

VITAL SIGNS

KILLER HEAT:

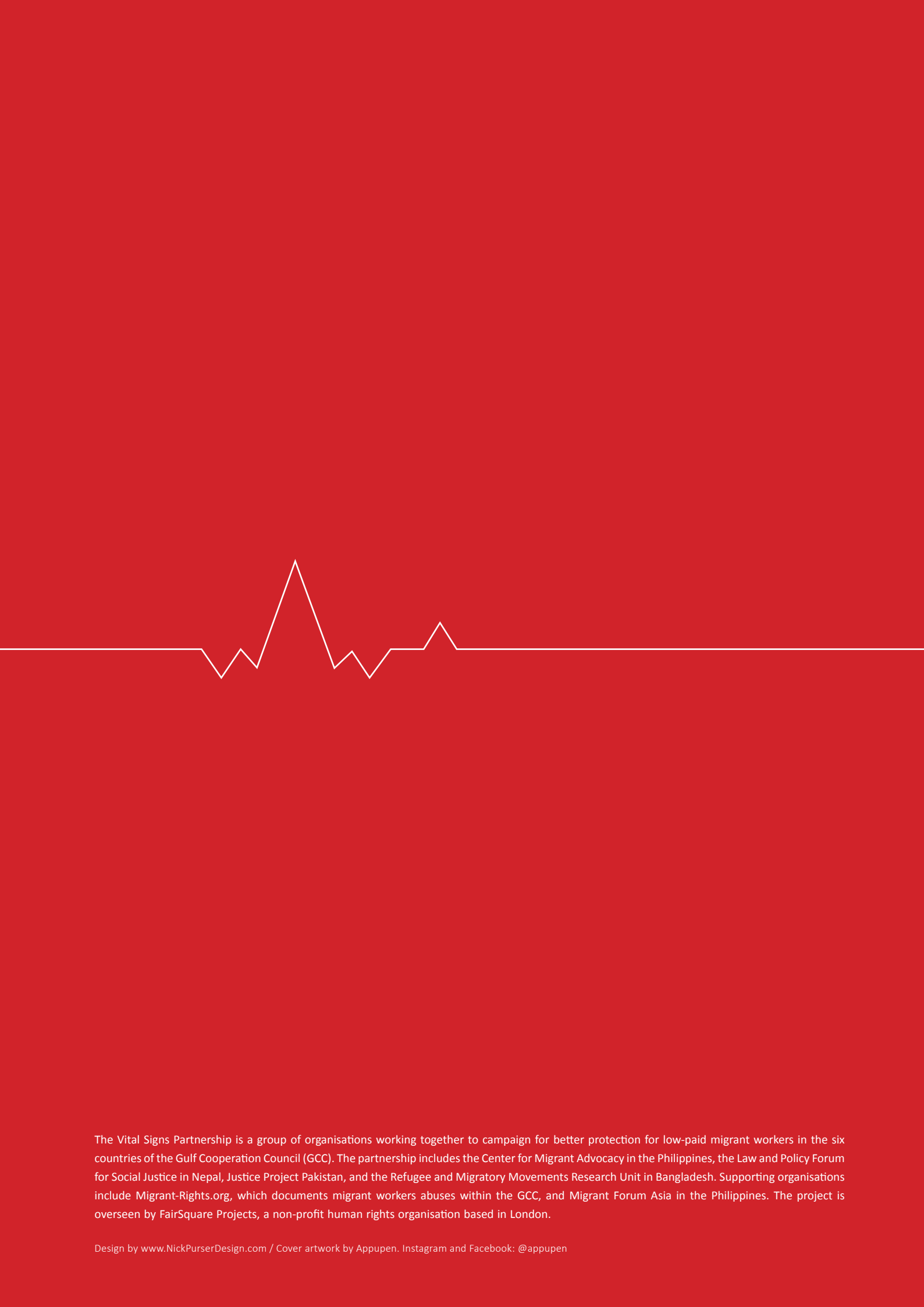
THE IMPACT OF EXTREME TEMPERATURES AND CLIMATE
CHANGE ON MIGRANT WORKERS IN THE GULF

REPORT 3 / JUNE 2023



vitalsignsproject.org





The Vital Signs Partnership is a group of organisations working together to campaign for better protection for low-paid migrant workers in the six countries of the Gulf Cooperation Council (GCC). The partnership includes the Center for Migrant Advocacy in the Philippines, the Law and Policy Forum for Social Justice in Nepal, Justice Project Pakistan, and the Refugee and Migratory Movements Research Unit in Bangladesh. Supporting organisations include Migrant-Rights.org, which documents migrant workers abuses within the GCC, and Migrant Forum Asia in the Philippines. The project is overseen by FairSquare Projects, a non-profit human rights organisation based in London.

Design by www.NickPurserDesign.com / Cover artwork by Appupen. Instagram and Facebook: @appupen

CONTENTS

Executive Summary	4
<hr/>	
1. About this report	10
Methodology	10
<hr/>	
2. How heat affects the human body	12
Cognitive impairment	12
Workplace accidents	13
Organ damage	14
<hr/>	
3. How hot is the Gulf?	18
What the climate data shows	20
<hr/>	
4. Inadequate heat protection measures in the Gulf	25
<hr/>	
5. (Lack of) data on impact of heat on workers	30
<hr/>	
6. Conclusions and recommendations	33
<hr/>	



EXECUTIVE SUMMARY

This report is the third from the Vital Signs Partnership, a coalition of human rights organisations working to research the deaths of migrant workers in the Gulf states, and to promote enhanced protection for workers' health. Our first report attempted to quantify and explain the deaths of low-paid migrant workers in the six states of the Gulf Cooperative Council (GCC) and identified serious and systematic problems in the manner in which deaths are investigated in the GCC. The second described the various barriers that prevent workers from accessing non-emergency healthcare in the region and identified these as a factor in the exceptionally high-rate of unexplained deaths of migrant workers.

In this report, we explore how extreme temperatures and the Gulf states' abusive labour practices combine with devastating consequences for the health of migrant workers. We find that long-term exposure to extreme heat leads to chronic health problems which require lifelong treatment. Despite the acute risks to health, and the potential contributory role of heat in a variety of diseases and other negative health outcomes, data that is crucial to a better understanding of how to prevent these problems is missing: there is almost no data on the

impact of heat on migrant workers, and the available data on migrant worker deaths does not register any fatalities to heat stress, nor record heat as a contributory factor in any deaths.

Anyone who has visited the Gulf states knows how hot the region is. But for migrant workers exposed to this heat on a daily basis, carrying out strenuous labour, it is punishing and potentially deadly. Workers described the physical effects of heat in the Gulf in graphic terms to Vital Signs researchers. A man who worked on construction projects in the UAE said that the heat was so intense that sweat would leak from his boots. For an electrician who was responsible for laying underground cables in Saudi Arabia, the ferocity of the heat felt like an imminent threat to his life: "Ten minutes after the bus dropped us off at the work site, I felt like life was exiting my body," he said. His co-workers would faint regularly as a consequence of the heat. Although he was considered good at his job and was in line for a promotion, he chose to return to India because the conditions in the Gulf were unbearable. Another worker in Saudi Arabia, who had to unload goods including bags of cement as part of his job at a hardware store, found the Gulf to be "three times as hot" as India.

Impact of extreme heat on the body

According to the World Health Organisation (WHO), exposure to excessive heat has wide-ranging physiological impacts for all humans, often exacerbating existing health conditions and resulting in premature death and disability. Extended periods of high day and night time temperatures create cumulative stress on the body, and can exacerbate the impact of respiratory and cardiovascular diseases, diabetes and kidney disease. Rapid rises in heat gain due to exposure to hotter than average conditions compromise the body's ability to regulate temperature and can result in what the WHO describes as "a cascade of illnesses", including heat cramps, heat exhaustion, hyperthermia and heat stroke. Even minor differences in seasonal average temperatures are associated with increased illness and death. Heat simultaneously affects cognition. Epidemiologist Dr Barrak Alahmad comments that, "there is emerging evidence that judgement is impaired during exposure to extreme heat," increasing the risk of occupational injuries, particularly in high-risk sectors such as construction.

Heat can severely impact internal organs, with the heart and kidneys being particularly susceptible to substantial damage. There is a very strong association between extreme heat and heart failure, heart attack, arrhythmia and stroke. Five consecutive days with a peak temperature over 32°C resulted in a 20% excess of such deaths among Nepalis in Qatar; for 11 consecutive days, that figure increased beyond 150%.

The Global Heat Health Information Network has noted that in the workplace, heat stress can affect the safety and health of workers engaged in physical effort at considerably lower temperatures than it would affect inactive people. Construction workers are particularly at risk of heat stress, given the physically demanding nature of the work, the long exposures to thermal radiation, and personal protective equipment that reduces the efficiency of sweating and heat loss through evaporation. Strikingly, an analysis from Kuwait found that the risk of workplace injuries was much higher; the risk increased by an average of 35% for a 1°C increase in summer temperatures.

A significant 2021 study by renowned climate change specialists including Elspeth Opperman, Todd Kjellstrom, and Jason Kai Wei Lee found that chronic heat exposure is just as critical for health as sudden temperature spikes during heat waves. Chronic exposure to persistently hot conditions ought therefore to be regarded as a 'slow onset event', with exposed workers being the 'canary in the coal mine', as they are likely to experience the damaging effects of this heat sooner.

Chronic Kidney Disease

Global concern is growing regarding the development of kidney injury and chronic kidney disease (CKD) - a fatal, progressive loss of kidney function - in people who frequently perform physically demanding work in the heat. A recent review by experts including Christopher Chapman and Hayden Hess has suggested that CKD and/or acute kidney injury are present in 15% of individuals who frequently work in hot environments, and the current scientific literature suggests that the frequency of occupational heat exposure may be related to the prevalence of kidney injury and kidney disease. In Central America, an epidemic of CKDnt is occurring among manual labourers and may have killed more than 30,000 sugar cane harvesters. The illness is also afflicting people in non-agricultural sectors, including construction, brick making, mining, and the fishing industry. Hotspots of CKDnt have also emerged in India and Sri Lanka, and there is increasing concern of CKDnt affecting workers in the United States, Chapman and Hess note.

Professor Vivekanand Jha, Executive Director at The George Institute for Global Health, India, and Chair of Global Kidney Health at Imperial College London told the Vital Signs Partnership that there is a clear association between CKDnt (chronic kidney disease of non-traditional origin) and abusive work in extreme heat. Dr. Md Dilder Hossain Badal, a nephrologist at Dhaka Medical College Hospital told Vital Signs partner members RMMRU that they received many patients with kidney problems that developed while working in the Gulf and attributed this to their exposure to the Gulf's heat and not consuming enough water to compensate for water lost as perspiration.

Two workers suffering the debilitating impact of chronic kidney disease after spells in the Gulf shared their experiences in detail with the Vital Signs Partnership. Sujan Thami, a 40-year-old migrant worker from Nepal worked as a plumber in Qatar in what he described as "searing heat" six days a week, often from the early hours of the morning until midnight, which left him "extremely exhausted". His accommodation resembled an "abandoned house", without air-conditioning and at his workplace, 100 workers shared a single water point. After only nine months in Qatar, Sujan began to experience blurred vision, headaches, and vomiting, and medical tests revealed that his kidneys were not fully functioning and that he needed immediate dialysis. Since returning to Nepal almost four years ago, he has lived with his sister in Kathmandu, close to the National Kidney Center for his tri-weekly dialysis. A kidney

transplant is unlikely due to the cost. “I don’t know how much longer I will live,” says Sujan. “I may die at any time.”

Another Nepali worker, Ganesh, went to UAE in 2018 to work as a lifeguard, and spent 12-hour shifts at the outdoor rooftop swimming pools of apartment blocks. “The ground was so hot I couldn’t touch it with bare feet,” he recalled. “It would burn my skin. You can’t imagine how hot it was.” Taking breaks led to complaints from the apartments’ residents and his employer. He often felt faint, developed heat rashes and sweated so heavily that his clothes would be completely drenched, but he had limited access to drinking water- just one bottle a day- and no time to eat. To compound the long hot days, Ganesh struggled to sleep at night. About a year after returning to Nepal, he experienced leg pain, abdominal bloating and vomiting and found himself struggling to breathe. Doctors diagnosed kidney failure, which he suspects resulted from his living and working conditions in the UAE. He does not have enough money for a life-saving transplant. “I don’t have a single rupee now,” he said. “My dad has already died, I should be taking care of my family. But I became like this. What can I do?” Ganesh has an 11 year-old daughter.

Dr. Rishi Kumar Kafle, Executive Director and Chief Nephrologist at Nepal’s National Kidney Center, told the Vital Signs Partnership that the numbers of Nepalese workers returning from the Gulf with chronic kidney disease was increasing and lamented the lack of coordinated government action on the issue, which leaves impoverished nations like Nepal footing the bill for costly dialysis and returnee migrants themselves having to pay for things like syringes, blood, and iron. “Nepali Workers go to the Gulf to earn money, but return with kidney disease”, he said Gulf nations are rich, they’re resourceful. They invite people from abroad to work for them. That’s okay, but they should provide safe working conditions. Why are these wealthy Gulf nations not doing anything for these workers?”



Heat risks in the Gulf

For migrant workers, the reality of life in the Gulf is one of exposure to dangerous levels of heat for extended periods of the year. The US Centers for Disease Control and Prevention (CDC), and the National Institute for Occupational Safety and Health (NIOSH) recommend that rather than air temperature, exposures to environmental heat should be expressed as so-called Wet Bulb Globe Temperature (WBGT) values. WBGT is a composite measure which incorporates air temperature,

humidity, wind speed and sunlight (or radiative heat) to assess the environmental heat risk to human health.

NIOSH finds that the risk of heat-related injury begins for *acclimatised* workers doing *moderately* strenuous work when the WBGT reaches as low as 28°C. For non-acclimatised workers, the threshold is even lower. WBGT temperatures in the Gulf routinely exceed these levels. For example, WBGT data from Dubai in the UAE since 2010 shows that workers are at risk from May to October inclusive, with peaks of extreme risk in June, July, August and September.

