health care, including disease diagnosis, treatment, and surveillance, therefore increasing the risk of zoonotic disease transmission to humans. Historically, the country has had conflict-driven outbreaks of yellow fever and Crimean–Congo haemorrhagic fever with high case fatality rates reaching up to 57%.[3,4] These outbreaks could serve as a harsh reminder of the health consequences related to zoonotic disease outbreaks during war.

Moreover, the destruction of key laboratories and equipment at Sudan's Central Veterinary Research Laboratory (CVRL) could be a crucial factor contributing to the spread of zoonotic diseases, as the CVRL has played a fundamental role in controlling these diseases. Due to the conflict, cold storage equipment containing pathogenic isolates (eg, Rift Valley fever virus) was destroyed or emptied and looted. This theft and destruction poses a substantial risk, as individuals who had contact with this equipment were exposed to deadly pathogens, escalating the likelihood of infections and outbreaks.

The displacement and mixing of animals and humans are major drivers for disease transmission.[1] The conflict displaced millions of livestock and forced them to alter their traditional migration routes in search of new grazing areas, increasing contact between livestock from different areas. Moreover, according to the UN's Office for the Coordination of Humanitarian Affairs, since April 15, 2023, more than 8·1 million people have been displaced—6.3 million people within Sudan and 1.8 million people have fled abroad.[5] Most people who were internally displaced took refuge with their relatives, increasing human contact and the associated risk of disease transmission. Given that zoonotic disease outbreaks are more likely to occur in densely populated areas, Sudan might face such outbreaks.[6]

To mitigate the impact of the conflict on zoonotic disease management, targeted strategies are required, including strengthening disease surveillance and reporting and conducting awareness campaigns. Furthermore, promoting collaboration with the Food and Agriculture Organization of the UN, World Organisation for Animal Health, and WHO is important for getting essential resources, expertise, and training to strengthen the veterinary sectors in all conflict-affected areas.

Overall, the ongoing armed conflict in Sudan has severely impacted veterinary services and zoonotic disease management, posing clinically significant risks for animals and humans. To effectively address the challenges that might arise, a collaborative One Health approach, targeted interventions, and emergency response strategies are crucial. The global community can support Sudan by assisting in rebuilding veterinary services and facilities. Without this collaboration, the health systems will be further strained in the event of an outbreak.

I declare no competing interests.

Editorial note: The Lancet Group takes a neutral position with respect to territorial claims in published text and institutional affiliations.

Yassir Adam Shuaib
vet.aboamar@gmail.com

Department of Preventive Veterinary Medicine and Public Health, College of Veterinary Medicine, Sudan University of Science and Technology, Khartoum North 13321, Sudan

1 Cornwell MS, Dodd CC. The role of veterinary services in areas of conflict. *Rev Sci Tech* 2020; **39:** 451–60.
2 Wilson RT. Livestock in the Republic of the Sudan: policies, production, problems and possibilities. *Animal Husbandry, Dairy and Veterinary Science* 2018; **2:** 1–12.
3 Ahmed A, Dietrich I, LaBeaud AD, Lindsay SW, Musa A, Weaver SC. Risks and challenges of arboviral diseases in Sudan: the urgent need for actions. *Viruses* 2020; **12:** 81.
4 Gayer M, Legros D, Formenty P, Connolly MA. Conflict and emerging infectious diseases. *Emerg Infect Dis* 2007; **13:** 1625–31.
5 United Nations Office for the Coordination of Humanitarian Affairs. Sudan situation report. 2024. https://reports.unocha.org/en/country/sudan (accessed March 6, 2024).
6 Stephens PR, Gottdenker N, Schatz AM, Schmidt JP, Drake JM. Characteristics of the 100 largest modern zoonotic disease outbreaks. *Philos Trans R Soc Lond B Biol Sci* 2021; **376:** 20200535.

Al-Buluk Children's Hospital in Khartoum

Sudan's war broke out in April, 2023, and has had a deadly impact on children's health services. Before the start of the war, the capital Khartoum had a dozen paediatric hospitals. Only one remains: Al-Buluk Children's Hospital, a government hospital near shifting front lines.

Al-Buluk is small: 26 emergency beds and 80 inpatient beds. It has wards for malnutrition, neonates, general paediatrics, and a high-dependency unit serving patients with renal, respiratory, cardiac, and neurological problems. It also has malnutrition, diabetes, and vaccination clinics. Each week, about 12 inpatients die.

One patient journey illustrates the scale of the crisis. Khadija (not her real name) is a 17-year-old girl with type 1 diabetes from Dar al-Salam, a displacement settlement 20 km west of Al-Buluk. Her area was besieged by one of the two armies fighting inconclusively for control of Khartoum, and bombarded by the other. Fighting shut the hospital where she received dialysis. Last year, Khadija's 8-year-old brother was diagnosed with diabetes. The family's insulin supplies dwindled, and Khadija rationed and then stopped taking insulin, so her brother could live. Her condition deteriorated and she undertook the perilous journey across front lines to Al-Buluk. She arrived emaciated and unconscious, and died a week later.

Khartoum's hunger crisis aggravates the child health crisis. Most nutrition centres are shut, and each week, Al-Buluk admits about 25 children for severe acute malnutrition. Each week, two or three of them die. The hunger crisis is linked to a wider economic collapse devastating the health system. Private hospitals—the majority—no longer have paying patients. Al-Buluk is a government hospital. Government facilities charge for services and prescriptions. Fee exemptions for children younger than 5 years reduce

cost burdens on many Al-Buluk patients. Free medicine supplies often run out: even before the war they were in short supply and since the war began, pharmacies and warehouses have been looted, and pharmaceutical imports have fallen sharply.

