# Gender-based violence in food systems

### 2 Lora Forsythe<sup>1</sup>

3

1

### 4 Editor's summary

- 5 The links between food systems and gender-based violence (GBV) remain largely neglected in
- 6 research and policy. Building on the analysis of GBV and systematic inequalities within food
- 7 systems, as well as how specific food system contexts shape GBV risk, this Perspective proposes a
- 8 five-point collaborative agenda to address GBV in food systems.

9

10

#### Abstract

- 11 Gender-Based Violence (GBV) is a significant and pervasive global health and human rights issue
- whereby prevalence rates have remained unchanged for a decade. However, the relationship
- between GBV and food systems the complex networks of people and activities involved in food,
- 14 from production to consumption lacks recognition in food systems research and policy. For both
- moral and practical reasons, GBV needs to be part of food system conversations, research and
- policy, so that the food sector can respond to global calls for action to address GBV.

17

18

34

## [Main]

- 19 Gender-Based Violence (GBV) is a significant global health and human rights issue. One in three
- women globally have experienced physical and/or sexual violence in their lifetime, a number that
- 21 has remained relatively unchanged for a decade<sup>1</sup>. This increases when taking race, age, disability,
- 22 displacement and other intersectional factors into account. GBV has considerable health impacts,
- particularly for women and children, with significant social and economic cost<sup>1,2,3,4,5</sup>. The sheer scale
- and endemic nature of GBV means that it touches virtually all aspects of life.
- 25 However, the relationship between GBV and food systems the complex networks of people and
- 26 activities involved in food, from production to consumption shockingly lacks recognition in food
- 27 systems research and policy. The FAO's<sup>6</sup> recent flagship report on the Status of Women in Agri-food
- 28 Systems goes some way to recognise the issue, but space given to the topic is severely limited. This
- 29 is curious, given that food systems are a part of our daily lives, and that there is increasing
- 30 momentum towards addressing GBV in other sectors, such as #Aidtoo in the humanitarian sector.
- 31 For both moral and practical reasons, GBV needs to be part of food system conversations, research
- 32 and policy. The food systems sector must respond to calls for action in a global, multi-sectoral
- response to GBV<sup>7, 8</sup>.

#### The concept of Gender-Based Violence (GBV)

- 35 While terminology is contested, the term GBV as used by UN Women<sup>9</sup> refers to "harmful acts
- directed at an individual or a group of individuals based on their gender." Rooted in systemic gender
- inequality and harmful social norms, GBV takes many forms physical, sexual, mental and economic
- 38 violence. It affects adults and children, and occurs at the household, community, national levels and

- beyond<sup>10</sup>. The term is also increasingly used to refer to violence experienced by men and boys,
- 40 particularly those who challenge established gender norms.
- 41 The use of the term *gender* is important. While GBV is often used to describe violence against
- 42 women and girls, gender is used to highlight that violence arises from social relations and the use of
- 43 power within these relationships. GBV risk is created as a result of being a woman, man or LGBTQI
- 44 within these relations, and is further exacerbated by intersectional characteristics. Therefore, the
- 45 term GBV encapsulates both the acts and causes of violence. Whereby individual acts of
- 46 interpersonal violence are connected to broader systems of structural violence violence that
- 47 originates from the unequal distribution of power as a result of deeply entrenched and historic
- 48 social, political, economic and institutional inequalities, fed by histories of colonialism and punitive
- social norms, that prevents people from meeting their basic needs<sup>11, 12, 13</sup>.

#### Reasons why GBV exists in food systems

- 51 Food systems involve all aspects and relations around feeding and nourishing people (or lack
- 52 thereof), including food production, processing, packaging, transporting, marketing and
- consumption. Food systems also involve many complex relationships between people, and people
- 54 with private sector companies, governments, technology, and with nature. Ontologies of power and
- critical feminist theory have a long history of 'unpacking' these relationships, but this has yet to
- reach dominate food systems narratives.

