The Impact of Road Construction, Bad Road Maintenance and Motor-Vehicle Accidents on Human Health on the Abuja-Keffi Expressway: A General Literature Review.

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ABSTRACT

Background: The Abuja–Keffi Expressway serves as a critical transportation corridor connecting Nigeria's Federal Capital Territory to Keffi, Nasarawa State, and facilitating access to subsequent routes. This highway plays a vital role in the regional transport network, enhancing connectivity and supporting economic activities in the surrounding areas. The ongoing road expansion and interim traffic management may improve mobility and economic activity, but can also create short- and long-term health risks for commuters, workers, and nearby residents.

Methods: A structured literature review was used to synthesize evidence across three domains: (1) environmental risks from construction-generated dust, (2) road safety risks associated with temporary traffic controls (including one-way flow) and constrained capacity, and (3) psychosocial and systemic burdens attributable to severe traffic congestion, including air and noise pollution and stress-related outcomes.

Results: Construction activities often produce significant quantities of dust, which include fine particulate matter such as PM10 and PM2.5. Additionally, these activities may release potentially hazardous substances, including respirable crystalline silica and asbestos fibers. The reported and plausible effects associated with the situation include respiratory irritation and an increased risk of broader respiratory morbidity, particularly impacting vulnerable populations such as children, construction workers, and residents in proximity to work zones. The risks related to road safety may escalate under temporary traffic controls and periods of congestion, with the Karu Bridge area frequently identified as a critical hotspot. Extended periods of congestion and idling leads to heightened exposure to traffic-related pollutants, such as particulate matter (PM), nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOCs). Additionally, increased noise levels may contribute to stress and a decline in overall well-being.

Conclusion: The paper supports implementing dust control, strengthening traffic management/enforcement, and mitigating congestion, alongside coordinated public health monitoring and surveillance to identify and address emerging impacts.

Keywords: road construction, Abuja-Keffi expressway, one-way traffic management, pollution, psychosocial stress

INTRODUCTION

The Abuja-Keffi expressway is a vital artery of transportation, connecting the Federal Capital Territory of Nigeria, Abuja, to Keffi and other important areas beyond, such as Kaduna, Plateau, Nasarawa, Bauchi and Gombe States. Recognising the increased traffic movement and the need for more infrastructure facilities, all roads are being constructed at present. The existing two-lane carriageway is to be made into a six-lane dual carriageway, whilst the existing infrastructure shall be rehabilitated. The Federal Government has further indicated that the project is expected to be completed by June 2026 (1). While this critical infrastructure

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development promises long-term outcomes for further enhancements in transportation efficiency and economic activities (1), there must be an incisive inquiry into the immediate and possible long-term adverse effects thereof on human health. Before the current expansion project commenced, the Abuja region was already grappling with a substantial burden of environmental and health issues (2). This report, therefore, intends to analyze in full the multifaceted health impacts with particular emphasis on dust pollution from construction, increased risk of traffic accidents due to poor implementation of one-way traffic management during construction, and the overall health consequences arising from traffic congestion; all of these need to be tackled to safeguard the health and wellbeing of the affected population as a result of this significant infrastructure project.

Objectives And Scope

The primary objective of this report is to conduct an incisive analysis of the multifaceted health consequences stemming from the ongoing Abuja-Keffi expressway expansion project. This assessment utilises a structured literature review framework to clearly delineate and analyse three independently categorised risk domains :

1. Environmental Health Risks: Specifically, the acute and chronic morbidity associated with dust pollution generated during construction activities.

2. Road Safety Risks: The heightened frequency and severity of traffic accidents resulting from the implementation of temporary traffic management strategies, notably the one-way system.

3. Psychosocial and Systemic Health Burdens: The consequences of worsened traffic congestion, including air pollution, noise pollution, and psychological stress.

Environmental Health Risks Dust Pollution and Its Health Hazards from Road Construction

The Composition of Dust from Road Construction:

Road construction is a complicated process that entails various steps which generate dust in massive quantities. These steps include the excavation of materials beneath the earth, the crushing and handling of the construction material, along with the movement of heavy machinery; there may be demolition or alteration of existing infrastructure (3). Since the Abuja-Keffi expressway construction project involves demolition and/or change of old infrastructure, there is a potential threat of releasing asbestos fibres in the air if asbestos-containing materials were disturbed (4).

