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# MEDJEM

The Mediterranean Journal of  
Emergency Medicine & Acute Care



*In Memoriam of  
Professor Peter Rosen*

Special Contribution  
*Mass Casualty Management in the Emergency  
Department - Lessons Learnt in Lebanon - Part I*

Original Research  
*USMLE Scores Do Not Predict the Clinical  
Performance of Emergency Medicine Residents*

Review Article  
*The International Medical Graduate*

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# ***MEDJEM***

## *Farewell to a Friend - with "Love"*

Amin Kazzi, MD, MAAEM, FAAEM  
Editor-in-Chief, MedJEM

Peter Rosen, MD, FAAEM, one of the main founding fathers and mothers in the field of emergency medicine, passed away in Tucson, Arizona, on the 11th of November 2019 from complications of chronic diseases, with his best friend and wife Ann at his side. He was 84 years old.

Dr. Rosen dedicated decades of his life advocating and promoting the field of emergency medicine as a medical discipline and academic specialty, one that stands in parity with all other primary categorical specialties. He obviously succeeded since emergency medicine is flourishing across the USA as well as many of the developing and developed nations in the world.

During his six decades of service to the specialty, Peter founded the Journal of Emergency Medicine (JEM) and our specialty's first complete textbook ("Rosen's Emergency Medicine: Concepts and Clinical Practice"). He authored hundreds of academic articles and supported hundreds of academic programs and faculty in their personal or departmental journeys advocating for their patients while advancing their careers and the specialty. He also founded two prominent emergency medicine residency programs and served as a faculty member at numerous others.

His 1979 essay, "The Biology of Emergency Medicine," was a historical milestone that defined for a field, still in its infancy, the core responsibilities of a well-trained emergency physician. He reasoned persuasively that physicians from other specialties, who typically had expertise in only one particular aspect of emergency medicine, could not adequately replace the qualified well-trained emergency physician.

Dr. Rosen was respected and loved by many. He mentored hundreds of us – physicians, students and friends. He blended the bright intellectual with the tactless indiscreet. He knew when not to be diplomatic and how to stand firm! But he also knew when to just walk away. He certainly left us all with memorable moments - many of them peculiarly entertaining. Peter just knew how to throw a punch, be blunt and make you smile!

Peter's legacy was recognized with numerous honors and awards including his 1993 election as the first emergency physician invited to join the Institute of Medicine of the National Academy of Sciences. His awards include the 1990 Leadership Award from the Society for Academic Emergency Medicine (SAEM), the 1977 and 1984 American College of Emergency Physicians' Outstanding Contribution to Emergency Medicine Award and the 1994 Award for Outstanding Contribution in Education.

On a personal note, I shall always remember Peter my own way...

Let me start with how he stared me down on a Boston sidewalk the first time we met in 1997. A group of us were heading out from the main hotel at the annual SAEM Conference. I asked Steve Hayden: "Who is that tall gentleman with a moustache accompanying you and indiscreetly studying me?" He smiled and said: "Peter – Peter Rosen." I should point out that I was then a vibrant 32 year old wearing a Cuban Guevara black beret, a German leather biker jacket and Texan alligator boots while attending our premier annual scientific meeting. So how can I ever forget those moments considering that it was that same night when Peter, Steve and the whole UC San Diego class of EM residents decided to bond by piercing eyebrows, lips and ears!

It took me another year to figure out Peter actually liked me. He ran into me in the hallway of a Palm Springs hotel and invited me to his room to chat. We sat on the balcony where he initiated me to smoking cigars. He omitted one relevant pearl: I was NOT supposed to inhale the smoke. That was understandably my first and last cigar.

Peter was there for me for the rest of my career. For two decades, he was always readily available guiding me as a leader in the American Academy of Emergency Medicine (AAEM) and as an academician engaged in international Emergency Medicine development. He provided invaluable support and mentorship establishing the Mediterranean Emergency Medicine Congress (MEMC) and the “Rules of the Road for Medical Students” textbook, and contributing to the founding and growth of the actual American Academy. He mentored me when I faced conflict and challenge in a variety of contexts internationally and nationally with other organizations in emergency medicine. He always found time to listen and to help.

In 2009, I faced one of the most difficult challenges in my life as a founding chair for the first department of emergency medicine at the American University of Beirut. At the time of my contract renewal as a chair, the institutional leadership at the time pressured me to sign a new contract that would engage Emergency Medicine, in my opinion, as a poorly-paid vertically-integrated second-tier discipline within the medical faculty. I wanted parity with other specialists and specialties for EM faculty.

Peter took me out for dinner with my late wife Cristina and shared his own 1970’s story that mirrored mine. That night in San Diego, Peter called me the ‘K factor’ – “an agent of change.” He described how “agents of change” create chaos initially, but should be wholeheartedly embraced “if they were capable and well intentioned” - as they are “essential to succeed in properly disrupting the sterile stagnation of status quo” in engrained institutions, systems, organizations, etc.

He told me his story at the University of Chicago when he established one of the first 3 residency programs in the history of the specialty. That program then graduated a significant number of giants in our specialty. He told me that when faced with adversity, “there is a time to make a stand and a time to let go.” “However, never let go on issues of principle”: the principle of parity between emergency medicine and all other disciplines. “You get things (support) from those in power ONLY on the way IN and on the way OUT.”

He stood by me – a guiding lighthouse and a supportive friend and giant. I declined to sign the dean’s offer to chair the department for another 3 years. This forced change and laid the grounds that enabled our group to secure proper support, resources and parity. We now have an exceptional vibrant ACGME-International accredited residency program, fellowship training and an open-access medical journal. EM won!

For the rest of my life, I shall proudly carry the “Peter Rosen Award” for service and leadership to the specialty, which the AAEM established to recognize this giant in the history of our specialty. However, I shall always feel a deep heartache thinking of my friend Peter. And I know that I shall always stare at my inbox looking for another one of those messages from Psoc@aol.com with the precious “Love, Peter” at the bottom.

Yes... I never said it! And it is time! I love you Peter.

# USMLE Scores Do Not Predict the Clinical Performance of Emergency Medicine Residents

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## ABSTRACT

**Background:** Scores on “high-stakes” multiple choice exams such as the United States Medical Licensing Examination® (USMLE) are important screening and applicant ranking criteria used by residencies.

**Objective:** We tested the hypothesis that USMLE scores do not predict overall clinical performance of emergency medicine (EM) residents.

**Methods:** All graduates from our University-based EM residency between the years 2008 and 2015 were included. Residents who had incomplete USMLE records were terminated, transferred out of the program, or did not graduate within this timeframe were excluded from the analysis. Clinical performance was defined as a gestalt of the residency program’s leadership and was classified into three sets: top, average, and lowest clinical performer. Dissimilarities of the initial blind rankings were adjudicated during a consensus conference.

**Results:** During the eight years of the study period, there were a total of 115 graduating residents: 73 men (63%) and 42 women. Nearly all of them (109; 95%) had allopathic medical degrees; the remainder had osteopathic degrees. There was not a statistically significant correlation between our ranking of clinical performance and the Step 2 Clinical Knowledge score. There was a non-significant correlation between clinical performance and the Step 1 score.

**Conclusion:** Neither USMLE Step 1 nor Step 2 Clinical Knowledge were good predictors of the actual clinical performance of residents during their training. We feel that their scores are overemphasized in the resident selection process.

**Keywords:** Emergency Medicine Education, USMLE Scores, Resident Clinical Performance, Emergency Medicine Training, Residency Recruitment, Residency Selection Criteria

## INTRODUCTION

Throughout undergraduate and graduate medical education, aspiring physicians are subjected to numerous standardized tests in an attempt to determine a standard of minimal competency and to objectively measure their fund of knowledge. While individual state medical licensing boards make the ultimate determination

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of certification for independent medical practice, “high-stakes” multiple choice examinations such as the United States Medical Licensing Examination® (USMLE), have become widely used to gauge the mastery of applied basic and clinical science knowledge. In an attempt to recruit the best possible candidates, scores on these examinations have become important applicant screening and ranking criteria. They are used by residency programs in a wide variety of medical specialties, including Emergency

Medicine, despite this not being their intended use.<sup>1,2</sup>

Several prior studies have examined the relationship between USMLE scores and performance on emergency medicine-specific examinations such as the in-training examination (ITE) and the American Board of Emergency Medicine® qualifying examination.<sup>3-7</sup> While most of these studies have demonstrated a statistically significant correlation, several other recent studies have questioned the relationship between performance on the USMLE and ITE examinations and a resident's clinical performance.<sup>8-10</sup> Additionally, we are not aware of any data, which shows whether USMLE scores correlate with evaluation of the actual clinical performance of emergency medicine residents at the conclusion of their residency training. In fact, after an extensive literature search, we are not aware of any study that has attempted to examine the relationship between USMLE scores and resident overall clinical performance.

