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Emerging or Newly Detected? Rethinking Infectious Disease Outbreaks in North Africa

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ABSTRACT

North Africa sits where climate change, armed conflict and cross-border mobility meet, and each of these moves pathogens. Yet outbreaks in the region are often recognized late, through travel surveillance abroad, single-hospital studies or reference laboratories rather than routine national reporting. This editorial, which opens the special issue on emerging and re-emerging infectious disease outbreaks in North Africa, reviews three microbial fronts: arboviruses such as West Nile, dengue and chikungunya viruses; antimicrobial resistance and conflict-driven cholera; and fungal pathogens, including *Candida auris*. It summarizes eleven outbreaks reported in the region since 2012 and how each came to light. The gap between reported and actual burden can be large: in eastern Sudan in 2018, surveillance counted 13,978 chikungunya cases, whereas the epidemic was later estimated to have affected about 487,600 people. The editorial argues that many infections called emerging in North Africa are newly detected rather than new, and that the main gap lies in laboratory and surveillance capacity. It calls for integrated One Health surveillance and wider access to molecular and fungal diagnostics.

ناشئة أم مكتشفة حديثاً؟ إعادة النظر في تفشيات الأمراض المعدية في شمال أفريقيا

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المخلص

يقع شمال أفريقيا عند ملتقى التغير المناخي والنزاعات المسلحة والتنقل عبر الحدود، وكلها عوامل تنقل مسببات الأمراض. ومع ذلك، كثيراً ما تُكتشف التفشيات في المنطقة متأخرة، عبر ترصد المسافرين في دول أخرى أو دراسات في مستشفى واحد أو مختبرات مرجعية، لا عبر أنظمة الإبلاغ الوطنية الروتينية. تستهل هذه الافتتاحية العدد بتفشيات الأمراض المعدية الناشئة والمتجددة في شمال أفريقيا، وتستعرض ثلاث جبهات ميكروبية: الفيروسات المنقولة بالمفصليات مثل فيروس غرب النيل وفيروس حمى الضنك وفيروس شيكونغونيا، ومقاومة مضادات الميكروبات والكوليرا المرتبطة بالنزاعات، وتلخص أحد عشر تفشياً سُجِّلت في المنطقة منذ عام 2012 وكيفية اكتشاف كل منها. وقد تكون الفجوة بين *Candida auris* والفطريات الممرضة ومنها العبد المبلغ عنه والعبد الفعلي كبيرة؛ ففي شرق السودان عام 2018 سجّل الترصد 13,978 حالة شيكونغونيا، بينما قُدِّر لاحقاً أن الوباء أصاب نحو شخص. وتبين الافتتاحية أن كثيراً من حالات العدوى الموصوفة بالناشئة ليست جديدة بل اكتشفت حديثاً، وأن الفجوة الرئيسية تكمن في القدرات المخبرية وأنظمة الترصد، وتدعو إلى ترصد متكامل وفق نهج الصحة الواحدة وتوسيع الوصول إلى التشخيص الجزيئي والفطري.

الكلمات المفتاحية:

تفشي الأمراض
الأمراض المعدية الناشئة
ترصد الصحة العامة
مقاومة مضادات الميكروبات
Candida auris
شمال أفريقيا

1. A region at a crossroads

North Africa sits where three pressures meet. Its climate is growing hotter and drier, armed conflict has displaced millions of people, and humans, animals and goods move constantly across the Sahara and the Mediterranean. Each of these pressures moves pathogens. Yet the region contributes little to the outbreak literature, and much of what is known about it comes from travelers diagnosed abroad or from single-hospital reports.

Dengue in Egypt shows the problem clearly. *Aedes aegypti* has re-established itself in the country, and outbreaks have recurred in Upper Egypt and along the Red Sea coast [1]. One of the sharpest signals of the 2023 season, however, came from Germany. Dengue cases acquired in Egypt rose to 36 that year, against zero to eight per year between 2017 and 2022, and over 90% of patients had stayed on the Red Sea coast [2]. When a distant country's travel surveillance describes a local outbreak more precisely than local systems do, the gap lies in infrastructure, not in clinical skill.

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This special issue was conceived to narrow that gap. It will bring together virological, bacteriological and mycological work produced in and about the region, so that North African outbreaks are described by the people who investigate them. Submissions remain open until 25 December 2026, and each article is published online as soon as it is accepted.

2. Three microbial fronts

2.1. Viruses

Arboviruses are the most visible sign of ecological change in the region. Tunisia has had neuroinvasive West Nile virus outbreaks in 1997, 2003, 2012 and 2018, mainly along its central coast [3]. National surveillance still depends on detecting severe human cases. When investigators sampled mosquitoes and horses instead, they found West Nile, Usutu and Sindbis viruses in *Culex perexiguus* and flavivirus antibodies in about 40% of horses tested [3]. Viruses circulate long before a patient reaches a neurology ward, and the systems built to detect them begin counting too late.

2.2. Bacteria

Antimicrobial resistance (AMR) is an outbreak that moves slowly. In 2019, bacterial AMR was directly responsible for an estimated 1.27 million deaths worldwide and associated with 4.95 million [4]. In Libya, a recent multicenter molecular study found NDM-1 to be the most common carbapenemase in Enterobacterales from patients, followed by OXA-48, and recovered the same enzymes from hospital surfaces [5]. A resistance gene present on ward surfaces is an outbreak waiting for a host. Conflict adds acute bacterial threats to this chronic one. Sudan's cholera epidemic, which began in July 2024, had reached all 18 states by September 2025, with more than 113,600 cases, over 3,000 deaths and a case fatality rate of 2.7% [6].

