Parameter	Units	Mean - LIC	Distribution - LIC	Mean - MIC	Distribution - MIC	Mean - HIC	Distribution - HIC	Assumptions, calculations & transformations	Source(s)
Population	People	100m	Not included in PSA	100m	Not included in PSA	100m	Not included in PSA	Assumed for comparability	/
Annual population growth	Rate, e.g. 0.02 → 2% annual growth	0.02120725	Not included in PSA	0.006578764	Not included in PSA	0.003443516	Not included in PSA	Used total population of whole income group, forecast using auto.ARIMA for 20 years in the future, and converted the 20 year change into a constant annual growth rate For income groups, we used the World Bank lending groups	World Bank Open Data
Timeframe	Years	20	Not included in PSA	20	Not included in PSA	20	Not included in PSA	Assumed for comparability	/
Productivity growth	Rate, e.g. 0.02 → 2% annual growth	0.02359892	Not included in PSA	0.04131553	Not included in PSA	0.01379446	Not included in PSA	Found the average growth rate from 2010-2019 for each country, and then took the population-weighted mean of these values for each income category	World Bank Open Data
Discount rate	Annual rate, e.g. 0.02 → 2% per year	0.043	Not included in PSA	0.068	Not included in PSA	0.029	Not included in PSA	From Haacker, Hallett and Atun we get a discount rate of r(c) = 0.01 + 1.4*g, where g is the growth in per-person consumption. Using the same per-person GDP growth rates that we used for the productivity growth rates, and this formula, we get a discount rate	Haacker, Allett and Atun, 2021
WTP per QALY	Current $USD	220	Not included in PSA	2450	Not included in PSA	25340	Not included in PSA	Took the mean of the upper and lower (nominal USD) values for WTP from Woods *et al*. for each country, and then inflated these values using the deflation factor relevant to each country to reflect the growth in WTP from 2015 to 2020. We then took the population-weighted mean of these values for each income category	Woods *et al*., 2016; World Bank, 2021
Number of pigs	Pigs	3037648	Lognormal (14.6972337, 0.02475434)	11229177	Lognormal (15.699209, 0.01485079)	28456813	Lognormal (16.9900869, 0.01866447)	We took the total meat production (tonnes) and divided it to get the tonnes per 100k human population. The world made 342422466 tonnes of meat and had population of 7752840547, giving 4416.7356 tonnes per 100,000 population There were 25.69bn chickens and 0.9783bn pigs worldwide, or 3.348 and 0.1275 per person, or (in a typical country of 100m people) 334,800,000 chickens and 12,750,000 pigs.	Our World in Data and World Bank Open Data
Number of chickens	Chickens	79765056	Lognormal (17.9652357, 0.02475434)	294864982	Lognormal (18.967211, 0.01485079)	747242435	Lognormal (20.2580889, 0.01866447)		

								For each country, we multiplied the tonnes / 100k population (relative to the world) by these numbers of pigs and chickens per 100m people. We then took the (population-weighted) mean of this for each income group Note that this assumes that the portion of pigs and chickens in total meat production is constant across countries of different income levels	
Portion of animals in industrial farms	Portion, e.g. 0.2 → 20%	0.125	Uniform (0, 0.25)	0.25 or 0.75	Uniform (0.25, 0.75)	0.875	Uniform (0.75, 1)	As the definition of intensified farming varies by country and there is little comparable cross-country data on the portion of agricultural output produced in these settings, we created four scenarios (low intensification in LICs, high intensification in HICS, and two scenarios for MICs to reflect different production systems). This source suggests that 70% of animals worldwide are 'factory farmed', and 99% of animals in the US. This source suggests that 80% of Vietnamese shrimp are produced in smallholder farms. This source suggests that in Ethiopia in the early 2010s, intensive factory farming was only present in and around a handful of major cities. Given uncertainty about how the level of intensification varies, we simply allowed	/
Size of industrial pig farm	Pigs	2000	Lognormal (7.476, 0.5)	2000	Lognormal (7.476, 0.5)	2000	Lognormal (7.476, 0.5)	Industrial pig farms: This article says that industrial farms in the UK hold around 40,000 chickens or 2,000 pigs, and contain 70% of the UK's farm animals. This source from Thailand lists 'large' pig farms as being those with at least 5,000 pigs. This gives a range of 2,000-5,000 Smallholder pig farms: The Thailand source lists backyard pig farms as having fewer than 5 pigs, and smallholder farms as having fewer than 50. We have therefore used 5-50 as the range	Sources linked in calculations
Size of smallholder pig farm	Pigs	10	Lognormal (2.0213, 0.75)	10	Lognormal (2.0213, 0.75)	10	Lognormal (2.0213, 0.75)		
Size of industrial chicken farm	Chickens	40,000	Lognormal (10.31, 0.75)	40,000	Lognormal (10.31, 0.75)	40,000	Lognormal (10.31, 0.75)		
Size of smallholder chicken farm	Chickens	1000	Lognormal (6.63, 0.75)	1000	Lognormal (6.63, 0.75)	1000	Lognormal (6.63, 0.75)		