The Mechanisms of Dust-Related Health Problems and Their Short-Term Health Effects

Road construction-generated dust affects human health through various intricate pathways, which can broadly be classified under a few categories. The major exposure pathway, by far, remains the inhalation pathway (5). Dust particles of any size can be inhaled; however, it is the fine particles, especially those with an aerodynamic diameter of less than 10 μm, and even smaller ones (PM2.5), that are of much greater concern because they can reach the deep regions of human lungs (6)

Due to their super fine nature, some particles can enter the bloodstream, affecting the respiratory as well as the circulatory systems (5). Some components of construction dust, such as cement powder, can cause skin irritation or dermatitis upon contact (7). This kind of reaction could be dryness, itching, and redness of the skin; in severe cases, actual chemical burnings may take place (7). Dust particles in the eyes are likewise capable of causing irritation that results in redness, itching, watering, burning sensation, blurry sight, and inability to bear bright light (8). Ingestion is another way of exposure to dust, usually related to children who play in contaminated areas or contamination of food and water sources (7).

Dust exposure from road construction activities on the Abuja-Keffi expressway will, undoubtedly, affect immediate and short-term health problems on construction workers and members of the general public in the vicinity (6). One of the most common effects is respiratory irritation (5). Moreover, other types of pollution in the air, including construction dust has been associated with other health concerns in the short term, such as headache, nausea, vomiting, dizziness, blurring of vision, and even amnesia (8). The people whose lives are

negatively affected by the construction activities on the Abuja-Keffi expressway suffer immensely from the dust in the traffic-congested roads.

Long-Term Health Effects of Dust Exposure and How It Affects Vulnerable Populations:

The disease silicosis is characterised by scarring of the lungs, which leads to respiratory complications and can potentially result in death. Silicosis is currently not curable (9). This disease can develop from long-term exposure to low-levels of silica dust, like chronic silicosis or can develop more rapidly from exposure to high levels of silica dust, like accelerated and acute silicosis (10). Another chronic ailment known as asbestosis is caused by the long-term inhalation of asbestos fibers resulting in scarring of the lungs and thickening of lung tissue (4). Moreover, an increase in construction and renovation activities with older materials also leads to exposure to certain types of asbestos. These factors significantly increase the chances of developing lung cancer (5). Additionally, long term exposure to building construction and renovation dust can lead to chronic obstructive pulmonary disease (COPD), a chronic respiratory ailment, which greatly impairs one's ability to breathe because of inflammation and narrowing of the airways (11).

The health risks resulting from construction dust of the Abuja-Keffi expressway are not equitable throughout the population; some groups tend to be more sensitive to the negative outcomes. A child's developing respiratory system and still-maturing immune system put them at a heightened risk of long term damages to the lungs due to weaker breathing (12). This within itself, subjects young children to the risk of long-term respiratory infections. Grown adults are also at risk of suffering from chronic pre-existing disorders, but are subject to the risks of having conditions such as asthma and heart disease (5). Having any of these health risks makes individuals vulnerable to the impacts that construction site dust can have. Residents living around the AbujaKeffi expressway spinal sites are also at risk of contracting severe diseases due to the dust that settles into their businesses, homes, and even the air that they breathe (11).

The construction process also involves the frequent movement of large, slow-moving construction vehicles entering and exiting the work zones. If these movements are not carefully managed with clear signage, flagmen, and potentially designated lanes or time slots, they can disrupt the flow of general traffic and create hazardous situations that could lead to accidents (13). Furthermore, the severe traffic congestion that often results from road construction and accidents can lead to driver frustration and impatience. In some instances, desperate motorists may resort to driving against the designated flow of traffic ('one-way') on the opposite carriageway in an attempt to bypass the gridlock (14). This dangerous behaviour significantly increases the risk of head-on collisions and can create further chaos and hazards on the expressway, as witnessed following major incidents like the Karu Bridge explosion (15). Therefore, while the one-way system aims to enable construction work, its implementation requires careful planning, clear communication to road users, and robust enforcement to mitigate the potential for increased accident risks (14).

