QING HAN, York University

Adaptive changes in sexual behavior in the high-risk population in response to monkeypox transmission can control the outbreak

Monkeypox, a zoonotic disease, is emerging as a potential sexually transmitted infection/disease, with underlying transmission mechanisms still unclear. We devised a risk structured, compartmental model, incorporating sexual behavior dynamics. We compared different strategies targeting the high risk population: a scenario of control policies geared toward the use of condoms and/or sexual abstinence (robust control strategy) with risk compensation behavior change, and a scenario of control strategies with behavior change in response to the doubling rate (adaptive control strategy). Monkeypox's basic reproduction number is 1.464, 0.0066, and 1.461 in the high risk, low risk, and total populations, respectively, with the high risk group being the major driver of monkeypox spread. Policies imposing condom use or sexual abstinence need to achieve a 35% minimum compliance rate to stop further transmission, while a combination of both can curb the spread with 10% compliance to abstinence and 25% to condom use. With risk compensation, the only option is to impose sexual abstinence by at least 35%. Adaptive control is more effective than robust control where the daily sexual contact number is reduced proportionally and remains constant thereafter, shortening the time to epidemic peak, lowering its size, facilitating disease attenuation, and playing a key role in controlling the current outbreak.