The Vital Signs Partnership commissioned Barrak Alahmad, a research fellow in the Exposure, Epidemiology and Risk (EER) Program at the Department of Environmental Health at Harvard T.H. Chan School of Public Health, and Dominic Royé, head of data science at the Foundation for Climate Research (FIC) in Madrid, to analyse climate data on the Gulf and to explain what the data shows both in terms of the current and projected risks from heat to workers. Their analysis, which included the latest state-of-the-art climate change projection models downscaled from NASA (NEX-GDDP-CMIP6), found:

- The Gulf is extremely hot for extended periods of time. In most parts of the Gulf, there are between 100 and 150 days when maximum daily temperature exceeds 40°C. For the same period, the annual average in New Delhi is 24 days. Extreme temperatures are not rare “heatwave” events in the Gulf, but present for three to five months of every year.
- The Gulf states are set to experience hugely significant increases in the number of extremely hot days even if global warming is kept at 1.5°C, and potentially catastrophic increases if global warming reaches 3°C. These latest models show that in Abu Dhabi, for example, the capital of the UAE which is this year hosting the COP28 climate summit, the number of hot days will have increased by 51% by the middle of the century if global temperatures increase by 1.5°C, and by 98% by the end of the century if global temperatures increase by 3°C. A 3°C increase will see Kuwait, Bahrain and Saudi Arabia experiencing 180 days out of 365 days where the temperature exceeds 40°C.
- The Gulf region experiences dangerously hot night time temperatures, as well as extremely hot days. For example, in June 2022 the temperature dropped below 30°C only eleven times during 28 days, and was above 30°C for 278 out of 290 night hours (between sunset and sunrise).

Barrak Alahmad told us he was “horrified and deeply alarmed” at the prospect of areas of the Gulf experiencing 180 days out of 365 days where the temperature exceeds 40°C. Alahmad said that even under more optimistic mitigation scenarios like 1.5°C these temperatures would markedly increase heat-related deaths in the region and that the consequences were impossible to predict. “These conditions could seriously disrupt human societies in ways we are just beginning to understand.” In relation to night-time heat, Dominic Royé told the Vital Signs Partnership that “poor and insufficient sleep, which is more likely to occur during hot nights, can increase chronic diseases and accidents.”

There is already evidence to suggest that heat in the Gulf is a contributory factor to migrant worker deaths. A 2020 study of migrant worker deaths in Kuwait found that non-Kuwaitis had a higher relative risk of death from hot temperature exposure, with working age non-Kuwaiti men having a double to triple risk of mortality in extreme hot temperature days. A 2019 study, published in the medical journal *Cardiology*, on links between heat stress and cardiac mortality in Nepali migrant

workers in Qatar found a strong correlation between average monthly afternoon heat levels (WBGT) and cardio-vascular disease deaths.

Lack of protection from heat

None of the six Gulf Cooperation Council (GCC) states have laws that adequately mitigate the risk posed to outdoor workers by its extremely harsh climate. Each country operates a rudimentary summer working hours ban that imposes a blanket ban on work at certain hours of the day during the summer months. There is a striking lack of consistency in the hours of the day and the times of the year when these various bans are in force, which underscores the rather arbitrary and non-scientific character of these protections. For example, the UAE bans work for 232.5 hours each year, approximately half as much as Kuwait, and 40% of the hours banned in Qatar.

Summer hours working bans across the Gulf

Country	Dates ban in force	Hours of ban	Mandatory work stoppages per year
Bahrain	1 July to 31 August	12pm - 4pm	248 hours
Kuwait	1 June to 31 August	11am - 4pm	460 hours
Oman	1 June to 31 August	12.30pm - 3.30pm	368 hours
Qatar	1 June to 15 September	10am - 3.30pm	588.5 hours
Saudi Arabia	15 June to 15 September	12pm - 3pm	279 hours
UAE	15 June to 15 September	12.30pm - 3pm	232.5 hours

In May 2021, Qatar passed a Ministerial Decision extending its ban on summer working hours to 588.5 hours a year and introducing additional measures requiring employers to mitigate the risk to workers from Qatar’s harsh climate, including steps that employers should take to modify work schedules in response to different levels of heat stress. These measures offer workers greater protection from climate risks as compared to Qatar’s previous legal framework and are better than the protective measures in the rest of the GCC, largely on account of Qatar increasing the length of time that blanket work bans are in force. However, according to experts who spoke to the Vital Signs Partnership, the law not only falls short of what is needed, but fundamentally fails to adopt a robust scientific approach that is based on protecting workers from risk.

Professor David Wegman, an expert on health and safety in the construction industry, has described the Qatari legislation as “an improvement that falls far short of what is necessary for the protection of labourers who are subject to heat stress exposures of all types”. Wegman emphasises the critical importance of balancing work and rest periods, and the importance of regulating temperatures in workers’ accommodation: “Inadequate cooling and recovery after heat stress, and heat stress combined with even minor infections, is likely to compound the risks of working in heat,” he commented.

Professor Natasha Iskander offered similar views on the likely ineffectiveness of the Qatari law and its potential to encourage “self-pacing” in Qatar’s construction sector: “For workers to self-

pace, they need to be able to consistently and reliably exercise autonomy at the worksite.... in Qatar, that is almost impossible to imagine....the notion that workers could self-pace is fanciful. The larger issue is that this law... gives [companies] legal cover. If a worker suffers from heat injury, now or in the future, then it henceforth becomes their fault, formally and legally, for not self-pacing well enough.”

Barrak Alahmad with other researchers at Harvard and Kuwait Institute of Scientific Research showed that the summertime midday ban in Kuwait did not result in reduction of workplace injuries. Alahmad argues for a quantifiable, risk-based method that can be applied indoors and outdoors, for all hours of the day uniformly to protect workers. This is a long-standing approach in occupational health, such as the regulation of exposure to benzene, a carcinogenic gas found in factory settings. Alahmad points out that this approach fundamentally differs from Gulf state regulations, including the 2021 Qatari heat law: “You can’t say workers are banned from exposure to benzene from June to August. You have a measurement to limit exposure. Why don’t we have the same thing for heat?”

No data on deaths or injuries from heat

Despite the dangerous risks presented by the combination of exertional work in often abusive conditions and the extreme heat of the Gulf region, there is almost no data on the impact of heat on migrant workers, and the available data on migrant worker deaths does not register any fatalities due to heat stress across the region, nor record heat as a contributory factor in any deaths. The lack of any data on heat-related deaths reflects broader failures in relation to the investigation and certification of migrant worker deaths in the Gulf. The first Vital Signs report found that of the approximately 10,000 deaths of migrant workers from south and southeast Asia in the Gulf annually, more than one out of every two are effectively unexplained, with deaths officially certified without any reference to an underlying cause, and terms such as “natural causes” or “cardiac arrest” appearing on death certificates instead. The high rate of unexplained deaths is also partly a factor of the systemic obstacles that migrant workers face when trying to access healthcare in the Gulf, as previously documented by the Vital Signs Partnership in its second report.

One Nepalese doctor we spoke to in the course of our research noted that if a patient’s medical history is not available and doctors don’t see the patient’s symptoms prior to death, “they have few clues as to what caused their death ... unless

an autopsy is performed.” This is a problem in the Gulf where traditional autopsies are the subject of some sensitivity and are carried out very rarely. Professor Dr. Harun-Ur-Rashid, Professor from Sir Salimullah Medical College Mitford Hospital in Dhaka told the Bangladeshi rights group RMMRU that Bangladeshi health authorities could perform autopsies on bodies that returned without a recognised cause of death on the death certificate, but currently no origin states do this as a matter of course.

The first Vital Signs report recommended that the Gulf states establish specialised teams of inspectors and medical examiners to ensure that all deaths of migrant workers are investigated and certified in accordance with international best practice, and that they introduce non-invasive and verbal autopsy procedures. No such steps have been taken.

The absence of any useful data on this issue is all the more alarming in light of the existence of numerous studies that have clearly established a causal link between extremely high temperatures and increased rates of death in other parts of the world. Good data is key to identifying the role of heat in deaths, because in individual cases, as noted by Natasha Iskander, it can be “difficult to discern under the best of circumstances” and “a definitive determination through autopsy is difficult”.¹ Barrak Alahmad told FairSquare that it can be common for overworked doctors to miss such cases when certifying deaths. Both experts concurred on heat’s long term contribution to a wide variety of potential fatal diseases. “Public Health doctors and epidemiologists are able to detect [the contribution of heat as an underlying cause of deaths] statistically by looking at a time series variations of population deaths and temperature”, said Barrak Alahmad. By way of recent example, the European heatwave of 2022, for example, saw the deaths of more than 15,000 people, according to data from public health authorities in countries affected. The risks in the Gulf are far more extreme, yet we know nothing about the scale of the problem.

There are approximately 30 million migrants in the Arab Gulf states, accounting for 52% of the region’s total population of 58 million, and the economies of the Gulf states are reliant on migrant labour. As Natasha Iskander commented, “the region’s economic system is existentially dependent on migrant workers” and without their labour, “Gulf states’ geopolitical power could not exist, their wealth could not exist, their cultural production, their urban spaces - none of it.” Protecting them from the Gulf’s extreme and worsening climate should be a political priority.

This year the Gulf hosts COP28, the crucial global climate conference, with the UAE leading negotiations as president. In May 2023, the UAE announced that for the first time, a day of

1. Email from Natasha Iskander, 6 June 2023.

the talks would be specifically dedicated to the health impacts of climate change, with the COP president announcing that “the most vulnerable communities, across the global south, who have done the least to cause climate change, are the most affected”. The focus on health impacts for global south communities is to be welcomed, and it is essential that discussions at COP28 extend to include such impacted communities within the UAE and the Gulf region, who are exposed to some of the most brutal impacts of extreme and rising temperatures.

Protecting workers from exposure to heat requires ambitious action and includes enabling workers to access adequate accommodation, nutrition and healthcare. Current heat protection measures in the Gulf are inadequate. but the Gulf countries have an opportunity to step up their approach and lead the way in setting a high standard for others to follow.

They should:

- Adopt a risk-based, rather than a calendar-based, approach to limit workers’ exposure to heat. Pass legislation to ensure that employers are required to provide workers with breaks of an appropriate duration, in cooled, shaded areas, when there is an occupational risk of heat stress; mandatory break times should take into account the environmental heat stress risks along with the exertional nature of the work being performed.
- Require all employers to ensure workers have easy access to water and chilled food storage facilities at work sites, and fully air-conditioned accommodation, and stress to employers that air conditioning is a health and safety priority.
- Ensure access to primary health care where preventable conditions are identified early and avoided.
- Conduct a study into the prevalence of CKDu or early stage kidney disease among low-paid migrant worker populations.
- Establish specialised teams of inspectors and medical examiners to ensure that all deaths of migrant workers are investigated and certified in accordance with international best practice.
- Commission independent investigations into the causes of migrant workers’ deaths and ensure that any investigation examines the possible role played by heat and humidity, as well as other risk factors such as overwork, air pollution, psychosocial stress, and workers’ ability to access health care.
- Commit to funding the healthcare costs, including kidney dialysis, of migrant workers who return to their countries requiring treatment for chronic kidney disease they contracted in the Gulf.

Origin states that send significant numbers of workers to the Gulf to work in the low-paid sectors of its economy have a critical role to play in ensuring protection from heat. They should:

- Call on the Gulf states to: enhance investigation procedures for migrant worker deaths; commission independent investigations into the causes of migrant worker deaths; enhance legal protection from heat stress.
- Make available all historical data on deaths of overseas workers, disaggregated by destination, occupation, age, gender, date of death and cause of death. This data should be available online and presented in a way that facilitates effective analysis by public health experts. It should be accompanied by accurate, detailed data on the numbers of nationals in each Gulf destination state.



Artwork by Appopen

1. ABOUT THIS REPORT

In this report, we outline how the human body is affected by physical work in extreme heat. We show that the Gulf is dangerously hot for extended periods of the year, placing migrant workers doing physically demanding jobs outdoors at extreme and disproportionate risk. Drawing on climate data, we describe that risk and examine the inadequacy of current heat protections in mitigating that risk. Due to systematic failures in the manner in which migrant worker deaths are investigated and certified (as documented in the first report in this series) it is not clear how many migrant workers die directly from heat stress in the Gulf or in how many cases heat is a contributory factor in preventable deaths. However, it is clear that heat has a profound and damaging impact on workers' bodies and that many who return home are left with lifelong chronic illnesses which prevent them from working, and which can require costly treatments such as kidney dialysis. Protecting workers *everywhere* from extreme heat is set to become ever more urgent as climate change leads to higher temperatures globally, requiring a fundamental rethink of how work is carried out and consideration of the social factors - such as good quality nutrition, housing, and healthcare- necessary for adequate and equitable standard of living. Migrant workers in the Gulf are now on the frontline of climate changes, and Gulf states have an opportunity to be leaders in occupational heat protection. The report makes a series of recommendations on how this can be achieved, and

is underpinned by workers' testimony and data from academic studies.

1.1 Methodology

This report is the third in a series of reports published by the Vital Signs partnership, a group of organisations and individuals working together to campaign for better protection for low-paid migrant workers in the six countries of the Gulf Cooperation Council (GCC). The partnership includes the Center for Migrant Advocacy in the Philippines, the Law and Policy Forum for Social Justice in Nepal, Justice Project Pakistan, and the Refugee and Migratory Movements Research Unit in Bangladesh, and researchers and advocates in India. Supporting organisations include Migrant-Rights.org, which documents migrant worker abuses within the GCC, and Migrant Forum Asia. The project is overseen by FairSquare Projects, a non-profit human rights organisation based in London.

This report:

- summarises the most up to date medical and sociological research on the short- and long-term health effects of

chronic exposure to extreme heat;

- presents data on climatic conditions in the Gulf, showing how migrant workers are exposed to dangerous levels of heat for extended periods of the year;
- assesses current heat protection measures in the Gulf and shows why these are inadequate; and
- provides case studies of low-paid migrant workers who worked outdoors in the Gulf's extreme temperatures without adequate protection, and subsequently developed chronic kidney disease.

The section on the effects of heat on the human body draws on sources including the: World Health Organization; the Global Heat Health Information Network (an independent forum of scientists, practitioners, and policy makers focused on improving capacity to protect populations from the avoidable health risks of extreme heat in a changing climate); research and interviews with migrant workers on construction sites in Qatar conducted by Professor Natasha Iskander, the

James Weldon Johnson Professor of Urban Planning and Public Service at New York University; and research papers from leading academic experts on occupational health and epidemiology specialists.

The data on heat in the Gulf and methodologies for measuring heat are from the World Meteorological Organisation, NASA and the US Centers for Disease Control and Prevention National Institute for Occupational Safety and Health. Data was extracted, downscaled and curated by Dr. Dominic Royé, head of data science at the Climate Research Foundation and Dr. Barrak Alahmad, research fellow in the Exposure, Epidemiology and Risk (EER) Program at the Department of Environmental Health at Harvard T.H. Chan School of Public Health.

