SUPPLEMENTARY FIGURES AND TABLES

Effect of water, sanitation, and hygiene interventions on detection of enteropathogens and host-specific fecal markers in the environment: an individual-participant data meta-analysis

Andrew Mertens PhD, Benjamin F. Arnold PhD, Jade Benjamin-Chung PhD, Prof Alexandria B. Boehm PhD, Joe Brown PhD, Drew Capone PhD, Prof Thomas Clasen PhD, Erica Fuhrmeister PhD, Jessica A. Grembi PhD, David Holcomb PhD, Jackie Knee PhD, Laura H Kwong PhD, Audrie Lin PhD, Prof Stephen P. Luby MD, Rassul Nala MPH, Prof Kara Nelson PhD, Sammy M. Njenga PhD, Clair Null PhD, Amy J. Pickering PhD, Mahbubur Rahman MBBS, Heather E. Reese PhD, Lauren Steinbaum PhD, Prof Jill Stewart PhD, Ruwan Thilakaratne MPH, Oliver Cumming PhD, Prof John M. Colford Jr. MD, Ayse Ercumen PhD

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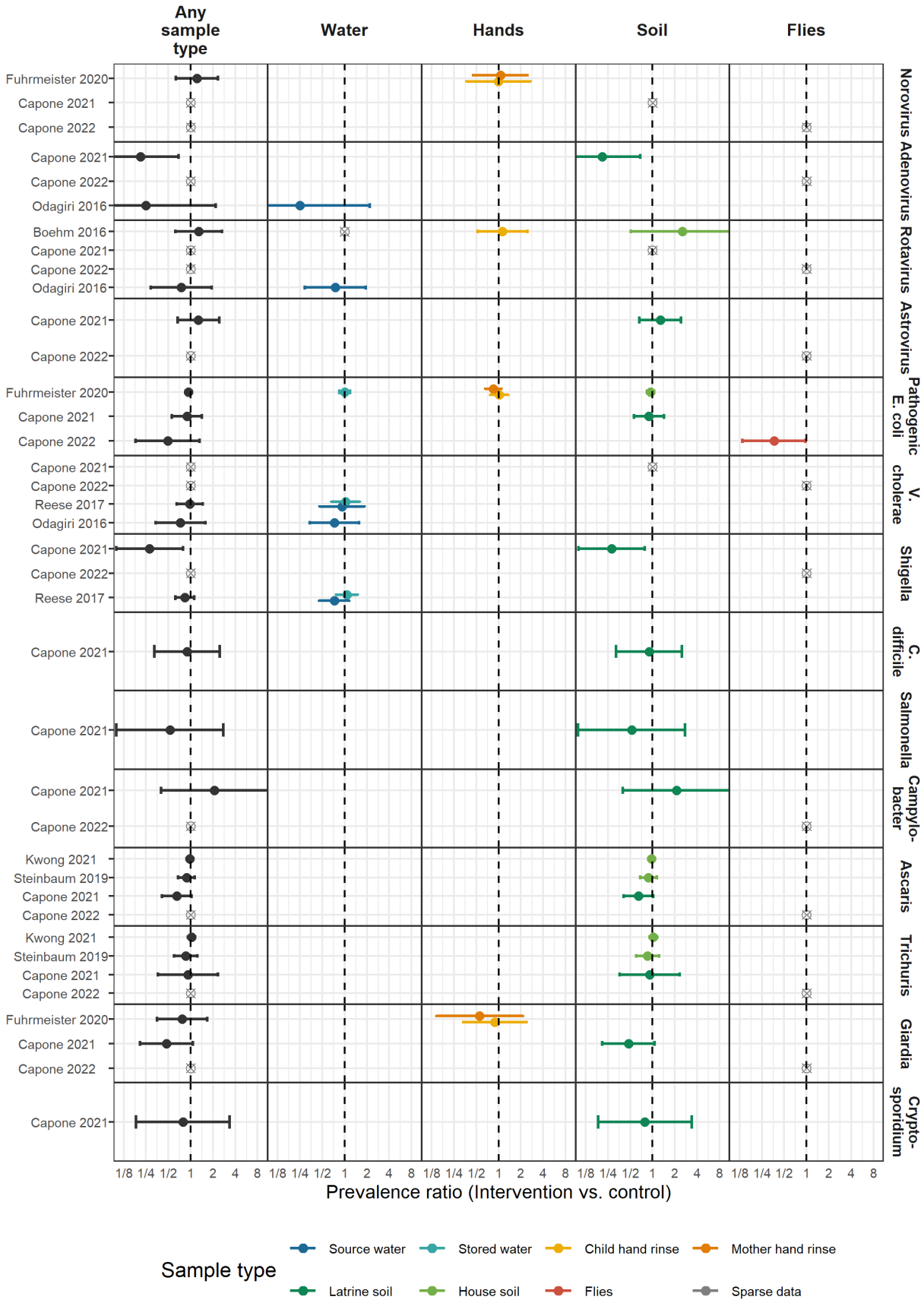


Figure S1 Forest plots of intervention effects on the prevalence of specific pathogens