50

66

- 57 However, the implications are clear. Expressions of power and control are part of how food is
- produced, processed, sold, distributed and consumed, from household to national levels. This is
- 59 illustrated by the use and dependency in food systems on precarious and exploitative labour
- 60 practices, for example, which increase GBV risk. In the 'Global North' evidence of this occurs among
- 61 migrant farm workers who are in some cases linked to large-scale supermarkets<sup>14, 15</sup>. In contrast,
- 62 there is a body of applied gender research within food systems, mainly focusing in the 'Global
- 63 South', which itself represents a problematic assumption of where gender equality exists and where
- 64 it does not. This rich body of research has some focus on GBV however it is often disconnected from
- broader forms of structural violence in food systems.

#### Current knowledge on GBV in the food system

- 67 There is a notable gap in evidence on the prevalence and nature of GBV in food systems despite it
- being a "systematic barrier for women's empowerment" <sup>16</sup>. Primarily situated within the public
- 69 health and humanitarian fields, with growing grey literature, GBV research often misses an
- 70 important association to food systems and vice versa. However, the gendered nature of food
- 71 systems is well established. Women are disproportionately represented in agri-food systems,
- 72 particularly in informal and unpaid labour, their labour is characterised by intense manual work,
- often combined with care and community work including food provision with low or no pay or
- 74 protection, poor access to resources and limited decision making authority, with clear links to
- punitive gender norms<sup>17, 6, 18, 19</sup>. This context of structural violence then exacerbates violence at the
- 76 community and household levels<sup>20, 21, 22</sup>.
- As such, high GBV prevalence would be expected in areas of the food system where power and
- 78 agency are low and under threat, and where power relations are exploitative and imbalanced.
- 79 Illustrative evidence reflecting different areas of the food system are provided below:
- 80 The most significant body of research regarding GBV in food systems relates to *food consumption*
- and production, or more precisely food security, largely focused on the Global South. This literature

has focused primarily on the relationship between food insecurity and intimate partner violence (IPV), where violence – in multiple forms – occurs as a result of women's limited agency in the household and gender roles related to food provision and production (use of income, access to assets)<sup>22, 23, 24</sup>. A smaller but important area of literature, mainly from humanitarian literature, examines issues of child marriage and 'survival sex' and risks of GBV and food security linked to conflict and climate change <sup>21, 25, 26, 27, 28</sup>. The Intergovernmental Panel on Climate Change <sup>29</sup> cites evidence connecting rising temperatures and resource pressures with increased GBV in the Global North and South, related to risk experienced while travelling longer distances to collect of food, water and firewood, in addition to risks experienced as a result of increasing household stress in the context of constrained resources. Many of these issues are of greater severity for female headed households, minoritized women, women and girls with disabilities and other marginalised women and girls. Attention to GBV and food insecurity among LGBTQ communities is limited but important, given the risk of food insecurity for this population<sup>30</sup>.

These issues are in view of livelihood, resilience and social protection interventions in the humanitarian and development sectors often under the umbrella of women's empowerment programmes<sup>31, 32, 33, 34, 35</sup>. A systematic analysis of the impact pathways and programme effectiveness would be highly valuable, along with its connection to more macro-level dynamics. However, food security and food consumption are only part of the picture.

Grey literature and limited empirical evidence indicate high GBV prevalence in some *food production* systems, largely in the Global South such as risks female farmers have experienced while farming <sup>36,</sup> <sup>37, 38</sup>, and USAID Feed the Future has recently released a toolkit to address GBV in the agriculture sector<sup>20</sup>. Several studies report GBV risks among workers in *commercial agriculture* and *fishing* <sup>39, 40</sup>. Heteronormative pressures may also play a role in men's labour in specific areas of the food system that are high risk for exploitation and abuse, including forced labour, trafficking, physical and sexual abuse. A recent report by the International Organization for Migration<sup>41</sup> provides several examples, including from the fishing industry. However, how these issues relate to GBV and broader food systems requires more exploration.

There is a significant gap in evidence of GBV risk in *food processing, marketing and trade*. However, existing research indicates GBV risk among food 'hawkers' and traders, including during covid<sup>42, 43</sup>.

There is also evidence from research on the fish trade in East and Southern Africa, of 'sex for fish' practices, whereby women 'sell' sex in exchange for a supply of fish to sell<sup>44, 45</sup>.

#### A collaborative agenda

A new collaborative agenda to address GBV in food systems, involving policy makers, researchers, civil society and activists, across the public health, food system, humanitarian and development sectors in the Global North and South, is urgently needed. This agenda should consider the following five points.