Interviews with former migrant workers and doctors in Nepal and India were conducted by Pramod Acharya and Usman Jawed respectively.



Artwork by Appugen

2. HOW HEAT AFFECTS THE HUMAN BODY

According to the World Health Organization (WHO), exposure to excessive heat has wide-ranging physiological impacts for all humans, often exacerbating existing health conditions and resulting in premature death and disability. Extended periods of high day and night time temperatures create cumulative physiological stress on the body, and can exacerbate the impact of respiratory and cardiovascular diseases, diabetes and kidney disease, which are all among the leading causes of death globally.² Heat gain in the body can be caused by a combination of external heat from the environment and internal body heat generated from metabolic processes. Rapid rises in heat gain due to exposure to hotter than average conditions compromise the body's ability to regulate temperature and can result in what the WHO describes as "a cascade of illnesses", including heat cramps, heat exhaustion, hyperthermia and heat stroke. Even minor differences in seasonal average temperatures are associated with increased illness and death.³

One of the underappreciated aspects of climate change impacts is chronic exposure to extreme heat. A significant 2021 study, conducted by renowned climate change specialists

including Elspeth Opperman, Todd Kjellstrom, and Jason Kai Wei Lee, found that consistent chronic heat exposure is just as critical for health as sudden temperature spikes during heat waves. Climate change projections should focus not only on the number of extreme heat events, but also on the cumulative hours or days of extreme hot conditions annually. This provides a more nuanced understanding of the intensity, frequency and duration of heat events, as well as the regions that face persistent, severe heat stress risk. Many of these regions are typically not viewed as heat wave-prone. On this basis, it is appropriate to term chronic exposure to increasingly hot conditions a 'slow onset event'. Exposed workers are the 'canary in the coal mine' of extreme heat as a slow onset event, as they are likely to experience its effects sooner.⁴

2.1. Cognitive impairment

Professor Iskander noted that heat first attacks the neuro-cognitive system. "The first experience of heat may be confusion as to what one is experiencing, affecting the ability to interpret the body. You may not really understand that

2. World Health Organisation, "[The top 10 causes of death](#)", (9 December 2020).

3. World Health Organisation, "[Heat and Health](#)", (1 June 2018).

4. Elspeth Oppermann, Tord Kjellstrom, Bruno Lemke et al., "[Establishing intensifying chronic exposure to extreme heat as a slow onset event with implications for health, wellbeing, productivity, society and economy](#)" Current Opinion in Environmental Sustainability, vol. 50 (June 2021).

you're experiencing heat stress," Iskander explained. "This goes beyond the well-documented effects of heat on cognitive performance to something more fundamental, which is the cognitive relationship to your own body. This is dangerous because protection from heat depends on deliberate and quick action, and if you're confused about what you're feeling, that may make it more difficult for you to protect yourself." On construction and other sites where work is dangerous and high stakes, and depends on cognitive focus coordinated with motor abilities, movement and balance, this can make work very dangerous and lead to secondary effects such as injuries as a result of an accident on the work site, she said. In this respect she recalled a personal incident that occurred while she was carrying out her research:

"I was on a scaffold many storeys in the air, wearing a heavy [safety] harness, and the water I was carrying was also heavy. And I'd climbed up and down these scaffolds many times, every day, but on that day, maybe I didn't sleep well, I just couldn't cope, I couldn't manage to orient myself on the ladders climbing up. It took so much effort to be in my body. I couldn't figure out where my hand went, where my foot went. That task felt enormous. I felt like I couldn't breathe and that my only way to survive in that moment was to take off all of my safety equipment. I started becoming panicked, disoriented. I had no sense that I was hot, that I was experiencing heat injury. All I knew was that I was in a space of crisis, and that crisis caused me to want to override every safety lesson that I had learned. And the only reason the story has a happy ending, is that the team around me noticed [what was happening]. If they hadn't noticed, I'm sure it would have led to an injury."

Workers in jobs which demand a high degree of practical skill, as well the courage needed to work at height were frequently ashamed to describe such disorientating experiences to Iskander, she said, and struggled with the sense of having let down their colleagues and placed them at risk.⁵

Dr Barrak Alahmad has extensively studied the effects of environmental exposures on the health of migrant workers in the Gulf. He notes that the mental health aspects of exposure to extreme heat, and the associated consequences, are overlooked. "Suicide rates increase during the hot season and we see increased rates of substance use during extremely hot conditions," he explained. "There is emerging evidence that judgement is impaired during exposure to extreme heat, and this is really critical, because if you are working in conditions that to start with are not safe, and you're doing construction, and mostly haven't had safety training for the job that you're doing, your judgement calls are going to be impaired and this will increase your risk of fatal injuries."⁶

Workers told Iskander that the most painful thing they encountered in Qatar was heat. "They described heat as if it were another actor on site, like another character in the story, it was so consequential, and unimaginable before coming to Qatar," she said. Even those who came from places where temperatures could reach similar extremes struggled to cope with the heat in Qatar, she said, because in those places, they would rest during the hottest part of the day and were able to take breaks from work whenever necessary.

Workers described the physical effects of heat in graphic terms to Vital Signs researchers. A man who worked in Saudi Arabia as a driver said that the heat was so intense, he would start to sweat as soon as he went outside, while another who worked on construction projects in the UAE said that sweat would leak out of his boots. For an electrician who was responsible for laying underground cables in Saudi Arabia, the intensity of the heat felt like an imminent threat to his life: "Ten minutes after the bus dropped us off at the work site, I felt like life was exiting my body," he said. His co-workers would faint regularly as a consequence of the heat at work. Although he was considered good at his job and was in line for a promotion, he chose to return to India because the conditions in the Gulf were unbearable. Another worker in Saudi Arabia who had to unload goods including bags of cement as part of his job as an assistant in a hardware store found the Gulf to be "three times as hot" as in India.⁷

2.2. Workplace accidents

People working continuously in an extremely hot environment are vulnerable to fatal heat strokes, which result from lengthy, extreme exposure to heat, when the body can no longer cool itself or sweat sufficiently to prevent internal temperature reaching dangerous levels that can cause vital organs to stop working, eventually leading to death if not treated immediately. But heat stroke, albeit a direct consequence of heat exposure, is not the sole health outcome. Excessive heat in the workplace can cause injury or exacerbate other conditions, leading to death.

The Global Heat Health Information Network has noted that, in the workplace, heat stress can affect the safety and health of workers engaged in physical effort at considerably lower temperatures than it would affect inactive people. This suggests that the combination of physically demanding work and heat can intensify the perception of heat stress, creating a potentially toxic environment for workers' bodies. People whose jobs involve more physical effort and take place

5. Interview with Natasha Iskander, 5 April 2023.

6. Interview with Barrak Alahmad, 30 March 2023.

7. Interviews with returnee migrant workers in Bihar, India, May 2023.

outdoors in hot climates, for example jobs in agriculture, natural resource management, construction, refuse collection, emergency repair work, transport, outdoor and street vending, are particularly at risk.⁸ As people get older their physiological resistance to high levels of heat decreases.⁹ Construction workers are particularly at risk of heat stress, given the physically demanding nature of the work, the long exposures to thermal radiation, and personal protective equipment that reduces the efficiency of sweating and heat loss through evaporation. In the United States, construction workers account for 36% of all heat-related deaths.¹⁰

Professor Iskander has conducted extensive field research on construction sites in Qatar and provides striking descriptions of migrant workers' experiences of lengthy exposures to extreme heat:

'Workers described the heat as a kind of torment. In interviews with me, workers ranked extreme temperatures as the most difficult and harmful pressure they faced by far. "I had never imagined a climate like this," said one worker from Nepal. "Until you feel it, you cannot believe it." "The heat is like a wall," said another from Kenya. "It melts the air, and you feel you are drowning. You cannot breathe," added his compatriot. "It is like the sky is pressing down on your body," described another worker.'

A comprehensive literature review and meta analysis of epidemiological evidence analysed the relationship between extreme heat exposure and an increased risk of workplace injuries in six countries (Australia, Canada, China, Italy, Spain, and the U.S.). Pooling data from 24 studies between 2005 to 2020 representing around 22 million injuries, the review found that a 1°C increase in temperature above reference values led to a 1% rise in injury risk.¹¹ On the other hand, an analysis from Kuwait found that the risk of workplace injuries increased by an average of 35% for a 1°C increase in summer temperatures, much higher than previously reported in the six countries.¹²

Iskander found that the workers on Qatar's construction sites were typically unable to rest in and cooled areas down when necessary, which is key to ensuring that an individual's body temperature does not rise to dangerous levels.¹³

2.3. Organ damage

Heat can severely impact internal organs, with the heart and kidneys being particularly susceptible to substantial damage. There is a very strong association between extreme heat and heart failure, heart attack, arrhythmia and stroke. Heat exposure increases heart rate, while at the same time the metabolic demands of the body increase and the blood diverts away from the heart and internal organs towards the skin. The rise in body temperature places the heart under additional strain, increasing the likelihood of complications or adverse heart events for those with a pre-existing heart condition. A 2023 study published and endorsed by the American Heart Association evaluated the relationship between extreme temperatures and deaths caused by cardiovascular diseases in 27 countries and found that across a range of extreme temperatures, hot days (above the 97.5 percentile) accounted for 2.2 excess deaths for every 1,000 cardiovascular deaths. Heart failure was associated with the highest excess deaths proportion from extreme hot days, with 2.6 for every 1,000 heart failure deaths.¹⁴ Studies in China found that during continued periods of heat during heat waves, working people had an almost 150% increase in heart disease deaths. One study in Beijing showed that a continuation of high heat exposure persisting over several days increased the cardiovascular mortality in all age groups, with a particularly high increase among people working in outdoor environments. Five consecutive days with a peak temperature over 32°C resulted in a 20% excess of such deaths; for 11 consecutive days, that figure increased beyond 150%.¹⁵ In her book, Iskander records how workers in the Gulf described the physical impact of heat on their bodies:

"They reported that heat wrecked their bodies; they found themselves vomiting, suffering from headaches and muscle cramps, experiencing sudden shortness of breath, or feeling exhaustion so intense that it felt like crushing physical pain, rendering them unable to eat, wash, or undress at the end of the day. Rashes spread across their bodies, and shivers racked them. These were all symptoms of heat stress injury, frequently indicators of organ damage."¹⁶

Heat impairs the physiology of kidneys. As highly vascular organs, kidneys rely heavily on a substantial blood flow to ensure proper function and uphold the body's fluid

8. See website of the Global Heat Health Information Network, "[Manage and Adapt to Heat at Work](#)".
9. William P. Cheshire Junior, "Thermoregulatory disorders and illness related to heat and cold stress", *Autonomic Neuroscience*, vol. 196 (April 2016).
10. Christopher L. Chapman, Hayden W. Hess et al., "[Occupational heat exposure and the risk of chronic kidney disease of non-traditional origin in the United States](#)", *American Journal of Physiology- Regulatory, Integrative and Comparative Physiology*, vol. 321, no. 2, (July 2021).
11. Syeda Hira Fatima, Paul Rothmore et al., "[Extreme heat and occupational injuries in different climate zones: A systematic review and meta-analysis of epidemiological evidence](#)", *Environment International*, vol. 148 (March 2021).
12. Barrak Alahmad, Ali Al-Hemoud et al., "[Extreme heat and work injuries in Kuwait's hot summers](#)", *Occupational and Environmental Medicine*, vol. 80, no. 6, (April 2023).
13. Interview with Natasha Iskander, 5 April 2023.
14. Barrak Alahmad, Haitham Khraishah, Dominic Royé et al., "[Associations Between Extreme Temperatures and Cardiovascular Cause-Specific Mortality: Results From 27 Countries](#)", *Circulation*, vol. 147, issue 1 (January 2023).
15. B. Pradhan, T. Kjellstrom et al., "[Heat Stress Impacts on Cardiac Mortality in Nepali Migrant Workers in Qatar](#)", *Cardiology*, vol. 143, (2019).
16. Natasha Iskander, "[Does Skill Make Us Human?: Migrant Workers in 21st-Century Qatar and Beyond](#)", Princeton University Press, (November 2021).

equilibrium. However, during extreme heat exposure, blood diverts towards the skin in a body's attempt to dispel surplus heat, leaving the kidneys deprived of their necessary blood supply. Concurrently, dehydration and fluid loss is another insult to the kidneys. Global concern is growing regarding the development of kidney injury and chronic kidney disease (CKD) - a fatal, progressive loss of kidney function - in people who frequently perform physically demanding work in the heat. In Central America, an epidemic of CKDnt (chronic kidney disease of non-traditional origin) is occurring among manual labourers, and may have killed more than 30,000 sugar cane harvesters.¹⁷ Among male Nicaraguan sugarcane workers, the prevalence of CKDnt has been reported to be as high as 42%, but CKDnt has also afflicted people in non-agricultural sectors in Central America, including construction, brick making, mining, and the fishing industry. Hotspots of CKDnt have also emerged in India and Sri Lanka, and there is increasing concern of CKDnt affecting workers in the United States. In Central

America, there is growing evidence from field studies of a link between heat stress-induced kidney injury and CKDnt.¹⁸

In response to a Freedom of Information (FOI) request from Vital Signs partner Center for Migrant Advocacy, the Philippine Health Insurance Corporation (PhilHealth) provided data on all OFWs and migrants who used their services, specifically those who have kidney diseases including CKD. The data includes: illness description; total claims count; payout amount per patient; and total of paid claims. The data is not disaggregated by country of destination.¹⁹ It shows that 1530 Overseas Filipino workers (OFWs) were admitted to hospital for kidney-related treatment between 2016 and 2022 - an average of 219 per year. Of these, 46% were classified as Chronic Kidney Disease, 4% were registered as "unspecified kidney failure" and 50% of patients were receiving hemodialysis / dialysis. 57% of cases were men and 43% were women. PhilHealth paid out an average of \$3,830 per patient during this period. 10% of patients were under 30, and 34% were under 40.²⁰

Number of returnee migrants recorded to have been admitted to hospital in the Philippines with kidney-related illness, 2016 - 2022.