Al-Buluk still receives some supplies: oxygen and some medicines from the health ministry, fuel and laboratory reagents from Médecins Sans Frontières, and donations from local charities to cover treatment for children without resources. But salaries are no longer paid, and many staff cannot afford to work for free: staff shortages have closed an entire wing. Thousands of Sudanese doctors work overseas, and donations from Sudanese medical associations in countries such as the USA and the UK supported Al-Buluk's payroll for many months. But these donations are drying up, and promised support from other organisations has failed to materialise.

Two specialist hospitals—one near Al-Buluk, the other 35 km away—still provide treatment for children in a few specialties. Otherwise, Al-Buluk is the only hospital serving the children of this vast metropolis, criss-crossed with front lines and checkpoints. This year it can barely afford to feed its malnourished patients.

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*Esra Eltahir, Khalid Abdelhafiz, Mai Ali, Sara Abdelgalil, *Edward Thomas*
eddie.thomas@london.msf.org

Sudanese Association of Paediatricians, Khartoum, Sudan (EE); British-Sudanese Association of Paediatric and Child Health, Peterborough, UK (KA, MA); Shabaka, Brighton, UK (SA); Manson Unit, Doctors Without Borders, London EC4A 1AB, UK (ET)

Inflammation, infection, and cardiovascular risk

We fully agree that low-density lipoprotein and inflammation both contribute to atherosclerotic cardiovascular disease, and generally agree with Paul M Ridker and colleagues' conclusions about the three trials analysed;[1] however, we would like to highlight the following points.

First, the participants in the trials were in their late midlife, and more than half of them were in the secondary prevention groups. Consequently, advanced atherosclerotic lesions had already developed in the susceptible arterial walls. Second, during statin treatment, low-density lipoprotein cholesterol concentrations at baseline were on average 2·0 mmol/L in each trial, that is, above the concentration at which atherosclerosis begins and, particularly, above the current target of less than 1·4 mmol/L for patients at very high risk of atherosclerosis.[2,3] We have argued that, in secondary prevention, a more efficient control of low-density lipoprotein cholesterol with PCSK9 inhibitors would be equal to statin plus anti-inflammatory treatment.[4] Third, there is some evidence that inhibition of cholesterol synthesis with statin treatment might not be sufficient to prevent vascular outcomes, because a substantial proportion of patients are high absorbers of cholesterol, and, therefore, a combination therapy with absorption inhibition would be needed.[5] Last, but not least, evidence (eg, from primitive cultures and genetic studies) indicates that low-density lipoprotein is the early root cause and is essential for the development of atherosclerotic cardiovascular disease.[2]

Consequently, the need for anti-inflammatory treatment in combination with statins might be too little, too late. More efficient and timely recognition of individuals at risk of atherosclerotic cardiovascular disease is needed.

TES has had educational, research, and consultative collaboration with several companies marketing lipid-lowering treatments, including Amarin, Amgen, Novartis, Orion Pharma, Raisio Group, and Sankyo. PTK has had collaboration with Amgen, Novartis, Raisio Group, Roche, and Sanofi. HG has taken part in educational and consultative collaboration regarding human cholesterol metabolism with Raisio Group.

**Timo E Strandberg, Petri T Kovanen, Helena Gylling*
timo.strandberg@helsinki.fi

University of Helsinki and Helsinki University Hospital, Helsinki 00029, Finland (TES, HG); University of Oulu, Center for Life Course Health Research, Oulu, Finland (TES); Wihuri Research Institute, Helsinki, Finland (PTK)

1 Ridker PM, Bhatt DL, Pradhan AD, et al. Inflammation and cholesterol as predictors of cardiovascular events among patients receiving statin therapy: a collaborative analysis of three randomised trials. *Lancet* 2023; **401:** 1293–301.
2 Tokgözoğlu L, Libby P. The dawn of a new era of targeted lipid-lowering therapies. *Eur Heart J* 2022; **43:** 3198–208.
3 Visseren FLJ, Mach F, Smulders YM, et al. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. *Eur Heart J* 2021; **42:** 3227–337.
4 Strandberg TE, Libby P, Kovanen PT. A tale of two therapies lipid-lowering vs. anti-inflammatory therapy: a false dichotomy? *Eur Heart J Cardiovasc Pharmacother* 2021; **7:** 238–41.
5 Miettinen TA, Gylling H, Strandberg T, Sarna S. Baseline serum cholestanol as predictor of recurrent coronary events in subgroup of Scandinavian simvastatin survival study. Finnish 4S Investigators. *BMJ* 1998; **316:** 1127–30.

Elevated high-sensitivity C-reactive protein (CRP) concentration is considered a risk enhancer in non-diabetic individuals at intermediate risk of atherosclerotic cardiovascular disease, and favours initiating moderate-intensity statin as primary prevention.[1] As stated in the Article by Paul M Ridker and colleagues, the residual inflammatory risk assessed by high-sensitivity CRP on atherosclerotic cardiovascular disease events in individuals receiving statin therapy had not been thoroughly investigated.[2]

In their collaborative analysis of three trials,[2] as compared with the lowest high-sensitivity CRP quartile (<1·1 mg/L), the highest high-sensitivity CRP quartile (>4·8 mg/L) was associated with a greater risk of atherosclerotic cardiovascular disease (adjusted hazard ratio 1·31, 95% CI 1·20–1·43). As two-thirds of the participants in the pooled sample had a prior atherosclerotic cardiovascular disease, those who used statins for secondary prevention might have had a greater residual inflammation risk and were at higher risk of recurrence than those without a prior atherosclerotic cardiovascular disease at baseline.