Firstly, all progress on the agenda to urgently address GBV in food systems must be informed by practice. This means that actions will require collaboration and leadership of practice-based organisations and GBV survivors/victims where appropriate. This will ensure that research and policy are relevant to the interests and priorities of GBV survivors/victims and is trauma informed — that activities are based on a complete understanding of how trauma affects individual and collective mental, physical, social, emotional or spiritual wellbeing. Efforts in this area will subsequently require new forms of collaboration, communication and co-creation.

Secondly, research evidence on GBV in food systems is required. Interdisciplinary and collaborative research on GBV in food systems is long overdue, starting from research that establishes prevalence, forms and contexts of GBV along food supply chains in the Global North and South. Informed by civil society organisations and policy makers, research is also urgently needed on what works and what could work to address GBV risk in food system contexts. Importantly, a research agenda needs to examine how violence is part of the very structure of how food systems function. This can be explored through drawing on broader ontologies of power that emphasise connections between interpersonal and structural violence. There is a wealth of empirically-based conceptual theory from philosophy, peace and conflict studies, in addition to practice-based and lived experience from civil society that can support a vibrant new research and policy agenda to address GBV in food systems.

 Thirdly, improved data collection on GBV in food systems is needed in the health, humanitarian and development sectors, based on best practice in collecting GBV-related data. While the Demographic Health Survey and the Violence against Children and Youth surveys contain GBV modules, many large-scale surveys and impact evaluations do not collect such data and agencies are not always committed or have the expertise to collect such data. There are important factors to consider in addressing these data gaps: i) if the data gap is also a priority for civil society and front line organisations, ii) if there are ways for data to be collected from perpetrators as opposed to victims/survivors<sup>46</sup>, iii) if data can reflect the diverse and dynamic roles that women, men, girls and boys play in food systems that also contribute to potential contexts of violence to occur. Women's roles in food systems, for example, go far beyond providing a household with the means for food and nutrition, however, this is seldom captured in survey data<sup>22</sup>. Furthermore, qualitative data is particularly important to understanding intersectional aspects of GBV to understand how the relationship of gender with "other inequalities/oppressions, such as sexuality, gender identity, ethnicity, indigeneity, immigration status, disability, to produce unique experiences of violence" is essential<sup>47</sup>.

Fourthly, meaningful reductions in GBV risk will require a fundamental change in the way food systems operate. Efforts can link with the current momentum around gender transformative change and broader transformative change towards the creation of more equitable, just and sustainable food systems. Both historic and contemporary examples from indigenous, feminist, anti-colonial social movements relating to, but are broader than, food systems offer insights into how change can occur<sup>48</sup>. However, while calls for food system transformation are increasing, the historic and contemporary use of power, violence and control within food systems need to be brought to the fore. This means, research, policy and practice must include and extend beyond women's empowerment and agency focused approaches that in practice have the tendency of over-emphasising individual change, which may detract from broader patterns of systemic abuse of power and lack of accountability within food systems.

Finally, change is required at the policy level within a global framework. The food systems sector must start by recognising their role in addressing GBV. Currently, the High-Level Panel of Experts (HLPE) on World Food Security, the current dominant paradigm that shapes policy on food and nutrition security, has made no reference to GBV or broader violence in its flagship reports<sup>49</sup>. While the recent move to include agency in food security definition is a welcome change, more is needed to bring to light and address GBV in global systems food systems. While the next HLPE report "Reducing inequalities for food security and nutrition" due to be released in June 2023 is a much welcome step in recognising

social context within food systems, it is hoped that it will extend a critical lens to GBV within food systems and deeper, historic power inequalities.

