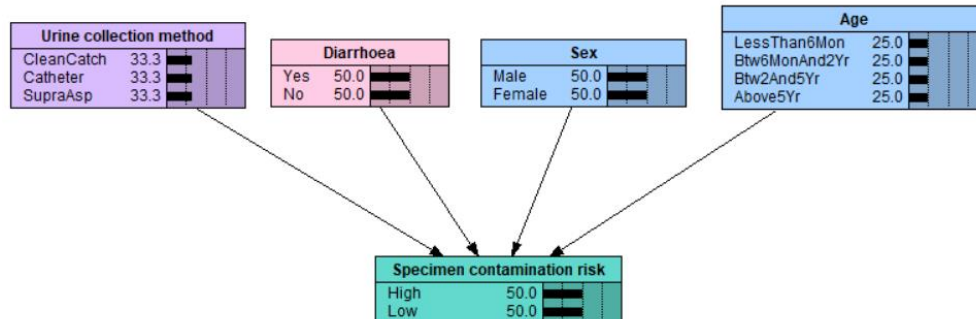


Additional file 2: The parameterisation survey questions

In this document we provided all survey questions used for the elicitation of parameters.

Q1. Risk of specimen contamination



Consider the risk of a non-causative organism/s entering the urine specimen during the specimen collection process. In the model (as shown in the above figure), the **risk of specimen contamination** is influenced by **age**, **sex**, presence of **diarrhoea**, and **urine collection method**. Assuming *the same* colonisation status of each child's perineum/ external genitalia (i.e., type and density of organisms), how do the following factors increase or decrease the risk of specimen contamination from the baseline (as specified below)? E.g., x0.3, x2, x10, etc.

1a. **Age** and **sex**, assuming **clean catch** as the method of specimen collection.

Age	Male	Female
>=5yo	1 (baseline)	
2 to 5yo		
6mon to 2yo		
<6mon		

1b. Presence of **diarrhoea**, assuming **clean catch** as the method of specimen collection.

Absence	1 (baseline)
Presence	

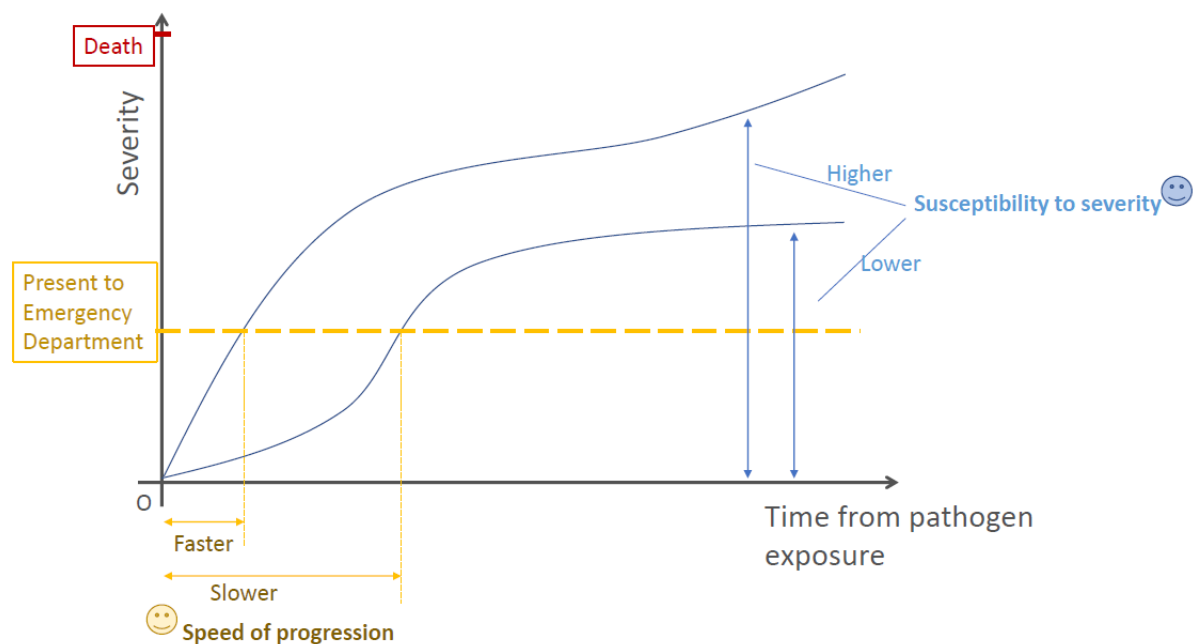
1c. **Urine collection method**

Supra aspirate	1 (baseline)
Catheter	
Clean catch	

1d. Any further comments?

Q2. Propensity to UTI progression

Consider a child's risk of progressing to more severe disease manifestations given they have a UTI, e.g., developing kidney infection, or experiencing worsening severity of local or systemic inflammatory response, which can be further broken into two concepts: the **speed of progression**, and the **susceptibility to severity** – illustrated using the diagram below. Please note that these curves are illustrative, not exact.



In the model, both the **speed of progression** and **susceptibility to severity** may be influenced by **age** and **UTI-relevant comorbidity** (such as VUR/anatomical abnormalities of the urinary tract). We now ask a series of questions on these two concept variables. Please provide your min, max, and best guess estimates for each question. Please note that the "min/max" should be plausible lower or upper values, e.g., 95th percentiles, not the extreme recordable value.

2a. Speed of progression

Assuming a baseline speed of progression (as specified below), how do the following factors increase or decrease the baseline? E.g., x0.3, x2, x10, etc.

