complex scenarios, with examples ranging from competitive dynamics [19] to social contagion [20]. Localization of dynamics over higher-order structures is yet another addition to this list. Our work thus paves the way for a more comprehensive analysis of structural interventions on networks.

ACKNOWLEDGMENTS

The authors acknowledge Calcul Québec for computing facilities. L.H.-D. was supported by the National Institutes of Health 1P20 GM125498-01 Centers of Biomedical Research Excellence Award. This work was also supported by the Fonds de recherche du Québec – Nature et technologies (V.T., G.S.), the Natural Sciences and Engineering Research Council of Canada (G.S., V.T., A.A., L.J.D.), and the Sentinelle Nord program of Université Laval, funded by the Canada First Research Excellence Fund (G.S., V.T., A.A., L.J.D.). L.H.-D. also acknowledges the dedication of his ALife 2020 coorganizers, Juniper Lovato and Josh Bongard, for moving the conference online to reduce the spread of COVID-19. The authors thank Simon DeDeo who inspired them to write this letter.

- [1] W. O. Kermack and A. G. McKendrick, "Contributions to the mathematical theory of epidemics," Bull. Math. Biol. **53**, 33 (1991).
- [2] W. O. Kermack and A. G. McKendrick, "Contributions to the mathematical theory of epidemics. ii the problem of endemicity," Bull. Math. Biol. **53**, 57 (1991).
- [3] W. O. Kermack and A. G. McKendrick, "Contributions to the mathematical theory of epidemics. iii further studies of the problem of endemicity," Bull. Math. Biol. **53**, 89 (1991).
- [4] O. Diekmann, J. A. J. Metz, and J. A. P. Heesterbeek, "The legacy of Kermack and McKendrick," in *Epidemic Model. Their Struct. Relat. to Data*, edited by D. Mollison (Cambridge University Press, 1995) p. 95.
- [5] R. M. Anderson, B. Anderson, and R. M. May, *Infectious Diseases of Humans: Dynamics and Control* (Oxford University Press, 1992).

- [6] L. Hébert-Dufresne, B. M. Althouse, S. V. Scarpino, and A. Allard, "Beyond R_0 : the importance of contact tracing when predicting epidemics," medRxiv (2020), 10.1101/2020.02.10.20021725.
- [7] R. Pastor-Satorras, C. Castellano, P. Van Mieghem, and A. Vespignani, "Epidemic processes in complex networks," Rev. Mod. Phys. 87, 925 (2015).
- [8] G. St-Onge, V. Thibeault, A. Allard, L. J. Dubé, and L. Hébert-Dufresne, "Master-equation analysis of mesoscopic localization in contagion dynamics on higher-order networks," arXiv:2004.10203 (2020).
- [9] F. Battiston, G. Cencetti, I. Iacopini, V. Latora, M. Lucas, A. Patania, J.-G. Young, and G. Petri, "Networks beyond pairwise interactions: Structure and dynamics," Phys. Rep. (2020), 10.1016/j.physrep.2020.05.004.
- [10] L. Hébert-Dufresne, P.-A. Noël, Vincent Marceau, A. Allard, and L. J. Dubé, "Propagation dynamics on networks featuring complex topologies," Phys. Rev. E 82, 036115 (2010).
- [11] M. E. J. Newman, "Properties of highly clustered networks," Phys. Rev. E 68, 026121 (2003).
- [12] T. Vojta, "Rare region effects at classical, quantum and nonequilibrium phase transitions," J. Phys. A. Math. Gen. 39, R143 (2006).
- [13] L. Hébert-Dufresne and A. Allard, "Smeared phase transitions in percolation on real complex networks," Phys. Rev. Res. 1, 013009 (2019).
- [14] L. V. McFarland and W. E. Stamm, "Review of clostridium difficile—associated diseases," Am. J. Infect. Control 14, 99 (1986).
- [15] S. C. Ferreira, R. S. Sander, and R. Pastor-Satorras, "Collective versus hub activation of epidemic phases on networks," Phys. Rev. E 93, 32314 (2016).
- [16] C. I. Del Genio, T. Gross, and K. E. Bassler, "All scale-free networks are sparse," Phys. Rev. Lett. 107, 178701 (2011).
- [17] M. E. J. Newman, *Networks*, 2nd ed. (Oxford University Press, 2018).
- [18] G. St-Onge, J.-G. Young, L. Hébert-Dufresne, and L. J. Dubé, "Efficient sampling of spreading processes on complex networks using a composition and rejection algorithm," Comput. Phys. Commun., 30 (2019).
- [19] J. Grilli, G. Barabás, M. J. Michalska-Smith, and S. Allesina, "Higher-order interactions stabilize dynamics in competitive network models," Nature 548, 210 (2017).
- [20] I. Iacopini, G. Petri, A. Barrat, and V. Latora, "Simplicial models of social contagion," Nat. Commun. 10, 1 (2019).