#### References

- 170 1. WHO. 2018 Violence Against Women Prevalence Estimates (2021) https://www.who.int/publications/i/item/9789240022256
- Chivers-Wilson, K.A. Sexual assault and posttraumatic stress disorder: a review of the
   biological, psychological and sociological factors and treatments. *McGill J Med*; 9:111-118
   (2006).
- Duvvury, N., Callan, A., Carney, P. Raghavendra, S. Intimate Partner Violence: Economic
   Costs and Implications for Growth and Development. Women's Voice, Agency &
   Participation Research Series No. 3. Washington, DC: World Bank Group (2013).
  - 4. Ouedraogo, R. and Stenzel, D. The Heavy Economic Toll of Gender based Violence: Evidence from Sub-Saharan Africa. IMF WP/21/277, Washington DC: USA (2021).
  - 5. Stockl, H., Devries, K., Rotstein, A. et al. The global prevalence of intimate partner homicide: a systematic review. *Lancet* 382: 859–65 (2013).
  - 6. FAO. The status of women in agrifood systems. Rome (2023). DOI: https://doi.org/10.4060/cc5343en
- Hughes, C., Marrs, C., & Sweetman C. Introduction to Gender, Development and VAWG.
   *Gender & Development*, 24(2):157-169, (2016). DOI: 10.1080/13552074.2016.1208471
  - 8. SVRI & EQI. Global shared research agenda for research on violence against women in low and middle-income countries. Sexual Violence Research Initiative, Pretoria (2021). <a href="https://www.svri.org/sites/default/files/attachments/2021-09-15/GSRA%20VAWG%20Sept%202021%20FullReport%20Final.pdf">https://www.svri.org/sites/default/files/attachments/2021-09-15/GSRA%20VAWG%20Sept%202021%20FullReport%20Final.pdf</a>
  - 9. UN Women. Frequently asked questions: Types of violence against women and girls (2020). https://www.unwomen.org/en/what-we-do/ending-violence-against-women/faqs/types-of-violence
  - 10. Heise, L. Violence Against Women: An Integrated, Ecological Framework. *Violence Against Women*, 4(3):262–290, (1998). DOI: <a href="https://doi.org/10.1177/1077801298004003002">https://doi.org/10.1177/1077801298004003002</a>
  - 11. Montesanti, S.R. The role of structural and interpersonal violence in the lives of women: a conceptual shift in prevention of gender-based violence. *BMC Women's Health* 15(93), (2015) DOI: https://doi.org/10.1186/s12905-015-0247-5
  - 12. Farmer, P. An Anthropology of Structural Violence. *Current Anthropology*, 45(3): 305-325 (2004).
  - 13. Galtung, J. Violence, Peace, and Peace Research. *Journal of Peace Research*, 6(3), 167–191. (1969).
    - 14. Shankley, W. Gender, modern slavery and labour exploitation: experiences of male Polish migrants in England. *Journal of Ethnic and Migration Studies*, (2021). DOI:10.1080/1369183X.2021.2000853
    - 15. Kelly, A. and de Pablo, O. Fresh abuse claims from women picking strawberries in Spain for UK market. 29 June 2019. URL <a href="https://www.theguardian.com/global-development/2019/jun/29/fresh-abuse-claims-from-women-picking-spain-strawberries">https://www.theguardian.com/global-development/2019/jun/29/fresh-abuse-claims-from-women-picking-spain-strawberries</a>
- 16. Njuki, J., Eissler, S., Malapit, H., Meinzen-Dick, R., Bryan, E., Quisumbing, A. A review of
   evidence on gender equality, women's empowerment, and food systems. Global Food
   Security, 33:100622, (2022). DOI: <a href="https://doi.org/10.1016/j.gfs.2022.100622">https://doi.org/10.1016/j.gfs.2022.100622</a>

- 17. FAO, IFAD, UNICEF, WFP and WHO. The State of Food Security and Nutrition in the World
   2018: Building Climate Resilience for Food Security and Nutrition. FAO (2018).
   http://www.fao.org/3/i9553en/i9553en.pdf
- 18. ILO. Women and Men in the Informal Economy Statistical Picture. ILO (2012).
   <a href="http://laborsta.ilo.org/informal\_economy\_E.html">http://laborsta.ilo.org/informal\_economy\_E.html</a>.