Age at time of admission	Number of OFW patients admitted for kidney-related illness, 2016 - 2022	% of the total
20-29	160	10%
30-39	374	24%
40-49	429	28%
50-59	391	26%
60-69	151	10%
70+	25	2%

Professor Vivekanand Jha, the Executive Director at The George Institute for Global Health, India, and Chair of Global Kidney Health at Imperial College London, told the Vital Signs Partnership that there was a clear association between CKDnt and abusive work in extreme heat.²¹ Dr. Md Dilder Hossain Badal, a nephrologist at Dhaka Medical College Hospital told Vital Signs partner members RMMRU that they received many patients with kidney problems that developed while working in the Gulf and attributed this to their exposure to the Gulf's heat and not consuming enough water to compensate for water lost as perspiration.²² Current evidence supports that heat stress induces tubular kidney injury, which is worsened

by higher core body temperatures, dehydration, lengthy work durations, muscle damaging exercise, and consumption of sugar-sweetened drinks. This heat stress hypothesis contends that physical work in the heat causes injury to the kidneys, which can be low-grade or overt acute kidney injury (AKI), a clinical diagnosis that typically occurs in occupational settings. CKDnt may then develop following repeated kidney injury and/or a singular bout of clinically diagnosed AKI brought about by physical work in the heat. A recent review has suggested that CKD and/or AKI are present in 15% of individuals who frequently work in hot environments, and the current scientific literature suggests that the frequency of occupational heat

17. Elspeth Oppermann, Tord Kjellstrom, Bruno Lemke et al., "Establishing intensifying chronic exposure to extreme heat as a slow onset event with implications for health, wellbeing, productivity, society and economy", *Current Opinion in Environmental Sustainability*, vol. 50, (June 2021).

18. Christopher L. Chapman, Hayden W. Hess et. al., "Occupational heat exposure and the risk of chronic kidney disease of non-traditional origin in the United States", *American Journal of Physiology- Regulatory, Integrative and Comparative Physiology*, vol. 321, no. 21, (July 2021).

19. The dataset is not disaggregated by country of destination, but approximately 50% of overseas Filipino workers are employed in the Gulf states, see Overseas Filipino Workers' Data published in December 2022 at the website of the [Philippines Statistics Authority](#).

20. Original documents on file with Center for Migrant Advocacy and FairSquare.

21. Telephone interview with Professor Vivekanand Jha, 12 April 2023.

22. Comments at Policy Maker Engagement Event on Labour Migrants' Access to Healthcare in the Gulf States in Dhaka, Bangladesh, organised by Refugee and Migratory Movements Research Unit (RMMRU), 7 June 2023.

exposure may be related to the prevalence of kidney injury and kidney disease.²³

Christopher Chapman and Hayden Hess note that recent intervention efforts in Central America have reduced incidence of kidney injury over a harvest, and of acute kidney injury by

as much as 72% and 94% respectively without impacting the commercial operations of the employers concerned. This was achieved via proper provision of mandated shaded rest, hydration, acclimatisation and organisational management support that included scoring management against health outcomes.²⁴

Dr. Rishi Kumar Kafle, Executive Director and Chief Nephrologist at Nepal's National Kidney Center: "Workers go to the Gulf to earn money, but return with kidney disease."

"Based on my observations at the National Kidney Center (NKC), the number of CKD patients is increasing. I don't have fine-grained data about CKD patients across Nepal, but out of almost 900 kidney patients receiving dialysis at the NKC, about 90 are returnee workers from the Gulf. In other words, 10% of the CKD patients at the Center have worked in the Gulf. Every week I see a new CKD patient who has returned from the Gulf seeking dialysis here. You'll hear the same thing from nephrologists at other hospitals.

"Before going to the Gulf for work, Nepalis have to undergo a medical examination, and they can leave for employment abroad only when certified as 'fit' or 'healthy.' They then go through another round of medical screening in the country of destination. All the same, I see many young migrant workers return to Nepal with kidney failure. I've met Nepali migrant workers who were diagnosed with kidney failure in the Gulf, started dialysis there, survived, and came back to Nepal to continue dialysis. They turn up at the NKC with a catheter already in their neck. Nepali Workers go to the Gulf to earn money, but return with kidney disease.

"When a young individual – under 40 years old or so – has kidney failure, there are four main causes: not drinking enough water while working in the hot climate; long working hours; stress; and overconsumption of meat, or poor diet in general. When people over 40 have renal failure, it could be due to conditions such as diabetes or high blood pressure.

"Migrant workers told me they worked long hours, were exposed to searing heat, ate more meat but fewer vegetables than usual, and took painkillers excessively without doctors' advice. Most of the patients I speak to say they were prevented from drinking water while working because they'd need to go to the restroom more frequently and this would hamper their work. They work 12-14 hours a day in extremely hot temperatures, but are unable to stay hydrated. They're also stressed as they're away from family and may have other employment-related problems. Meat is more readily and abundantly available in the Gulf than in Nepal, so they eat more of it. Those who initially suffered from diabetes and hypertension later developed kidney disease as they didn't take their medication on a regular basis.

"Most migrant workers have no idea how kidneys fail, so they can't adopt preventative measures. Kidney failure doesn't develop quickly. You don't work long hours with limited water intake one day and then suffer kidney failure the next day, it's not like that. But frequent dehydration can gradually compromise kidney function, and because most patients don't realise their kidneys are failing in the initial stage, they don't seek medical care. It's only when 80-90% of the kidney is damaged that symptoms like loss of appetite, nausea, vomiting, weakness, swollen limbs, trouble falling asleep, itching, and blackening skin occur. When young migrant workers go to hospitals with symptoms like these, nephrologists should investigate their working conditions.

"Most patients who come to us are already in an "established kidney failure state," which can't be reversed. Kidney damage is irreparable, so the patients need regular dialysis or a kidney transplant. Nepal provides free dialysis to CKD patients, despite being one of the poorest nations in the world, and without this, poor patients would be unable to have dialysis, so it's a great support for them. At the National Kidney Center (NKC), you'll find patients who have been receiving dialysis for 15 to 20 years. "Without it they could have died. Poor Nepalis can't even think of paying for lifelong dialysis from their personal funds.

23. Christopher L. Chapman, Hayden W. Hess et. al., "Occupational heat exposure and the risk of chronic kidney disease of non-traditional origin in the United States", *American Journal of Physiology- Regulatory, Integrative and Comparative Physiology*, vol. 321, no. 2, (July 2021).
24. Christopher L. Chapman, Hayden W. Hess et. al., "Occupational heat exposure and the risk of chronic kidney disease of non-traditional origin in the United States", *American Journal of Physiology- Regulatory, Integrative and Comparative Physiology*, vol. 321, no. 2, (July 2021).

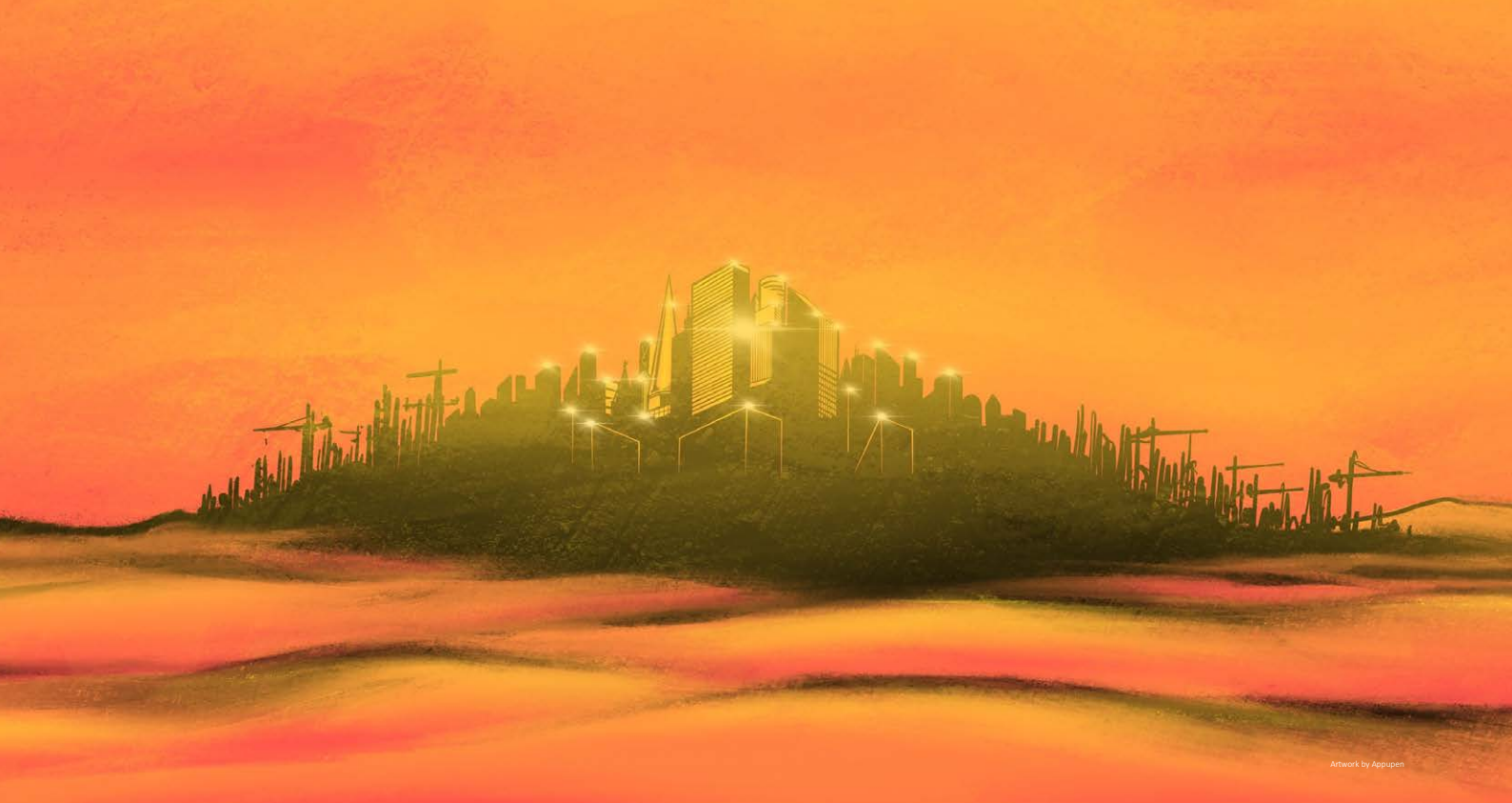
“The government bears the cost of dialysis, but the patients are responsible for paying for their own medicines. During dialysis sessions, when needed, a patient may be asked to pay for medication, syringes, blood, iron, etc. For this, a patient spends between 1,000 to 2,000 rupees [US\$8-16] per dialysis session. They should access all the medication they need during the dialysis, otherwise the quality of the dialysis is compromised, meaning their lifespan is reduced. CKD patients should also eat nutritious food; dialysis alone can’t save people’s lives for long. They have to eat healthily. Patients also have to pay for travel to the hospital, which is another financial burden. But most of the patients are so poor they can’t afford food; how can they pay for medicines?

“It’s particularly difficult for the Gulf-returnee CKD patients because they’re very poor. Some come to the hospital on foot, which they shouldn’t do, as they can’t pay for a taxi. They took out loans to travel to the Gulf to earn money, but returned sick. On the one hand, they have a physical illness, and at the same time, they’re under mental pressure to repay the loans, provide a good education for their children etc. I see CKD patients worried because they’re unable to afford food for their family, medications for themselves, and they’re concerned about their children’s future. They’re often the breadwinner for the whole family, and since they now can’t earn money, life becomes even harder.

“About a year ago, the government introduced a scheme to provide 5,000 rupees [US\$40] a month to kidney patients, but it’s not clear that the scheme is being adequately implemented or that all CKD patients have been receiving the payment. The patients have to ask local authorities to reimburse the money, but how can patients based in Kathmandu for treatment go to their villages to receive the payments? It’s not a patient-friendly way of providing the money.

“The Nepali government also covers the cost of renal transplants at government-owned hospitals, but it doesn’t cover the expenses patients incur during the course of pre-checkups. Patients also need to wait several months to undergo renal transplants as hospitals lack staff and infrastructure, and are dealing with an influx of patients. Patients have to travel to the hospital repeatedly to get a date for surgery, which increases their expenses. The government gives 100,000 rupees [US\$758] to patients following the transplant, but patients have to spend 10,000 to 15,000 rupees [US\$76-114] monthly on medication for the rest of their lives. Who’ll pay for that? I’m sure the majority of patients can’t.

“To my knowledge, there have been no serious discussions between the governments of Gulf nations and the Nepali government regarding the issue of kidney failure among migrant workers. It hasn’t been considered as a serious issue yet. When Nepali workers become seriously ill, they return to Nepal with no guarantee of getting medical support from their employer in the Gulf. Gulf nations are rich, they’re resourceful. They invite people from abroad to work for them. That’s okay, but they should provide safe working conditions. Why are these wealthy Gulf nations not doing anything for these workers? If they had the will, they could do something, but they seem uninterested. The workers have contributed a lot to them, they toiled hard in the sweltering climate, but they aren’t taken care of. In the 21st century, workers shouldn’t be put in a situation where they have to compromise their rights.”



Artwork by Appopen

3. HOW HOT IS THE GULF

On 21 July 2016, an air temperature of 54°C was recorded in Mitribah, Kuwait. Following analysis of the temperature observations, in 2019 the World Meteorological Organization accepted this as the highest temperature ever recorded for Asia, and the joint highest, officially recognized temperature to have been recorded in the last 76 years.²⁵ This is a temperature extreme; but for migrant workers, the reality of life in the Gulf is one of exposure to dangerous levels of heat for extended periods of the year.

The US Centers for Disease Control and Prevention (CDC), and the National Institute for Occupational Safety and Health (NIOSH) recommend that rather than air temperature, exposures to environmental heat should be expressed as so-called Wet Bulb Globe Temperature values.²⁶ Wet Bulb Globe Temperature (WBGT) is a composite measure which incorporates air temperature, humidity, wind speed and sunlight (or radiative heat) to assess the environmental heat risk to human health.²⁷ NASA succinctly describes WBGT as: "...the lowest temperature to which an object can cool down when moisture evaporates from it...It measures how well our bodies cool down by sweating when it's hot and humid, and tells us if conditions may be harmful to our health, or even deadly."²⁸

The WBGT measure has been widely used by the U.S. Army since the 1950s. Its purpose was to figure out how much physical activity soldiers could endure during basic training, based on different heat conditions. They created a guide or matrix to show which activities and protections were safe under various WBGT levels. For instance, under cooler WBGT levels, intensive activity was deemed safe. But as WBGT levels increase, the amount and intensity of safe physical activity decreases. When the WBGT reached around 30 to 32°C, only low-intensity activity for just a few minutes per hour was recommended, with rest periods in between. The same was true of hydration; at different WBGT levels, different amounts of water were prescribed, between one cup [equal to 236ml] and four cups per hour. This matrix has not undergone significant revision since then, and is still considered to be the most credible and accurate metric. More recently, however, pressures to revise the WBGT metric as the sole predictor have started to emerge, as in the words of Professor Natasha Iskander, "...the pressures of production run up against the imperative of keeping workers safe in heat as climate change becomes more of an issue, and more places experience higher temperatures. The GCC countries are a harbinger of that interaction".

