

# The Hajj: Season of Rahma or Zahma? Allowing ambulances to access patients

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## Abstract

This chapter focuses on the need for ambulances during Hajj, the allocation of resources by the Saudi Red Crescent Authority, and the technology used to monitor and control the crowd. Recommendations for smoother crowd control include a recalculation of the intake numbers and improved communication between the police force and the Saudi Red Crescent Association (SRCA) in relation to traffic control points. Additionally, crowd health and safety awareness courses could be included in the Hajj visa process and reiterated by Hajj operators worldwide.

## Introduction

Hajj is the most important pilgrimage Muslims make at least once in a lifetime. Arabia has always welcomed Muslim pilgrims as the '*Dhuyoufar*' *Rahman*', meaning 'Guests of the Most Merciful One'. The Hajj ritual is restricted to time and space; whereby it is performed between the 8th to the 13th of the Islamic lunar month of Dhul Hijjah in the Hajj zone, which includes Mecca, Mina, Muzdalifa, and Arafat. With over two million pilgrims arriving from all nations of the world, the Saudi government have invested enormously in grand constructions, expansions, and health facilities including mega-ambulances. However, the most difficult challenge the government continue to face every year is controlling the large dense crowds. Within this crowd are patients who might be on the verge of or might already have suffered from a heat stroke or a cardiac arrest. However, the emergency medical service struggles to reach these patients in time when the crowds block the routes for ambulances. While Muslims are ambitious of gaining

spiritual rewards and are observant of the jurisprudential rulings of performing the Hajj, there remains ignorance about mass crowd health and safety.

Photographers have captured some of the most breathtaking views of the Hajj with over two million pilgrims from all around the world gathered in one place to glorify their Creator. On the other hand, some of the most shocking photographs of the Hajj have also been taken (see Figure 1 below) where hundreds of pilgrims are seen engulfing an entire fleet of ambulances (Photos Fig.1 (1,2) and pilgrims are seen walking in front of flashing ambulances (Photos Fig 1(3,4)).

Such alarming Hajj moments raise a series of questions: such as: why is there a stationary ambulance blocking the path of the pilgrims? Or the reverse, why are hundreds of pilgrims crowding and blocking an ambulance route? What protocol set by the Saudi Ministry of Hajj and Umrah was supposed to be followed by the emergency response service (EMS) and other Hajj volunteers as well



Figure 1: Photos of pilgrims blocking ambulances.

as the crowd? Are these ambulances trying to reach a patient? or are they trying to transport a patient to medical facilities and emergency care? How serious is the condition of patients that they critically require an ambulance during peak Hajj days? The fundamental question, however, is – why do such scenarios occur and what measures can be put in place to avoid them?

To address these questions, first, the valley of Mina will be described, followed by the need for ambulances in the Hajj zone. The contribution of the Saudi Red Crescent Association (henceforth SRCA) will also be explained. Measures taken to manage the Hajj crowd will also be explored including the challenges created by a) traffic control points and b) pilgrims sleeping on routes. Lastly, factors are discussed for the consideration of the MOH as well as Hajj operators worldwide.

## Mina

Mina is an area, mostly a valley, where the pilgrims participate in rituals in remembrance of Abraham and his family (Peace be upon them). One of the rituals involves casting stones on the 10th to the 13th of the Islamic lunar month Dhul Hijjah at a place within Mina known as the Jamarat. Because this ritual is essential in Hajj and because Mina is a central location in relation to Mecca and Arafah, where other Hajj rituals are observed, from the 8th to the 13th of Dhul Hijjah, pilgrims reside in Mina. The area of Mina is 20 km<sup>2</sup>[5]. Since the time of the Prophet Muhammad (peace be upon him), pilgrims brought and pitched their own tents. In the 90s, the Saudi government installed permanent cotton tents. However, permitting pilgrims to cook and warm food on open fires near these cotton tents posed a major health and safety

risk [5]. Consequently, the great fire of Mina in 1997 injured over 1,500 pilgrims and claimed the lives of over 340 pilgrims [6]

Subsequently, open source flames were prohibited by the Saudi government [7]. Moreover, the government invested in 100,000 permanent fireproof tents made of fibreglass with an outer coating of Teflon [8]. Large tents can accommodate between 100 to 150 pilgrims [9]. Furthermore, the tents are air-conditioned. The tents have been grouped and divided by nationalities and are situated with a complex network of walking streets and roads used by conventional and shuttle buses [10]. Cooking sites are now regulated and monitored for fire threats [11][12]. Additionally, in recent times, several towers have also been built in Mina as an alternative accommodation. As such, Mina today accommodates up to three million people and is renowned as the ‘City of tents’. Moreover, the city is provided water by the National Water Company, which consists of nearly 2,300 employees who help to maintain water systems and to clean and maintain toilets at the Hajj sites including Mina [13].