Road Safety Risks

Review Of Accidents On The Abuja-Keffi Expressway During Construction

Reports from various news outlets and official sources consistently indicate a high frequency of traffic accidents on the Abuja-Keffi expressway during the period of ongoing construction. The area around the Karu Bridge has, unfortunately, gained notoriety as a recurring accident hotspot (16).

One of the most catastrophic incidents involved a CNG-powered cement truck that exploded after experiencing brake failure near the Karu Bridge. The disaster caused a huge fire that engulfed many vehicles, leading to the death of 10 people and injuries to multiple others (17). Equally shocking is the fact that a second truck, which was carrying fertilizer crashed at the same spot after 24 hours, which clearly showed that the safety problems of the area had been persistent (18). However, no one lost their lives in the second incident (19). Apart from this, there have been numerous instances in the reports where trucks have lost control and collided with other vehicles due to brake failure (16). The most prevalent cause of accidents is dangerous driving practices, which include speeding, careless overtaking, flaunting of traffic rules, and driving of cars in poor motorable conditions (14). All these are significant contributors to the high number of accidents on the Maraba-Masaka axis of the Abuja Keffi expressway, especially those that occur at the down-slope sections (20). The Federal

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Road Safety Corps (FRSC) has consistently published the occurrence of accidents, and the media is inundated with stories about brake failures. They have also reiterated the importance of careful driving (21).

Health Outcomes of Accidents:

The frequent road accidents occurring on the Abuja-Keffi expressway during the ongoing construction are primarily resulting in significant direct health complications. The effects are huge and cover a variety of physical injuries, such as minor cuts and bruises, as well as severe trauma, fractures, extensive burns (as seen in the Karu Bridge truck explosion), spinal cord injuries, and other life-altering disabilities. A good number of these injuries may require specialised care, such as surgeries and long intensive medical care, which may eventually require long-term rehabilitation (17). Survivors and their families may also endure the psychological sequelae of this incidence such as severe anxiety, persistent fear of driving, post-traumatic stress disorder (PTSD), clinical depression, and bereavement, mainly requiring care from a mental health professional (23). Additionally, victims of road traffic accidents are generally in urgent need of medical care, with the corresponding healthcare system in peri-urban areas of Abuja and surroundings being particularly strained (24). While emergency medical services are already overextended, they might have to deal with an exceptionally large number of patients with limited resources (24). Overall, the combined occurrence of these accidents results in a massive public health problem, highlighting the critical necessity of the effective implementation of preventive measures and the provision of the necessary assistance to the affected parties.

Health Impacts Of General Traffic Congestion

Contribution of Road Construction to Traffic Congestion:

The nature of the construction work that is ongoing necessitates the diversion of traffic to a single lane (14). This reduces the highway's capacity to serve a regular number of cars that ply this road, leading to severe congestion (25). The net result of lane closures, slower speeds, and temporary diversions is that the duration of daily commute increases, interrupting economic routines (14).

Health Effects of Traffic-Related Air Pollution:

The increase in traffic congestion has resulted in negative environmental impacts as the air is highly polluted. When traffic is heavily congested, vehicles spend more time idling. This inefficient operation leads to a higher rate of emission of various harmful air pollutants from vehicle exhausts (25). These pollutants include fine particulate matter (PM2.5), coarse particulate matter (PM10), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOCs), and greenhouse gases (4). Prolonged exposure to these elevated levels of air pollutants can trigger or exacerbate a range of respiratory illnesses (13), such as asthma attacks, bronchitis, chronic cough, and chronic obstructive pulmonary disease (COPD). Studies conducted in Abuja have already indicated poor air quality and have established a link between air pollution and an increased incidence of respiratory diseases (4). Beyond these well-established effects, long-term exposure to the complex mixture of air pollutants emitted from vehicles in congested traffic can have broader systemic consequences, potentially contributing to the development of various forms of cancer, as well as damage to the liver and kidneys, and adverse effects on the central nervous system (8). Therefore, the increased traffic congestion on the Abuja-Keffi expressway, directly resulting from the construction activities, poses a significant public health hazard by exposing commuters and residents living or working near the corridor to higher concentrations of harmful air pollutants, thereby increasing their risk of developing or worsening a variety of respiratory and cardiovascular illnesses, alongside other potential long-term health problems.