This study attempts to clarify the relationship between performance on the most commonly used multiple choice USMLE examinations (Step 1, Step 2 CK) and global clinical performance of the residents at the conclusion of their training at an emergency medicine residency program. The objective of this study was to assess the association between USMLE scores and overall clinical performance of emergency medicine (EM) residents.

## METHODS

All graduating residents from our university-based emergency medicine residency program between the years 2008 and 2015 were eligible for inclusion in the analysis. There were 115 study subjects screened for eligibility. Residents were excluded if they had incomplete USMLE records because they were osteopathic medical school graduates who did not take the USMLE examinations. Residents who were terminated, transferred out of the program, or did not graduate within the specified timeframe were also excluded due to incomplete information available regarding their overall clinical performance. This study was granted exempt status by our IRB.

The primary endpoint of the study is the comparison of the residents' overall clinical performance with their

USMLE scores.

The resident's overall clinical performance was defined as a gestalt of the three physicians who comprised the residency program's leadership (program director, associate program director, and assistant program director) during the study period. These physicians had an intimate knowledge of all aspects of the resident's clinical performance during the entire duration of their 3 years of emergency medicine residency training, including access to all of their end-of-rotation evaluations (both on-service and off-service rotations), ITE scores, biannual formative evaluations, and performance improvement data (patient, nurse, or physician complaints/compliments, case reviews, morbidity and mortality referrals, etc.). This gestalt was based on the Accreditation Council for Graduate Medical Education's six core competencies (patient care, medical knowledge, professionalism, systems-based practice, practice-based learning and improvement, and interpersonal and communication skills)<sup>11</sup> that were used at that time to evaluate the residents' clinical performance. The other attending physicians' opinions were purposefully not sought due to their incomplete knowledge of all aspects of the residents' clinical performance and due to potential "popularity" and "likability" bias. This bias was believed to be minimized by the PD/APDs' complete knowledge of the residents' files. The years of training that were selected for the study included only those years when all three stated physicians were working together as PD/APDs.

These three physicians were presented with lists of graduating residents by year and asked to classify the residents into three groups: top clinical performer (top one-third), average clinical performer (middle one-third), and lowest clinical performer (bottom one-third). The grouping process was based on these three physicians' recall of these residents' overall clinical performance during their residency training at the time of graduation. The physicians were initially blinded to each other's grouping selections. Dissimilarities of the rankings were adjudicated during a consensus conference. The residents' files were then accessed and the residents' USMLE Step 1 and Step 2CK scores were obtained.

Descriptive statistics were generated. The data

from the initial physicians’ grouping selection were compared and inter-rater reliability was calculated using intraclass correlation (ICC). A correlation analysis utilizing Spearman’s rho (rs) was performed to uncover whether a resident’s examination scores were associated with clinical performance. A p value of < 0.05 was considered significant.

**RESULTS**

During the eight years of the study period, we graduated 115 residents. There were 73 men (63%) and 42 women. Nearly all of them (109; 95%) had allopathic medical degrees; the remainder had osteopathic degrees. Both USMLE Step 1 and Step 2CK scores were available for 106 residents; a total of 9 had one or more score results that could not be obtained. Of these, four were osteopathic graduates who did not take the USMLE Step 2CK examination and one osteopathic medical student did not take either USMLE Step 1 or Step 2CK. In 4 cases, the scores could not be located.

Table 1 shows the distribution of the final consensus ranking of the residents. The inter-rater reliability of the initial rankings was strong with an ICC = 0.845 (p < 0.01).

**Table 1** Final Ranking of Residents

Category	Number	Percentage
Top	38	33.0%
Middle	44	38.3%
Bottom	33	28.7%

There was a poor, but statistically significant, correlation between our ranking of overall clinical performance and the USMLE Step 2 CK score. The coefficient of determination, r<sup>2</sup>, was 0.042 for Step 2 CK. There was not a statistically significant correlation between clinical performance and the USMLE Step 1 score (Table 2).

**DISCUSSION**

The recruiting season is an important part of every residency program’s life cycle. Each residency program hopes to recruit outstanding applicants who will develop into excellent residents and physicians. Various criteria are used to screen candidates for an interview and to determine rank list order; USMLE scores being one of the most

commonly used benchmarks.

The existing literature suggests that scores on the USMLE do correlate with scores on the ITE3 as well as with the pass or fail status on a resident’s first attempt on the ABEM qualifying examination.<sup>4</sup> It seems that a good performance on one standardized test predicts a good performance on all subsequent standardized tests, while a poor performance on one standardized test predicts a poor performance on all subsequent standardized tests. In other words, good test-takers do well on tests.

**Table 2** Correlation between Clinical Performance and Examination Scores

	USMLE Step 1	USMLE Step 2 CK
Correlation Coefficient	0.067	0.205
P Value	0.49	0.04
N	109	106

Our study reveals that neither USMLE Step 1 nor Step 2CK are useful predictors of a resident’s final clinical performance as judged by program leadership. The most readily available piece of information, the Step 1 score, showed no correlation with clinical performance; whereas, the Step 2 CK score showed only a poor correlation, with that score accounting for about 4% of the total variation in clinical performance. McGaghie et al have likewise “discouraged” the use of USMLE scores for postgraduate medical residency selection decisions.<sup>9</sup> Their research synthesis article referenced several studies that show that measures of clinical skills, as diverse as cardiac auscultation, central venous catheter insertion, thoracentesis, advanced cardiac life support scenarios, and communication skills, are not correlated or poorly correlated with USMLE Step 1 and Step 2 scores. We did not evaluate the correlation of the USMLE Step 3 or ITE scores with clinical performance since these scores are not readily available during the recruitment process.

USMLE scores are an important piece of the future resident’s overall application packet, and they should neither be discarded nor ignored. However as shown in our study, since neither USMLE Step 1 nor Step 2 CK are good predictors of the actual clinical performance of the residents at the completion of their training, we believe that

their scores should not be overemphasized in the resident selection process. A resident with a higher USMLE score will not necessarily become a more effective or efficient emergency physician than one with a lower score.

## LIMITATIONS

We are missing test scores for several residents, either because they could not be found or because they were osteopathic residents who did not take the USMLEs. Furthermore, since osteopathic-trained candidates represented a small subgroup of our study population, we did not include the Comprehensive Osteopathic Medical Licensing Examination® (COMLEX) scores in a separate analysis. As this examination tests different material than the USMLE, it is likely that our findings are not generalizable to this examination.

Second, we used only the “final” passing score for each examination in this analysis. It is possible that a resident may have failed an examination one or more times before obtaining this passing score. Therefore, we cannot draw conclusions as to the significance of a failure on the future clinical performance.

Third, there is no “gold standard” to assess a resident’s overall clinical performance at the end of residency training. We felt that the consensus opinion of the three physicians comprising the residency leadership was the best method for achieving this ranking; and as mentioned, included all facets of a resident’s performance. These rankings may be subject to recall bias since we performed all the ratings at one time and a significant amount of time had passed since the earliest classes graduated.

Finally, during our consensus conference we discussed the possibility of the “halo effect” for discordant rankings. This is a cognitive bias in which the overall impression is influenced by excellent, or poor, performance in one specific area, such as communication skills, work-load efficiency, or personality. In an effort to ameliorate the effects of social popularity, or likability bias, we specifically discussed a resident’s standing in each of the six core competencies and form a unanimous opinion based on the overall clinical performance.

## CONCLUSION

Neither USMLE Step 1 nor Step 2 CK are good predictors of the actual clinical performance of residents at the completion of their training. We feel that USMLE scores may be overemphasized in the resident selection process.

*Conflicts of Interest:* The authors declare no conflicts of interest or sources of funding.