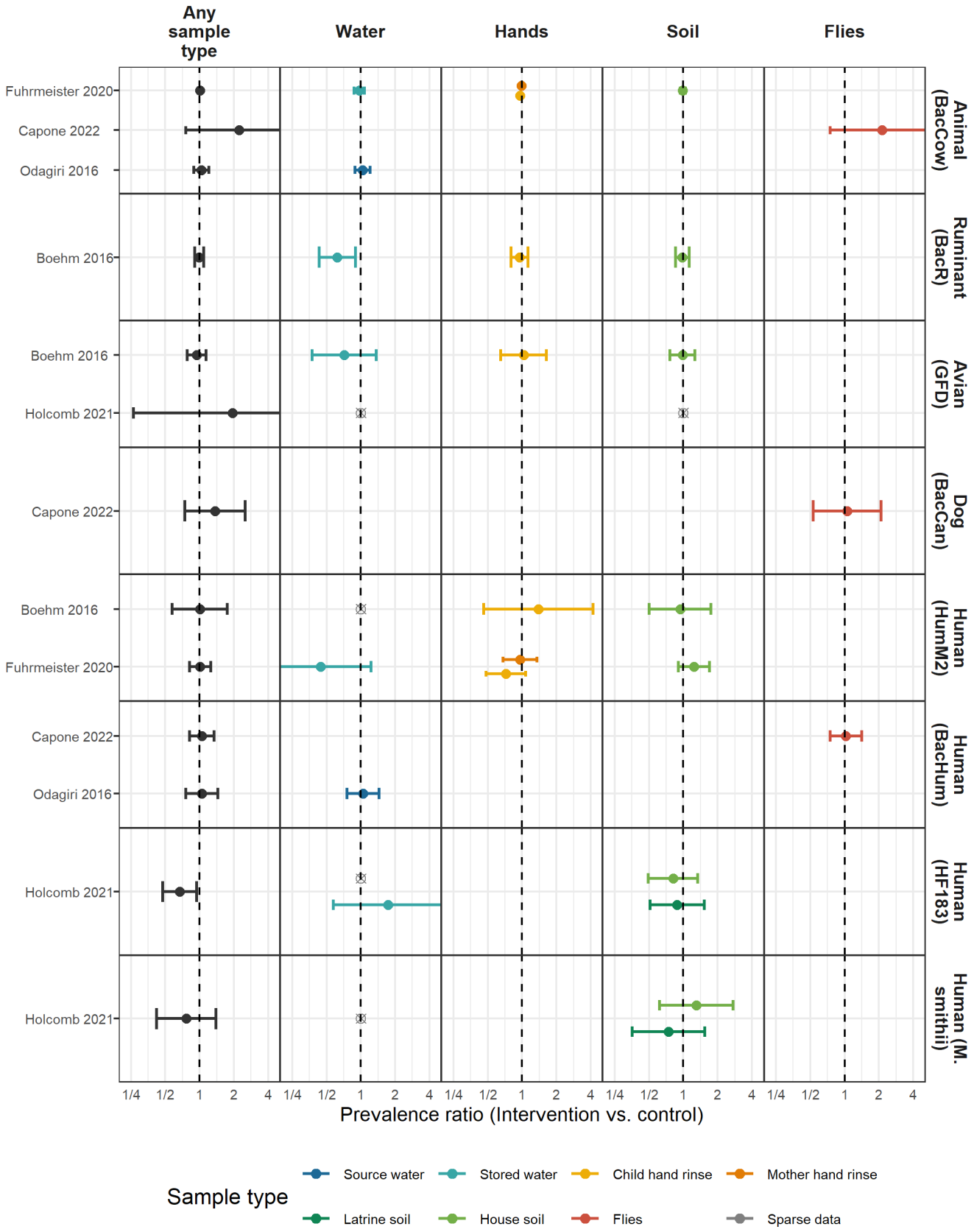
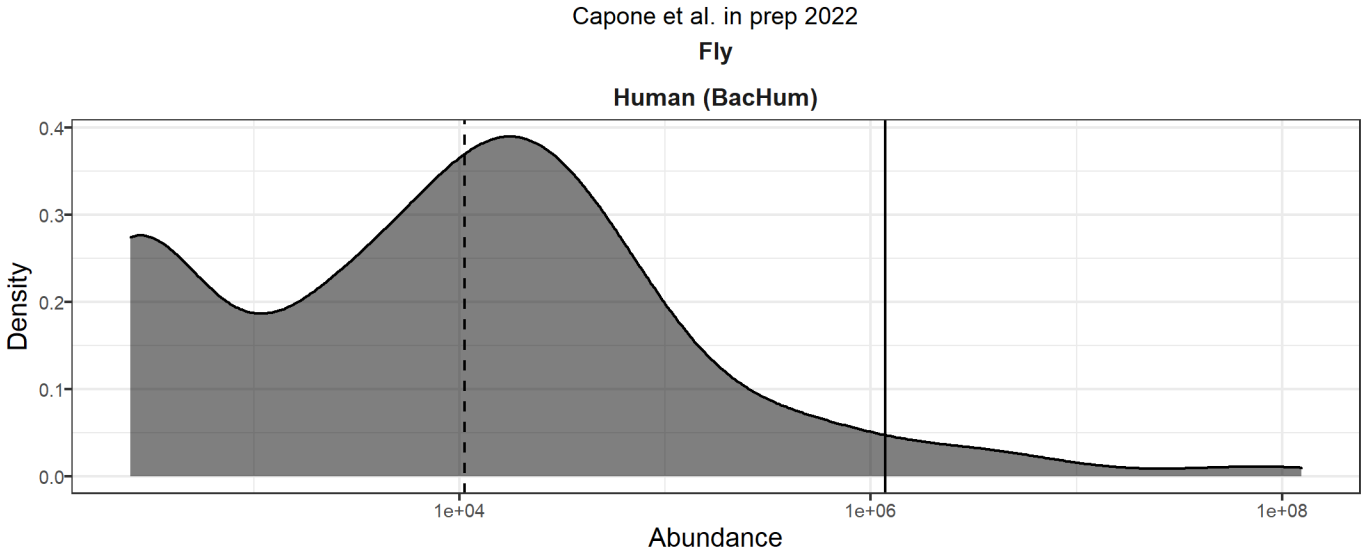
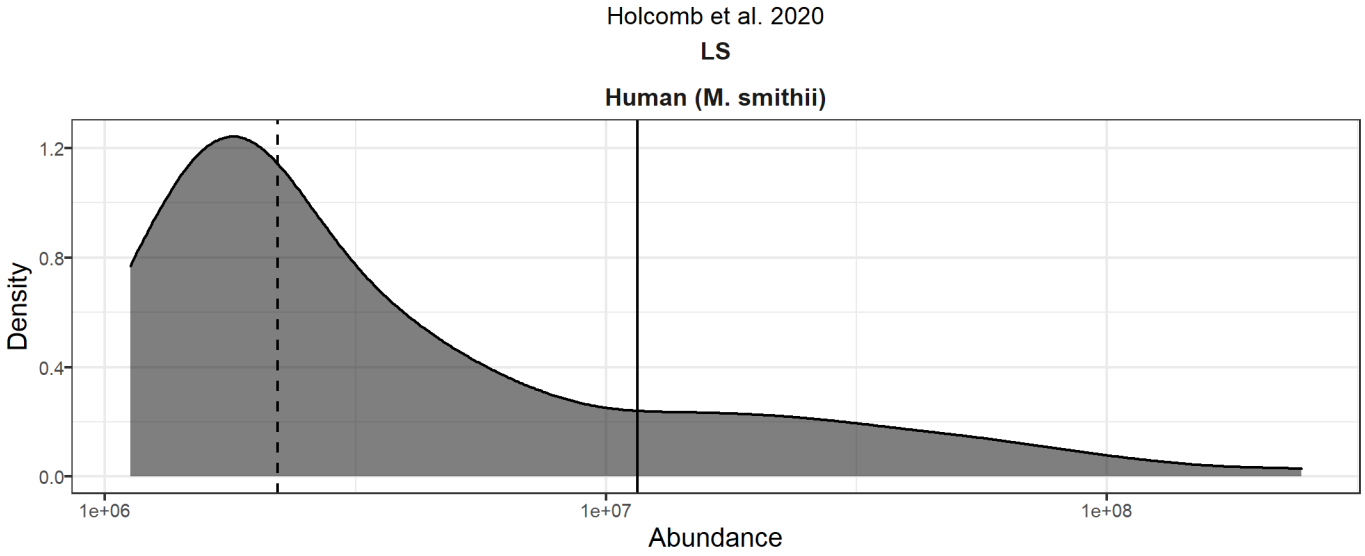
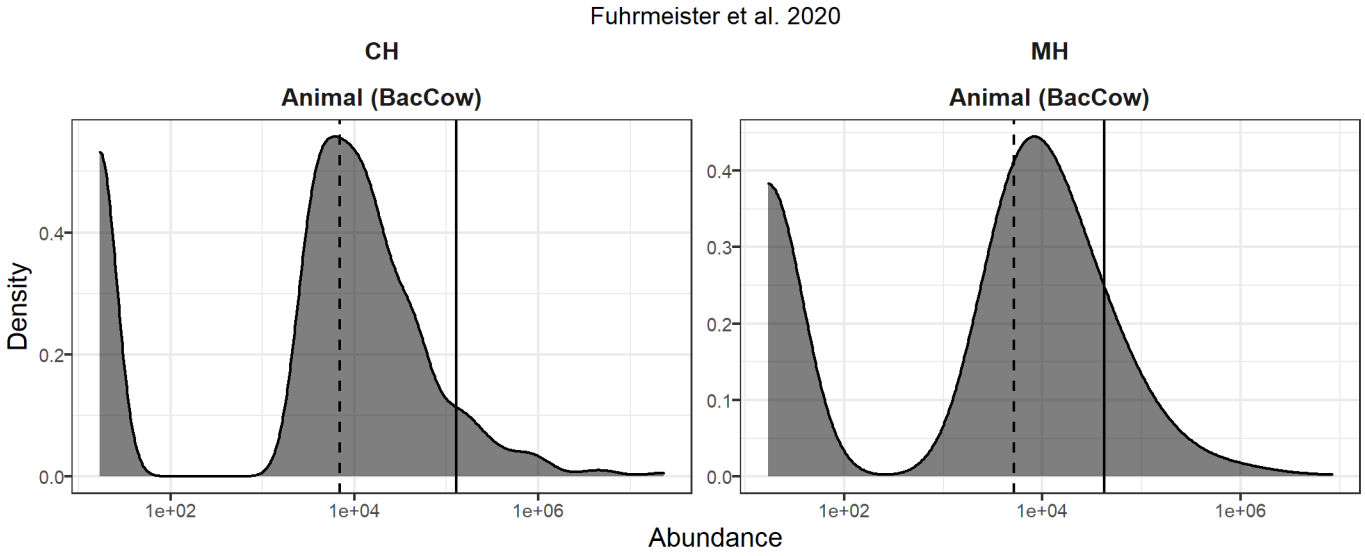