25. Andrea Merlone, Hassan Al-Dashti, et al., "[Temperature extreme records: World Meteorological Organization metrological and meteorological evaluation of the 54.0°C observations in Mitribah, Kuwait and Turbat, Pakistan in 2016/2017](#)", International Journal for Climatology, (June 2019).

26. Amnesty International "[In the Prime of Their Lives: Qatar's failure to investigate, remedy and prevent migrant workers' deaths](#)" (26 August 2021).

27. WBGT is a highly authoritative index that is used by: regulatory bodies, including International Standards Organization and the American College of Government Industrial Hygienists; armed forces, including US, UK and Australia; and sporting bodies including the International Olympic Committee. It also takes into account wind and solar radiation.

28. Alan Buis, "[Too Hot to Handle: How Climate Change May Make Some Places Too Hot to Live](#)", ASK NASA CLIMATE (9 March 2022).

Today, regulatory bodies consider a WBGT of as low as 28°C as a point where the risk of heat-related injury begins for acclimatised workers doing moderately strenuous work.²⁹ For non-acclimatised workers, the threshold is even lower. WBGT temperatures in the Gulf regularly exceed these levels. In 2019, FairSquare conducted an assessment of a multinational company's policies and procedures to address heat-related injuries, with a specific focus on corporate operations in the Gulf. The report found that since 2010, mean WBGT temperatures in Dubai in August have typically exceeded 30.5°C, and temperature data shows that workers are at risk from May to October inclusive, with peaks of extreme risk in June, July, August and September. In July and August, the estimated outdoor WBGT regularly reaches temperatures where there is a risk of heat stress even when no work is being performed, and for 86% of the daytime when Gulf state summer working bans permit outdoor/ non-shaded work, workers are exposed to outdoor WBGT temperatures in excess of 28°C.³⁰ Importantly, this calculation does not factor in the often high and extreme risk due to high humidity late at night and in the early hours of the morning, notably, in the months of July and August, nor does it take into account the additional occupational factors of acclimatisation, clothing, metabolic rate (physical effort) and pre-existing health conditions.³¹

A 2020 paper co-authored by experts from Harvard, Johns Hopkins and Kuwait universities and Kuwait's Ministry of Public Health explored associations of temperature extremes in Kuwait on the risk of mortality across gender, age groups and nationality. Kuwait has a desert and hyper-arid climate, with a long summer season that is usually extremely hot. Migrants make up almost two-thirds of Kuwait's 4.5 million population, and more than 65% of migrants are men, mainly of working age. Many male migrant workers in Kuwait work in construction, agriculture, fishing and manufacturing. The paper concluded that non-Kuwaitis had a higher relative risk of death from hot temperature exposure, with working age non-Kuwaiti men having a double to triple risk of mortality in hot temperatures. A previous study on poor air quality effects and dust storms showed that non-Kuwaiti males, particularly adults, are at heightened risk of death as they tend to spend more time outdoors, and are exposed to heat and dust storms more than Kuwaiti nationals.³²

A 2019 study, published in the medical journal *Cardiology*, on links between heat stress and cardiac mortality in Nepali migrant workers in Qatar found a strong correlation between average monthly afternoon heat levels (WBGT) and cardiovascular disease deaths. The heat exposure was assessed by monthly estimates of WBGT, based on data collected between 2009 and 2017 at the Doha weather station and from the records of the Foreign Employment Promotion Board in Nepal on daily deaths and their causes. The research also concluded that a large proportion of these cardiovascular deaths during hot months were likely due to serious heat stroke. One of the report's authors told Amnesty International, "...since relatively young male workers selected for their ability to sustain physical work usually don't suffer from deadly cardiovascular disease, my conclusion as a cardiologist is that these deaths are caused by heat strokes."³³

As the world's climate continues to change, global temperatures will rise and the intensity of heatwaves is likely to escalate. Since the 19th century, global mean temperature has increased by more than 1°C. This is projected to go up to at least 3°C this century if current national climate change mitigation policies are implemented, and without mitigation the increase is forecast to reach 4°C or more by the end of the century. Urbanisation further increases heat exposures and contributes to the slow onset of higher temperatures at local scale. The 2021 study by climate change specialists Elspeth Opperman, Todd Kjellstrom, and Jason Kai Wei Lee noted, for example, that in Doha, annual mean temperature increased by 0.46°C every decade between 1980 and 2018.³⁴ At the same time, the near-constant demand for workers to build new buildings and complexes in energy-intensive cities such as Kuwait continues to grow, giving rise to widening health disparities.³⁵ As the authors of the study note:

"Although gradual, increasing average temperatures do not just affect long-term decision making. They are of urgent and immediate concern where populations are already close to thresholds of what is physiologically tolerable, particularly if they are exposed either seasonally or all year round, or where already-high temperatures are intensified in urban heat islands or by humid conditions which magnify the impact on the human body and ability to work."³⁶

29. Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, "[Criteria for a recommended standard: occupational exposure to heat and hot environments](#)", (2016).

30. FairSquare data analysis, copies on file.

31. FairSquare data analysis, copies on file.

32. Barrak Alahmad, Ahmed F. Shakarchi, Haitham Khraishah et al., "[Extreme temperatures and mortality in Kuwait: Who is vulnerable?](#)" *Science of The Total Environment*, vol. 732, (25 August 2020).

33. Amnesty International "[In the Prime of Their Lives: Qatar's failure to investigate, remedy and prevent migrant workers' deaths](#)" (26 August 2021)

34. Elspeth Oppermann, Tord Kjellstrom, Bruno Lemke et al., "[Establishing intensifying chronic exposure to extreme heat as a slow onset event with implications for health, wellbeing, productivity, society and economy](#)" *Current Opinion in Environmental Sustainability*, vol. 50 (June 2021)

35. Barrak Alahmad, Ahmed F. Shakarchi, Haitham Khraishah et al., "[Extreme temperatures and mortality in Kuwait: Who is vulnerable?](#)", *Science of The Total Environment*, vol. 732, (25 August 2020)

36. Barrak Alahmad, Ahmed F. Shakarchi, Haitham Khraishah et al., "[Extreme temperatures and mortality in Kuwait: Who is vulnerable?](#)", *Science of The Total Environment*, vol. 732, (25 August 2020)

3.1. What the climate data shows

FairSquare commissioned Barrak Alahmad, a research fellow in the Exposure, Epidemiology and Risk (EER) Program at the Department of Environmental Health at Harvard T.H. Chan School of Public Health, and Dominic Royé, head of data science at the Foundation for Climate Research (FIC) in Madrid, to analyse climate data on the Gulf and to describe what the data shows both in terms of the current and projected risks from heat to workers.

3.1.2. Intensity, frequency and duration of heatwaves

The Gulf is very hot for extended periods of time. An analysis of every 121 km² in the Gulf region from the EU's Copernicus (ERA5-Land) program based on the period 2012-2021 shows that in most parts of the Gulf, there are between 100 and 150 days when maximum daily temperature exceeds 40°C. For the same period, the annual average in New Delhi is 24 days. Extreme temperatures are not rare events in the Gulf. On the contrary they are present between 3 and 5 months of every year.

"We assess heatwaves by looking into 3 aspects: intensity, frequency and duration," Barrak Alahmad told the Vital Signs Partnership. "In the Gulf region, these three aspects are amplified all at once. We see extremely high temperatures, occurring with significant regularity, and persisting for several months." The Gulf is an outlier in this sense; other regions of the world with large working populations do not experience similar heatwave patterns.

3.1.3. "Horrificed and deeply alarmed"

The second graph shows how many days of extreme heat the region's major cities experience and how the impact of climate change will increase the number of extremely hot days. Based on historical data and averaging across 31 of the latest climate change projection models downscaled from NASA (NEX-GDDP-CMIP6) all of the Gulf states are set to experience hugely significant increases in the number of extremely hot days even if global warming is kept at 1.5°C and potentially catastrophic increases if global warming reaches 3°C. These latest state-of-the-art models show that in Abu Dhabi, for example, the capital of the UAE which is this year hosting the COP28 climate summit, the number of hot days will have increased by 51% by the middle of the century if global temperatures increase by 1.5°C, and by 98% by the end of the century if global temperatures increase by 3°C.

Barrak Alahmad said he was "horrified and deeply alarmed" at the prospect of areas of the Gulf experiencing 180 days out of 365 days where the temperature exceeds 40°C. He said that even under more optimistic mitigation scenarios like 1.5°C these temperatures would markedly increase heat-related deaths in the region and that the consequences were impossible to predict. "These conditions could seriously disrupt human societies in ways we are just beginning to understand."

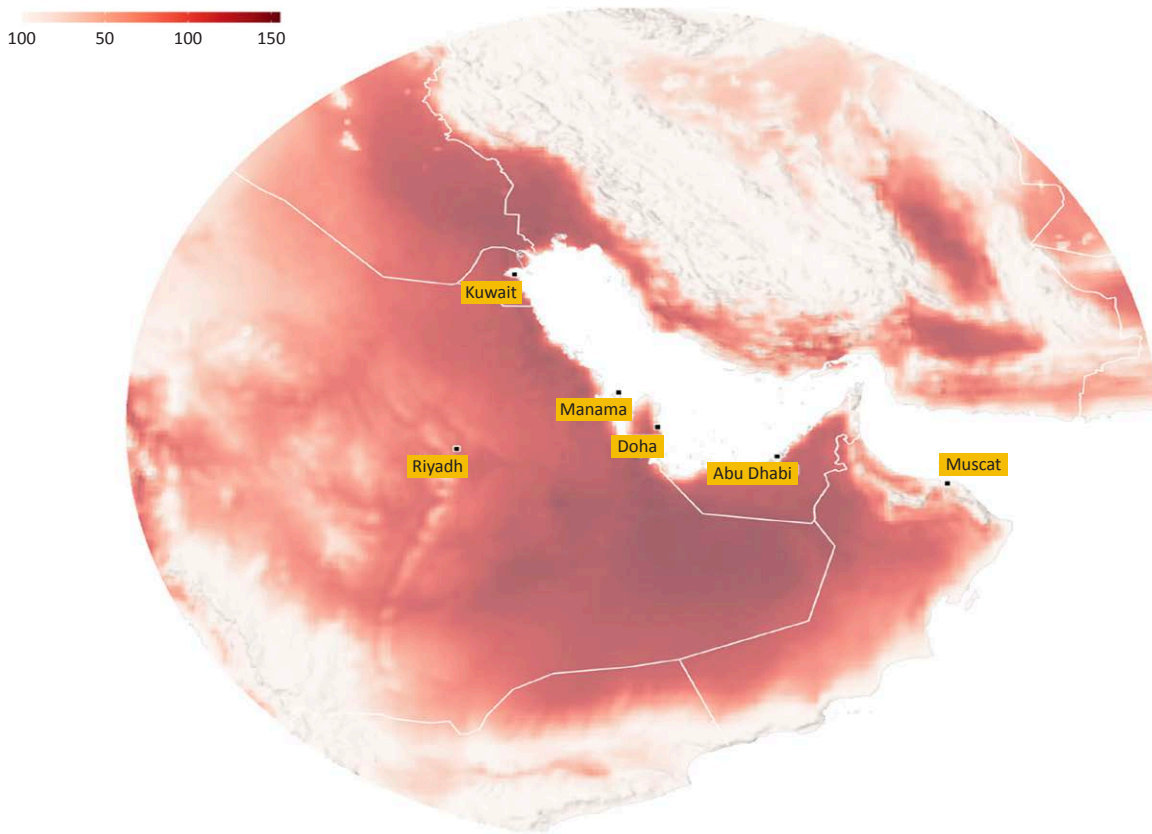
3.1.4. Dangerously hot night-time temperatures

The third graph demonstrates not only that the Gulf region experiences extremely hot days but dangerously hot night time temperatures. The Qatar 2022 World Cup was moved from summer to winter time to protect players and supporters from the risk of extreme summer temperatures, which in the case of the players would have been greatly exacerbated by the highly exertional nature of professional football. This decision is borne out by the comparison of June 2022 temperatures (in red) with November/December 2022 temperatures (when the tournament took place, in green). The red graph shows that temperature risks remain high even during night-time when, as the graph shows, the temperature only dropped below 30°C eleven times during 28 days in June 2022 and was above 30°C for 278 night hours (between sunset and sunrise) of 290 hours.