## REFERENCES

1. Green M, Jones P, Thomas JX Jr. Selection criteria for residency: Results of a national program directors survey. *Acad Med.* 2009;84:362–367.
2. Balentine J, Gaeta T, Spevack T. Evaluating applicants to emergency medicine residency programs. *J of Emerg Med.* 1999;17:131–134.
3. Thundiyil JG, Modica RF, Silvestri S, et al. Do United States Medical Licensing Examination (USMLE) scores predict in-training test performance for emergency medicine residents? *J of Emerg Med.* 2010; 38:65-9.
4. Harmouche E, Goyal N, Pinawin A, et al. USMLE Scores Predict Success in ABEM Initial Certification: A Multicenter Study. *West J of Emerg Med.* 2017; 18:544-549.
5. Wagoner NE, Suriano R. Program directors’ responses to a survey on variables used to select residents in a time of change. *Acad Med.* 1999;74:51-58.
6. Fine PL, Hayward RA. Do the criteria of resident selection committees predict residents’ performances? *Acad Med.* 1995;70:834-838.
7. Nelson M, Calandrella C. Does USMLE Step 1 & 2 Scores Predict Success on ITE and ABEM Qualifying Exam: A Review of an Emergency Medicine Residency Program from its Inception. *Ann of Emerg Med.* 2017;70:S58 - S59.
8. Blanchard J. Board scores and resident performance: Is there a link? *Ann of Emerg Med.* 2000;36:64-67.
9. McGaghie WC, Cohen ER, Wayne DB. Are United States Medical Licensing Exam Step 1 and 2 scores valid measures for postgraduate medical residency selection decisions? *Acad Med.* 2011;86:48-52.
10. Ryan JG, Barlas D, Pollack S. The Relationship Between Faculty Performance Assessment and Results on the In-Training Examination for Residents in an Emergency Medicine Training Program. *J Grad Med Educ.* 2013;5:582-6.
11. LaMantia J. The ACGME core competencies: getting ahead of the curve. *Acad Emerg Med.* 2002;9:1216-7.

# The International Medical Graduate

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## ABSTRACT

International medical graduates (IMGs) are graduates of medical schools located outside the United States (U.S.) and Canada. IMGs face various challenges on the road to U.S. residency training. These challenges include sitting for the United States Medical Licensing Examinations (USMLEs) to obtain certification from the Educational Commission for Foreign Medical Graduates (ECFMG). After that, IMGs are faced with a foreign application process whereby they must apply for and secure a position in a residency program through the Electronic Residency Application System (ERAS) and the National Resident Matching Program (NRMP). Once accepted into a residency program, IMGs who are not US citizens or legal permanent residents are challenged with securing a visa to be able to practice in the U.S. In this article, we elaborate on these processes and highlight the challenges IMGs may face along the way.

**Keywords:** emergency medicine, International Medical Graduates, National Residency Matching Program, match, residency, visa, Educational Commission for Foreign Medical Graduates, USMLE, foreign medical graduates

## INTRODUCTION

International medical graduates (IMGs), formerly known as foreign medical graduates, are physicians who have received their degree from an international medical school listed in the International Medical Education Directory (IMED) and located outside the United States and Canada. IMG classification relies solely on the country of medical study rather than the country of citizenship. Accordingly, IMGs can be classified into U.S. IMGs (if they are U.S. citizens) and non-U.S. IMGs (if they are not U.S. citizens). International graduates of medical schools in the U.S. and Canada are not classified as IMGs.<sup>1-5</sup> Many IMGs apply to the Match in the U.S. Acceptance into a residency program, however, is challenging. In fact, the 2019

PGY-1 match rates for U.S. IMGs and non-U.S. IMGs were 59% and 58.6%, respectively. This is compared to an overall match rate of 79.6% (U.S. Seniors, U.S. grads, IMGs, osteopathic, Canadian and 5-year pathway) and a match rate of 93.9% for U.S. seniors. Nonetheless, these match rates are the highest for IMGs since the early 1990s.<sup>4,5</sup>

## The Road to Residency in the U.S.

Many IMGs opt to pursue residency in the U.S. for various reasons, including the aspiration to receive high quality training with no resource constraints, the opportunity to earn higher wages, and/or desire to secure employment and have foreseeable career paths.<sup>6-8</sup> Challenges are many and start from the moment they decide to apply for residency in the U.S. The first step of the process is obtaining the Educational Commission for Foreign Medical Graduates (ECFMG) certification. It is followed by the submission of residency applications using the Electronic Residency Application System (ERAS) and application to the National Resident Matching Program (NRMP). Once matched into a program, many IMGs need a visa to be able to join the program and practice in the U.S.<sup>6,9</sup> IMGs continue to face various challenges even after starting residency,

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which include cultural barriers, biased perceptions and communication difficulties.<sup>10-12</sup>

**ECFMG certification**

To apply for residency in the U.S., IMGs are required to have ECFMG certification. This is needed to evaluate their suitability when applying to programs accredited by the Accreditation Council for Graduate Medical Education (ACGME). ECFMG certification requires the completion of the United States Medical Licensing Examinations (USMLEs): USMLE Step 1 exam, USMLE Step 2 Clinical Knowledge (CK) exam and USMLE Step 2 Clinical Skills exam. The mean USMLE Step 1 and 2 CK scores for matched U.S. allopathic seniors, U.S. IMGs, and non-U.S. IMGs are displayed in **Table 1**.<sup>13</sup> Additionally, the ECFMG requires IMGs to have obtained their diplomas from institutions listed in the World Directory of Medical Schools, indicating that the medical school complies with the ECFMG requirements.<sup>6,9,14</sup> As of 2023, however, IMGs applying to the US must be graduates of a medical school accredited by an organization authorized to accredit medical programs by the World Federation for Medical Education (WFME).<sup>15</sup>

**Table 1** The mean USMLE Step 1 and 2 CK scores for matched U.S. allopathic seniors, U.S. IMGs, and non-U.S. IMGs.<sup>13</sup>

Type of Applicant	Mean (SD) USMLE scores	
	Step 1	Step 2 CK
U.S. allopathic seniors	232.8 (17.5)	245.6 (15.0)
U.S. IMGs	222.5 (16.1)	232.2 (14.2)
Non-U.S. IMGs	234.1 (16.4)	239.7 (15.0)

**ERAS and NRMP**

All applicants to residency in the U.S., including IMGs, need a residency token from ECFMG to be able to register for the ERAS. ERAS has four separate portals. The first is MyERAS, where applicants complete their applications: a personal statement, curriculum vitae, examination transcripts, and personal picture. Applicants select the programs to which they want their applications submitted. ERAS also includes the Dean's Office WorkStation (DWS), where the medical school performance evaluations (MSPEs) and medical school transcripts

are submitted. Additionally, there is the Letter of Recommendation Portal (LoRP), where authors upload the letters of recommendation. Program directors receive and review the applications through the Program Director's WorkStation (PDWS).<sup>6,16</sup>

Applicants are also expected to register for the NRMP, which is at a later stage to rank the programs that have interviewed at in order of preference.<sup>6-17</sup>

**Statistics**

IMGs currently constitute a quarter of physicians practicing in the US.<sup>18-21</sup> In 2019, the number of registered non-U.S. IMGs was the lowest since 2005, and the number of active non-U.S. IMGs was the lowest since 2012. Nevertheless, non-U.S. IMGs had a 58.6% match rate to PGY-1 positions, registering the highest match rate since 1990.<sup>5</sup>

**Table 2** 2019 Match Data for All Specialties (PGY-1 Positions)<sup>5</sup>

Total Number of	Number
Programs that participated	4,780
Positions offered	32,194
Unfilled programs	569

In 2019, around two-thirds of IMGs matched in primary care disciplines such as the categorical track of internal medicine, family medicine, and the categorical track of pediatrics with more than half matching to their preferred specialty.<sup>5</sup> Over the past 5 rounds of the match, more IMGs are matching in neurology while less IMGs are matching in obstetrics and gynecology as well as the preliminary track of surgery.<sup>5</sup> Match rates were higher for U.S. IMGs than non-U.S. IMGs for all specialties except dermatology, internal medicine, child neurology, neurology, psychiatry and pathology.<sup>4</sup> **Table 2** provides a summary of the 2019 Match data for all specialties (PGY-1 positions).<sup>5</sup> **Table 3** outlines the 2018 charting outcomes in the 2018 match for international medical graduates.<sup>22</sup> **Table 4** compares of the 2018 match rates of U.S. Seniors, U.S. IMGs and non-U.S. IMGs in select specialties.<sup>4,23</sup>

**The Supplementary Offer and Acceptance Program (SOAP)**

The SOAP is the process that facilitates the complementation of unmatched residency positions with unmatched residency applicants during Match Week.<sup>24</sup> In the 2019 SOAP, the match rate was 8%.<sup>5</sup>

**Table 3** Charting Outcomes for the 2018 Match for IMGs\*<sup>22</sup>

Total Number of	Applicants	Accepted	Percentage
U.S. IMGs that participated	4,238	2,248	53.0%
Non-U.S. IMGs that participated	6,206	3,269	52.7%
Total IMGs that participated	10,444	5,517	52.8%

\*The 2019 Match charting outcomes for IMGs are still not available.