Any sample type
Water
Hands
Soil
Flies
Fuhrmeister 2020
Capone 2022
Odagiri 2016
Boehm 2016
Boehm 2016
Holcomb 2021
Capone 2022
Boehm 2016
Fuhrmeister 2020
Capone 2022
Odagiri 2016
Holcomb 2021
Holcomb 2021
Animal (BacCow)
Ruminant (BacR)
Avian (GFD)
Dog (BacCan)
Human (HumM2)
Human (BacHum)
Human (HF183)
Human (M. smithii)
1/4
1/2
1
2
4
Prevalence ratio (Intervention vs. control)
Sample type
Source water
Stored water
Child hand rinse
Mother hand rinse
Latrine soil
House soil
Flies
Sparse data

Figure S2. Forest plots of intervention effects on the prevalence of specific MST markers.







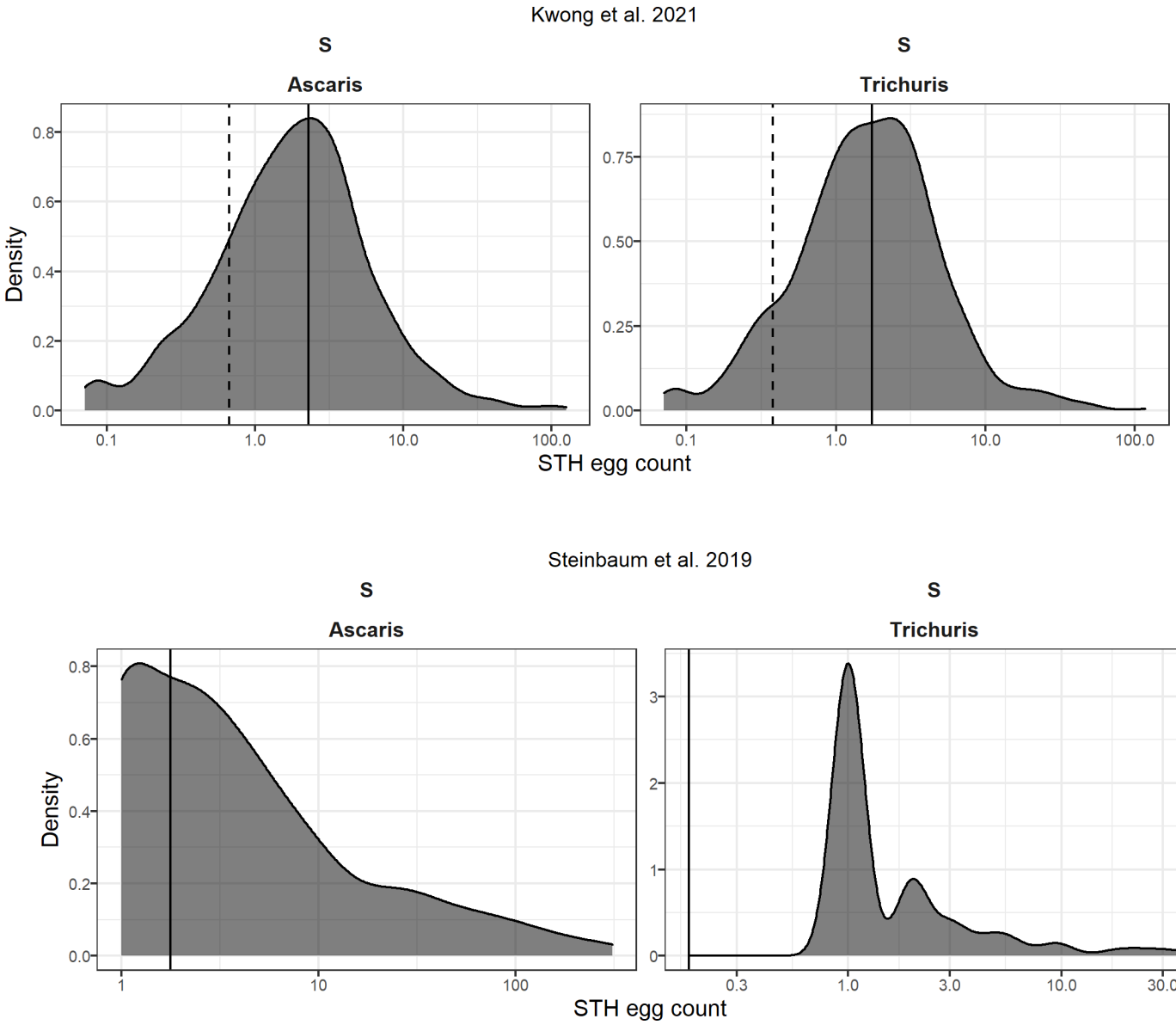


Figure S3. Distributions of abundance outcomes. The X-axes are displayed on the log-10 scale. Black vertical lines mark the means, and dashed lines mark the medians. Values below the limit of detection were imputed with with half the limit of detection and values below the limit of quantification were imputed with the midpoint between the limits of detections and quantification, leading to some bimodal distributions.