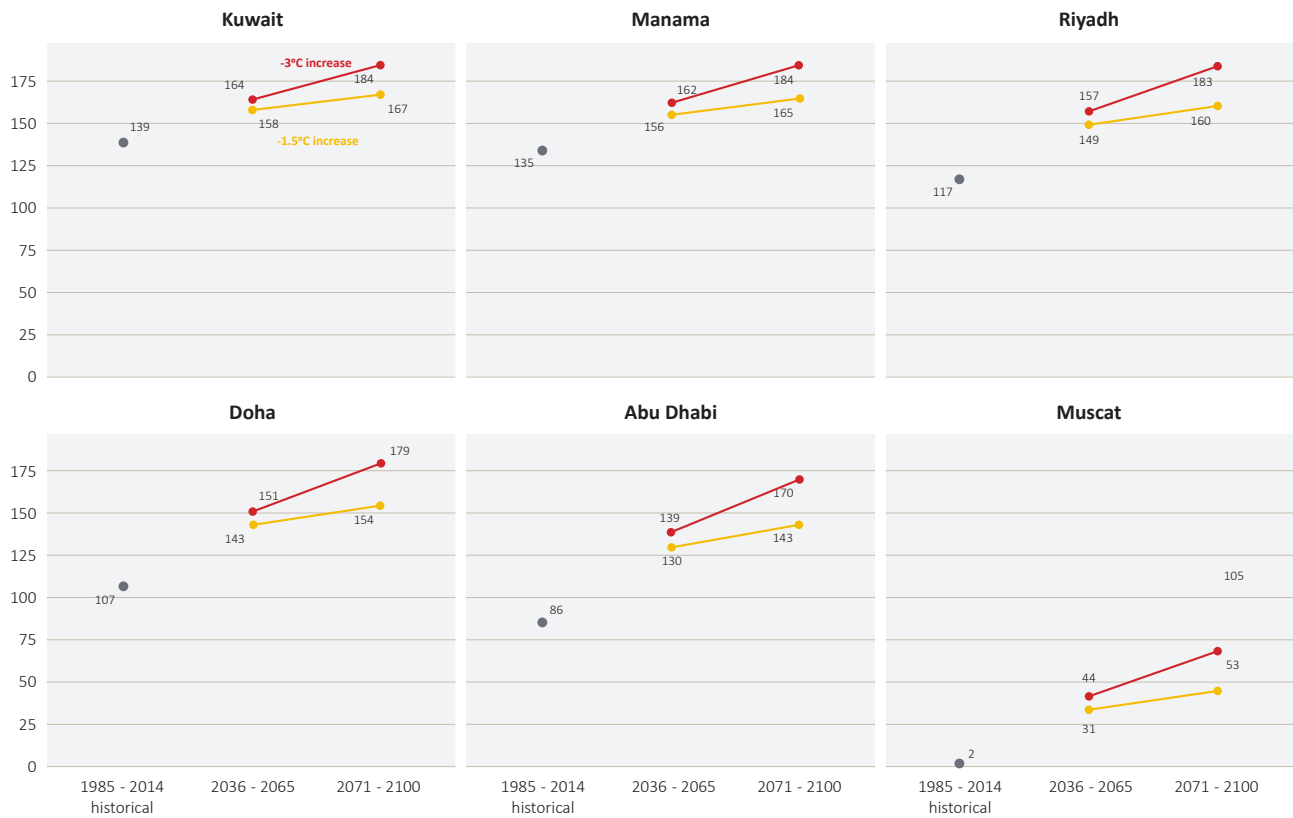
"The data shows that it made sense for FIFA to move the World Cup from June to November," said Barrak Alahmad. "Yet, when it comes to the under-paid migrant workers making less than the minimum wage, who labour in these same harsh conditions building massive stadiums, the same level of concern is inexplicably absent." He drew particular attention to the consistently high night-time temperatures. "The threat of extreme heat doesn't confine itself to daytime hours. Hot nights are equally alarming. Without the body's ability to find relief from the heat at night, heat stress on organs can accumulate, exacerbating existing conditions, leading to illness and, in some cases, death."

"Poor and insufficient sleep, which can occur during hot nights, can increase chronic diseases and accidents," Dr Dominc Royé commented. "Heat stress at the workplace is an occupational health hazard that reduces labour productivity. The main question I have is, if workers in the Gulf sleep during the day to work at night, do they have good conditions for sleeping in the hottest temperatures of the day?"

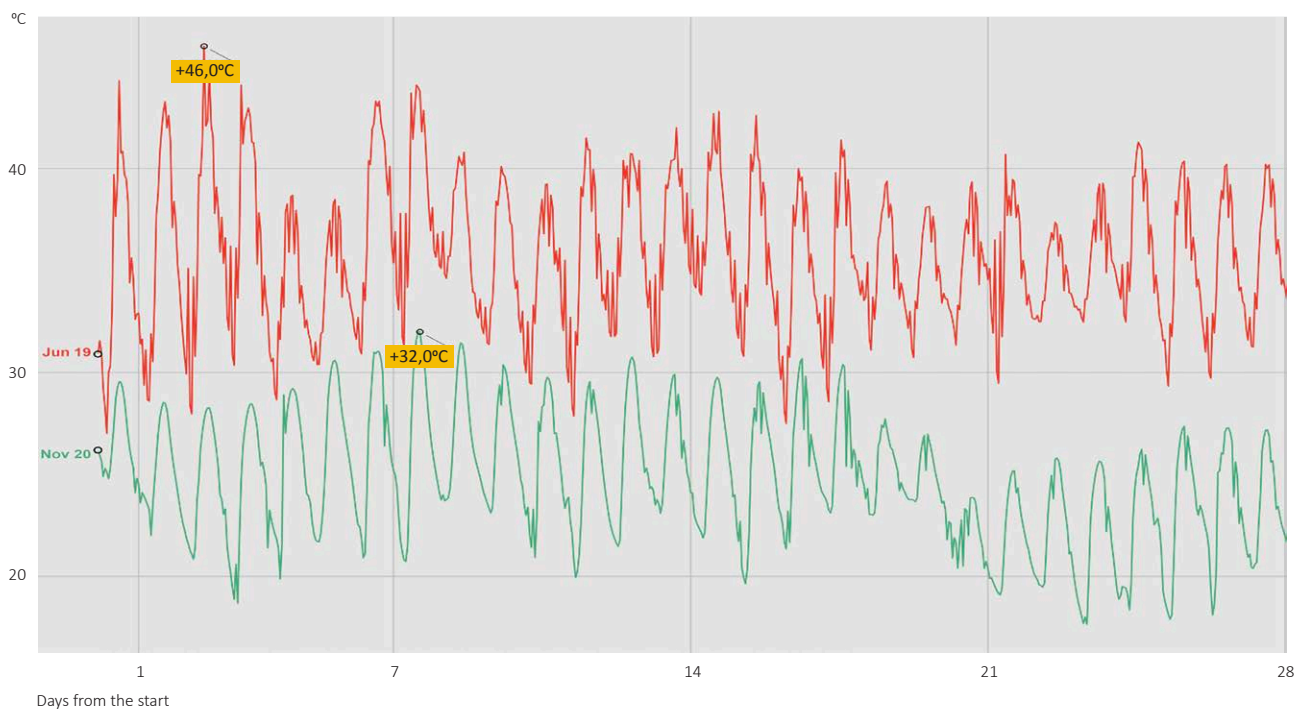
Graph 1. Hot days: Annual average number of days with maximum temperature > 40°C



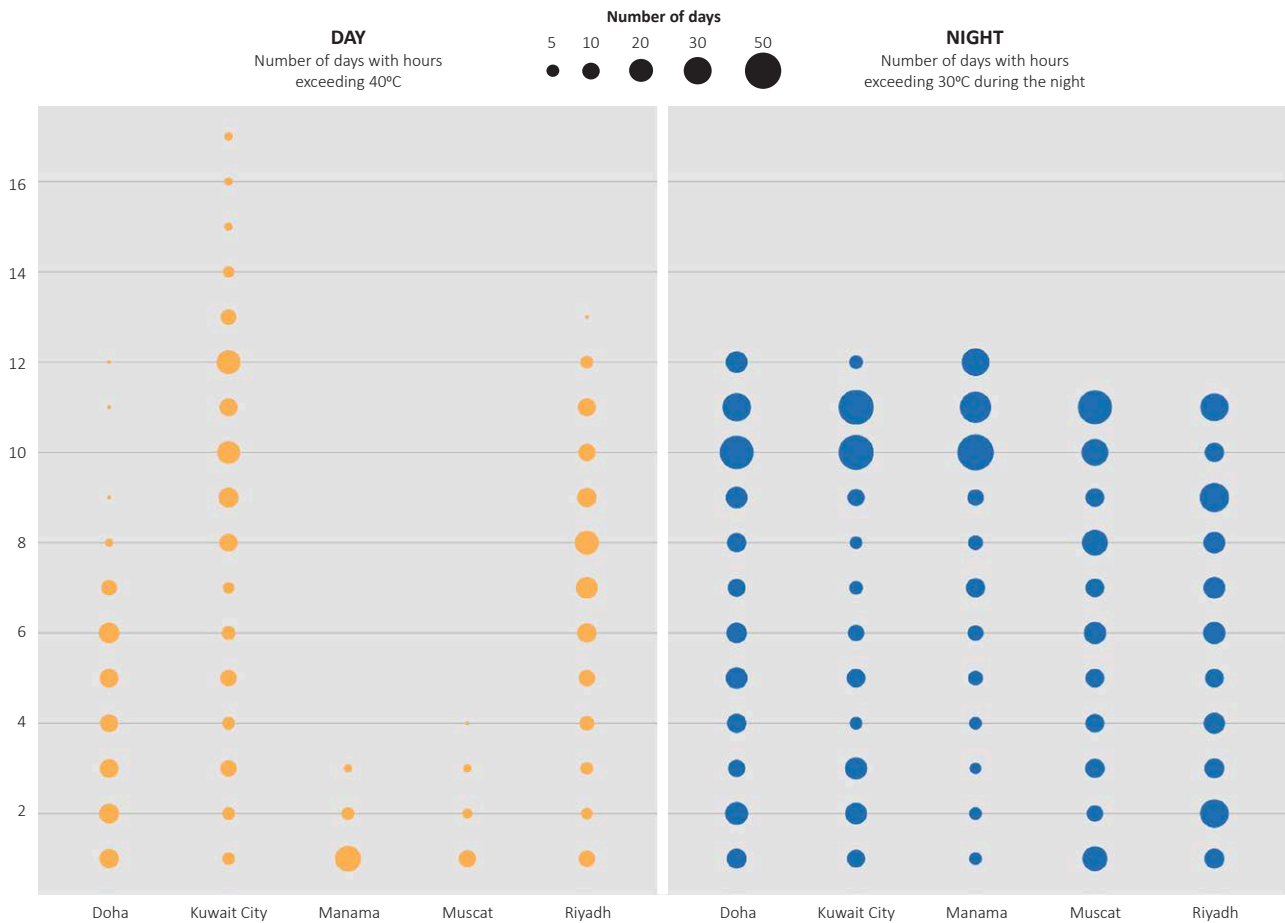
Graph 2. Hot days: Annual average number of days with maximum temperature > 40°C



Graph 3: How hot would FIFA's Men's Qatar World Cup have been in the summer of 2022?



Graph 4: Hot extremes 2022



3.1.5. Long days of extreme temperatures

Graph 4 shows firstly for how many hours every day it stays extremely hot (i.e. above 40°C) in five Gulf capitals, and secondly for how many hours every night it stays above 30°C. Doha, Kuwait and Riyadh experienced long days of extreme temperatures in 2022, with Kuwait a notable and dangerous outlier, experiencing scores of days in 2022 when

the temperature stayed above 40°C for more than 12 hours out of 24. All five cities experienced long periods of extreme night-time heat with each city experiencing hundreds of nights every year where the temperature exceeded 30°C for 8 hours.

Alahmad said that exceptional temperatures such as those presented in the data above require specific and detailed protection to protect the health and lives of anyone required to work in them.

Ganesh Darai: “All my dreams have been shattered.”

At the end of 2018, Ganesh went to UAE through Good Luck International Manpower. He was connected with a Good Luck agent through a colleague. Ganesh said he paid 350,000 rupees in cash to the manpower company for the travel and visa arrangements, and he spent an additional 150,000 on swimming training, medical examinations and local travel. Determined to give his daughter a bright future, Ganesh dreamt of earning a good salary.

On arrival in the UAE, he was employed by Federal Security Services, an agency which provides security staff and lifeguards for various companies. As an agency worker, Ganesh worked wherever he was sent by Federal Security. In the beginning, his salary was 1,800 dirhams monthly, which was increased to 2,000 dirhams after six months of employment.

Ganesh worked 12-hour shifts as a swimming pool lifeguard at several apartment buildings, hotels and a sports complex in the Dubai area for over eighteen months. Much of the work was outside, at rooftop swimming pools under the scorching sun. The heat was unbearable. “The ground was so hot I couldn’t touch it with bare feet,” Ganesh recalled. “It would burn my skin. You can’t imagine how hot it was.” Although he wore sunscreen and a cap, these measures were insufficient to beat the searing heat of summer. “I was given an umbrella. When I felt hot, I used to sit under its shade, but how could it be enough in such hot weather?” he said.

Though he often felt faint and would sweat heavily, Ganesh couldn’t take even short breaks, let alone rest in an air-conditioned room. “My clothes would be completely drenched in sweat. My body would itch and I developed heat rashes,” he told FairSquare. “But if I took a break, the people in the apartments would complain, and the people from the company I was working for would reprimand me.” He had limited access to drinking water and no time to eat. “I’d get very thirsty but couldn’t drink water because there wasn’t a tap nearby,” he said. “I used to drink one bottle of water a day. Sometimes I didn’t have enough money to buy more.”

The distance between Ganesh’s accommodation and his workplace was a further problem. He lived in a labour camp in Ajman and commuted by bus to the workplaces in Dubai, spending four to five hours travelling every day, which was unpaid. Combining working hours and travel time, Ganesh spent 16-17 hours at work, six days a week. He would return to his room exhausted, but had to wait for his turn in the kitchen to cook food, as there weren’t enough stoves for workers. He typically went to bed around midnight or 1am. Bitten by bed bugs and mosquitos, and in shared accommodation, he struggled to sleep. “I couldn’t fall asleep easily and quickly. I could sleep only three-four hours. It used to be very difficult the next day because of the sleeplessness in the night,” he explained. Before getting on the bus to work, he’d buy food for breakfast, but often didn’t get a chance to eat it because he’d fall asleep on the journey. About a year after he returned to Nepal from UAE, Ganesh started to experience leg pain and abdominal bloating. Vomiting and struggling to breathe, he visited several hospitals in Pokhara and Tanahun, where doctors suggested he could be suffering from food poisoning or gastritis. Finally, at the Teaching Hospital in Kathmandu, he was diagnosed with kidney failure. Medics asked about his working conditions, and explained that kidney failure can be caused by insufficient water intake and sleep deprivation. Ganesh suspects that his kidney problems resulted from his living and

working conditions in the UAE. He thinks the additional stress following the loss of his father may have exacerbated his health problems.

Ganesh's mother is prepared to donate a kidney to her only son and Ganesh wants a transplant, but lack of money means the operation is impossible. "I've already spent over 600,000 rupees for pre-medical check-ups. But now we've stopped because it's beyond our capacity," he said. "I'd be very happy if someone could support me financially." Every Monday and Thursday at the National Kidney Center in Tanahun, Ganesh receives dialysis. The treatment is free, but he has to find 30,000 to 40,000 rupees every month for medication and transport. With no income, he borrows money from relatives and friends. "I don't have a single rupee now," he said. "It's not easy to run the family. My dad has already died. I should be taking care of my family. But I became like this. What can I do?" Reflecting on his time in the UAE and his hopes before he travelled there, Ganesh said, "All my dreams have been shattered. Everything has been torn apart."