The Hajj is a unique event as it attracts over two million pilgrims from more than 180 countries [14]. Such a mass gathering is larger in scale than sports events, festivals, and concerts [15][16]. Furthermore, unlike these static events, the Hajj ambulance system requires unique perspectives because it involves pilgrims moving to and from locations [15].

## Need for ambulances in Hajj

Pilgrims who are most likely to require an ambulance include patients who suffer from diabetes mellitus, hypertension, asthma, and anemia, but especially patients with cardiovascular diseases. To illustrate, cardiac arrests account for 43% of deaths in Hajj, making it the most common cause of death in Hajj [17]. Blocking ambulances from reaching patients in peri-arrest is likely to result in the death of the patient [18]. Moreover, in the summer and early autumn, ambient temperatures in the region reach up to 45°C. Such extreme heat causes body temperature to rise resulting in dizziness, disorientation, hallucinations, and loss of consciousness. In extreme cases, especially when one is dehydrated, clots can appear in the blood vessels of the brain, resulting in a heat stroke. In Hajj 2018, the number of heat stroke cases reached 124 [19] and over the years, has become a major cause of morbidity and mortality [18]. Even if patients survive, there is a high risk of patients suffering from permanent paralysis [20]. Another hazard that requires

ambulances in Hajj involves pedestrian traffic accidents when people are walking in close proximity to dense traffic, resulting in traumatic injury [21]. One study revealed that of patients that were admitted to different surgical departments, 60% were involved in road traffic accidents [22].

When stampedes have occurred, pilgrims have been killed as a result of asphyxiation or head trauma [21]. Unfortunately, ambulances and paramedics are been unable to reach patients in large dense crowds. In the Hajj 2006 stampede, for instance, 363 pilgrims were killed and over a thousand pilgrims were injured [23]. Crowd crushes in Mina have always been a fear given the 1995 fire and the stampedes in 1990, 1994, 2004, 2006, and 2015 [24]. Due to major incidents, between 1994 and 2006, an estimated 1,300 pilgrims were injured and over a thousand pilgrims were killed. With over two million pilgrims gathered in close proximity under extreme heat, casualties and incidents are imminent, especially for patients with existing health conditions. As such, awareness of ambulance routes is imperative for pilgrims to allow paramedics access to reach patients in time and try to save their lives.

### SRCA medical response provisions

The primary emergency medical services operator for the Hajj is the Saudi Red Crescent Authority (SRCA). Over the years, reports have mentioned the MOH's high allocation of emergency medical staff. Estimates show that to provide all emergency and medical services to pilgrims inside and outside Makkah and other holy places, over 100 field teams consisting of over 1,800 people are allocated [25]. In Hajj 2012, the SRCA deployed 1,750 EMS providers and 600 volunteers to respond from 26 ambulance stations [26]. The MOH has been known to deploy a medical workforce for Hajj consisting of over 17,500 specialised personnel with more than 15,000 doctors and nurses [27]. Moreover, for a fortnight at Hajj time, around 30,000 medical staff, paramedics, and volunteers are reported to operate 24 hours [28]. For critical situations, authorities provide flying paramedics [29]. As of Hajj 2021, Saudi women have also joined the military to serve as guards during the Hajj season [30]. With pilgrims attending from over 120 countries, Leggio et al. describe that for non-Arab speakers, the SRCA use 'custom-designed picture books with facial expressions, anatomical graphics and medical and traumatic depictions ... to assist pilgrims in communicating the location and severity of their medical condition, illness or injury' [31].

A high number of ambulances are reported to have been deployed by the SRCA. For instance, in Hajj 2015, they deployed a fleet of 452 ambulances, nine mini ambulances, 21 SUV paramedics, 24 motorcycle units, and nine helicopters to operate as mobile intensive care units to handle field ambulatory emergencies [32]. Hajj 2016 included 57 large ambulances and 120 mini ambulances [33]. Special landing pads have also been constructed to lift ambulances to landing pads to transport patients by helicopter [7]. Another impressive provision by the SRCA is the highly-equipped mega-ambulances that are capable of handling several cases at the same time [32].