**Table 4** Comparison of the 2018 Match Rates of U.S. Seniors, U.S. IMGs and Non-U.S. IMGs in Select Specialties.<sup>4,23</sup>

Specialty	Offered positions	IMGs		U.S. Seniors		U.S. IMGs		Non-U.S. IMGs	
		Number matched	Match Rate						
Internal Medicine	7,542	2,828	57.5%	3,195	85.5%	911	56.9%	1,917	57.7%
Emergency Medicine	2,278	99	47.1%	1,606	87.4%	72	48.6%	27	43.5%
Family Medicine	3,629	759	48.7%	1,628	83.8%	519	53.1%	240	41.2%
Pediatrics	2,768	477	67.2%	1,764	90.3%	189	73.8%	288	63.4%
General Surgery	1,319	123	29.4%	1,005	74.4%	61	33.3%	62	26.4%
Neurology	552	228	56.2%	280	55.9%	60	55.5%	168	56.4%
Obstetrics & Gynecology	1,336	93	40.3%	1,051	85.6%	57	46.7%	36	33%
Anesthesiology	1,253	229	65.1%	861	73%	114	67%	115	63.2%

IMGs constituted more than two-thirds of SOAP-eligible applicants in 2019 (67.4%).<sup>5,23</sup> Table 5 summarizes the 2019 SOAP data for all specialties (PGY-1 positions).<sup>5</sup>

### Visa

To be able to practice in the U.S., IMGs who are not US citizens or legal permanent residents (green card holders) need a visa. Getting accepted into a program does not guarantee a visa. There are several visa options available, the most commonly pursued being the J-1 and H-1B visas. Table 6 highlights the differences between the J-1 and H-1B visas. The number of residencies non-U.S. IMGs can apply to is limited by the number of institutions able to offer work visas (J-1, H-1B, or O1).<sup>6,25</sup>

### Cultural Challenges

During residency training, IMGs are presented with cultural challenges that include biased perceptions and communication difficulties.<sup>10-12</sup> In a systematic review of the literature on intercultural issues of IMGs, many IMGs were found to describe

the approach to healthcare in the U.S. as different from their home country, with a major shift to patient-centered care in the U.S. They also discuss a lower hierarchy between different stages of medical training as well as between physicians and their patients. Many study participants discussed coming from areas where physicians are treated with immense respect and almost regarded to be 'godlike' and not finding the same degree of respect in the U.S. Finally, one major challenge is the loss of status in society and the clinical environment.<sup>12</sup> IMGs also face many communication barriers including the subtleties of foreign language, the comfort with idioms and slangs, as well as non-verbal communication.<sup>10</sup>

### Program Directors View

According to the 2018 NRMP Program director survey, the percentage of programs that interview and rank U.S. IMGs and non-U.S. IMGs is 59% and 42%, respectively. Programs give visa status a 4.1 mean importance rating [on a scale from 1 (not at all important) to 5 (very important)] in selecting

applicants to interview and a 4.0 mean importance rating in ranking applicants.<sup>26</sup>

**Table 5** 2019 SOAP Data for all Specialties (PGY-1 positions).<sup>5</sup>

Total Number of	Number
Programs participating	589
Positions offered	1,652
Programs filled	403
Positions filled	1,310
Eligible applicants	12,472

**Additional Tips**

An important way to strengthen applications for IMGs includes attempting to secure observerships, electives, or sub-internships in the US. These rotations are vital for establishing connections with U.S physicians and obtain their support in residency applications. It is not currently known whether most IMGs end up ranking higher, or matching, at sites where they completed away electives. Non-U.S. IMGs are also required to secure a B1 visa to

partake in these rotations, to take the Step 2 Clinical Skills Exam, and to participate in interviews. After graduating, and before applying to the residency training, some IMGs also spend research years internationally or in the U.S. to strengthen their applications.

**How Do IMGs Compare to U.S. Seniors and Graduates?**

It is best to conclude this article with the available studies that compare IMGs’s post-residency professional practice with that of US seniors and graduates. In one study of 20% sample data from Medicare fee-for-service beneficiaries aged 65 years or older, patients treated by IMG internists had more chronic conditions and lower mortality when compared with US medical graduates.<sup>27</sup> Similarly, a study comparing outcomes of care between IMGs and graduates of U.S. medical schools did not find significant mortality difference in populations of congestive heart failure or acute

**Table 6** Differences Between the J-1 and H-1B Visas.<sup>6,25</sup>

	J-1 Visa	H-1B Visa
Sponsor Purpose Validity	ECFMG Restricted to training Lasts as long as the resident is in training.	Institution Allowed to work Granted for up to three years initially.
	Yearly renewal to a maximum of seven years.	Renewal up to a maximum of six years is allowed.
Legal Status	Non-immigrant visa. Holders are not permitted to change their legal status.	Non-immigrant visa. Holders can apply for permanent residency status.
Home Residency Requirement	Has a 2-year home residency requirement, which necessitates that the physicians return to their home countries for two years before they are allowed to apply for any other U.S. visa status*.	No 2-year home residency requirement. However, unless they change their legal status to permanent residents during the training period, physicians are required to return back to their home country for at least one year before being eligible to reapply for another visa.
USMLE step 3	Not required	Required

*\*Waivers to the "two-year home requirement" are available.*

myocardial infarction.<sup>28</sup> Additionally, IMGs are more often reported as caring for patients with public insurance.<sup>29</sup>

Despite the lower matching rates when compared to US Seniors, IMGs maintain a high interest in applying to the domestic training programs. It is evident that the path for IMGs to the US based

residency training programs is complex and challenging at many levels. The selected IMGs have at least comparable skills to US Seniors. The Question remains; are the non-selected less qualified or they are just the victims of their IMG status? Future studies comparing the non-selected IMGs to the selected US Seniors are needed.

## Future of IMGs in the USA

Despite the large increase in US medical schools and graduates, as well as the expanding number of medical schools in the Caribbean and Grenada, the US healthcare system still requires IMGs to fill about 25% of residency spots.<sup>30</sup> This is largely due to the parallel increase in insured US citizens requiring primary and advanced medical care following enactment of the Affordable Care Act. As the deadline of 2023 approaches, at which time IMGs applying to the US must be graduates of a medical school accredited by an organization authorized to accredit medical programs by WFME, the number of IMGs eligible to apply for US residency spots may fall precipitously. This is because the majority of IMGs are from India, Pakistan, and the Asian sub-continent, where, at the present time, there are few if any WFME-authorized accrediting bodies. How the US will deal with the potentially large gap between demand and supply in 2023 and beyond remains unclear. This is among the many challenges that face IMGs and the US health system in the years to come.<sup>15</sup>