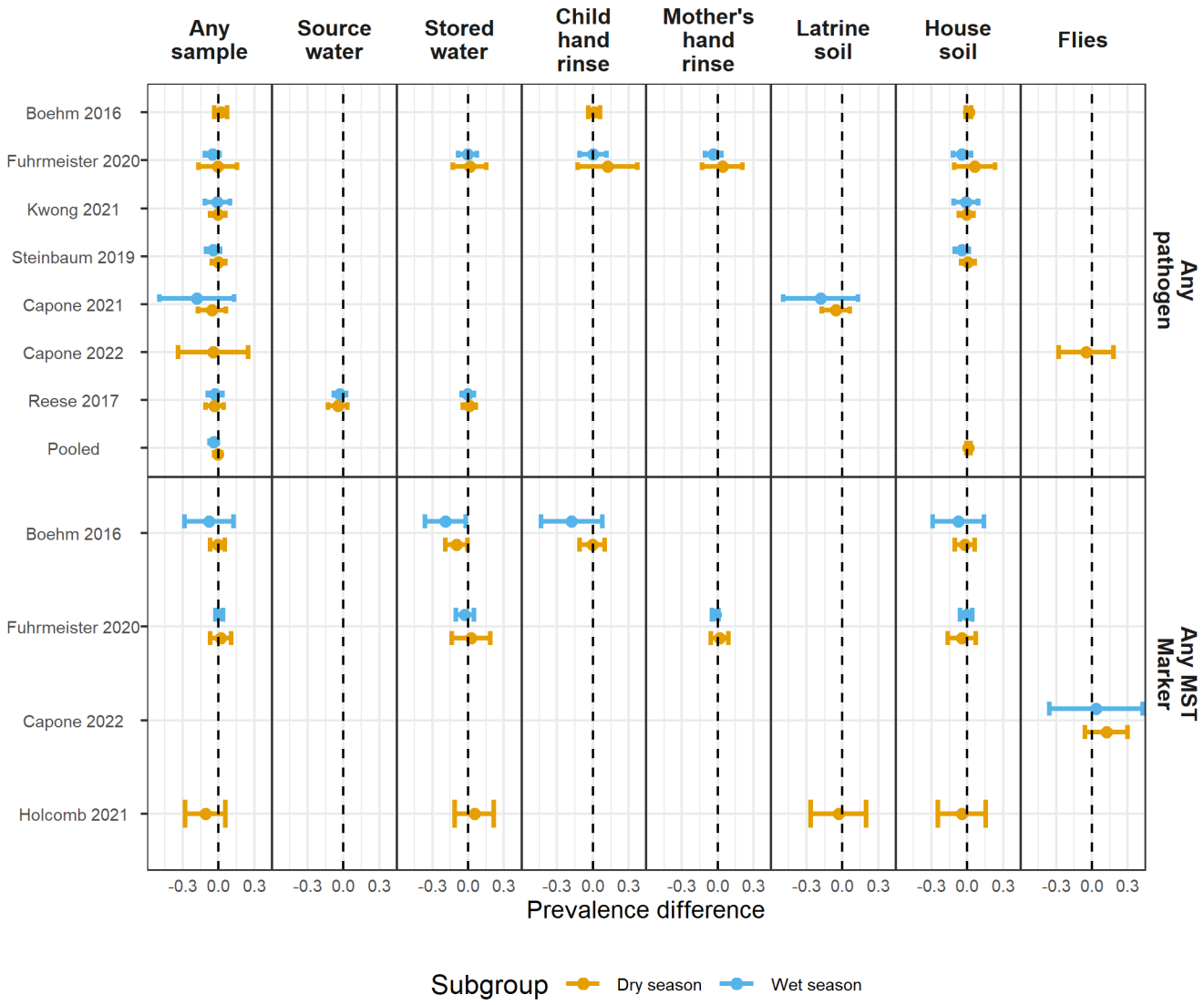


Figure S4. Forest plots of any enteropathogen prevalence differences or any MST prevalence differences between intervention and control arms, stratified by whether the sample was collected during the wet versus dry season (defined by the 6 months of highest average rainfall). Significant effect modification, as determined by the p-values on the regression model interaction term, is marked above points with asterisks (P < 0.05 = "*", P < 0.01 = "**", P < 0.001 = "***"). Grey crossed points denote data that were too sparse to estimate a prevalence ratio (i.e., <10 positive observations).

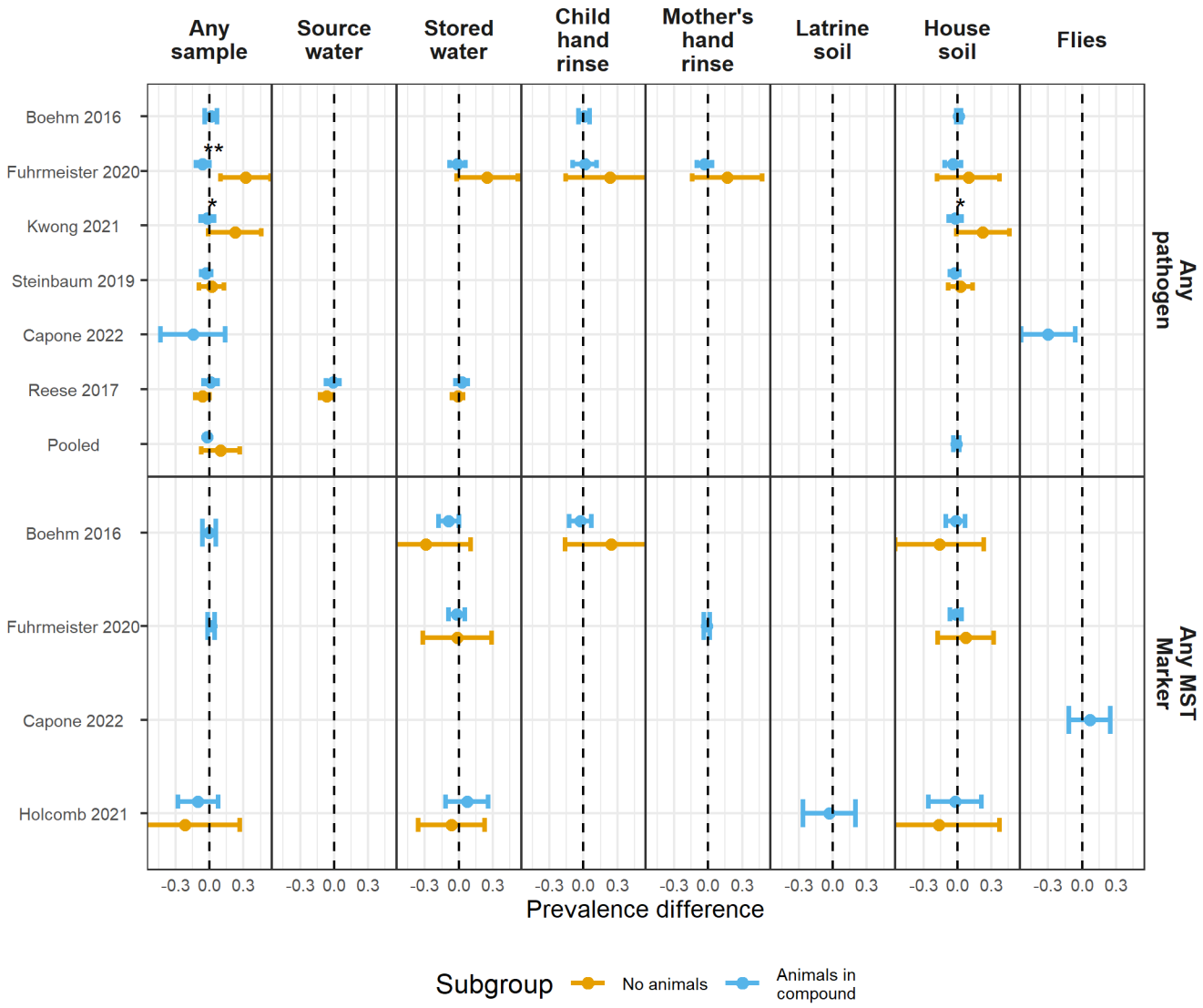


Figure S5. Forest plots of any enteropathogen prevalence differences or any MST prevalence differences between intervention and control arms, stratified by whether any animals were present in the compound. Significant effect modification, as determined by the p-values on the regression model interaction term, is marked above points with asterisks (P < 0.05 = "*", P < 0.01 = "**", P < 0.001 = "***"). Grey crossed points denote data that were too sparse to estimate a prevalence ratio (i.e., <10 positive observations).