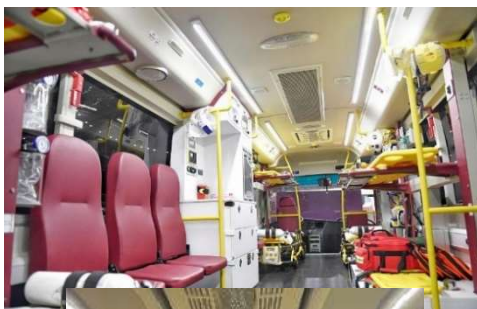
For Hajj 2023, preparations were made to provide seven such mega ambulances [34]; each one with a specific design, purpose, and even a name:

1. *Dhamak*: This ambulance was designed to deliver special equipment, wear, and shields, to tactical teams and paramedics.
2. *Haddadg* and *Sanad*: These two ambulances were designed to contain and deliver medical supplies to serve 90 injured people at a time (See Figure 2 below [35]). With main roads either shut down or blocked by crowds [36], these ambulances could help with medical supplies with less movement.
3. *Khuzam*: A four-wheel drive designed to reach difficult terrain and also contains medical equipment for the safety of paramedics and patients.
4. *Salma*: *Designed to respond to cases involving dangerous chemical spills.*
5. *Thurayya*: The design of this ambulance includes high-quality thermal cameras to monitor accident sites and provide an urgent response. Additionally, this ambulance contains a mobile operating room for communications.
6. *Tuwaiq*: This mega-ambulance is designed for multiple incidents within a crowd and can accommodate the transportation of ten patients at once. Tuwaiq also contains medical equipment, integrated first aid kits, and electric shock devices (see Figure 3 below [37]).

Ambulance routes lead to facilities prepared by the Saudi Ministry of Health (MOH) to help pilgrim patients.



*Figure 2: The Haddadg ambulance in Hajj 2022*



*Figure 3: Photos of The Tuwaiq ambulance at the Hajj Expo 2023*

During the Hajj season, the pilgrims can be treated at 25 hospitals; with 5,000 beds including 500 critical beds [27]. Historically, since Mina has seen the most incidents near the Jamarat Bridge and in the surrounding areas, Mina contains 28 healthcare centres and four hospitals [38]. These hospitals include: 1) Mena General Hospital (350 beds), 2) Mena Aljisir (207 beds), 3) Mena Alwadi (145 beds), and 4) Mena Almahbat (91 beds) [7].

Along the Jamarat Bridge are 17 emergency care centres to provide immediate healthcare access [39]. Furthermore, medical tents and mobile clinics, staffed with medical personnel and equipped with medical supplies, are strategically located in Mina and along the Hajj routes to Arafat and Muzdalifah. The total number of temporary and permanent rescue centres allocated by the SRCA exceeds over 150 centres [40]. Moreover, health care is provided free to all pilgrims.

D'Alessandro et al. [41] report that:

“During the 1433H/2012G Hajj, the SRCA answered 57,420 calls for assistance, with 20,210 responses that provided care to 18,230 patients. Of these patients, 34% were transported medical patients; 39% were non-transported medical patients; 11% were transported trauma patients and 16% were non-transported trauma patients.”

Moreover, In relation to Hajj 2017 (1439 AH), The General Authority for Statistics (GASTAT) reported that the Hajj medical team performed ‘142 cardiac catheterization procedures, 9 open-heart surgeries in addition to other 568 surgeries during the same period’ [42]. In Hajj 2018, the number of open heart surgeries reached 35 [43]. One report from 2018 mentions that the MOH carried out 1,280 blood transfusions [44].

To transport patients to these strategic locations, ambulance services are distributed within ‘hot zones’. The System A Medical Evacuation Plan [45] describes 302 ambulance fleets being stationed in these potential areas to allow for quick response in mass emergency cases. Additionally, the SRCA and the MOH have detailed documents that provide guidelines for the Hajj staff. Key documents prepared by the SRCA include operation plans for ambulance missions for Hajj [46], as well as general [47] and detailed plans for Hajj [48].