## REFERENCES

- Majeed MH, Ali AA, Saeed F. International medical graduates: from brain drain to potential gain. *International journal of medical education*. 2017;8:37.
- Eckhert NL, van Zanten M. US-citizen international medical graduates—a boon for the workforce. *N Engl J Med*. 2015 Apr 30;372(18):1686-7.
- Ranasinghe PD. International medical graduates in the US physician workforce. *J Am Osteopath Assoc*. 2015 Apr 1;115(4):236-41.
- Charting Outcomes in the Match: International Medical Graduates [Internet]. National Resident Matching Program (NRMP); [cited 2018Dec3]. Available from: <http://www.nrmp.org/wp-content/uploads/2018/06/Charting-Outcomes-in-the-Match-2018-IMGs.pdf>
- National Resident Matching Program (The Match). Results and data: 2019 main residency match. Washington, DC: National Resident Matching Program; 2019
- Applying for Residency as an International Medical Graduate [Internet]. NEJM Knowledge. 2019 [cited 2019Oct13]. Available from: <https://knowledgeplus.nejm.org/blog/applying-for-residency-as-an-international-medical-graduate/>
- Pinsky WW. The importance of international medical graduates in the United States. *Annals of internal medicine*. 2017 Jun 6;166(11):840-1.
- Traverso G, McMahon GT. Residency training and international medical graduates: coming to America no more. *Jama*. 2012 Dec 5;308(21):2193-4.
- Residency Application Requirements for International Medical Graduates [Internet]. The American Academy of Family Physicians; 2013 [cited 2019Oct21]. Available from: <https://www.aafp.org/medical-school-residency/residency/apply/img.html>
- International Medical Graduates - Strengths and Weaknesses of International Medical Graduates in U.S. Programs: A Chairperson's Perspective [Internet]. The American College of Physicians; [cited 2019Oct21]. Available from: <https://www.acponline.org/about-acp/acp-international-for-international-medical-graduates/training-in-the-us/international-medical-graduates-strengths-and-weaknesses-of-international-medical-graduates-in-us>
- Bourne S. What are the biggest challenges international medical graduates face when starting work in the NHS?. *BMJ*. 2018 Feb 20;360;j5618.
- Michalski K, Farhan N, Motschall E, Vach W, Boeker M. Dealing with foreign cultural paradigms: A systematic review on intercultural challenges of international medical graduates. *PloS one*. 2017 Jul 17;12(7):e0181330.
- A Comparison of the Characteristics and Examination Performances of U.S. and Non-U.S. Citizen International Medical Graduates who sought Educational Commission for Foreign Medical Graduates Certification: 1995–2004
- How to Confirm That a Medical School Meets Eligibility Requirements for ECFMG Certification [Internet]. The Educational Commission for Foreign Medical Graduates (ECFMG); [cited 2019Oct22]. Available from: <https://www.ecfm.org/resources/medical-school-reqs.pdf>
- Certification [Internet]. The Educational Commission for Foreign Medical Graduates (ECFMG); [cited 2019Nov19]. Available from: <https://www.ecfm.org/accreditation/>
- ERAS Applications [Internet]. [cited 2019Oct13]. Available from: <https://students-residents.aamc.org/applying-residency/article/about-eras/>
- Intro to Main Residency Match [Internet]. The Match, National Resident Matching Program. [cited 2019Oct13]. Available from: <http://www.nrmp.org/intro-to-main-residency-match/>
- Active Physicians Who Are International Medical Graduates (IMGs) by Specialty, 2017 [Internet]. The Association of American Medical Colleges (AAMC); [cited 2019Oct13]. Available from: <https://www.aamc.org/data-reports/workforce/interactive-data/active-physicians-who-are-international-medical-graduates-imgs-specialty-2017>
- ACGME Residents and Fellows Who Are International Medical Graduates (IMGs) by Specialty, 2017 [Internet]. The Association of American Medical Colleges (AAMC); [cited 2019Oct13]. Available from: <https://www.aamc.org/data-reports/workforce/interactive-data/acgme-residents->

and-fellows-who-are-international-medical-graduates-imgs-specialty-2017

20. Ahmed AA, Hwang WT, Thomas Jr CR, Deville Jr C. International medical graduates in the US physician workforce and graduate medical education: current and historical trends. *Journal of graduate medical education*. 2018 Apr;10(2):214-8.
21. Ranasinghe PD. International medical graduates in the US physician workforce. *J Am Osteopath Assoc*. 2015 Apr 1;115(4):236-41.
22. Charting Outcomes in the Match: International Medical Graduates [Internet]. The National Resident Matching Program (NRMP); [cited 2019Oct13]. Available from: <http://www.nrmp.org/wp-content/uploads/2018/06/Charting-Outcomes-in-the-Match-2018-IMGs.pdf>
23. National Resident Matching Program (The Match). Results and data: 2018 main residency match. Washington, DC: National Resident Matching Program; 2018
24. NRMP's Supplemental Offer and Acceptance Program (SOAP) [Internet]. The Educational Commission for Foreign Medical Graduates (ECFMG); [cited 2019Oct13]. Available from: <https://www.ecfmg.org/echo/nrmp-soap.html>
25. Abou Dagher G, Lewandowski C, Ali SS, Barsky C, Kazzi B, Cheaito MA, Lotfipour S, Kazzi A, Kazzi Z. The International Medical Graduate & Emergency Medicine. *The Journal of Emergency Medicine*. Forthcoming 2019
26. Results of the 2018 NRMP Program Director Survey [Internet]. The National Resident Matching Program (NRMP); [cited 2019Oct13]. Available from: <https://www.nrmp.org/wp-content/uploads/2018/07/NRMP-2018-Program-Director-Survey-for-WWW.pdf>
27. Tsugawa Y, Jena AB, Orav EJ, Jha AK. Quality of care delivered by general internists in US hospitals who graduated from foreign versus US medical schools: observational study. *bmj*. 2017 Feb 3;356:j273.
28. Norcini JJ, Boulet JR, Dauphinee WD, Opalek A, Krantz ID, Anderson ST. Evaluating the quality of care provided by graduates of international medical schools. *Health Affairs*. 2010 Aug 1;29(8):1461-8.
29. Katakam SK, Frintner MP, Pelaez-Velez C, Chakraborty R. Work Experiences and Satisfaction of International Medical School Graduates. *Pediatrics*. 2019 Jan 1;143(1):e20181953.
30. Tips for Researching U.S. Residency Programs [Internet]. Kaplan; 2019 [cited 2019Nov21]. Available from: <https://www.kaptestglobal.com/usmle/blog/tips-researching-us-residency-programs>

# Mass Casualty Management in the Emergency Department – Lessons Learned in Beirut, Lebanon - Part I

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## INTRODUCTION

Over the last century, mass casualty incidents (MCIs) affected many nations and their emergency departments. The unscheduled arrival of large number of injured victims over a short period of time often causes major chaos and crowding.

When a rapid surge in operational needs overwhelms available Emergency Department (ED) resources and personnel, the chaos and overwhelming mismatch between needs and resources can quickly spread to the rest of the hospital.<sup>1, 2</sup> Nonetheless, as the front door of the hospital, the ED plays a pivotal role in determining the quality and effectiveness of an institution's MCI response. This requires effective planning, which translates into preparedness. Unfortunately, many EDs are overburdened even on regular days. Damaged infrastructure further compounds the challenge.<sup>1</sup>

## DISCUSSION

Because ED personnel are the first providers in the hospital to receive mass casualties, they are often the first to recognize that an MCI is unfolding. This enables them to activate the facility's disaster plan to mobilize additional resources as they begin to triage and treat victims.<sup>1,3</sup> The goal of ED care in MCIs is to identify victims with the greatest

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immediate need for intervention, initiate life-saving care & stabilization while the operating room (OR), intensive care unit (ICU) and inpatient units prepare to support the response.<sup>2-5</sup> Because the ED is the front door to the community, its personnel also interface with distressed crowds, friends and families, unexpected volunteers, media and sometimes, armed parties.<sup>6</sup> Typically, it is also the first unit of the hospital to recognize that an MCI is resolving so the hospital can begin deactivating its institutional response.

Lebanon has experienced a disproportionate number of MCIs over the last 40 years due to war, civil conflicts and natural and manmade disasters. Several Lebanese studies have reported key aspects of some of those MCIs and described lessons learned from individual events.<sup>7-11</sup> In one recent study, El Sayed discussed the applicability of certain principles of management, currently implemented in the United States, to Lebanon and other developing countries.<sup>7</sup> Another suggested that principles regularly used in Lebanon could be adopted by hospitals in countries that currently lack formal disaster plans.<sup>8</sup> Two studies highlighted the importance of critically analyzing prior experiences with MCIs to improve preparedness and response to future incidents.<sup>10,11</sup>

In the past 14 years, Beirut has been the scene of numerous armed clashes between warring militias, more than a dozen car bombs, including targeted assassinations, and a month of daily air raids. Over this period, Lebanon witnessed more than 65 conflict related MCIs.<sup>12,13</sup> Responding to these events has provided the emergency department staff of the American University of Beirut Medical Center (AUBMC) with substantial experience in mass casualty management. AUBMC is the largest tertiary care center in Lebanon and its ED is the busiest among Beirut's 14 hospitals.<sup>14</sup> Since 2005,

AUBMC's ED has managed ten mass casualty incidents, including one with more than 250 victims, two with more than 60 victims and seven with approximately 70 victims.