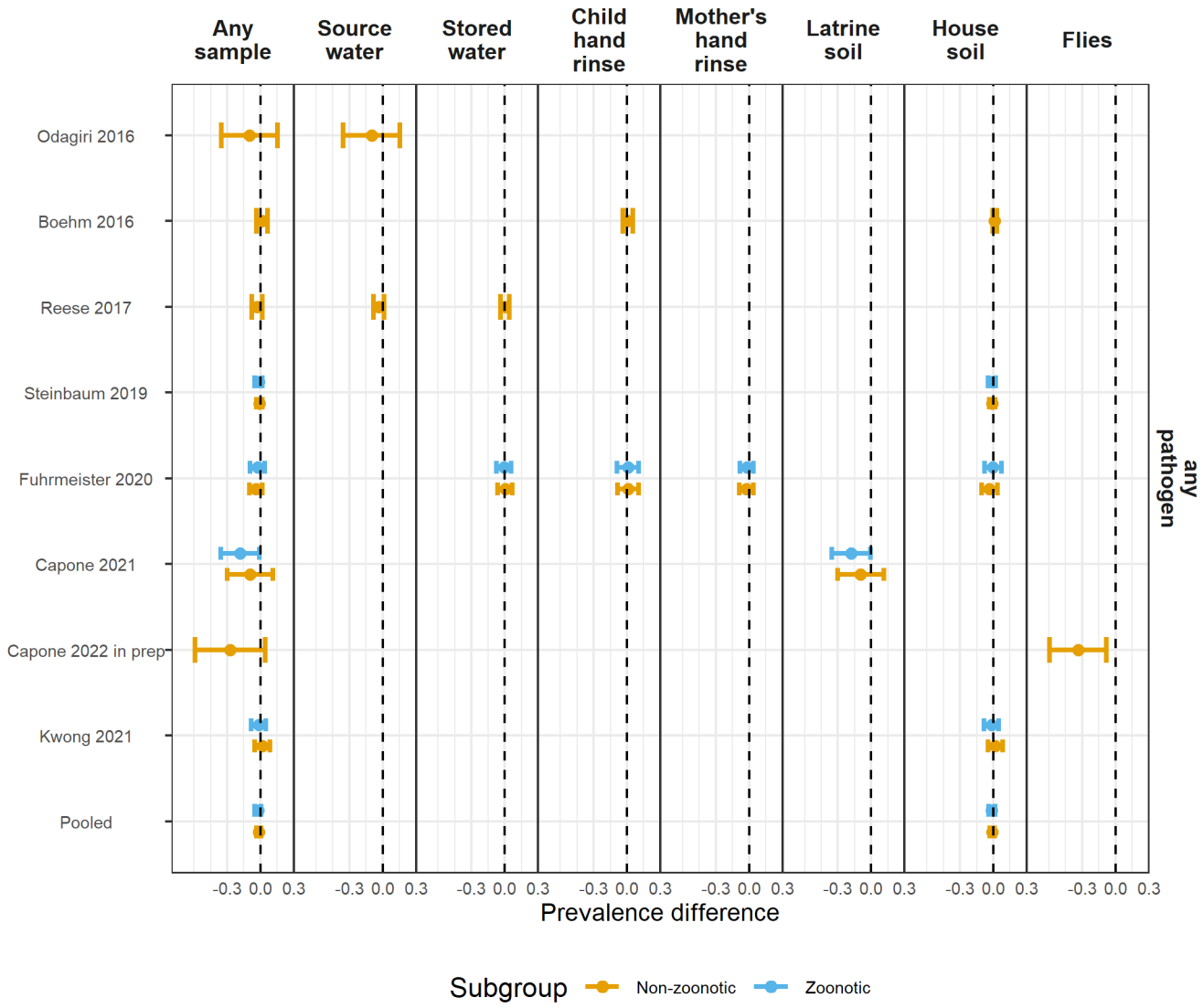


Figure S6. Forest plots of any enteropathogen prevalence differences or any MST prevalence differences between intervention and control arms, stratified by whether the pathogen is zoonotically transmitted. Grey crossed points denote data that were too sparse to estimate a prevalence ratio (i.e., <10 positive observations). Significant effect modification, as determined by the p-values on the regression model interaction term, is marked above points with asterisks (P < 0.05 = "*", P < 0.01 = "**", P < 0.001 = "***"). Grey crossed points denote data that were too sparse to estimate a prevalence ratio (i.e., <10 positive observations).

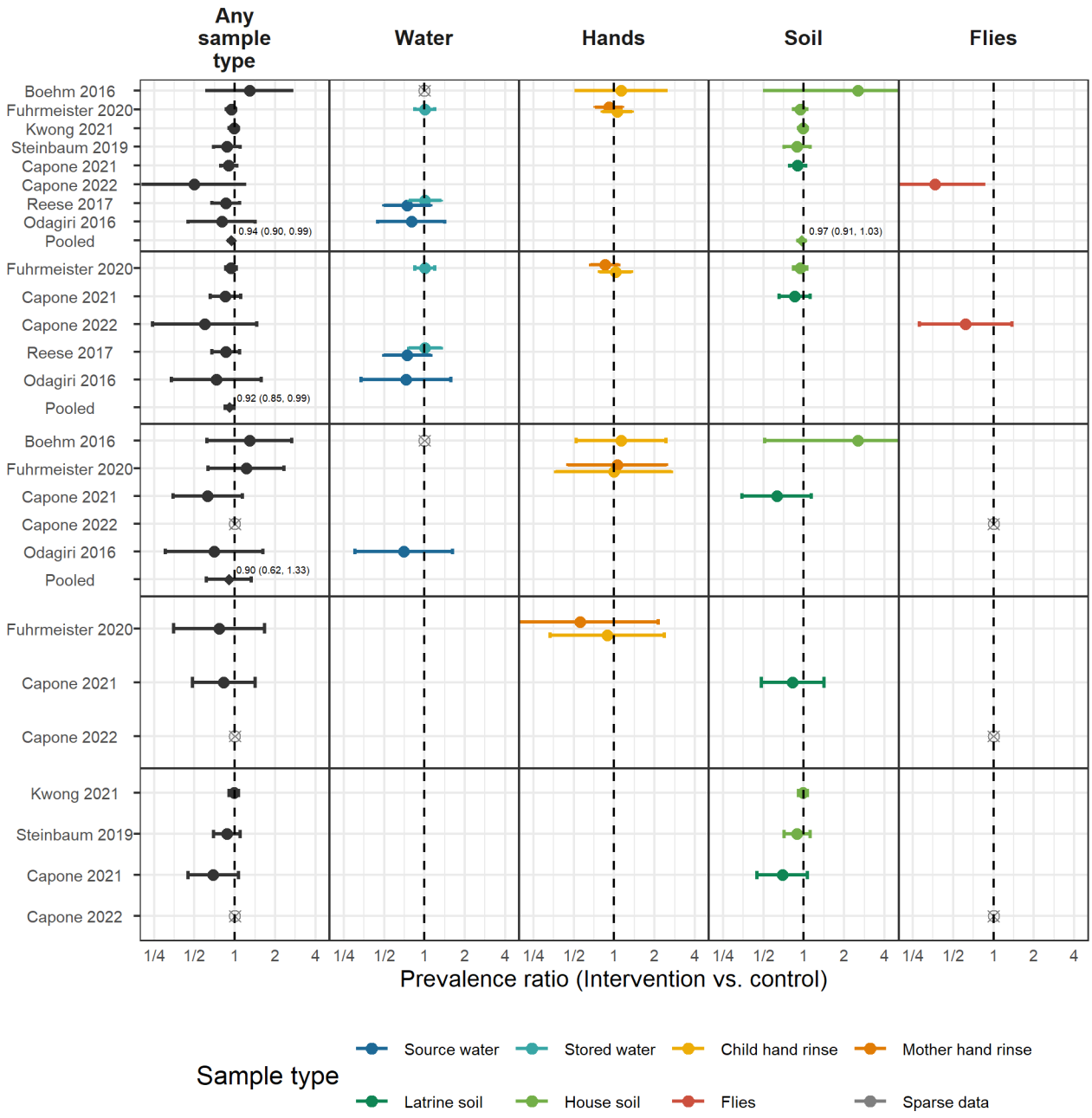


Figure S7. Forest plots of unadjusted intervention effects on the prevalence of any enteropathogen or type of enteropathogen (any bacteria, any virus, any protozoa and any STH) in different types of environmental samples. Point estimates and confidence intervals are printed next to pooled estimates. Grey crossed points denote data that were too sparse to estimate a prevalence ratio (i.e., <10 positive observations).

