

Table S2. Equations for model of IVD approval process

Variable	Descriptions	Equations
Ongoing approval	Number of products initiated by the authorization review process	= INTEG (successful development-failed approval-successful approval,0)
Successful approval	Passed according to success rate after the time required for permission	= Ongoing approval*approval success rate/approval time
Failed approval	Failure to pass the permit according to the '1-success rate' after the time required for the permit	= Ongoing approval*(1-approval success rate)/approval time
Approved product	Accumulated number of licensed products	= INTEG (successful approval-insurance benefit assessment process,0)
Insurance benefit assessment process	After the passage of the evaluation period for new medical technology and insurance reimbursement determination, entry into the market	= Approved product/(new health technology assessment time+insurance benefit assessment time)
Marketing product	Accumulated number of market-entry products	= INTEG (insurance benefit assessment process,0)
Approval success rate	Application of less than 5% dropout rate [59]	= 0.95*policy S
Gov network	The strength of the network formation between government 1 agencies responsible for product authorization and IVD firms	
Policy S	The difficulty of permission increases to cope with the crisis in the early stages of the infectious disease crisis (the occurrence of infected people)	= IF THEN ELSE (total infected > 0, S delay, 0.6)
S delay	Implementation of 180 days at the end of the initial response (reflecting COVID-19 response process in Korea)	= DELAY FIXED (S value, 180, 0.6)
S value	Return to normal difficulty with the commencement of formal authorization	= IF THEN ELSE (total infected > 0, 0.6, 0.4)
Approval time	The period of examination of permission. It takes up to 80 days depending on the Regulation. Increase or decrease according to government policy (reflecting COVID-19 response process in Korea).	= 80*policy A
Policy A	In the early stages of the infectious disease crisis (the occurrence of infected people), the approval period is reduced by implementing an emergency policy for diagnostic reagents.	= IF THEN ELSE (total infected > 0, E delay, 1)
E delay	EUA minimizes the permission time to 7 days (COVID-19 response process in Korea is reflected).	= DELAY FIXED (E value, 180, 0.0875)
E value	Conversion to formal authorization. Less than the usual time required for permission (reflecting COVID-19 response process in Korea)	= IF THEN ELSE (total infected > 0, 0.38, 0.0875)
New health technology assessment time	30 days to check for existing technology; reduced time in response to crisis	= 30*policy T
Insurance benefit assessment time	100 days of determination of insurance benefit coverage. Reduce time according to response policies in case of a crisis	= 100*policy T
Policy T	In the event of a new infectious disease crisis, the evaluation period decreases (100 days during normal time and 7 days during crisis). It is maintained from the initial evaluation until the end of the spread of infectious diseases (reflecting Korea's COVID-19 response process).	= IF THEN ELSE (total infected > 0, 0.07, 1)

IVD, *in vitro* diagnostics; COVID-19, coronavirus disease 2019.