Noise Pollution from Construction and Traffic:

The ongoing project is a major contributor to noise pollution, impacting road users and the surrounding communities. When the construction works are being undertaken, loud construction machinery, such as excavators, bulldozers and trucks, operating noisy construction methods, like jackhammering and pile driving, leading to noise pollution (26). This increase in road traffic creates further noise from the vehicles, the constant roar of idling engines, the honking of horns from frustrated road users, and the sound of moving vehicles, particularly during peak morning and afternoon rush hour periods (25). Previous studies conducted in Abuja suggest that the noise levels in both business and residential areas often exceed what the World Health

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Organisation (WHO) considers safe (26). In addition, unmitigated exposure to disruptive loud noise from construction and traffic can contribute to elevated stress and anxiety levels. Chronic stress over time can negatively affect psychological and physical health (23). Long and repeated exposure to loud disruption has also been correlated with increased risks of hypertension and other cardiovascular diseases (27). The significant increase in noise pollution caused by the Abuja-Keffi expressway construction and subsequent traffic congestion pose a substantial risk to the health and quality of life of the affected population.

Stress and Mental Health Consequences of Traffic Congestion:

Daily commute constantly delayed due to congestion is an inconvenience that has substantial repercussions on the mental health and psychological welfare of commuters (25). Dealing with the slow pace and unpredictability of traffic is a source of chronic stress and tension (23). The delays can lead to higher levels of anxiety, irritability and in some individuals, road rage (27). Wasting significant time in traffic can lead to people arriving late to work, school, or important meetings that will reduce productivity and cost money. Some people have noted the stress of perpetual traffic congestion has impacted their overall mental health and reduced their engagement with daily living activities such as work, socializing and exercise. Clearly, the road construction causing traffic congestion on the Abuja-Keffi expressway is more than just a logistical issue; because it is affecting the mental health and psychosocial well-being of these individuals travelling in their cars to and from the same place on a daily basis.

Existing Literature And Reports:

The current literature and reports elicit that the Abuja region is already confronting a range of environmental and health issues potentially worsened by the construction of the Abuja-Keffi expressway (28). The existing literature established causation between the exposure to air pollutants and the increased incidence of respiratory and cardiovascular illness and potential cancer among the population (3). Research specifically oriented to road construction workers in Abuja showed these workers are occupationally exposed to metal dust (especially lead) that has a demonstrated association with liver and other negative health outcomes (29). In relation to road construction projects in the Abuja area, there has been discussion of dust pollution related to the rehabilitation of the Old Bwari Road that has negative implications for respiratory health and illness of local residents (30). The Abuja-Keffi-Lafia traffic congestion is a well-studied and longstanding challenge with many studies and reports documenting its impacts on higher rates of air and noise pollution, longer and less predictable travel times, greater stress levels for drivers and commuters, and lower overall life satisfaction for the individuals impacted (8, 22, 26). As an example, the Abuja-Keffi-Lafia highway, which comprises the highway currently under construction, has consistently been reported as one of the high-risk transportation corridors in the country, with an alarmingly high number of road traffic collisions and associated fatalities recorded annually (8, 18, 22, 28). Therefore, the current body of research and reports strongly implies that Abuja is facing environmental related and transportation-related health risks. As such, the construction on the Abuja-Keffi expressway exacerbates already existing negative health factors, possibly compounding the risk to the health of individuals that live, work and commute in this area.