2.3. Fungi

Fungal pathogens remain the least visible front. In 2022 the World Health Organization published its first fungal priority pathogens list. It names 19 fungi, four of them critical: *Candida auris*, *Candida albicans*, *Aspergillus fumigatus* and *Cryptococcus neoformans* [7]. An 18-month study from a tertiary center in Cairo has characterized local *C. auris* isolates [8], but most laboratories in the region cannot confirm the species reliably, because commercial biochemical systems have misidentified it as *Candida haemulonii* [9]. Where laboratories did use mass spectrometry and sequencing, as for seven intensive care patients in Algeria, four separate *C. auris* clades turned up in a single hospital [10]. A pathogen that laboratories cannot name is absent from the surveillance data, even while it spreads through intensive care units.

3. Emergence or detection?

These three fronts share one lesson: many infections called “emerging” in North Africa are not new. They are newly detected, or still undetected. The difference matters because it changes the response. A truly new pathogen calls for research on its biology. A long-present but invisible one calls for laboratories, trained staff, reagents that arrive on time, and reporting systems that reach a national database.

The gap between what is reported and what occurs can be large. In eastern Sudan in 2018, surveillance had counted 13,978 chikungunya cases by early October [11], yet a later cohort study estimated that the epidemic affected about 487,600 people, the largest chikungunya epidemic recorded in Africa [12]. Table 1 summarizes eleven outbreaks reported in North Africa since 2012 and how each came to light. In several of them, the decisive evidence came from a research study, a reference laboratory or another country's surveillance system rather than from routine national reporting.

Table 1. Selected infectious disease outbreaks reported in North Africa, 2012–2025, and how each came to light.

Year	Country (area)	Pathogen or disease	Scale reported	How it came to light	Ref.
2012; 2018	Tunisia (central coast)	West Nile virus (neuroinvasive disease)	86 cases, 12 deaths (2012); 53 cases, 2 deaths (2018)	Surveillance of neuroinvasive human cases; later mosquito and horse sampling showed wider circulation	[3]
2017	Egypt (El Quseir, Red Sea)	Dengue virus serotype 2	97 of 144 febrile patients IgM-positive	Hospital-based study with testing of mosquitoes	[13]
2018–2019	Sudan (Kassala and six other states)	Chikungunya virus	13,978 reported cases by 2 October 2018; about 487,600 people estimated affected	Syndromic reporting; true scale estimated by a later cohort study with genome sequencing	[11,12]
2018	Algeria (seven wilayas)	<i>Vibrio cholerae</i> O1 El Tor	291 suspected and 97 confirmed cases	National reference laboratory; genome sequencing showed a new introduction from South Asia	[14]
2020	Mauritania	Rift Valley fever virus	75 of 214 people tested positive; 25 deaths	Joint human and animal investigation; camels, small ruminants and cattle positive	[15]
2022 (report)	Algeria (intensive care units)	<i>Candida auris</i>	7 patients; four clades (I–IV) in one hospital	MALDI-TOF mass spectrometry and sequencing in a research study	[10]
2023	Egypt (Upper Egypt and Red Sea coast)	Dengue virus	Local outbreaks; 36 cases acquired in Egypt diagnosed in Germany	Local reporting; travel surveillance in Germany gave the clearest measure	[1,2]
2023	Libya (Sabha and Bani Walid)	Measles virus	391 suspected and 93 confirmed cases in nine weeks	National measles surveillance supported by WHO	[16]
2023–2025	Morocco (national)	Measles virus	More than 25,000 suspected and 13,706 confirmed cases; 184 deaths	National surveillance reported through WHO	[17]
2024–2025	Sudan (all 18 states)	<i>Vibrio cholerae</i>	More than 113,600 cases and 3,000 deaths by September 2025	Ministry of Health and WHO reporting during armed conflict	[6]

Year	Country (area)	Pathogen or disease	Scale reported	How it came to light	Ref.
2025 (report)	Libya (multicentre)	Carbapenemase-producing Gram-negative bacteria	NDM-1 most frequent, then OXA-48, in patients and on hospital surfaces	Molecular research study of clinical and environmental isolates	[5]

Scale is given as reported in the cited source; case definitions and periods differ between sources. IgM, immunoglobulin M; MALDI-TOF, matrix-assisted laser desorption/ionization time-of-flight; NDM-1, New Delhi metallo- β -lactamase 1; OXA-48, oxacillinase-48; WHO, World Health Organization.

Diagnostic and reporting infrastructure is thin across much of the region and absent in parts of it. Laboratories serving large rural and desert areas, including southern Libya, often rely on culture and phenotypic methods without routine access to molecular confirmation or sequencing. Disrupted services also reopen the door to old infections: in early 2023, measles cases were confirmed in Sabha and Bani Walid after routine immunization had been interrupted by conflict and the pandemic [16]. Conflict in Libya and Sudan has interrupted reporting and pushed patients across borders, so cases may be counted in one country, in another, or nowhere. Surveillance that waits for severe human cases will keep describing outbreaks after they have peaked.

The Tunisian arbovirus work points to a better model: integrated One Health surveillance in which mosquitoes, animals and humans are sampled together, so that circulation is detected before spillover [3]. Mauritania's response to Rift Valley fever in 2020, which tested camels, small ruminants and cattle alongside patients, shows that this approach is already feasible in the region [15]. The same logic applies to resistance genes in hospital environments and to fungal colonization in intensive care units. This special issue invites work of exactly this kind: studies that make hidden circulation visible, from the laboratory bench to the field.

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