Given our ED's substantial involvement in managing MCIs and the importance of experience in MCI management, the hospital's ED staff has developed practical strategies we believe other EDs, hospital administrators, healthcare personnel and preparedness planners can use to optimize their own facility's response to mass casualty incidents. Obviously, every hospital and ED needs to need to tailor its MCI management plan to its particular community threats and operational needs. However, our hope is that the lessons we've learned in Beirut will be of value to others.

### **Lesson 1: MCIs are a “predictable surprise”.**

One can tell when or where a major mass casualty incident will happen.<sup>3,5</sup> “Disaster drills” can be scheduled for convenient times but *MCIs cannot*. MCIs often occur before hospital staff start their daily work in the OR, ICU or clinic, or hours after they have departed for the day. They can also strike during busiest mid-day or evening hours when hospital and ED resources are already strained. They can occur late at night, on weekends and on holidays, when hospital leadership are at home or unavailable and the facility is minimally staffed. Given particular aspects of the incident, hospital leadership may be incapacitated, or the facility may become temporarily inaccessible. Therefore, everyone must know the facility's plan and multiple individuals on all shifts must have the skills and knowledge they need to lead the response.

### **Lesson 2: MCI definition is based on the number of casualties relative to the resources available to treat them, the facility's level of preparedness and its surge capacity at the time.**

What constitutes an MCI for one ED may not challenge another. Likewise, an unexpected surge in arrivals may be challenging during a busy shift in one ED but represent an overwhelming disaster for another. In addition, a significant surge in injured patient arrivals may not constitute an MCI in a well-staffed ED on a weekday morning. However, it could overwhelm that same ED and hospital at 2 am.

### **Lesson 3: Institutional disaster drills are important**

Never assume an institution has an MCI response plan and never assume all individuals needed during a disaster response know or understand their roles and responsibilities. Follow the moto: “Test it and Drill it.”

A systematic review of 17 studies revealed that those that regularly drilled their response plans familiarized the staff with its procedures and identified flaws in their plans. This allowed for improving preparedness for future disasters through modifications to the plans.<sup>15</sup>

Some of the identified deficiencies include communication errors stemming from lack of authority,<sup>16-18</sup> inexperienced staff committing clinical operation errors,<sup>16</sup> mistakes made during the triage phase of casualty treatment, inaccurate documentation of events,<sup>17,18</sup> and deficiencies in the use of available resources.<sup>18,19</sup>

Usually, accreditation auditors ask hospitals for their external disaster response plan (EDP). Hospitals will typically provide a plan signifying that institution and staff will follow it. Hospitals may also provide reassurance or documents that indicate their readiness to participate in the national and regional disaster plans.

However, our experience in Lebanon taught us to look deeper at this. The reality is not as simple as it seems, at least in Lebanon, and perhaps in other nations. In fact, studies have reported errors and failure to adhere to triage protocols during the stressful MCI circumstances by emergency responders, regardless of their level of training.<sup>20-22</sup>

It is therefore critical to ask if there is an actual plan. Or, is it a simple policy or document, filed or forgotten in a drawer or a manual on the shelf of the chief of staff or accreditation office? Is it one that only a few can find when an MCI occurs? More importantly, is the plan simple enough to be understood but detailed enough to provide practical measures that can support an organized response and ensure adequate surge capacity at any time?

Has the hospital administration ever communicated the plan to the hospital staff? Do employees know (or have they ever even heard about)

the measures that pertain to their own department or clinical service? Were all stakeholders included in the initiative? Plans that are only communicated to a select few physicians, nurses and administrators (typically those involved in its drafting or preparing for a carefully staged annual drill) are often not available when a disaster strikes. As a result, those who are physically present at the time may not be sufficiently knowledgeable or empowered to act?

Ideally, a facility's plan should be communicated to all hospital staff and departments: administrators, heads of services, physicians, nurses, residents, students, pharmacists, security, clerks, admitting and finance, janitors, transporters, housekeeping, physical plant, medical engineering, central supplies, and store managers.<sup>23,24</sup>

The plan should also be shared and coordinated with prehospital agencies and regional and national healthcare authorities. However, in a developing nation or conflict zone prehospital emergency medical services (EMS) systems may not exist, or they may be incapable of supporting the plan.

The picture is brighter in high-income countries like the United States of America, where the Joint Commission (TJC), compels health care organizations, including hospitals, to cooperate in disaster planning so they can deliver services to a "contiguous geographic area".<sup>25</sup> JCI requirements also include testing a facility's EDP twice yearly, with at least one drill being a community-wide.<sup>25</sup>

Additionally, a better comprehension of the hospitals' abilities to respond to MCIs is possible via no-notice drills.<sup>26</sup> The US Department of Health and Human Services developed tools that can allow hospitals to run such no-notice drills.<sup>26</sup>

Last but not least, will the plan work? Has it ever been tested or drilled? If so, has it ever been tested on a no-notice basis? Was its effectiveness rigorously assessed so it could be revised to address shortcomings prior to an actual MCI?

More attention should be directed to evaluating disaster training activities in a scientifically rigorous manner. According to Hsu et al., studies are needed to assess the effectiveness of certain training methods, as the current evidence is inadequate to produce solid conclusions.<sup>23</sup>

#### **Lesson 4: Upside-Down triage**

Expect "upside-down triage"! In most MCIs, the most severely injured arrive after a first wave of less injured victims who bypass EMS and go directly to the closest hospitals.<sup>27</sup> These are the "walking wounded", typically with relatively minor injuries. They are ambulatory and hemodynamically stable, often walk to, or are driven to the closest ED, bypassing EMS triage systems.<sup>28</sup> If these individuals are taken into the EDs treatment areas and resuscitation bays, these facilities won't be available when more critically ill and injured patients begin to arrive.

Those who arrive later are often trapped or too severely injured to leave the scene. Because many will be disabled or unstable, they will need to be transported from the scene. They will rely on bystander volunteers or wait for prehospital responders to assist them. They need transportation, sometimes extrication, fire control, safe roads and access to the ED. In a military or civil conflict, these may not be readily or rapidly available.

#### **Lesson 5: Carefully define the ED capacity to handle mass casualty as well as when and how to activate the MCI plan.**

*When does an external disaster warrant activation of a hospital's MCI plan?*

An MCI should be declared when the ED receives an influx of casualties that exceeds its available capacity. This may vary depending on the time of the day, day of the week and on how crowded or poorly staffed the ED is. On-duty emergency physicians and the nurse-in-charge should be able to roughly estimate their available capacity at any given time and to identify when the number of mass casualty victims will exceed it. One study highlighted the importance of defining the term 'disaster' for the emergency physician and nurse-in-charge who must ultimately decide whether or not to activate the plan.<sup>29</sup>

*Can an institution define a specific number as a threshold to activate its own EDP?*

It can, but this does not mean the number is accurate, reliable or valuable. ED capacity can vary dramatically between hospitals and within a single institution over a 24-hour span of time. Equally

important, ED capacity will also strongly depend on how busy the ED and how many ORs, ICUs and inpatient beds are available within the institution when disaster strikes.

In general, any ED with a single medical provider “team” (one qualified attending physician and one nurse) should be able to handle triaging and stabilizing 5-10 casualties arriving within a short period of time. Accordingly, our experience in Beirut indicates that MCI response activation should be considered any time the ratio of patients-to-provider exceeds 5 walking wounded per each medical provider team within 30 minutes AND the “team” secures information suggesting more victims are expected.

Quality of care should be taken into consideration when assessing the admitting capacity of a hospital. In fact, disaster planners often err by disregarding quality of care. As a result, their calculations are based only on the number of personnel and beds that can be made available without considering a hospital’s surgical resources and the number of trauma teams. Therefore, capacity estimates are usually inflated beyond a hospital’s functional capacity to properly deal with cases that require trauma-trained personnel.<sup>30</sup>

*How to identify reliable information about the likelihood of receiving additional casualty?*

In communities that lack reliable communications with the point of injury, an initial estimate of the scale of an MCI can be determined by asking the first arriving victims, their companions and/or EMS providers to describe the scene.

In our experience, one cannot rely on the media, the hospital security officers, or the local or national police. They may not have the information needed. Those who actually know may be too busy on-scene to communicate what the ED needs to know.