Health Surveys and Reports from Residents and Commuters

Reports and anecdotal evidence from a variety of news media provide some useful information about the health complaints and concerns of residents and commuters addressing the construction on the Abuja-Keffi expressway (20, 22, 23, and 27). Commuters have consistently made comments on their overwhelming frustration, and the burden they withstand, in response to the traffic congestion and the road closures (25). Oftentimes, daily commute is increased so dramatically that daily activities, and the economy are disrupted (22, 25). Residents and commuters have previously complained, multiple times, about the pervasive and often very heavy dust that the construction generates and its possible respiratory health risks and degraded air quality along the expressway (11). After serious traffic incidents and accidents, commuters have repeatedly called for alternative routes to escape the severe and often debilitating gridlock, to escape exposure to dangerous conditions on the congested highway (16 - 19). In fact, there are several reports indicating that regular, routine commute on the Abuja-Keffi expressway led to increased stress, anxiety, and feelings of total discomfort from the extended travel times and the difficulty of driving conditions due to construction (25, 28). This direct feedback, and the repeated patterns described by those most impacted by the road construction, are further

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evidence of the health impacts indicated through scientific research, and formal reports. The continual complaints of discomfort due to dust, the considerable stress of delayed traffic, and the stress and anxiety related to driving safely on the expressway, support the proposed potential negative health impacts of this major infrastructure project.

Mitigation Strategies And Recommendations

Dust Pollution:

To mitigate health risks from dust pollution from the Abuja-Keffi expressway construction it is important to implement a variety of control measures, and strategies to lower exposure for workers and members of the public. The most fundamental measure is the repeated and consistent water spraying of all active construction areas, the access roads where construction vehicles are travelling, and the exposed soil. Spraying water on surfaces will prevent floatation. Also, all stock piles of materials, primarily that containing silica or possible asbestos, any construction debris also needs to be properly covered with protective materials to avoid dispersion by wind. For construction activities identified as generating high volumes of dust (i.e. concrete cutting, grinding and drilling), the use of on-tool dust extraction systems is essential, especially for the health of construction workers (6). In addition, using an industrial vacuum with a high-efficiency particulate air (HEPA) filter to clean construction debris will provide the most effective means of removing dust particles, and should be required. To get a sense of the levels of dust and the effectiveness of measures in place, continuous air quality monitoring should take place at selected and local locations on the expressway and around neighbourhoods, monitoring fine particulate material (PM2.5), coarse particulate material (PM10) and silica dust (7). The results should be made available to the public, and residents should receive notifications about periods of higher concentrations of dust, so that they can take the proper precautions. In ensuring the health and safety of construction workers. It is essential to provide appropriate personal protective equipment (PPE) such as effective dust masks/respirators (with a proper fit); eye protection; and protective clothing. The use of PPE should be consistent and made mandatory, and visible enforcement of PPE should take place. To clean dust or debris on construction sites and nearby areas, wet cleaning methods (e.g., wet sweeping or vacuuming) should be a priority over dry sweeping or compressed air because the latter two methods can re-suspend dust back into air (7). Lastly, a construction project should be executed in clearly demarcated phases to shrink the total amount of exposed land at any given time. Good site best management practices should include required cleaning and ongoing dust control for the duration of the project. Construction should be scheduled for off-peak hours, especially when there is less traffic at night.

For Traffic Accidents:

Given the known rate of traffic accidents on the Abuja-Keffi expressway during construction and the one-way traffic, traffic management and safety practices must be improved and strengthened. An extensive review and overhaul of the traffic management plan should be done with a focus on accident hotspots, especially the Karu Bridge and Kugbo Hill locations. A new traffic management plan must include traffic management strategies for both peak and off-peak traffic, and contingency plans for accidents and unforeseen events. It is critical that all signs, as applicable to the one-way traffic system, lane closures, well-posted speed limits, required diversions, etc., are clearly visible, sized appropriately and sufficiently in advance of any of the above. Other road markings must be consistent and understandable enough to assist drivers with the new traffic patterns. Overall, there must be increased traffic law enforcement presence from traffic law enforcement agencies (FRSC, Nigeria Police Force) to enforce the traffic laws without exception. That includes observing speed limits, lane discipline and heavy vehicles' movement. The presence of patrols and speed monitoring implementations could be deterrence actions that dissuade reckless behaviour. To the fullest extent practicable, construction vehicle traffic should be physically separated from the general flow of traffic to minimise interactions and the potential for conflict. This could take the form of a designated lane or specific times for construction vehicle movement. Sustained public awareness and education campaigns are necessary to inform and educate drivers about the inevitable temporary one-way traffic system, to remind drivers to follow all principles of traffic regulation when operating their vehicles in construction zones, to promote awareness of the dangers of speeding and careless driving behaviour, and the need to maintain a vehicle regularly. There needs to be a systematic, mandatory safety inspection system for all vehicles to address the issue of accidents caused by mechanical failure, such as brake failure in heavy trucks, with proper enforcement of roadworthy