								Industrial chicken farms: This source claims that, in the Netherlands, the average broiler farm had 81,632 chickens but that the country had been experiencing a concentration of production in fewer larger farms This source suggests that the average pig farm in the USA had a stock of 1,900 *female* pigs, so presumably ~4,000 pigs in total As the USA and Netherlands are quite intensive, we will assume for HICs that there are only industrial farms (2,000 pigs or 40,000 chickens) but that they can only be visited one at a time] Smallholder chicken farms: Burgos *et al*. describes backyard farms in VN as being <=50 birds (average 32), semi-intensive as being 51-2000 and intensive as being > 2000. Intensive farms are described as having as many as 100,000 birds.	
Price of a pig	Current $USD	64.64618 *1.015892	64.64618 * lognormal (-0.0351000,0.06007284)	64.64618 *1.802562	64.64618 * lognormal (0.5590797,0.00807645)	64.64618 *1.699701	64.64618 * lognormal (0.4408899,0.013521752)	Population-weighted average weight of a pig across countries (64.64618kg) multiplied by the (population-weighted) price per kg of meat in countries of each income group	FAO (1) for animal prices per kg, Knoema for pig weight, and FAO (2) for chicken weight
Price of a chicken	Current $USD	1.484145 *2.935612	1.484145 * lognormal (1.0685631,0.01998350)	1.484145 *1.667056	1.484145 * lognormal (0.4494172,0.010793934)	1.484145 *1.382834	1.484145 * lognormal (0.2776198,0.013028735)	Population-weighted average weight of a chicken across countries (1.484145kg) multiplied by the (population-weighted) price per kg of meat in countries of each income group	
Pig production cycles per year - smallholder	Cycles per year (from birth to slaughter)	2.5	Not included in PSA	2.5	Not included in PSA	2.5	Not included in PSA	/	ILRI data
Chicken production cycles per year - smallholder	Cycles per year (from birth to slaughter)	3	Not included in PSA	3	Not included in PSA	3	Not included in PSA	/	Phu *et al*., 2021
Pig production cycles per year - industrial	Cycles per year (from birth to slaughter)	2	Not included in PSA	2	Not included in PSA	2	Not included in PSA	Australian source suggests 3-4 weeks before weaning, then 5-6 months before slaughter UK source suggests that slaughter weight is reached after 24 weeks China source suggests that porkers live for 180-230 days	This source for Australia This source for UK This source for China