Previous MCIs have shown that the timeframe during which MCI survivors present to the ED is influenced by the nearness of the hospital, EMS response (capacity and timeliness), and the time needed for rescue and evacuation. This timeframe reflects on the duration of the impact a certain MCI has on an ED and therefore has relevance for planning.<sup>31</sup>

*Are there any patterns we can use?*

During conflicts, the majority of mass casualty incidents involve two waves of casualties.<sup>27</sup> Based on our experience, it is reasonable to double the count the ED receives during the first hour of victim arrivals to roughly predict the total that the ED should expect after the “first wave” of casualties. By the end of the 3<sup>rd</sup> hour after single MCI events such as explosions, car bombs, gun assault of a crowd, and large vehicular accidents. Most patients will have been transported to healthcare facilities.

An example of that is the 1996 Oklahoma City bombing, the first wave of mildly injured casualties began arriving 15 minutes after the bombing. This was followed by a second wave of more severely injured patients who were transported by prehospital EMS.<sup>32</sup>

If structural collapse occurs, one can also expect markedly increased severity and delayed arrival of casualties. For example, after a bombing in Buenos Aires in 1994 resulting in structural collapse, the last victim was extracted 36 hours after the bombing.<sup>33</sup>

## Lesson 6: Tiered response

To avoid unnecessary mobilization of resources, it is necessary to plan, establish and use tiered response. A two-tiered disaster plan could include two levels of activation and response.

- **Level I:** This is the highest level of disaster response. All health care providers & staff are called-in.

- **Level II:** This is the first and moderate level of activation & response. Only on-call providers/staff are called in to support the ED team on-duty. The ED team should entertain and decide calling in all emergency physicians and nursing staff to come to the ED.

## Lesson 7: Tiered activation

An additional strategy that we recommend is to establish tiered activation with a two-step process that includes:

- **Step 1: Alert Status**

This is the first step of an activation; and this could be applied for either Level 1 or 2 response. Health care providers and staff are advised via pagers, messages and phone calls that they may be called in

to participate in a mass casualty response.

#### - Step 2: Activation Status

This is the second and final step of an activation; and this also could be applied for either Level 1 or 2 response. Health care providers and staff are advised via pagers, messages and phone calls that *they ARE being called in and expected* to participate in a mass casualty response.

### Lesson 8: Proper call routing systems

It is key to instruct ahead of time the community, hospital and ED staff not to call the ED if they hear a disaster or possible disaster has occurred. They should remember or be reminded that at such time the ED would be particularly strained. Everyone should remember to strictly refrain from taxing the already overburdened ED staff time by forcing them to answer unnecessary phone calls. For example, during the Oklahoma City bombing, the metropolitan area witnessed 12 million call attempts within 2 hours from the bombing.<sup>34</sup>

This calls for need to have proper call routing systems in the ED setting to prevent the system from crashing while simultaneously making sure of timely referral of calls to the right people. One option is adopting an automated call routing system that prioritizes calls and refers them accordingly.<sup>35</sup>

### Lesson 9: Pre-identify mobilization sites

Pre-identify mobilization sites and train all medical providers, staff, and leadership to use them; and drill them to make sure they remember to do so!

We recommend the following mobilization sites: the ED lounge or conference room for all on-call and ED physicians, the nursing department conference room for the nursing managers and leaders, the hospital Director Office for the institutional leadership disaster committee, and the largest hospital cafeteria or hall for all others. Ensure the large crowds do not convene close to the ED.

### Lesson 10: Defining roles and responsibilities

Define roles and responsibilities for every service one may need, highlighting what they have in common with the rest of the institution and what is peculiar to them in terms of duties, response, mobilization, exceptions, etc. Normally, the ED attending should take on the responsibility of

assigning the roles and responsibilities to physicians and nurses who are called in.<sup>36</sup> For example, do not expect housekeeping staff to respond to pagers overhead, beepers or cell phones. Do they have one? Another example, does every head of service or hospital department maintain 24/7 prompt access to the contact information for all members of their unit? Will phone networks be functional during such a period notoriously overwhelmed during disasters? Plan for such details, unit by unit.

Drill them on their capacity to properly respond. Define them, communicate them and then drill them on their duties. Ensure all new staff or recruits have been properly oriented to all this. Identify one leader in the service to ensure this is coordinated in that division or unit.

Key individuals and departments include but are not limited to the following: clinical departments and services, laboratory and radiology departments, the chief of staff, chief medical officer and hospital director, the nursing director, managers and staff, protection officers, chief pharmacist, admitting head, store manager, transport and support personnel, communication, information technology, risk management, and housekeeping. They all have a role to be predefined, communicated and ready 24/7. It is vital for all staff sectors to be aware of the resources, roles, and responsibilities of all the other sectors.<sup>37</sup>

### Lesson 11: Secure and control entry & exit into the ED

Keep only one ED entrance and one ED exit open and make sure they are separate from one another. Additionally, restrict entry into the ED to control crowds and reduce interference and security risk.

Allow one companion per patient, if they have one, to serve as a surrogate guardian and help with patient identification, transportation, and a variety of ancillary needs that will become evident at the bedside.

Keep only one ED exit open to ensure proper ED discharge. This last check will enable the ED team to ensure the accuracy and completion of ED care, proper identification, treatment plan, documentation and discharge instructions.

When possible, have all ED staff and on-call

responders use a 3<sup>rd</sup> pre-designated restricted door to enter and exit the ED discretely and away from crowds.

A “convergence” phenomenon has been described in multiple studies referring to the large numbers of dispensable individuals who present to the ED during a MCI.<sup>27,38,39</sup> These include family members, volunteers, and media personnel. Heavy-duty, lockable doors as well as gates or barricades may be used to control ED entrances and exits.<sup>6</sup> Failure to do so can lead to ED disruption and inadvertent contamination.<sup>6,40</sup>

## CONCLUSION

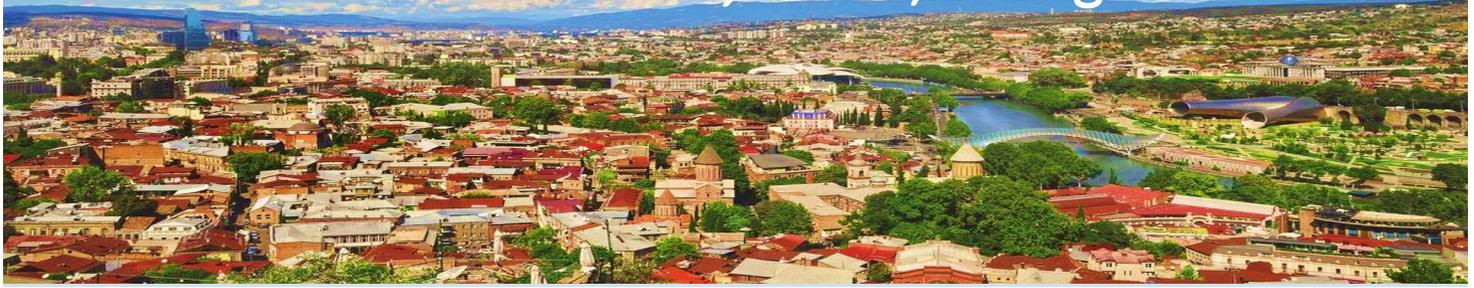
Conflicts and mass casualty response have become more frequent over the last century. The establishment of the relatively new specialty “emergency medicine” has provided opportunity in the last decade that did not exist in older conflicts in the Middle East. We now have emergency nurses and physicians with real-time experience facing mass casualty events. Since they have committed life and career to the ED, emergency medicine providers can now finally retain and organize the lessons they have acquired in such adverse conditions. By experiencing repeatedly real-time mass casualty influx, they now can turn chaos into practical strategies that we have tried to organize for our colleagues. Readers who experienced mass casualty incidents will recognize in our manuscript thoughts and situations they have personally experienced. We also know that the challenges and solutions in a Beirut ED and urban tertiary care medical center may not apply in other context, situations and countries. We hope some readers can help us develop this material by providing letters to the editor. Together, we can build on this material and develop it into a format that can serve our people and patients.