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standards. The FRSC, working with transport unions (i.e. National Union of Road Transport Workers (NURTW)) to implement pre-departure safety inspection checklists of commercial vehicles, could serve as a preventative measure. Finally, more haste should be made to complete and enable alternative roads to help divert traffic from the heavily populated Abuja-Keffi expressway. Intelligent traffic management systems (e.g. synchronized traffic lights at major junctions and the provision of real-time traffic information to commuters) could also facilitate a more effective use of resources.

For General Traffic Impacts:

An approach that limits the detrimental health impacts coming from heightened traffic congestion, air pollution, and noise pollution on the Abuja-Keffi expressway should be a collaborative, multi-faceted approach. In line with road safety best practices, the restriction of tricycles (*Keke*) and motorcycles (*Okada*) from the Abuja–Keffi Expressway is recommended. Given the high operating speeds characteristic of federal highways, these vehicles pose heightened safety risks due to their limited stability, erratic movement patterns, and lack of adequate physical protection. Their presence on high-speed roadways also interferes with traffic flow, increasing the potential for congestion and road traffic accidents. Enforcing such restrictions may reduce crash severity and enhance overall traffic safety on the corridor.

A considerable investment in and promotion of a reliable and efficient public transit system, such as bus rapid transit (BRT) systems or light rail, may persuade commuters away from vehicular commuting. Increased traffic management technologies, such as adaptive traffic signal control systems (e.g. adjusting signal tempo based on real-time traffic) that could be compounded with providing commuters with real-time traffic information (using mobile/ web-based, and e-board displays) can also improve traffic flow and efficiency, which lessens idling times. For pedestrians, there should be safe-crossing options available. Finally, a more comprehensive approach to urban planning, with respect to land use, should be considered in the longer term. When identifying residential, commercial, and workspace areas, planners should strive to keep them integrated spatially, in order to deter commuting from space to space in private vehicles. The noise reduction can be addressed by using noise barriers on certain sections of the expressway that pass through major residential or dense populations. Using noise barriers along the right-of-way (ROW) will lessen the impact of traffic noise on residents living along the expressway. For construction noise, regulations need to be established to restrict noisy construction activities to the daytime and limit their impacts on sleeping and everyday living, particularly at night. Another way to reduce health impacts from expressway emissions is to promote less polluting vehicle technology like electric vehicles (EVs) and compressed natural gas (CNG) vehicles. However, the safety and maintenance of CNG vehicles must be carefully monitored.

Public Health Monitoring and Surveillance:

To fully understand the long-term impacts on health associated with the construction of the Abuja-Keffi expressway, a public health monitoring and surveillance system needs to be established. This should include the conduct of baseline health surveys on a randomised sample of residents and commuters in the affected areas that are within the commuting zone, before the commencement of the major phases of the construction project. These surveys should document data related to respiratory health (including symptoms and diagnoses for conditions such as asthma and COPD), cardiovascular health (including blood pressure and event incidence), mental health (in terms of stress level, anxiety, and depression), and other health data. Follow-up surveys should take place at regular intervals throughout the duration of the construction project and after the completion of the project to determine any significant variations in these health outcomes. Similarly, health records from hospitals serving the communities along the Abuja-Keffi expressway should be periodically reviewed to identify trends or spikes with regard to hospital admissions for respiratory illness, cardiovascular events, accident-related injuries, and any other illnesses that could potentially relate to the construction project. A rigorous and continuous environmental monitoring program should be initiated to monitor aspects of air quality (levels of air pollutants including PM2.5, PM10, silica dust, heavy metals, nitrogen oxides, and carbon monoxide) and noise above ambient and background levels at multiple preselected well-chosen locations on the expressway, as well as some locations of nearby residential areas. Finally, the environmental monitoring data should be considered with the health outcome data to establish if there are potential relationships between changes in public health and exposure to pollutants going above background levels. In addition, a formal public health complaint registry, which is easy to access, needs to be created for residents and drivers to report any health complaints and concerns that they consider to be related to the road construction activities. The registry should be monitored regularly and have public health staff investigate complaints as soon as possible,

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as a way to detect the development of health concerns or trends over time. Monitoring programs should also be developed that focus specifically on vulnerable populations, including children, the elderly, people with pre-existing respiratory or cardiovascular illnesses, and construction workers, to assess the impact of the construction on health and identify interventions when necessary.

