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Discussions on generation intervals and beyond

The concept of generation intervals have been around in the literature for a long time (since the 1940s), and the terminology has been sometimes interchangeably called as serial intervals or transmission intervals, although their definitions are different both conceptually and quantitatively. In addition to the ambiguity in terminology, the matter is more complex because some of these intervals are based observations; some are not observable but they conceptually capture the transmission between infector-infectee pairs; whereas some are “intrinsic” (Champredon and Dushoff, 2015) within a single infected individual that directly link to important transmission parameters such as the reproduction number. This presentation is a discussion on these distinctions with a renewed perspective in the relationships between the transmission rate at the level of individuals and the intrinsic growth rate at the population level, and a discussion on the distribution of the (intrinsic) generation intervals and its relationship with the equilibrium conditions.