Chicken production cycles per year - industrial	Cycles per year (from birth to slaughter)	9.125	Not included in PSA	9.125	Not included in PSA	9.125	Not included in PSA	Production cycle of 35-45 days → 365/40 = 9.125	This article
Chicken mortality - industrial	Portion dying before slaughter, e.g. 0.02 → 2% die before slaughter	0.05	Beta (1.6, 30)	0.05	Beta (1.6, 30)	0.05	Beta (1.6, 30)	Weeks *et al*. found that mortality for laying hens in the UK during laying period was 5.39% in cages, 8.55% in parn, 9.52% for free-range and 8.68% for organic van Horne *et al*. found that, in Mexico, broiler mortality was 8-10% due to disease problems. They found that it was around 4% in the USA and 3-3.5% in the EU Since we are taking chicken farms to be smallholder only in the LIC scenario, and since we are looking only at broilers, we use the results of van Horne *et al*., taking the mortality rate to be 3.5% in HICs and 9% in MICs	Weeks *et al*., 2021; van Horne et al., 2018
Chicken mortality - smallholder	Portion dying before slaughter, e.g. 0.02 → 2% die before slaughter	0.25	Beta (50, 150)	0.25	Beta (50, 150)	0.26	Beta (50, 150)	Phu *et al*. found mortality of 25% (Viet Nam) The original parameter spreadsheet used 32.9% Delabouglise *et al*. found 19.9% (Viet Nam) but this was for extremely small farms (avg. 16 birds) Carrique-Mas *et al*., 2019 found 37.76%, but this was during an ongoing disease outbreak Otiang *et al*. (Kenya) found mean offtake of 5.35 per quarter, of which 59.41% (3.178435) was from mortality. Average farm size was 10, suggesting 31.8% mortality. However, as we are looking at larger smallholder farms (~ 2,500) this may be less relevant, and this is given per quarter rather than per production cycle Therefore go with the estimates of Phu *et al*.	Phu *et al*., 2021; Delabouglise *et al*., 2019; Carrique-Mas *et al*., 2019; Otiang *et al*., 2020
Pig mortality - industrial	Portion dying before slaughter, e.g. 0.02 → 2% die before slaughter	0.18355	Beta (11.2, 50)	0.18355	Beta (11.2, 50)	0.18355	Beta (11.2, 50)	Mehling *et al*., 2019 suggests that in 'commercial' pig farms, the density of pigs affects post-weaning mortality, ranging from 8.36% to 28.35% mortality Mainau *et al*., 2015 suggest that pre-weaning mortality ranges from 5% to 35% and is the result of several	Mehling *et al*., 2019; Mainau *et al*., 2015; Bergman *et al*., 2019; Gebhart *et al*., 2020

								innate and structural factors - however it might not make sense to include this as the number of pigs that we use is based on the number in farms, which will naturally not include those which died at birth Bergman *et al*., 2019 found that, in Finland, large intensive pig farms had mortality of 10% where smaller and less intensive ones had mortality of ~8%, but culling was much higher than mortality for both Gebhart *et al*., 2020 (systematic review) note that some studies find stocking density to have contributed positively to mortality We will use the average of the range from Mehling *et al*. → 0.5(0.0836 + 0.2835) = 0.18355	
Pig mortality - smallholder	Portion dying before slaughter, e.g. 0.02 → 2% die before slaughter	0.1565	Beta (18.55, 100)	0.1565	Beta (18.55, 100)	0.1565	Beta (18.55, 100)	Kambashi *et al*. found mortality of 9.5% to 21.8% (0.1565)	Kambashi *et al*., 2014
Chance of developing sepsis	Annual portion	0.013182211	Beta (8.483491, 635.831784)	0.006753598	Beta (2.342106, 344.344761)	0.00202957 2	Beta (13.09855, 6455.69134)	The population-weighted average incidence for countries in each income group	Rudd *et al*., 2020
Sepsis fatality (sus)	Portion who die from infection	0.3544173	Beta (8.483491, 635.831784)	0.2514949	Beta (16.16834, 48.09834)	0.1548441	Beta (35.20625, 192.16882)	For each country, we divided the incidence (per 100,000) by the mortality (per 100,000) to get the mortality rate. Then, we took the population-weighted average for countries in each income group as the mortality for susceptible infections. We multiplied this by 1.62 following Serra-Burriel *et al*.'s findings that multidrug-resistance increases the mortality odds ratio of HAI's by 1.62	Rudd *et al*., 2020; Serra-Burriel *et al*., 2020
Sepsis fatality (res)	Portion who die from infection	0.574156026	1.62 * Beta (8.483491, 635.831784)	0.407421738	1.62 * Beta (16.16834, 48.09834)	0.25084744 2	1.62 * Beta (35.20625, 192.16882)		
Portion of Sepsis from resistant bacteria	Portion, e.g. 0.02 → 2%	0.106864	Beta (58.82916, 491.64083)	0.106864	Beta (58.82916, 491.64083)	0.045100	Beta (3.059945, 64.807960)	The portion of infections by resistant bacteria based on a meta-analysis (Serra-Burriel *et al*., 2020) of 19 studies from HICs and 1 from an MIC (China) was 0.0451. We assumed this to be representative of HICs. For the relative incidence of AMR by income status, we looked to the overall drug resistance index (DRI) from CDDEP. The index was only available for MICs and HICs. We took the	Serra-Burriel *et al*., 2020; CDDEP; World Bank Open Data; World Bank

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>population-weighted average DRI by income category, and assumed that the DRI is the same in MICs as in LICs.