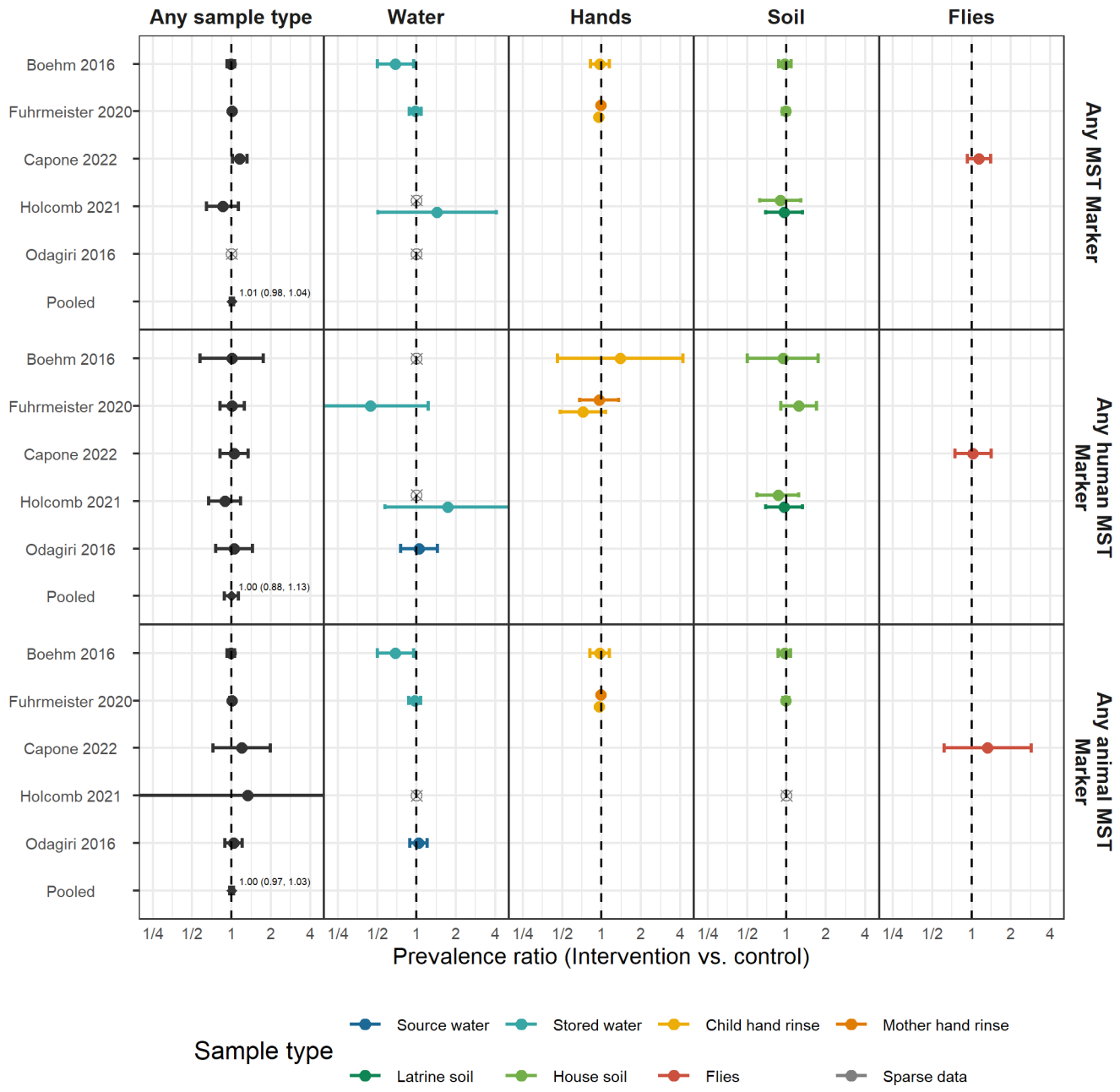


Figure S8. Forest plots of unadjusted intervention effects on the prevalence of any MST marker or type of MST marker (human or animal MST markers) in different types of environmental samples. Point estimates and confidence intervals are printed next to pooled estimates. Grey crossed points denote data that were too sparse to estimate a prevalence ratio (i.e., <10 positive observations).

