to those who follow us.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

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