We multiplied the DRI relative to HICs by the portion of infections by resistant bacteria in HICs to get the estimated portion of infections by resistant bacteria in each income category

<table>
<tr><th>Income level</th><th>DRI</th><th>DRI relative to HIC</th><th>Estimated portion of infections from AMR Pathogens</th></tr>
<tr><td>LIC</td><td>66.24125</td><td>2.369491</td><td>0.106864</td></tr>
<tr><td>MIC</td><td>66.24125</td><td>2.369491</td><td>0.106864</td></tr>
<tr><td>HIC</td><td>27.95590</td><td>1</td><td>0.0451</td></tr>
</table>
</td><td></td></tr>
<tr><td>AMR growth</td><td>Annual growth, e.g. 1.02 → 2% annual growth</td><td>1.02844688</td><td>1 + 0.01 * Gamma(6853.33, 0.015)</td><td>1.02844688</td><td>1 + 0.01 * Gamma(6853.33, 0.015)</td><td>1.02844688</td><td>1 + 0.01 * Gamma(6853.33, 0.015)</td><td>For the mean growth rate, we took the estimated global resistance prevalence in 2015 and 2030, and assumed a constant growth rate

For upper and lower bounds, we used the same method as we did to find the default growth rate, but used the extremes of the 95% CI for the projected values for 2030 (still using the middle values for 2015)

third-gen cephalosporin-resistant E coli: lower bound 64.5% to 55% [0.9894], upper bound 64.5% to 99.1% [1.029]

carbapenem-resistant E coli: lower bound 5.8% to 3.7% [0.9705], upper bound 5.8% to 19.9% [1.0857]

third-gen cephalosporin-resistant K pneumoniae: lower bound 66.9% to 50.2% [0.981], upper bound 66.9% to 66.1% [0.9992]</td><td>Alvarez-Uria et al., 2018</td></tr>
</table>

								carbapenem resistant K pneumoniae: lower bound 23.4% to 16.3% [0.9762], upper bound 23.4% to 89.3% [1.0934] Average of lower bounds: 0.979275 Average of upper bounds 1.051825	
Chance of developing sequelae following sepsis with susceptible bacteria	Portion, e.g. 0.02 → 2% probability of sequelae following infection	0.361634098	2.3791717 * Beta (3.5849, 20)	0.23432137	1.54158796 * Beta (3.5849, 20)	0.152	Beta (3.5849, 20)	Kyriazopoulou *et al*. trialled a specific form of antimicrobial withdrawal for patients with sepsis in an HIC (Greece), and found that the baseline prevalence of sequelae after 180 days was 15.2% - we use this for HICs. For other countries, we assume that the relative probability of sequelae is the same as the relative probability of fatality (from Rudd *et al*.), by looking at the ratio of population-weighted average fatality from sepsis by income category i.e.: 0.152(0.2387058/0.1548441) = 0.23432137 0.152(0.3684007/0.1548441) = 0.361634098 We then assumed that the odds ratio for sequelae from resistant bacteria was the same as the odds ratio for mortality from resistant bacteria from Serra-Burriel *et al* (1.62), i.e. 0.152 * 1.62 = 0.24624 0.23432137* 1.62 = 0.379600619 0.361634098 * 1.62 = 0.585847239	Kyriazopoulou *et al*., 2021; Rudd *et al*., 2020; Serra-Burriel *et al*., 2020
Chance of developing sequelae following sepsis with resistant bacteria	Portion, e.g. 0.02 → 2% probability of sequelae following infection	0.585847239	3.85425815 * Beta (3.5849, 20)	0.379600619	2.4973725 * Beta (3.5849, 20)	0.24624	1.62 * Beta (3.5849, 20)		
QoL from infection	Subjective quality of life relative to perfect health (1), e.g. 0.4 refers to a health state for which a year has the same subjective value as 0.4 years of perfect health	0.66035	Beta (195, 100)	0.66035	Beta (195, 100)	0.66035	Beta (195, 100)	They give a disability weight of 0.125 for uncomplicated BSIs, which occur with probability 0.595; and a disability weight of 0.655 for complicated BSIs, which occur with a probability 0.405 Therefore expected QoL is 0.595(1-0.125) + 0.405(1-0.655) = 0.66035 QoL for sequelae is just mean QoL of different kinds of sequelae named in paper, adjusted by their relative probabilities For the extreme values, we used the min and max QoL for each state in the paper, and then selected an unbiased distribution with little probability mass	Cassini *et al*., 2015
QoL from sequelae	Subjective quality of life relative to perfect health (1), e.g. 0.4 refers to a health state for which a year has the same subjective value as 0.4 years of perfect health	0.9355	Beta (1090, 75)	0.9355	Beta (1090, 75)	0.9355	Beta (1090, 75)		