## REFERENCES

1. Aitken P, Leggat P. Considerations in mass casualty and disaster management. *Emergency Medicine: An International Perspective*. 2012;145-82.
2. Einav S, Aharonson-Daniel L, Weissman C, Freund HR, Peleg K, Group IT. In-hospital resource utilization during multiple casualty incidents. *Annals of surgery*. 2006;243(4):533.
3. Timbie JW, Ringel JS, Fox DS, Pillemer F, Waxman DA, Moore M, et al. Systematic review of strategies to manage and allocate scarce resources during mass casualty events. *Annals of Emergency Medicine*. 2013;61(6):677-89. e101.
4. Shi P, Dai J, Ding D, Ang SK, Chou M, Jin X, et al. Patient flow from emergency department to inpatient wards: Empirical observations from a Singaporean hospital. Available at SSRN 2517050. 2014.
5. Halpern P, Tsai M-C, Arnold JL, Stok E, Ersoy G. Mass-casualty, terrorist bombings: implications for emergency department and hospital emergency response (Part II). *Prehospital and disaster medicine*. 2003;18(3):235-41.
6. Halpern P, Goldberg SA, Keng JG, Koenig KL. Principles of emergency department facility design for optimal management of mass-casualty incidents. *Prehospital and disaster medicine*. 2012;27(2):204-12.
7. El Sayed MJ. Emergency response to mass casualty incidents in Lebanon. *Disaster medicine and public health preparedness*. 2013;7(4):433-8.
8. El Sayed M, Chami AF, Hitti E. Developing a hospital disaster preparedness plan for mass casualty incidents: lessons learned from the downtown Beirut bombing. *Disaster medicine and public health preparedness*. 2018;12(3):379-85.
9. Frykberg ER, Alexander R. The 1983 Beirut Airport terrorist bombing. Injury patterns and implications for disaster management. *The American Surgeon*. 1989;55(3):134-41.
10. Frykberg ER, Tepas 3rd J. Terrorist bombings. Lessons learned from Belfast to Beirut. *Annals of surgery*. 1988;208(5):569.
11. Scott LBA, Fletcher CRJ, Pulliam CMW, Harris CRD. The Beirut terrorist bombing. *Neurosurgery*. 1986;18(1):107-10.
12. List of attacks in Lebanon [Internet]. Wikipedia; 2019 [cited 2019Dec3]. Available from: [https://en.wikipedia.org/wiki/List\\_of\\_attacks\\_in\\_Lebanon](https://en.wikipedia.org/wiki/List_of_attacks_in_Lebanon)
13. Timeline of explosions and targeted assassinations from 2004 to 2012 [Internet]. The Daily Star Newspaper. [cited 2019Dec3]. Available from: <http://www.dailystar.com.lb/News/Politics/2012/Oct-20/192095-timeline-of-explosions-and-targeted-assassinations-from-2004-to-2012.ashx>
14. Statistical Bulletin 2016 [Internet]. Republic of Lebanon Ministry of Public Health ; [cited 2019Dec3]. Available from: <https://moph.gov.lb/en/Pages/0/14901/statistical-bulletin-2016>
15. Hsu EB, Jenckes MW, Catlett CL, Robinson KA, Feuerstein

- C, Cosgrove SE, et al. Effectiveness of hospital staff mass-casualty incident training methods: a systematic literature review. *Prehospital and disaster medicine*. 2004;19(3):191-9.
16. Baughman K, Calvert D. Internal disaster drill critique. *Journal of emergency nursing: JEN: official publication of the Emergency Department Nurses Association*. 1990;16(4):240.
17. Weston C. The operating theatre's on fire. *Health services management*. 1988;84(3):20-3.
18. Lau P, Lau C. A disaster drill in Hong Kong. *Accident and emergency nursing*. 1997;5(1):34-8.
19. Halstead MA. Fire drill in the operating room: Role playing as a learning tool. *AORN journal*. 1993;58(4):697-706.
20. Operation Dark Cloud Planning Committee, One Florida Regional Domestic Security Task Force [internet]. Operation Dark Cloud After-Action Report. [cited 2019Dec3]. Available from: <http://www.tallytown.com/redcross/odc.html>.
21. Hirshberg A. Multiple casualty incidents: lessons from the front line. *Annals of surgery*. 2004;239(3):322.
22. Wilkerson W, Avstreich D, Gruppen L, Beier KP, Woolliscroft J. Using immersive simulation for training first responders for mass casualty incidents. *Academic emergency medicine*. 2008;15(11):1152-9.
23. Hsu E, Jenckes M, Catlett C, Robinson K, Feuerstein C, Cosgrove S, et al. Training of Hospital Staff To Respond to a Mass Casualty Incident: Summary. *AHRQ Evidence Report Summaries: Agency for Healthcare Research and Quality (US)*; 2004.
24. Mehta S. Disaster and mass casualty management in a hospital: How well are we prepared? *Journal of postgraduate medicine*. 2006;52(2):89.
25. The Accreditation Guide for Hospitals [Internet]. The Joint Commission. [cited 2019Dec3]. Available from: [https://www.jointcommission.org/assets/1/18/171110\\_Accreditation\\_Guide\\_Hospitals\\_FINAL.pdf](https://www.jointcommission.org/assets/1/18/171110_Accreditation_Guide_Hospitals_FINAL.pdf)
26. Waxman DA, Chan EW, Pillemer F, Smith TW, Abir M, Nelson C. Assessing and improving hospital mass-casualty preparedness: a no-notice exercise. *Prehospital and disaster medicine*. 2017;32(6):662-6.
27. Kumar M. Blast injuries. *Medical Journal Armed Forces India*. 2010;66(4):309-11.
28. Morell PG, Naif FE, Domenech RP, Carol ES, Roda JB. Burns caused by the terrorist bombing of the department store Hipercor in Barcelona. Part I. *Burns*. 1990;16(6):423-5.
29. Muir A, Shenton S. If the worst happens: the use and effectiveness of disaster plans in libraries and archives. *Library management*. 2002;23(3):115-23.
30. Hirshberg A, Holcomb JB, Mattox KL. Hospital trauma care in multiple-casualty incidents: a critical view. *Annals of emergency medicine*. 2001;37(6):647-52.
31. Arnold JL, Tsai M-C, Halpern P, Smithline H, Stok E, Ersoy G. Mass-casualty, terrorist bombings: epidemiological outcomes, resource utilization, and time course of emergency needs (Part I). *Prehospital and disaster medicine*. 2003;18(3):220-34.
32. Hogan DE, Waeckerle JF, Dire DJ, Lillibridge SR. Emergency department impact of the Oklahoma City terrorist bombing. *Annals of emergency medicine*. 1999;34(2):160-7.
33. Biancolini CA, Del Bosco CG, Jorge MA. Argentine Jewish community institution bomb explosion. *Journal of Trauma and Acute Care Surgery*. 1999;47(4):728.
34. McLain S. The Oklahoma City bombing: Lessons learned by hospitals. Available on the American Hospital Association Web site ([www.aha.org](http://www.aha.org)) under "Disaster Readiness. 2001.
35. Mass Casualty Incident Whitepaper [Internet]. Alcatel-Lucent Enterprise; [cited 2019Dec3]. Available from: <https://www.al-enterprise.com/-/media/assets/internet/documents/mass-casualty-incident-whitepaper-en.pdf>
36. Heinrichs WL, Youngblood P, Harter PM, Dev P. Simulation for team training and assessment: case studies of online training with virtual worlds. *World journal of surgery*. 2008;32(2):161-70.
37. Pfefferbaum BJ, Reissman DB, Pfefferbaum RL, Klomp RW, Gurwitch RH. Building resilience to mass trauma events. *Handbook of injury and violence prevention*: Springer; 2008. p. 347-58.
38. Gavagan TF, Smart K, Palacio H, Dyer C, Greenberg S, Sirbaugh P, et al. Hurricane Katrina: medical response at the Houston Astrodome/Reliant center complex. *Southern medical journal*. 2006;99(9):933-40.
39. Kirschenbaum L, Keene A, O'Neill P, Westfal R, Astiz ME. The experience at St. Vincent's Hospital, Manhattan, on September 11, 2001: preparedness, response, and lessons learned. *Critical care medicine*. 2005;33(1):S48-S52.
40. Okumura T, Suzuki K, Fukuda A, Kohama A, Takasu N, Ishimatsu S, et al. The Tokyo subway sarin attack: disaster management, Part 1: Community emergency response. *Academic Emergency Medicine*. 1998;5(6):613-7.

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