CONCLUSION

The ongoing road construction along the Abuja-Keffi expressway has an extensive and complex risk to human health. There are severe hazards of dust pollution exposure from construction activities, a potential increase in the number of traffic accidents from a one-way traffic flow while construction is taking place, and a severe burden from traffic congestion leading to increased air pollution, noise pollution and psychological stress for residents and commuters. In conclusion, a set of robust mitigation strategies which have been outlined in this report must be upheld and enforced to proactively safeguard the health and well-being of affected populations, primarily:

(1) construction workers;

(2) commuters that utilize the expressway on a day-to-day basis; and

(3) residents who live in close proximity to the construction activities.

Additionally, it is also critical that a cohesive and sustainable public health monitoring and surveillance system is established. This would effectively track the longer-term health effects of the project, quickly identify and mitigate any health effects that might emerge, and provide additional data and knowledge that can be relayed and built into other planned infrastructure works in Nigeria and other countries in the future. Ultimately, it is a collective effort to ensure that this important infrastructure project is delivered in a manner that reduces public health harm as much as possible, and it needs a serious commitment from all stakeholders, which includes government agencies at all levels, the construction company undertaking the project, traffic management agencies, health care providers, the commuters who travel along the expressway, and the residents who live in the area.

Key Table

Table 1: Causes of Reported Accidents on the Abuja-Keffi Expressway (in-text citation can be found in the table).

Date (Reported)	Location	Description of Incident	Reported Cause(s)	Fatalities	Injuries	Works cited
March 2025	Karu Bridge	CNG-powered truck explosion involving 18 vehicles	Brake failure	10	25	[16, 17]
March 2025	Karu Bridge	Fertilizerladen truck collided with Hijet and dump truck	Not reported	0	0	[18]
May 2025	Abuja-Keffi Expressway	Trailer's collision with pure water vehicle crushed	Brake failure	0	Several	[31]

June 2019	FCT (general)	Highest number of road crashes recorded in Nigeria for the month	Not specified	29	295	[22, 23]
Dec 2023	Abuja-Keffi	Truck hit a luxurious bus and two other stationary vehicles	Brake failure, indiscriminate parking	0	6	[13, 15]

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APPENDIX: Some Pictures of the Abuja-Keffi Expressway during the ongoing construction.

Figure a.

Figure a: Vehicles in a gridlock at peak hours.

Figure b.

Figure b: Vehicles moving on a one-way flow to avoid traffic congestion and dust pollution due to the road construction

Figure c.

Figure c: Disturbing image of a truck on the Abuja-Keffi expressway

Figure d.

Figure d: Flooding of the Abuja-Keffi expressway on a typical rainy day.

ABBREVIATION

1. National Union of Road Transport Workers (NURTW)
2. Chronic Obstructive Pulmonary Disease (COPD)
3. Federal Road Safety Corps (FRSC)
4. Post-Traumatic Stress Disorder (PTSD)
5. Fine Particulate Matter (PM2.5)
6. Coarse Particulate Matter (PM10)
7. Nitrogen Oxides (NOx)
8. Carbon Monoxide (CO)
9. Volatile Organic Compounds (VOCs)
10. High-Efficiency Particulate Air (HEPA)
11. Personal Protective Equipment (PPE)
12. Bus Rapid Transit (BRT)
13. Right-Of-Way (ROW)
14. Compressed Natural Gas (CNG) 15. Electric Vehicles (EVs)

Authors Contributions

The authors confirm contribution to the paper as follows: study conception and design: Adekeye Author; data collection: Umoti Author; analysis and interpretation of results: Authors, Adekeye and Umoti. draft manuscript: Umoti Author. All authors reviewed the results and approved the final version of the manuscript.

Conflict Of Interest

The authors declare no conflict of interest.

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