- 19. World Bank World Development Report: Agriculture for Development. World Bank, Washington DC (2008).
- 20. Eckman, A.K., Williamson, J., Cheney, K., Mesfin, Z. Toolkit to Address Gender-Based Violence in Agriculture and Market Systems Development. EnCompass LLC for the United States Agency for International Development (2022).
  - 21. Castañeda Camey, I., Sabater, L., Owren, C. and Boyer, A.E. Gender-based violence and environment linkages: The violence of inequality. Wen, J. (ed.). Gland, Switzerland: IUCN. 272pp (2020).
  - 22. CARE. Food Security and Gender Equality: A synergistic understudied symphony (2022).
  - 23. FAO. How can we protect men, women and children from gender-based violence? (FAO, 2018). <u>17928EN.pdf (fao.org)</u>
  - 24. Hatcher, A.M., Stöckl, H., McBride, R.S, Khumalo, M., Christofides, N. Pathways From Food Insecurity to Intimate Partner Violence Perpetration Among Peri-Urban Men in South Africa. *American Journal of Preventative Medicine*, 56(5): 765-772 (2019).
  - 25. Clark, H. and Bachelet. M., Conflict, climate change, and covid-19 combine to create a breeding ground for sexual and gender-based violence. *BMJ* 2022; 378:o2093 (2022). DOI: https://doi.org/10.1136/bmj.o2093
  - 26. Flatø, M. Women, Weather, and Woes: The Triangular Dynamics of Female-Headed Households, Economic Vulnerability, and Climate Variability in South Africa. *World Development*, 90 (2017) https://doi.org/10.1016/j.worlddev.2016.08.015.
  - 27. Plan. Beyond hunger: the gendered impacts of the global hunger crisis. Plan International, Surrey: UK (2022).
  - 28. Njoku, E. T and Akintayo, J., Sex for survival: terrorism, poverty and sexual violence in north-eastern Nigeria. *South African Journal of International Affairs*, 28(2): 285-303 (2021) DOI: https://doi.org/10.1080/10220461.2021.1927166
  - 29. IPCC. Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. (2022)
  - 30. Wilson B.D.M., Lee Badgett, M.V., and Gomez, A.G.H. We're still hungry: Lived Experiences with Food Insecurity and Food Programs Among LGBTQ People. UCLA School of Law:

    Williams Institute (2020) <a href="https://williamsinstitute.law.ucla.edu/wp-content/uploads/LGBTQ-Food-Bank-Jun-2020.pdf">https://williamsinstitute.law.ucla.edu/wp-content/uploads/LGBTQ-Food-Bank-Jun-2020.pdf</a>
- 31. Buller, A.M., Peterman, A., Ranganathan, M., Bleile, A., Hidrobo, H., Heise, C. A Mixed-Method Review of Cash Transfers and Intimate Partner Violence in Low- and Middle-Income Countries. *The World Bank Research Observer*, 332): 218–258 (2018). DOI: https://doi.org/10.1093/wbro/lky002
- 32. Donald, A., Doss, C., Goldstein, M., Gupta, S. Sharing responsibility through joint decision making and implication for intimate-partner violence. Policy Research Working Paper 9760. World Bank Group: Gender Innovation Lab (2021).

257 33. Grabe, S., Grose, R.G., Dutt, A. Women's land ownership and relationship power: a mixed 258 methods approach to understanding structural inequities and violence against women. 259 Psychol. Women Q. 39 (1):7–19 (2015). DOI: http://dx.doi.org/10.1177/0361684314533485.