Likewise, key documents prepared by the MOH include the unified framework for emergency planning [49], medical evacuation plans [50], and the emergency plans

evacuation form [51]. According to these plans, several key roles are played by the EMS:

1. Pre-locating the ambulance teams within the hot zones
2. Following the pilgrims as they move from site to site
3. Being prepared to respond quickly to any incident
4. Leading the triage area
5. Treating patients on location including providing first aid to the injured
6. Transporting patients from the scene to a primary healthcare centre or a hospital
7. Executing the medical evacuation plan

## Hajj crowd management

The greatest difficulty, however, that ambulances face during Hajj is finding access to patients in large dense crowds [52]. Nevertheless, for Hajj 2016, the MOH introduced electronic GPS wrist bracelets [53]. Pilgrims were expected to wear these to provide authorities with demographic information to help track, manage, and control the crowd movement. Advanced versions of these bracelets have included information relevant to the identity of pilgrims; such as their names, ages, and nationalities; their location and accommodation; and importantly, information related to their health such as blood oxygen, pulse, blood type, allergies, and comorbidity. Additionally, the bracelets would allow pilgrim patients to request emergency medical assistance. Such facilities and gadgets have made the Hajj inclusive and welcoming to patients who would otherwise be incapable of performing the Hajj. The Hajj is also monitored by The Radio and Television Authority [13], which has over 1,200 employees. This authority, as described by GASTAT, broadcasts the Hajj through five satellite channels and six radio stations. Moreover, the Hajj rites are also broadcasted by the Audio-Visual Production Organization through nearly 250 satellite channels.

## The reality in the Hajj zone

Despite the generous allocation of resources and health and safety measures, ambulances are still stuck in Hajj.

According to Al Ruwaithi [52], among the main reasons for this phenomenon include problematic traffic control points (TCPs) and pilgrims sleeping on the streets and waysides.

## Traffic control points

A major problem EMS face is passing traffic control points during Hajj times. Ambulances are allowed to pass only on very rare occasions and according to strict limits. Despite radio communication and seeking permission for road access, their requests are reported to have been denied by traffic control officers – even sometimes when transferring critical patients. Although golf cart size mini ambulance vehicles would easily be able to pass through a large crowd, those too are restricted from passing TCPs.

Al Ruwaithi quotes a member of the Hajj workforce in his interview study that the situation was “normal” and that security forces permitted EMS to enter and pass freely until Hajj 2015 but it was from Hajj 2017 that “the strict control began”. Strict traffic control has also been reported to increase the average response time. The Operational Plan for the implementation of Ambulance Missions for the Hajj Season 2018 highlights that ambulances are required to adhere to the orders of the traffic police. Part of the guidance in the plan is to allow EMS coordinators to pass through. However, reports from ambulance crew members reveal that the police are known to block and barricade roads forcing even ambulances to take a U-turn or take other roads. EMS members have also reported that manoeuvring ambulances through TCPs causes unnecessary delays in reaching emergency cases, transferring patients to health centres, and returning to EMS stations. Another ambulance crew member reported that on one occasion he left the EMS centre at noon to deal with an urgent case 3 km away but reaching the patient took 40 minutes. Returning to the EMS centre, however, took two and a half hours. All interviewees from EMS systems in Al Ruwaithi’s study agree[d] that 1) TCPs significantly affect the ambulance dispatching process whether they see it a reasonable approach or not, and 2) there is a need for improving the coordination of those TCPs’.

## Sleepers on routes

Another problem that seriously hinders ambulance movement in the Hajj zone as highlighted by Al Ruwaithi is pilgrims deciding to sit or sleep on the sidewalks and even on the routes. Despite police intervention and government regulations to mitigate sleeping on routes,

the problem persists. Such pilgrims are not without accommodation, however, they choose to sleep on the routes rather than return to their accommodations to allow them to reach their destination quicker the next day. A large crowd of pilgrims, therefore, sleep on the Eastern borders of Mina on the night of the 9th to be able to proceed to Arafat the next morning or spend the last few nights sleeping on the Western borders of Mina or by the Jamarat Bridge for the remaining of the Hajj to be able to proceed to Mecca or to avoid travelling to and fro for the stoning ritual at the Jamarat.