								outside of those limits Minimum and maximum possible QoL from Cassini *et al.* Complicated infection: probability 0.34-0.47, DW 0.579-0.727 Uncomplicated infection: 0.53-0.66, DW 0.104-0.152 Maximum DW and maximum likelihood of complication gives: 0.47(0.727) + 0.53(0.152) = 0.42225, so QoL = 0.57775 Minimum DW nd minimum likelihood of complication gives: 0.34(0.579) + 0.66(0.104) = 0.2655, so QoL = 0.7345 Min DW from sequelae: 0.584(0.012) + 0.0064(0.071) + 0.0026(0.117) + 0.0005(0.194) + 0.0013(0.154) + 0.236(0.058) + 0.0483(0.136) + 0.118(0.090) = 0.0389406, so QoL = 0.9610594 Max DW from sequelae: t0.584(0.052) + 0.0064(0.489) + 0.0026(0.516) + 0.0005(0.560) + 0.0013(0.534) + 0.236(0.107) + 0.0483(0.194) + 0.118(0.146) = 0.0876636, so QoL = 0.9123364	
Hospital LoS from sus infection	Years	0.01227	(1/365.25) * Lognormal (1,1)	0.01227	(1/365.25) * Lognormal (1,1)	0.01227	(1/365.25) * Lognormal (1,1)	Baseline attributable LoS from sepsis is 5.6 days according to this source (0 - 23, SD 5.44). This source found that it was 4.5 days, but was 6.5 days for severe sepsis and 16.5 days for septic shock. This source found that the average length of stay was only 3.35 days. For the mean length of stay, we take the mean of these three values (avg(5.6,4.5,3.35) = 4.483 days). Because the sources suggested that the length of stay can increase greatly with severity and can be up to 23 days, we chose a lognormal distribution with a long tail. We converted this into years (as one period in our model is one year) We multiply this figure by 1.27 for resistant infections, adjusting for the effect of resistance on LoS from	Armstrong-Briley *et al.*, 2015; Paoli *et al.*, 2018; McCoy and Das, 2017; Serra-Burriel *et al.*, 2020
Hospital LoS from res infection	Years	0.01559	(1.27/365.25) * Lognormal (1,1)	0.01559	(1.27/365.25) * Lognormal (1,1)	0.01559	(1.27/365.25) * Lognormal (1,1)		

