

Table S1. Equations for model of IVD development process

Variable	Descriptions	Equations
Information disclosure	Spread of pathogen genetic information and increase the ease of securing pathogens over time	= WITH LOOKUP (Time, ((0,0), (365,0), (366,0.1), (396,0.5), (426,1), (493.387,1.55303), (572.965,2.04545), (649.36,3.56061), (719.39,5.56818), (757.587,6.66667), (818.067,7.80303), (884.913,8.78788), (964.491,9.35606), (1096,10)))
Network	Global information and pathogen sharing network activity	= 1
Information sharing intensity	The level of information disclosure (increase or decrease based on network or policy)	= Information disclosure*Network*Inf sharing policy
R&D cost	Product development costs (10,000 is an arbitrary setting for model configuration, reflecting lower costs as pathogen information is released)	= 10,000-100*information disclosure
New development	Initiate new product development when investment is greater than product development costs	= IF THEN ELSE("R&D investment" >= ongoing development*"R&D cost", ("R&D investment"-ongoing development*"R&D cost")/"R&D cost", 0)
Investment delay	Initiate R&D investment a month before the first patient (assuming overseas occurrence recognition time)	= DELAY FIXED (10,000, 360, 0)
Ongoing development	Number of products in development	= INTEG (new development failed development-successful development, 0)
Successful development	Successful product development based on success rate after product development period	= Ongoing development*success rate/development time
Failed development	Product development failure based on '1-success rate' after product development period	= Ongoing development*(1-success rate)/development time
Success rate	Product development success rate. Increasing or decreasing the probability of success as information is disclosure. Calibration to align with MFDS approved product counts over time	= 0.3+0.034*information sharing intensity
Development time	Product development time. About 30 days is the average time to develop a new PCR test method. Reduced duration due to the disclosure of pathogen information	= 30-information disclosure
Prototype products	Number of successful prototypes in development	= INTEG (successful development, 0)
R&D investment	Total R&D investment	= (Inside investment+outside investment)*10
Company investment	Assume that a certain amount of R&D investment is continuously carried out from the start of R&D, and an additional 2% of total sales is invested	= Total sales*0.02+investment delay
Outside investment	Investment outside of the company. Investment also changes as demand increases and decreases. The basic investment amount is 16.3% of the firm investment amount	= 163*Government investment+100*VC investment
Government investment	Government's R&D investment policy intensity. R&D investment started a month before the first case (assuming overseas occurrence recognition time)	= DELAY FIXED(1, 360, 0)
VC investment	VC investment intensity. Related to total number of tests	= Total tested*0.000001

IVD, *in vitro* diagnostics; R&D, research and development; VC, venture capital; PCR, polymerase chain reaction; MFDS, Ministry of Food and Drug Safety.