Another problem that is created as a result of pilgrims sleeping on routes is that other pilgrims are blocked from reaching their destinations. Another challenge that authorities and pilgrims face in the Hajj zone is the beggars, peddlers, and squatters blocking the paths. Some pilgrims believe that spending the last few nights in Mina is a ritual obligation. Such doctrines further complicate the movement of pilgrims in the Hajj zone [54]. Resultantly, pilgrims are forced to find a different way and risk getting lost and confused. For patients with underlying health conditions, such detours in the heat, often involving a much longer route with slow-moving crowds would be perilous. In the case of non-Arabic pilgrims, finding their way back is even more difficult due to language barriers and remains a significant problem [55].

## Discussion

Hajj authorities must revisit their plans and consider the concerns raised by EMS and the SRCA concerning the right of passage at traffic control points. Ambulance delays have resulted in the deaths of pilgrims and so the facilitation of ambulance movement must be revisited to ensure that traffic bottlenecks are avoided and the response time is quicker.

To improve the Hajj experience for all parties involved, a recalculation of the Hajj zone along with an evaluation of ingress and egress models is crucial. Ambulance routes to emergency health care centres must be excluded from calculations and the intake of pilgrims needs to be based on the accommodation zones and other walkways. Ambulance routes could be paved in red and enclosed by high gates and guarded by the military to prevent pilgrims from trespassing. These pathways could also lead to medical centres in the Hajj zone; with the entire city consisting of white tents, medical tents could be red.

To ease the medical burden, countries Turkey, Malaysia, and Iran bring medical experts to Hajj to provide walk-in

care for pilgrims in their groups [56]. Also, organisations like the British Hajj Delegation [57], the Council of European Jamaats [58], and US-based Imamia Medics International Hajj Medical Mission [59] have been involved in health care for pilgrims.

Every group that attends the Hajj from abroad require a Hajj visa and, therefore, the number of pilgrims is limited. The Hajj visa process requires pilgrims to abide by health regulations. The process includes ensuring pilgrims are vaccinated against infectious diseases like yellow fever, meningococcal meningitis, polio, Covid-19, and seasonal influenza[60].

Another factor that could be added to the Hajj visa process is a psychological evaluation of individuals, especially those with underlying mental health conditions, to examine whether they are mentally prepared and that they would be able to respond rationally in large dense and slow-moving crowds in high temperatures. Patients with severe mental illnesses and those who suffer from high blood pressure due to stress would also be at risk of strokes and cardiac arrests [61]. In Hajj 2005, 92 patients were presented to psychiatric services for anxiety disorders (34%), mood disorders (22%), and psychotic disorders (20%) [62]. Likewise, anxiety can lead to the development of heart disease [63]. Hajj can also affect sleep patterns, which consequently can affect brain function. As such, disturbed sleep patterns in patients with underlying mental health illnesses could lead them to have panic attacks [64] and breathing difficulties [65]. In large dense crowds and temperatures, a pilgrim with underlying mental health issues can be a danger to others and themselves. Hajj is a journey that is meant to provide an opportunity for spiritual reflection. The purpose of Hajj must not be conflated as a form of therapy for mental health issues. Assuming that mental health is a result of djin influence that can be cured by performing Hajj can potentially be tragic.

Whilst the Saudi government are responsible for the crowd intake and its management in the Hajj, another key group includes private organizers and Hajj campaign leaders. Every pilgrim from abroad is required to join a Hajj group from their respective countries. Hajj operators worldwide commonly take the role of applying for visas on behalf of their group members. In collaboration with large mosques, people who intend to go for Hajj are invited to practice sessions where they are taught the rites of Hajj from a jurisprudential viewpoint. Hearing the grand virtues of kissing the black stone and performing prayers by the Maqam Ibrahim is common, however,

pilgrims in such training sessions are likely to underestimate the challenges of mass multi-lingual crowds and high temperatures. Findings from a study of 136,000 Indian pilgrims revealed that more resources and awareness are needed as 83% of pilgrims reported not being adequately informed about the actual difficulties involved during the Hajj [66].

To support the Hajj authorities, the Saudi Ministry of Hajj could collaborate with the Federation of Islamic Medical Associations (FIMA) to create Hajj crowd safety courses that could be mandatory to complete as part of the visa process. Key Hajj plans and maps could also be shared with FIMA to help promote the plan worldwide and so that pilgrims would be conscious to avoid negatively affecting EMS. In relation to maps, all personnel involved in the Hajj including the ambulance crew also require advanced navigation training in the Hajj zone. The training needs to prepare the ambulance crew to manoeuvre in difficult situations and learn to navigate the Hajj zones using key landmarks.