260 261

262

263 264

265

266

267

268 269

270

271

272

273

274

275

276

277

278

279

280

281

282

283 284

285

286

287 288

289 290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

- 34. Lees, S., Kyegombe, N., Diatta, A., Zogrone, A., Roy, S., & Hidrobo, M. Intimate Partner Relationships and Gender Norms in Mali: The Scope of Cash Transfers Targeted to Men to Reduce Intimate Partner Violence. Violence Against Women, 27(3-4): 447-469 (2021). DOI: https://doi.org/10.1177/1077801219897853
- 35. Theis, S., Quisumbing, A., Meinzen-Dick, R., Gender research: Issue Post Takeaways from twenty years of gender and rural development research at IFPRI: The elements of resilience. (October 8, 2015). https://www.ifpri.org/blog/takeaways-twenty-years-gender-and-ruraldevelopment-research-ifpri-elements-resilience
- 36. Theis, T., Martinez, E., Myers, E. "You will be afraid of doing anything on your own": Agricultural development, intimate partner violence, and women's agency. AGRILINKS. (December 4, 2018) https://agrilinks.org/post/you-will-be-afraid-doing-anything-your-ownagricultural-development-intimate-partner-violence
- 37. Onyima, B.N. & Iwuoha, V.C. New Dimensions to Pastoralists-Farmers Conflicts and Sustainable Agricultural Development in Agadama and Uwheru Communities, Niger Delta. African Security, 8(3): 166-184, (2015). DOI: 10.1080/19392206.2015.1069119
- 38. Frankenthal, I. and Dutty, D. Risk Factors for Gender-based Violence: The Case of Indian Agriculture Oxfam Research Backgrounder series (2021): https://www.oxfamamerica.org/explore/research-publications/risk-factors-forgenderbased-violence-the-case-of-indian-agriculture/
- 39. Henry, C. & Adams, J. Spotlight on sexual violence and harassment in commercial agriculture lower and middle income countries. ILO Working Papers 994987690302676, ILO (2018).
- 40. Feed the Future Enabling Environment for Food Security project, Nordehn, Cultural Practice Women's Work in Agribusinesses and Gender-Based Violence: What Do We Know? AGRILINKS (2018) https://www.agrilinks.org/post/womenswork-agribusinesses-and-genderbased-violence-what-do-we-know
- 41. IOM. The climate change-human trafficking nexus. IOM (2016) https://publications.iom.int/system/files/pdf/mecc infosheet climate change nexus.pdf
- 42. Fawole, O.I., Ajuwon, A.J., Osungbade, K.O. and Faweya, O.C. Prevalence and nature of violence among young female hawkers in motor-parks in south-western Nigeria. Health Education, 102(5): 230-238 (2002). DOI: https://doi.org/10.1108/09654280210444100
- 43. Picchioni, F., Po, J. Forsythe, L. Strengthening resilience in response to COVID-19: A call to integrate social reproduction in sustainable food systems. Canadian Journal of Development Studies. / Revue canadienne d'études du développement, 42(1-2): 28-36 (2021). DOI: 10.1080/02255189.2020.1858761
- 44. Béné C., Merten S. Women and fish-for-sex: transactional sex, HIV/AIDS and gender in African fisheries. World Development, 36:875–899 (2008).
- 45. Mudege, N.N., Mwema, C.M., Kakwasha, K., Chisopo, A., Manyungwa-Pasani, C., Banda, L., Kaunda, E., Marinda, P. The impacts of covid-19 on gender dynamics and power relations among men and women involved in cross border fish trade in Zambia and Malawi. Marine Policy, 146, 105322 (2022). DOI: https://doi.org/10.1016/j.marpol.2022.105322
- 46. Flood, M. & Dembele, L. Putting perpetrators in the picture. QUT Centre for Justice Briefing Papers, 10 May (2021). https://eprints.gut.edu.au/215168/
- 47. Imkaan. Intersectionality in understanding violence against women and girls (VAWG). Imkaan, UN Women, European Union (2019). https://eca.unwomen.org/sites/default/files/Field%20Office%20ECA/Attachments/Publicati

305	ons/2019/10/The%20value%20of%20intersectionality%20in%20understanding%20violence
306	%20against%20women%20and%20girls.pdf
307	48. Korieh, C. J. The Land Has Changed: History, Society and Gender in Colonial Eastern Nigeria.
308	Calgary: University of Calgary Press (2010).
309	49. HLPE Food security and nutrition: building a global narrative towards 2030. A report by the
310	High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food
311	Security (2020).
312	
313	Acknowledgements
314	The author is grateful to Adrienne Martin, Lilian Treasure, Diana Castaneda Lopez, Sarah Martin,
315	Valerie Nelson, Fiorella Picchioni, June Po, Deborah Rubin and Gillian Summers. The author also has
316	immense gratitude to the many women farmers, processors and traders that have given their time
317	to speak candidly about their experiences.
318	
319	Author information
320	Affiliation
321	<sup>1</sup> Natural Resources Institute, University of Greenwich, Medway Campus, Central Avenue, Chatham,
322	Kent ME4 4TB, UK
323	Corresponding author
324	Lora Forsythe   I.forsythe@gre.ac.uk
325	
326	Ethics declaration – Competing interests
327	The authors declare no competing interests.