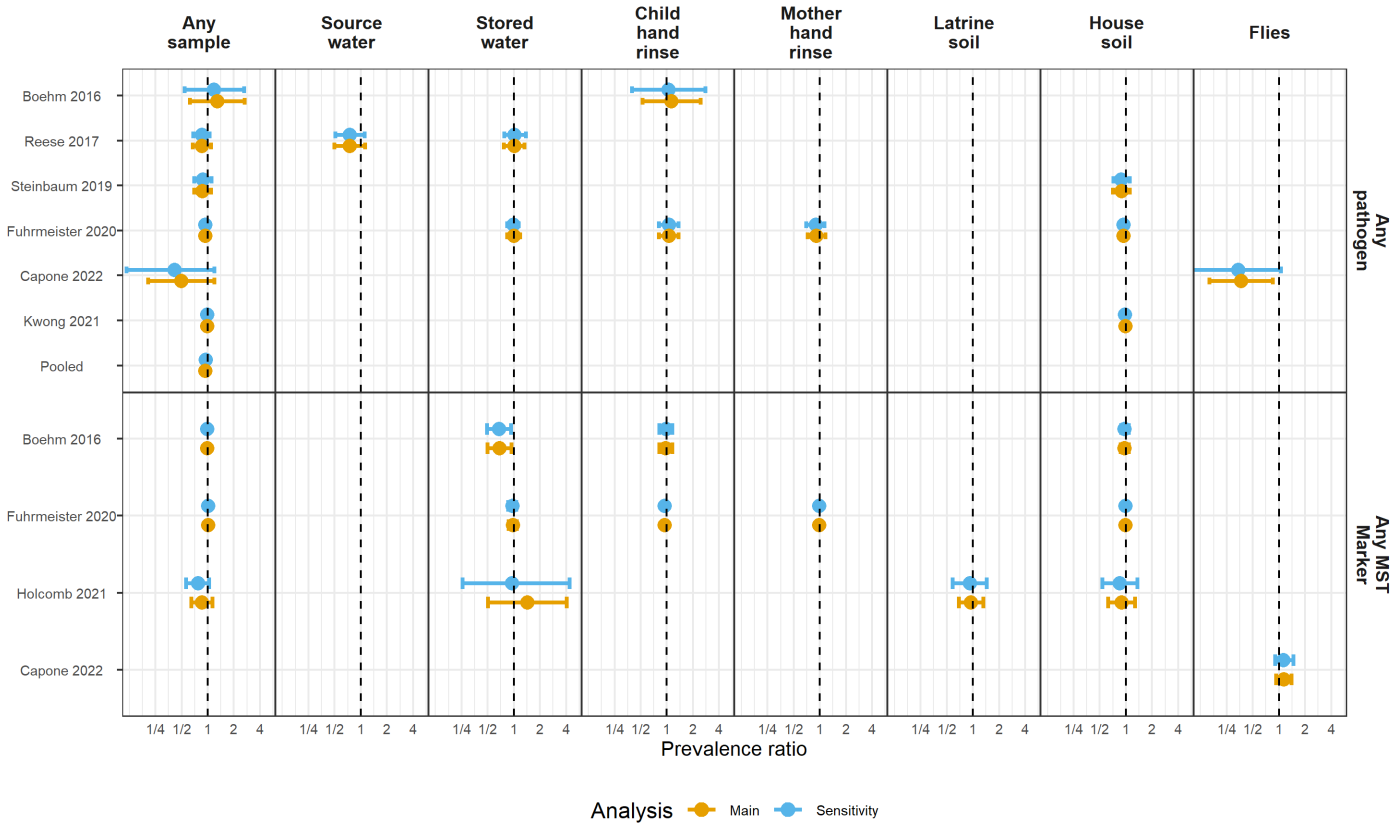


Figure S9. Forest plots of results from the primary analysis (orange) compared to a sensitivity analysis to the covariate prescreening method (blue) for the outcomes of any pathogen detection (top row) and any MST marker detection (bottom row) for different studies and sample types (columns). The sensitivity analysis used LASSO penalized regressions to select covariates across 200 bootstrap iterations with replacement, with 95% confidence intervals estimated with using the quantile method.

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Table S1. Systematic review search terms

Search terms were combined with "OR" within columns and with "AND" across columns. We developed a search strategy from a two-step process. First, known key studies prior to the systematic review (WASH Benefits, Mapsan, Gram Vikas, Odisah [Table 1]) were examined for keywords and Medical Subject Heading (MeSH) terms relating to each of the following categories of terms comprising our search string: WASH interventions; microbial source tracking and environmental contamination; enteric infection; diarrhea; and child growth and development. Next, we performed an initial search using these terms and extracted other relevant terms and synonyms from relevant articles in the search results, resulting in the final list presented in this table.

Study design	WASH	Environmental markers	Child health
matched, trial, RCT, experiment, intervention, randomized, randomised, quasi-randomized, quasi-randomised, quasi-experimental, pseudo-randomized, pseudo-randomised, non-randomized controlled trials	Water, Sanitation, Hygiene, Handwashing, WSH, Sanitation, Water Supply, Sanitary Drainage, Toilet Facilities, Drinking Water, Hand Hygiene, Water Purification, Waste Water, disinfection	molecular source tracking, microbial source tracking, microbial transmission, diarrheal pathogen, diarrheal pathogens, diarrhoeal pathogen, diarrhoeal pathogens, fecal-oral, faecal-oral, entericpathogen, entericpathogens, ruminant, avian, Feces, Faeces, Fecal, Faecal, Fecally, Faecally	Entericinfection, Soil-transmitted helminth, Protozoan, Seroconversion, Fecal microbiology, Faecal microbiology, Fecal biomarker, Faecal biomarker, Intestinal Diseases, Parasitic, Seroconversion, Enteritis, Helminthiasis, Helminthiases, Intestinal infection, Viral infection, Bacterial infection, Parasite infection, Parasitic infection, Helminth infection, Fecal sampling, Faecal sampling, Stool sampling, Stool collection, Diarrhea, Dysentery, Child growth faltering, Growth faltering, Child development, Length-for-age, Height-for-age, Weight-for-age, Head circumference, Waist circumference, Stunting, Stunted, Wasting, Wasted, Linear growth, Anthropometric measurement, Malnutrition, Undernourished, Undernutrition, Underweight, Growth Disorders, Childnutrition disorder, Wasting syndrome, Thinness, Growth velocity

Table S2. Pubmed search string

[MH] are mesh headers and [TW] are text words. Search strings for other databases are available in the Open Science Framework analysis preregistration materials (https://osf.io/8sgzn/).

((matched [tw]) OR (trial [tw]) OR (RCT [tw]) OR (experiment [tw]) OR (intervention [tw]) OR (randomized [tw]) OR (randomised [tw]) OR (quasi-randomized [tw]) OR (quasi-randomised [tw]) OR (quasi-experimental [tw]) OR (pseudo-randomized [tw]) OR (pseudo-randomised [tw]) OR ("non-randomized controlled trials as topic" [mh])) AND ((Water [tw]) OR (Sanitation [tw]) OR (Hygiene [tw]) OR (Handwashing [tw]) OR (WSH [tw]) OR ("Sanitation" [mh]) OR ("Water Supply" [mh]) OR ("Drainage, Sanitary" [mh]) OR (Sanitary Drainage [tw]) OR ("Toilet Facilities" [mh]) OR ("Drinking Water" [mh]) OR ("Hand Hygiene" [mh]) OR ("Water Purification" [mh]) OR ("Waste Water" [mh]) OR (disinfect* [tw])) AND ((molecular source tracking [tw]) OR (microbial source tracking [tw]) OR (microbial transmission [tw]) OR (diarrheal pathogen [tw]) OR (diarrheal pathogens [tw]) OR (diarrhoeal pathogen [tw]) OR (diarrhoeal pathogens [tw]) OR (fecal-oral [tw]) OR (faecal-oral [tw]) OR (enteric pathogen [tw]) OR (enteric pathogens [tw]) OR (ruminant* [tw]) OR (avian* [tw]) OR ("Feces" [mh]) OR (Feces [tw]) OR (Faeces [tw]) OR (Fecal [tw]) OR (Faecal [tw]) OR (Fecally [tw]) OR (Faecally [tw])) AND (((Enteric infection* [tw]) OR (Soil-transmitted helminth* [tw]) OR (Protozoan* [tw]) OR (Seroconversion [tw]) OR (Fecal microbio* [tw]) OR (Faecal microbio* [tw]) OR (Fecal biomarker* [tw]) OR (Faecal biomarker* [tw]) OR ("Intestinal Diseases,

Parasitic/epidemiology" [mh]) OR ("Seroconversion" [mh]) OR (Seroconversion [tw]) OR ("Enteritis/epidemiology" [mh]) OR ("Helminthiasis/complications" [mh]) OR (Helminthiasis [tw]) OR (Helminthiases)OR ("Helminthiasis/epidemiology" [mh]) OR ("Helminthiasis/prevention and control" [mh]) OR (Intestinal infection* [tw]) OR (Viral infection* [tw]) OR (Bacterial infection* [tw]) OR (Parasite infection* [tw]) OR (Parasitic infection* [tw]) OR (Helminth infection* [tw]) OR (Fecal sampling [tw]) OR (Faecal sampling [tw]) OR (Faecal sampling [tw]) OR (Bacterial infection* [tw]) OR (Parasite infection* [tw]) OR (Parasitic infection* [tw]) OR (Helminth infection* [tw]) OR (Fecal sampling [tw]) OR (Faecal sampling [tw]) OR (Stool sampling [tw]) OR (Stool collection [tw])) OR ((Diarrh* [tw]) OR (Dysentery [tw]) OR ("Diarrhea/epidemiology" [mh]) OR ("Diarrhea/etiology" [mh]) OR ("Diarrhea/prevention and control" [mh]) OR ("Diarrhea, Infantile" [mh]) OR ("Dysentery" [mh])) OR (Child growth faltering [tw]) OR (Growth faltering [tw])OR (Child development [tw]) OR (Length-for-age [tw]) OR (Height-for-age [tw]) OR (Weight-for-age [tw]) OR (Head circumference [tw]) OR (Waist circumference [tw]) OR (Stunt* [tw]) OR (Wasting [tw]) OR (Wasted [tw]) OR (Linear growth [tw]) OR (Anthropometric measurement* [tw]) OR (Maln* [tw]) OR (Undernourish* [tw]) OR (Undernutrition [tw]) OR (Underweight [tw]) OR ("Growth Disorders" [mh]) OR (Growth Disorders [tw]) OR ("Child nutrition disorders" [mh]) OR (Child nutrition disorder* [tw]) OR ("Malnutrition" [mh]) OR ("Wasting Syndrome" [mh]) OR (Wasting syndrome [tw]) OR ("Thinness" [mh]) OR (Thinness [tw]) OR (Growth velocity [tw]))