								Serra-Burriel *et al.*	
Portion of population working	Portion, e.g. 0.02 → 2%	0.3931943	Not included in PSA	0.4284953	Not included in PSA	0.4827129	Not included in PSA	Portion of population of working age multiplied by labour force participation rate. We then take the population-weighted mean of this value for each income category	World Bank Open Data
Annual productivity per worker	Current $SUD	2530.0268	Not included in PSA	22875.54	Not included in PSA	91200.02	Not included in PSA	To get the productivity per worker, we multiply the average annual hours worked per worker by the productivity per hour worked. For MICs and HICs, we take the population-weighted average of this by income group. There was no productivity data for LICs from these sources, so we took the MIC with the lowest estimated annual productivity per worker (Cambodia, $5554.053), and adjusted the value by the ratio of Cambodia's GDPPC ($1512.728) to the LIC average ($689.09) Thus, val = 5554.053 * (689.09/1512.728) = 2530.0268	Penn World Tables
Adjustment for unpaid productivity (multiply productivity per person, inclusive of LFPR, by this factor)	E.g. 1.2 means that total productivity per person is 1.2 times higher than paid productivity per person	1.4849951	Not included in PSA	1.46548185	Not included in PSA	1.2935917	Not included in PSA	Bridgman *et al.*, 2018 estimate the ratio of total productivity per person to market productivity per person. We regress this against GDPPC and then take the expected values for the average PC income level of each income group, giving ratios of LIC: 1.4849951 MIC: 1.46548185 HIC: 1.2935917	Here and here
Cost of a hospital bed day	$USD	6.232739	Lognormal (1.257771, 0.925305)	39.732420	Lognormal (3.2110302, 0.9573006)	627.543312	Lognormal (6.3243080, 0.5410926)	Population-weighted average for countries in each income group, in $2019	WHO-Choice
Remaining life years	Years	45	Not included in PSA	41	Not included in PSA	39	Not included in PSA	For each country, we took the median age and life expectancy. The difference was taken to be the remaining life years. For remaining work years, we took the difference between 65 (assumed age of retirement) and median age. We took the population-weighted average of these two values for countries in each income group	World Bank (life expectancy) and CIA World Factbook (median age)
Remaining working years	Years	45	Not included in PSA	34	Not included in PSA	23	Not included in PSA		

Effect on human AMR	Proportional change, e.g. -0.02 means that the portion of infections from resistant bacteria falls by 2%	{-0.025, -0.05, -0.1, -0.16}	-1 * beta (1.1, 20.9)	{-0.025, -0.05, -0.1, -0.16}	-1 * beta (1.1, 20.9)	{-0.025, -0.05, -0.1, -0.16}	-1 * beta (1.1, 20.9)	Drawn from the literature (see paper)	See paper
Pig income effect	Proportional change, e.g. -0.02 means that the income per animal falls by 2%	{-0.02, -0.01, 0, 0.01, 0.02}	90% chance of beta (1, 39), 10% chance of - beta (1, 39)	{-0.02, -0.01, 0, 0.01, 0.02}	90% chance of beta (1, 39), 10% chance of - beta (1, 39)	{-0.02, -0.01, 0, 0.01, 0.02}	90% chance of beta (1, 39), 10% chance of - beta (1, 39)	/	/
Chichen income effect	Proportional change, e.g. -0.02 means that the income per animal falls by 2%	{-0.02, -0.01, 0, 0.01, 0.02}	90% chance of beta (1, 39), 10% chance of - beta (1, 39)	{-0.02, -0.01, 0, 0.01, 0.02}	90% chance of beta (1, 39), 10% chance of - beta (1, 39)	{-0.02, -0.01, 0, 0.01, 0.02}	90% chance of beta (1, 39), 10% chance of - beta (1, 39)	/	/
Pig mortality effect	Proportional change, e.g. -0.02 means that the chance of pre-slaughter mortality falls by 2%	{-0.02, -0.01, 0, 0.01, 0.02}	10% chance of beta (1, 39), 90% chance of - beta (1, 39)	{-0.02, -0.01, 0, 0.01, 0.02}	10% chance of beta (1, 39), 90% chance of - beta (1, 39)	{-0.02, -0.01, 0, 0.01, 0.02}	10% chance of beta (1, 39), 90% chance of - beta (1, 39)	/	/
Chicken mortality effect	Proportional change, e.g. -0.02 means that the chance of pre-slaughter mortality falls by 2%	{-0.02, -0.01, 0, 0.01, 0.02}	10% chance of beta (1, 39), 90% chance of - beta (1, 39)	{-0.02, -0.01, 0, 0.01, 0.02}	10% chance of beta (1, 39), 90% chance of - beta (1, 39)	{-0.02, -0.01, 0, 0.01, 0.02}	10% chance of beta (1, 39), 90% chance of - beta (1, 39)	/	/