Artwork by Appupen

4. INADEQUATE HEAT PROTECTION MEASURES IN THE GULF

None of the Gulf states have laws that adequately mitigate the risk posed to outdoor workers by its extremely harsh climate. Each country operates a rudimentary summer working hours ban that imposes a blanket ban on work at certain hours of the day during the summer months. There is a striking lack of consistency in the hours of the day and the times of the year when these various bans are in force, which underscores the rather arbitrary and non-scientific character of these protections. For example, the UAE bans work for 232.5 hours each year, approximately half as much as Kuwait, and 40% of

the hours banned in Qatar. Bahrain only starts its ban on 1 July, where its neighbours begin theirs either at the beginning or middle of June. In September 2022 a Bahraini media report said migrant workers were pleading with the Labour Ministry from respite from the heat, and specifically asking them to extend the summer time working ban beyond 31 August. One worker apparently told reporters that an extension to the ban (which was not granted) would be a “wonderful move” though added that, “our bodies are ready to bear this extreme temperature.”³⁷

Summer hours working bans across the Gulf³⁸

Country	Dates ban in force	Hours of ban	Mandatory work stoppages per year
Bahrain	1 July to 31 August	12pm - 4pm	248 hours
Kuwait	1 June to 31 August	11am - 4pm	460 hours
Oman	1 June to 31 August	12.30pm - 3.30pm	368 hours
Qatar	1 June to 15 September	10am - 3.30pm	588.5 hours
Saudi Arabia	15 June to 15 September	12pm - 3pm	279 hours
UAE	15 June to 15 September	12.30pm - 3pm	232.5 hours

37. “Bahrain Workers Plea to Extend Outdoor Work Ban to September”, The Daily Tribune, 1 September 2022

38. For a summary of each of the Gulf states’ labour laws see Building Responsibly and ILO Labour Law Factsheets, available online at <https://www.building-responsibly.org/internal-resources>. Migrant-rights.org have also published a comparison of the Gulf states’ summer working hours bans, available online at <https://www.migrant-rights.org/2021/06/summer-midday-work-ban-fails-to-adequately-protect-workers>

In May 2021, Qatar passed a Ministerial Decision extending the ban on summer working hours and introducing additional measures requiring employers to mitigate the risk to workers from Qatar's harsh climate by taking the following steps:

- completing and regularly updating heat stress risk assessments;
- performing annual health check-ups to diagnose and manage chronic diseases that may contribute to the risk of heat stress; and
- providing workers with appropriate personal protective equipment for the hot weather including thin, loose and light-coloured clothing.

Significantly, the regulation includes steps that employers should take to modify work schedules in response to different levels of heat stress. Employers must:

- extend the summer working hours ban, prohibiting "work in the sun, in outdoor workplaces or in places that are not shaded and ventilated" between 10:00 to 15:30 from 1 June to 15 September every year;
- adopt the 'WBGT heat stress index' to assess the level of occupational heat stress and stop work if the index rises above 32.1°C; and
- provide workers with "the right to stop working and submit a complaint before the Ministry when they have good reason to believe that heat stress is a threat to their safety or health".

These measures offer workers greater protection from climate risks as compared to Qatar's previous legal framework and are better than the protective measures in the rest of the GCC, largely on account of Qatar increasing the length of time that blanket work bans are in force. However, according to experts who spoke to the Vital Signs Partnership, the law not only falls short of what is needed, but fundamentally fails to adopt a robust scientific approach that is based on protecting workers from risk. For example, while the use of a WBGT heat stress index is appropriate, the legislation does not complement this with 'activity modification guidelines', requiring hourly periods of rest depending on the heat-stress index reading and the level of exertion involved in the work being done. This approach is widely used by military agencies, occupational safety agencies and governing bodies in athletics in the US. Instead, Qatar's legislation gives workers "the right to stop working" if they feel heat stress is putting them at risk. This creates a serious risk in the Qatari context as it risks encouraging a culture of "self-pacing", which places responsibility on workers to stop work. Many workers find this difficult given the deeply unequal power relations between employees and employers in Qatar.

Professor David Wegman, an expert on health and safety in the construction industry has described the Qatari legislation as "an improvement that falls far short of what is necessary for the protection of labourers who are subject to heat stress exposures of all types". He told Amnesty International that ensuring work is safely performed without risk of heat-related illness "is **critically dependent** on a balance of work and rest periods" and that limits on work "should be determined objectively according to WBGT measurements combined with an objective assessment of work effort". He added that periods of work rest "should not be voluntary" on the basis that "individuals are unable to perceive work-rest ratios with sufficient accuracy to rest voluntarily as frequently or for sufficient duration as is necessary to protect health." He said that rather than only banning work in the hottest hours, efforts needed to be made to understand and manage heat risks throughout the day: "Apart from adapted work/rest schedules this includes addressing factors such as the drivers of work tempo and overwork, heat levels in worker residencies, and the possibility to abstain from work when feeling unwell. Inadequate cooling and recovery after heat stress, and heat stress combined with even minor infections, is likely to compound the risks of working in heat."

Natasha Iskander raised serious concerns about the potential for the law to encourage "self-pacing" in Qatar's construction sector:

"For workers to self-pace, they need to be able to consistently and reliably exercise autonomy at the worksite. Based on the time I spent observing construction sites in Qatar, that is almost impossible to imagine. In addition to workers' inherent vulnerability and deportability, construction projects work under intense and unpredictable time pressures. In this context, the notion that workers could self-pace is fanciful. The larger issue is that this law shunts the primary responsibility to avoid injury onto workers. In addition to giving companies a pass, it gives them legal cover. If a worker suffers from heat injury, now or in the future, then it henceforth becomes their fault, formally and legally, for not self-pacing well enough."

Maggie Morissey, the Director of Occupational Safety at the KoreyStringer Institute at the University of Connecticut said that she "agreed wholeheartedly" with the concerns of Professors Wegman and Iskander. She told the Vital Signs Partnership that employers should also be required to implement "timely communication strategies to inform workers of acceptable work-to-rest ratios based on environmental conditions" and noted that some workers in sectors like construction are required to wear heavy personal protective equipment that further increases the risk of heat stress.

A 2019 “Assessment of Occupational Heat Strain and Mitigating Strategies”, commissioned by the ILO and Qatari government, and carried out by the FAME Laboratory at the University of Thessaly in Greece, highlighted that while self-pacing could be an effective measure for workers *who felt empowered* to request breaks, the implementation of work-rest ratios was necessary for workers who are not in a position to request rest. The report stated: “The work-rest ratio strategy offered the most effective mitigation for those who were less empowered to self-pace and negotiate breaks with their supervisors.” Focus group discussions with workers carried out for the FAME study confirmed these findings. In cases where workers were empowered, they were able to inform their supervisors about their need to rest, however those who were able to negotiate breaks with their supervisors “described the peace of mind that came from knowing that they could rest for ten minutes without any pressure to get back to work”.³⁹

For Barrak Alahmad, the choice of banning work during particular hours in certain months is an arbitrary approach, “... not based on science, based on calendar months. Policymakers pick three to five hours during the day, mainly the hottest hours, and they choose three months during the summer and they ban work during those hours. To me, this does not make any sense. Nature does not work this way. Is 11: 59 am different from 12: 01 pm? It’s not. Chances are it’s not going to make a difference. Heat can also affect night workers- sunlight is just one factor.”⁴⁰

Alahmad with other researchers at Harvard and Kuwait Institute of Scientific Research showed that the summertime midday ban in Kuwait did not result in reduction of workplace injuries.⁴¹ Alahmad argues for a quantifiable, risk-based method that can be applied indoors and outdoors, for all hours of the day uniformly to protect workers. This is a long-standing approach in occupational health. For example, US regulation of benzene, a carcinogenic gas found in factory settings, requires employers to monitor workers’ exposure to the toxic substance and ensure safe levels are not exceeded.⁴² Alahmad points out that this approach fundamentally differs from the Qatari heat law: “You can’t say workers are banned from exposure to benzene from June to August. You have a

measurement to limit exposure. Why don’t we have the same thing for heat?” Such approaches do exist. For instance, in the U.S. state of California, a temperature of 80° Fahrenheit, (27°C) triggers requirements for employers to provide workers with water and shade.⁴³ Singapore, which has a large migrant worker population and a tropical climate, has a fairly elaborate preventive action plan for heat stress control. It adopts WBGT and Heat Stress Index as indicators of thermal environment conditions and alerts employees and the public with hourly readings.⁴⁴

Negative health impacts of heat are predictable and largely preventable if employers adhere to scientifically grounded guidance and if workers are fully aware of the risks they face and the steps they need to take to mitigate them. Dunu Roy, the coordinator of the Hazards Centre in India, noted the importance of scientifically sound heat protection and told the Vital Signs Partnership that such measures should not be imposed in a top-down way and that they would only be effective if complemented with the right approach to health and safety, which ensures that workers are consulted in the design and implementation of safety measures and that their lived experience be fully taken into consideration.” “It is also necessary that workers understand the basic principles of occupational health and safety”, he said.⁴⁵

Natasha Iskander told FairSquare that a holistic approach is required. “If we dealt with heat in a way that allowed us to really think about protecting lives, it would force us to rethink the relationship between work and livelihood, in really meaningful ways, where wages were not the only question, where safety at work was not the only question, but rather the full gamut of supports or components required for decent livelihood, including things like decent housing, access to nutrition, healthcare” Iskander was highly critical of skewed priorities in the Gulf. “Migrant workers are viewed as a source of flexibility, their bodies in particular are viewed as a source of flexibility. The deadlines are hard, the building designs are firm, the cost structure is immovable, but workers’ bodies are infinitely exploitable. The only real rejection of that exploitation, the only real proof that further exploitation is not possible is death.”

39. ILO Project Office for the State of Qatar, “Assessment of Occupational Heat Strain and Mitigating Strategies”, (11 October 2019).

40. Interview with Barrak Alahmad, 30 March 2023.

41. Barrak Alahmad, Ali Al-Hemoud et al., “Extreme heat and work injuries in Kuwait’s hot summers”, Occupational and Environmental Medicine, vol. 80, no. 6, (April 2023).

42. See [Toxic and Hazardous Substance Standards webpage](#) at United States Department of Labor, Occupational Health and Safety Administration website.

43. See [Heat Exposure- standards webpage](#) at United States Department of Labor, Occupational Health and Safety Administration website.

44. Andrea Jia and Yang Miang Goh, “Managing climatic heat stress in Singapore: state of the practice and wearables on site”, presented at 37th Annual ARCOM Conference, (September 2021).

45. Email correspondence with Dunu Roy, 12 June 2023.

Sujan Thami: “I don’t know how much longer I’ll live.”

Five years ago Sujan Thami, 40, travelled from Nepal to work in Qatar through a Kathmandu-based agency called Asia Link Services. He paid the agency 10,000 rupees (US\$75) and spent a total of around 100,000 rupees (US\$750) on medical tests, flight tickets, and sundries. The firm had promised him work as a security guard, with a monthly salary of 2,200 riyals (US\$604). “But they cheated me,” Sujan told FairSquare. “I got neither the salary they promised, nor the job.”

Instead, Sujan was employed as a plumber in Qatar, working six days a week. With no fixed hours, he tended to begin work at 8am, but had to be ready at any time in case the company received an urgent work request. He frequently worked until midnight or the early hours of the morning, compromising his sleep despite being “extremely exhausted” from the previous day’s work. He was paid 1,200 riyals (US\$330) a month and to earn more, he worked overtime. Shortly before he returned home, his salary was increased by 100 riyals (US\$27).

The work involved carrying out repairs in hotels and private residences. Sujan described the job as “very difficult”, mainly because he often had to work outdoors in searing heat and couldn’t take breaks. “I sweated profusely, I’d be completely drenched in sweat. When I squeezed my inner clothes, a lot of sweat would come out of them,” he said. “But I wasn’t allowed to rest when supervisors were around. If they saw, they’d complain. My only break was during lunch hour.” The indoor work was also gruelling, and involved operating a grinding machine, cutting and fitting large pipes, stripping and replastering walls, and drilling.

For two months, Sujan was housed in accommodation which he describes as resembling an “abandoned house”, without air-conditioning. He was later moved into a camp in Umm Salal, which was clean and had a kitchen. Sujan and his roommates would cook in the evening and save food for the next day’s lunch, but their diet lacked vegetables. Sujan also struggled to drink enough water. At an apartment block where he worked - which didn’t have air-conditioning at the time - there was only one water cooler between more than 100 workers. The water didn’t stay cool for long due to the high temperatures, and workers felt it was unsafe to drink. Sujan took a bottle of water to work with him, but this also heated up rapidly in the sweltering climate. He managed to drink about two litres of water a day, but drank a lot of chilled drinks too, as these were cheaper and easier to get hold of than water. The need to access cold water led Sujan to take extreme measures: “I’d go to the sea during the lunch hour to drink seawater because it was cold,” Sujan explained. “I’d splash water on my face. It was very relaxing.”

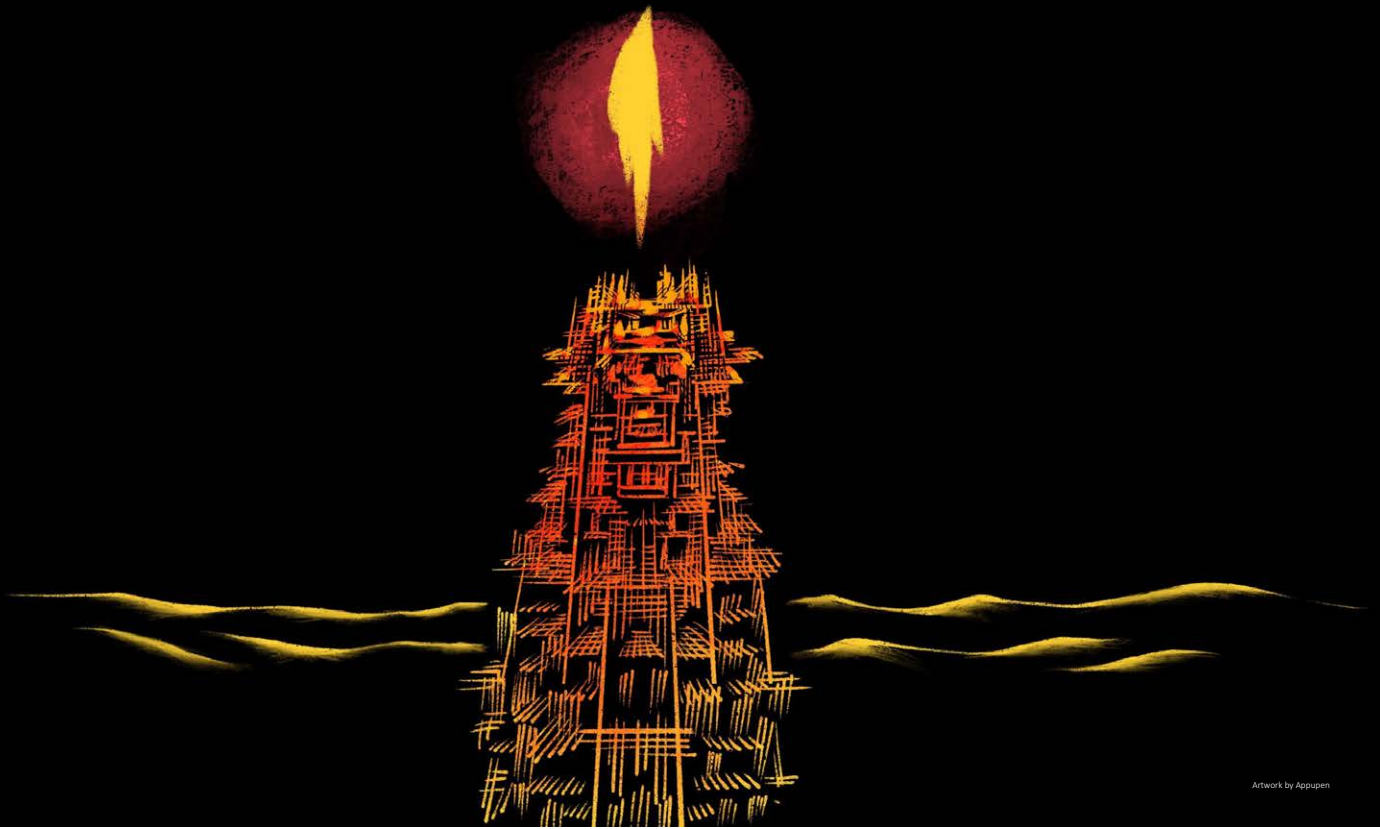
Towards the end of his nine months in Qatar, Sujan began to experience blurred vision, headaches, vomiting, and the need to urinate frequently during the night. His intense workload forced him to delay seeking medical treatment, but a week after developing symptoms he went to the Hamad Hospital, where following a series of tests he was told by doctors that his kidneys were not fully functioning. “They said I needed to undergo dialysis immediately, but I was so scared,” Sujan recalled, “I tried to run away from the hospital, but I was caught by the security guards. Then I was taken to a room and given a general anaesthetic. After a couple of hours, when I regained consciousness, I found myself lying on a hospital bed. They did surgery on my neck to put in a tube.”