From the month of Ramadan onward, social media could be used to promote Hajj plans and warn pilgrims against trespassing on ambulance routes with a focus on health risks and mortality rates. Crowd safety videos could also be displayed by airlines as well as provide leaflets to pilgrims to read during their flights. Pilots could emphasise crowd safety to pilgrims upon landing. At the Hajj terminal, pilgrims wait for transport to be taken to their destinations; this wait can take many hours. The Hajj staff could deliver crowd safety sessions to pilgrims in person in various languages. Hotels that accommodate pilgrims could also show crowd safety videos intermittently.

A factor that could be contributing to the acceptance of Hajj deaths is the notion that death during the pilgrimage is considered praiseworthy. Such a belief might be rooted in an incident recorded during the Hajj of Rasulullah when a camel bucked and the pilgrim riding it fell to his death [67][68]. Rasulullah comforted those grieving that the deceased will be resurrected and when he does, he will continue to recite the talbiyah, meaning glorification of God. This report requires a few considerations; 1) Rasulullah is attesting to the case of one specific pilgrim; which further attests that the pilgrim was sincere in his Hajj and that the fall was accidental. 2) A similar case is found in a battle context when a person was found to end his own life and Rasulullah did not guarantee the same outcome. 3) The reward of Hajj is described as the pilgrim would be forgiven their sins committed against God, however, one's dealings with humanity such as

debts, oppression, and injustice remain a matter that must be settled through seeking forgiveness from those wronged. A pilgrim who avoids foul behaviour was described by Rasulullah to return to a state whereby they are as sinless as the day they were born [67][68]. As such, the purpose of Hajj was never to die therein, but to return alive and to continue living a spiritual life. Given this context, those responsible for the health and safety of the pilgrims must exert every effort to ensure lives are not lost in Hajj.

## Conclusion

The Hajj is one of the most aspired rituals by Muslims. The only country wherein the Hajj takes place is Saudi Arabia. As such, the burden of responsibility falls on the Saudi government to ensure the health and safety of over two million pilgrims. Accordingly, the Saudi government has certainly improved the Hajj zone by investing in grand constructions and expansions. The government has also showcased advanced surveillance technology for Hajj purposes along with impressively designed mega-ambulances. Thousands of personnel are deployed with supporting patients. The Hajj plan is also scripted in key documents. Despite such strenuous efforts, the challenge remains on the ground. Traffic control points and pilgrims sleeping on ambulance routes seem to trample these plans and render the authorities helpless.

Therefore, evaluating a range of ingress and egress models is crucial. Calculations for determining the intake of pilgrims must take into account the space required for ambulances and EMS. Ambulance routes could be paved in red and enclosed by high gates and guarded by the military. Medical tents could also be red. In relation to crowd management, the main obstacles that ambulances face need to be explored further; Is the interaction with walking pilgrims the main concern or that no specific routes are allocated for them? Hot spots in Mina, Arafat, and Muzdalifa where pilgrims crowd and block ambulance routes also need to be precisely located and investigated.

Moreover, whilst the Saudi government continue to revise and improve the Hajj plans, Hajj operators worldwide also need to take responsibility. All individuals intending to perform the Hajj must be psychologically prepared for the Hajj for instance, by passing a crowd safety course that could be required as part of the Hajj visa process. The Qur'an (5:32) states that to save one life is to save humanity whereas the killing of one individual is equal to killing humanity. Applying this verse to Hajj, the severity must be realised

that the ‘killing’ of even one pilgrim as a result of unnecessary and avoidable blocking of ambulances would be equal to the massacre of all pilgrims. Hajj operators must also emphasise that injustice toward patients in need of emergency medical attention is a matter related to the rights of people, a crime for which completing the rites of Hajj might not suffice to be forgiven. Rasulullah highlighted that ‘there is no intelligence like planning ahead’. Ultimately, a safe Hajj requires rigorous advanced planning that is collaborative between Saudi authorities and between Saudi Arabia and Muslim medical associations worldwide.

Lastly, concerning the future, Saudi Vision 2030 involves a trillion-dollar plan to create an awesome line. By contrast, the key question that lingers for now, is what investments are still required in the Hajj zone for pilgrims fighting for their lives to have a secure ambulance lane?

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