Age

>=5yo	Speed of progression = 1 (baseline)		
Estimate	Min	Max	Best
2 to 5yo			
6mon to 2yo			
<6mon			

UTI-relevant comorbidity

No comorbidity	Speed of progression = 1 (baseline)		
Estimate	Min	Max	Best
With comorbidity			

Any further comments on the speed of progression?

E.g., will the impact be different for different comorbidities, pathogens?

2b. Susceptibility to severity

Assuming a baseline susceptibility to severity (as specified below), how do the following factors increase or decrease the baseline? E.g., x0.3, x2, x10, etc.

Age

<i>>=5yo</i>	Susceptibility to severity = 1 (baseline)		
Estimate	Min	Max	Best
<i>2 to 5yo</i>			
<i>6mon to 2yo</i>			
<i><6mon</i>			

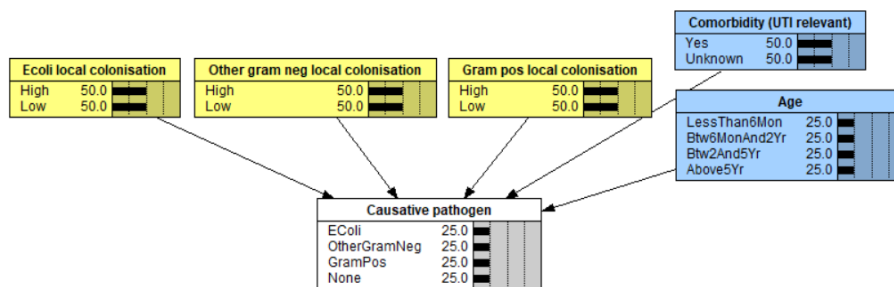
UTI-relevant comorbidity

<i>No comorbidity</i>	Susceptibility to severity = 1 (baseline)		
Estimate	Min	Max	Best
<i>With comorbidity</i>			

Any further comments on the susceptibility to severity?

E.g., will the impact be different for different comorbidities, pathogens?

Q3. Causative pathogen for UTI



Colonisation of the perineum/ external genitalia by bacteria is assumed to predispose children to urinary tract infection (UTI). In the model, the probability of UTI with each causative pathogen (shown as **causative pathogen** in the above figure) is influenced by **age**, **local colonisation**, and **UTI-relevant comorbidity** (such as VUR/anatomical abnormalities of the urinary tract).

3a. Consider the PEA cohort, we enrolled children who presented to the Emergency Department (ED) at Perth Children's Hospital and were managed for presumed UTI (with an antibiotic prescription in the ED and a urine sample sent for laboratory investigation). These patients typically underwent urine dipstick in the ED. What do you estimate the probability (min, max, best guess) of true UTI in this cohort (prior to seeing the laboratory culture result)? Please note that the "min/max" should be plausible lower or upper values, not the extreme recordable value.

	True UTI, in %					
Age	Boy			Girl		
Estimate	Min	Max	Best	Min	Max	Best
>=5yo						
2 to 5yo						
6mon to 2yo						
<6mon						

3b. In the case of an otherwise healthy child with colonisation of the perineum/ external genitalia by all the following three groups of organisms: E.coli, other gram negatives, and gram positives. Note, we refer to gram positives that can potentially cause UTI, such as Enterococcus, rather than gram positives like Staph epidermidis which are unlikely cause UTI.

	Consider the E coli pathogenicity as baseline, could you please indicate the relative pathogenicity of others? E.g., x0.5, x3, etc.	Please comment if different pathogens affect the speed of progression and susceptibility to severity differently? If so, how?
E.coli	1 (baseline)	
Other gram negatives		
Gram positives (e.g., Enterococcus)		

3c. Any further comments?

Q4. Impact of exiting antibiotic use

4a. For modelling purpose, we have grouped antibiotics into two groups: narrow and broader, could you please review this grouping and suggest if any antibiotic should be grouped differently? Please feel free to add new group/s.

Narrow: Amoxicilin, Amoxicillin + clavulanic acid, Trimethoprim, Trimethoprim + Sulfamethoxazole, Benzylpenicillin, Cefalexin, Cefazolin, Co-trimoxazole, Erythromicin

Broader: Amikacin, Cefepime, Cefotaxime, Ceftazidime, Ceftriaxone, Ciprofloxacin, Colistin, Ertapenem, Gentamicin, Meropenem, Moxifloxacin, Nitrofurantoin, Norfloxacin, Piperacillin + Tazobactam, Tazocin, Tobramycin, Vancomycin

Any further comments?

4b. Given a UTI, the successful detection of the causative pathogen of the UTI in laboratory can be influenced if the patient has been on antibiotic when they came to the ED where the urine sample was taken. Presumably this is largely affected by the antimicrobial susceptibility pattern of the pathogen which can variable by different subgroups, so please consider an average community-acquired case in 2019-2020.

Under the following scenarios, please provide your min, max, and best guess estimates for each question. Please note that the "min/max" should be plausible lower or upper values, not the extreme recordable value. (Please feel free to refer to your experience of treating UTI in adults.)

Consider a UTI caused by E.coli

	Probability of positive culture of E.coli		
Estimate	Min	Max	Best guess
<i>Not on abx</i>			
<i>On narrow abx</i>			
<i>On broader abx</i>			
<i>Pls feel free to add more groups</i>			

Consider a UTI caused by other gram negative bacteria

	Probability of positive culture of other gram neg		
Estimate	Min	Max	Best guess
<i>Not on abx</i>			
<i>On narrow abx</i>			
<i>On broader abx</i>			

Consider a UTI caused by gram positive bacteria (e.g., Enterococcus)

	Probability of positive culture of gram pos		
Estimate	Min	Max	Best guess
<i>Not on abx</i>			
<i>On narrow abx</i>			
<i>On broader abx</i>			

Any further comments?

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