After four dialysis sessions in Qatar, Sujan returned to Nepal. His employer paid for his flight ticket and gave him 1,000 riyals (US\$275). At home, he consulted with doctors and pondered why his kidneys had failed. “I still wonder how it happened. Maybe it was due to the difficult work conditions, unsafe water, and low-quality food we were given?” said Sujan.

Sujan now regrets going to Qatar. Since returning to Nepal almost four years ago, he’s lived with his sister in Kathmandu in order to be near the National Kidney Center for his tri-weekly dialysis. Although the dialysis is provided free of charge, he spends around 3,500 rupees on medication, transport, and snacks for each session. Already in debt and with no income, he struggles to pay for the medication, and is reliant on money from friends and relatives for the expenses. Sujan would like a kidney transplant, but this is unlikely due to the cost. “I’ve seen several dialysis patients dying in

front of my eyes. I was scared to see them. I don't know how much longer I will live. I may die at any time – today or tomorrow. I could live longer with a kidney transplant, but how can I find the money?" asked the father of two. "I feel I'm a burden to my family. I don't know how long they can support me."

Sujan went to Qatar to improve his poor financial situation. He had no medical conditions at the time. He'd also considered moving to another country after making some money in Qatar. "I fell ill before my dreams were met," he reflected. "I feel so bad when I think about my situation and future. How can I explain what I'm going through now? No one else can understand what it's like."



Artwork by Appupen

5. LACK OF DATA ON IMPACT OF HEAT ON WORKERS

Despite the dangerous risks presented by the combination of exertional work in often abusive conditions and the extreme heat of the Gulf region, there is almost no data on the impact of heat on migrant workers, and the available data on migrant worker deaths does not register any fatalities to heat stress, nor record heat as an underlying cause in any deaths.

The lack of any data on heat-related deaths reflects broader failures in relation to the investigation and certification of migrant worker deaths in the Gulf. Of the approximately 10,000 deaths of migrant workers from south and southeast Asia in the Gulf annually, more than one out of every two are effectively unexplained, which is to say that deaths are officially certified without any reference to an underlying cause, with terms such as “natural causes” or “cardiac arrest” appearing on death certificates instead.

This exceptionally high rate of unexplained deaths is largely a factor of the systematic failure of the Gulf states to investigate deaths (as detailed in the first Vital Signs report), but it is also partly a product of the systemic obstacles that migrant

workers face when trying to access healthcare in the Gulf, as described in detail in the second Vital Signs report.⁴⁶ Professor Vivekanand Jha, Executive Director at The George Institute for Global Health, India, and Chair of Global Kidney Health at Imperial College London told the Vital Signs Partnership that the inability of workers to access healthcare was in all likelihood “a critical factor” behind the high rate of unexplained deaths in the Gulf.

Dr. Birat Krishna Timalisina, a cardiologist at the Shahid Gangalal National Heart Centre and Metro Hospital in Kathmandu told the Vital Signs Partnership that failure to provide easy access to healthcare would be a contributory factor in the number of preventable deaths, particularly in an environment where workers are exposed to extreme heat, or other environmental risk factors, and high levels of stress.⁴⁷ Another Nepalese doctor we spoke to in the course of our research noted that if a patient’s medical history is not available and doctors don’t see the patient’s symptoms prior to death, “they have few clues as to what caused their death ... unless an autopsy is performed.” This is a problem, since invasive autopsies have

46. Vital Signs Partnership, [“The Deaths of Migrants in the Gulf”](#), (March 2022) and [“The Cost of Living: Migrant Workers’ Access to Health in the Gulf”](#), (November 2022)
47. Vital Signs Partnership, [“The Cost of Living: Migrant Workers’ Access to Health in the Gulf”](#), (November 2022).

traditionally been the subject of some sensitivity in the Gulf region and they are carried out rarely.⁴⁸ Despite this sensitivity, the Gulf states currently overwhelmingly rely on invasive autopsies as the primary method of identifying cause of death, and have largely ignored significant advances in the non-invasive techniques and technologies that are available to pathologists. Professor Dr. Harun-Ur-Rashid, Professor from Sir Salimullah Medical College Mitford Hospital in Dhaka told the Bangladeshi rights group and Vital Signs partner member RMMRU that Bangladeshi health authorities could perform autopsies on bodies that returned without a recognised cause of death on the death certificate, but currently no origin states do this as a matter of course.⁴⁹

A 2021 International Labour Organization (ILO) report analysing work-related deaths and injuries in Qatar made the following significant recommendation on “natural causes”, unexplained deaths of death, and autopsies:

“There is a need to review the approach taken to investigating deaths of seemingly healthy young workers from “natural causes”, to be able to determine whether they are in fact work-related, and ensure more accurate identification of the cause. This is important for OSH [occupational safety and health] data collection purposes, but more importantly to ensure workers’ families receive due compensation. There is a need to cast a wider net when identifying possible work-related injuries at the outset, as they may otherwise not be identified in secondary reviews. For example, investigations by the labour inspectorate should be made more systematic in cases of deaths of “natural causes” that meet certain criteria, e.g. young men who work outdoors. There is already a proposal to formalize linkages at the operational level among ADLSA [the labour ministry], MOPH [the Ministry of Public Health] and MOI [Interior Ministry] to share information and conduct investigations on specific cases that need further investigation. In addition, more consultation is required on the situations in which autopsies may be viable from a legal, cultural, medical and practical perspective.”⁵⁰

The first Vital Signs report recommended that the Gulf states establish specialised teams of inspectors and medical examiners to ensure that all deaths of migrant workers are investigated and certified in accordance with international best practice, and that they introduce non-invasive and verbal autopsy procedures. No such steps have been taken, to our knowledge. To compound this inaction, the gradual shift in the

region to mandatory private health insurance, described in our second report, is likely to further restrict access to healthcare for migrant workers.

The countries that send workers to the Gulf cannot on their own resolve these issues, but, as recommended in the first Vital Signs report, they can publicly press for the above steps to be taken, and they can make available all historical data on deaths of overseas workers, disaggregated by destination, occupation, age, gender, date of death and cause of death. By doing so, and notwithstanding the poor quality of the data they receive from the Gulf states, they would facilitate effective analysis by public health experts and shine a light on the poor investigation and certification of migrant worker deaths in the Gulf. Unfortunately, origin states generally do not make available useful data on cause and date of death and other important characteristics such as sex, age and occupation.

Nepal and the Philippines provide the most detailed data on the deaths of their nationals abroad. Nepal makes its data public, but the most recent report from its Ministry of Labour, Employment and Social Security, which lists deaths into seven broad categories, does not give any indication that heat is either a primary cause of death or a contributory factor in the deaths of its nationals abroad.⁵¹ Data released by the Philippine Statistics Authority in response to an RTI request submitted by the Center for Migrant Advocacy, is disaggregated for each country of death by occupation, age bracket and cause of death, but there is no mention of heat as a cause of death. The only data available in Pakistan relates to death claims made to the State Life Emigrants’ Insurance Fund. In Bangladesh, the Refugee and Migratory Movements Research Unit was able to obtain country-specific data from the Shahjalal International Airport, Dhaka, where more than 90% of deceased Bangladeshis, including the vast majority of bodies of migrant workers from the Gulf states, are received. However, no data is available on the causes of deaths nor on the characteristics of the returning deceased migrants. In India, through RTI requests, parliamentary questions, and analysis of fragmented data sets shared by Indian embassies in the Gulf, it is possible to make some assessment of the circumstances of the deaths of Indian nationals, but there is no reference in any of these data sets to the role of heat in causing or contributing to deaths.

The absence of any useful data on this issue is all the more alarming in light of the existence of numerous studies that have clearly established a causal link between extremely high temperatures and increased rates of death in other parts of

48. Mohammed Omar Sohaibani, Autopsy and Medicine in Saudi Arabia, 1993, Annals of Saudi Medicine, 213-214

49. Comments at Policy Maker Engagement Event on Labour Migrants’ Access to Healthcare in the Gulf States in Dhaka, Bangladesh, organised by Refugee and Migratory Movements Research Unit (RMMRU), 7 June 2023.

50. International Labour Organization “[One is too many: The collection and analysis of data on deaths and injuries in Qatar](#)”, (November 2021).

51. The categories are cardiac arrest, heart attack, natural causes, traffic accident, suicide, workplace accident and ‘other causes’. See Government of Nepal Ministry of Labour, Employment and Social Security “[Nepal Labour Migration Report 2022](#)” The report refers to the findings of the first Vital Signs report on heat on page 108.

the world. Good data is key to identifying the role of heat in deaths, because in individual cases, as noted by Natasha Iskander, it can be “difficult to discern under the best of circumstances” and “a definitive determination through autopsy is difficult”.⁵² Barrak Alahmad told FairSquare that it can be common for overworked doctors to miss such cases when certifying deaths. Both experts concurred on heat’s long term contribution to a wide variety of potential fatal diseases. “Public Health doctors and epidemiologists are able to detect [the contribution of heat as an underlying cause of deaths] statistically by looking at a time series variations of population deaths and temperature”, said Barrak Alahmad.

By way of example, the European heatwave of 2022 saw the deaths of more than 15,000 people, according to the World Meteorological Organization, which gathered data from public health authorities in the countries affected.⁵³ A Lancet study of baseline mortality data from 43 countries across five continents, published in 2021, found that deaths related to hot temperatures increased in all global regions from 2000 to 2019, indicating that global warming due to climate change will make this mortality figure worse in future.⁵⁴

52. Email from Natasha Iskander, 6 June 2023.

53. World Meteorological Organization (WMO), [State of the Global Climate 2022](#), (2023).

54. Qi Zhao, Yuming Guo et al., [“Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019: a three-stage modelling study”](#) The Lancet, (2021).”

6. CONCLUSIONS AND RECOMMENDATIONS

Exposure to extreme heat affects cognition, causes heat cramps, heat exhaustion and heat stroke, and leads to heightened risks of death from common cardiovascular conditions. Long-term exposure to heat is associated with the development of chronic kidney disease in people working outdoors. Heat exposure of this nature is widely experienced by migrant workers in the Gulf countries, and is set to be an urgent issue globally as temperatures rise due to climate change. Protecting workers from exposure to heat requires ambitious action and includes enabling workers to access adequate accommodation, nutrition and healthcare. Current heat protection measures in the Gulf are inadequate, but the Gulf countries have an opportunity to step-up their approach and lead the way in setting a high standard for others to follow.

Recommendations to the governments of Gulf Cooperation Council (GCC) states

- Adopt a risk-based, rather than a calendar-based approach to limit workers' exposure to heat. Pass legislation to ensure that employers are required to provide workers with breaks of an appropriate duration, in cooled, shaded areas, when there is an occupational risk of heat stress; mandatory break times should take into account the environmental heat stress risks along with the exertional nature of the work being performed.
- Require all employers to ensure workers have easy access to water and chilled food storage facilities at work sites, and fully air-conditioned accommodation. Stress to employers that malfunctions in air conditioning should be treated as a maintenance priority.
- Ensure access to primary health care where preventable conditions are identified early and avoided.
- Conduct a study into the prevalence of CKDu or early stage kidney disease among low-paid migrant worker populations.
- Ensure that labour laws and occupational safety and health regulations align with international standards, that migrant workers are fully informed of regulations and are adequately trained, and that labour inspectorates are properly resourced and empowered to instigate

administrative proceedings and to refer serious violations for criminal prosecutions.

- Make all necessary healthcare for low paid migrant workers free of charge at the point of care, irrespective of workers' immigration status or their possession of identity documents. Ensure that fully resourced clinics and emergency rooms are in close proximity to areas with large populations of low-paid migrant workers.
- Commit to funding the healthcare costs, including kidney dialysis, of migrant workers who return to their countries requiring treatment for chronic kidney disease they contracted in the Gulf.

Recommendations to the governments of origin states

- Make available all historical data on deaths of overseas workers, disaggregated by destination, occupation, age, gender, date of death and cause of death. This data should be available online and presented in a way that facilitates effective analysis by public health experts.
- Commission and publish studies into the prevalence of CKDu among nationals returning from the Gulf, which should include full details of the cost of their treatment and the proportions of those costs that are paid for by the government, private insurers, or the patients themselves.
- Call on the Gulf states to: enhance investigation procedures for migrant worker deaths; commission independent investigations into the causes of migrant worker deaths; enhance legal protection from heat stress.
- Publicly press governments of the GCC states to improve access to healthcare for migrant workers: highlight existing barriers and urge their removal.



VITAL SIGNS

vitalsignsproject.org