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Topic	o.	Item	Location where item is reported
TITLE			
Title		Identify the report as a systematic review.	Page 1
ABSTRACT			
Abstract		See the PRISMA for Abstracts checklist below	
INTRODUCTIO N			
Rationale		Describe the rationale for the review in the context of existing knowledge.	Introduction paragraph 2
Objectives		Provide an explicit statement of the objective(s) or question(s) the review addresses.	Introduction paragraph 3
METHODS			
Eligibility criteria		Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Line 161-164
Information sources		Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Line 159-160, Fig. S1
Search strategy		Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Tables S1-S2
Selection process		Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Line 169-173

Topic	o.	Item	Location where item is reported
Data collection process		Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Line 169-173
Data items	0a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Line 177-179
	0b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Line 177-179
Study risk of bias assessment	1	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Line 173-174
Effect measures	2	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Line 193-253
Synthesis methods	3a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item 5)).	Line 193-253
	3b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Line 193-253
	3c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Figure captions
	3d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Line 161-193

Topic	o.	Item	Location where item is reported
	3e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Line 224-253
	3f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Line 203-253
Reporting bias assessment	4	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Not applicable
Certainty assessment	5	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Not applicable
RESULTS			
Study selection	6a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Figure S1
	6b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Line 262-265
Study characteristics	7	Cite each included study and present its characteristics.	Line 219-230, Table 1
Risk of bias in studies	8	Present assessments of risk of bias for each included study.	Table S4
Results of individual studies	9	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Figures 1,2 S2-S3, S5-S8, Tables 2, S6-S9
Results of syntheses	0a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Not applicable
	0b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Figures1 ,2 S2-S3, S5-S8, Tables 2, S6-S9

Topic	o.	Item	Location where item is reported
	0c	Present results of all investigations of possible causes of heterogeneity among study results.	Line 370-382
	0d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Line 370-382
Reporting biases	1	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Not applicable
Certainty of evidence	2	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Figures1 ,2 S2-S3, S5-S8, Tables 2, S6-S9
DISCUSSION			
Discussion	3a	Provide a general interpretation of the results in the context of other evidence.	Line 385-419
	3b	Discuss any limitations of the evidence included in the review.	Line 444-465
	3c	Discuss any limitations of the review processes used.	Line 444-465
	3d	Discuss implications of the results for practice, policy, and future research.	Line 466-498
OTHER INFORMATION			
Registration and protocol	4a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	https://osf.io/8sgzn/
	4b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	https://osf.io/8sgzn/
	4c	Describe and explain any amendments to information provided at registration or in the protocol.	Not applicable

Topic	o.	Item	Location where item is reported
Support	5	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Line 73
Competing interests	6	Declare any competing interests of review authors.	Line 512
Availability of data, code and other materials	7	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Lines 513-516

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Topic	o.	Item	Re ported?
TITLE			
Title		Identify the report as a systematic review.	Yes
BACKGRO UND			
Objective s		Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHOD S			
Eligibility criteria		Specify the inclusion and exclusion criteria for the review.	Yes
Informati on sources		Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	No

Topic	No.	Item	Reported?
Risk of bias		Specify the methods used to assess risk of bias in the included studies.	Yes
Synthesis of results		Specify the methods used to present and synthesize results.	Yes
RESULTS			
Included studies		Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results		Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence		Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	Yes
Registration	12	Provide the register name and registration number.	Yes

Table S4. Risk of bias based on modified Newcastle-Ottawa scale

Reference	Selection bias	Response bias	Follow-up bias	Misclassification bias	Outcome assessment	Outcome measurement	Bias in analysis	Total
	Is there evidence of selection bias, which refers to systematic differences between baseline characteristics of the groups that are compared?[a]	Is there evidence of response bias?[b]	Is there evidence of bias due to missing follow-up data?[c]	Is there risk of households not receiving the intervention being misclassified as having received it, or vice versa?[d]	Is there evidence of bias arising from how the outcome was assessed?[e]	Is there evidence of ascertainment bias?[f]	Is there evidence that analysis was not appropriately adjusted for clustering and/or confounding, if appropriate?[g]	Total number of stars (x/9 possible stars).
Clasen T, et al. Effectiveness of a rural sanitation programme on diarrhoea, soil-transmitted helminth infection, and child malnutrition in Odisha, India: a cluster-randomised trial. Lancet Glob Health. 2014.	*	* no, laboratory assessed and blinded	possible (86% of possible weeks are reported weeks)	* household-level interventions	**	*	** adjusted for clustering	8
Luby, S.P. et al.. Effects of water quality, sanitation, handwashing, and nutritional interventions on diarrhoea and child growth in rural Bangladesh: a cluster randomised controlled trial. The Lancet Global Health	*	* no, laboratory assessed and blinded	* 94% complete FU	* household-level interventions	**	*	**	9

Table S4. Risk of bias based on modified Newcastle-Ottawa scale

Reference	Selection bias	Response bias	Follow-up bias	Misclassification bias	Outcome assessment	Outcome measurement	Bias in analysis	Total
2018								
Null, C. et al., Effects of water quality, sanitation, handwashing, and nutritional interventions on diarrhoea and child growth in rural Kenya: a cluster-randomised controlled trial. The Lancet Global Health 2018	*	* no, laboratory assessed and blinded	* <1% loss to FU	* household-level interventions	**	*	**	9
Reese, H. et al. Assessing longer-term effectiveness of a combined household-level piped water and sanitation intervention on child diarrhoea, acute respiratory infection, soil-transmitted helminth infection and nutritional status: a matched cohort study in rural Odisha, India. International journal of epidemiology 2019	selection bias is possible, as the study is not randomized and there are some baseline differences between intervention and control group	* no, laboratory assessed and blinded	substantial loss to FU	* household-level interventions	**	*	**	7

Table S4. Risk of bias based on modified Newcastle-Ottawa scale

Reference	Selection bias	Response bias	Follow-up bias	Misclassification bias	Outcome assessment	Outcome measurement	Bias in analysis	Total
Knee, J. et al. Effects of an urban sanitation intervention on childhood enteric infection and diarrhea in Maputo, Mozambique: A controlled before-and-after trial. eLife 2011	selection bias is possible, as the study is not randomized, but intervention and control groups were mostly balanced at baseline. Control households were more likely to have covered floors and higher quality walls and intervention groups had more people per household.	* no, laboratory assessed and blinded	substantial loss to FU	* household-level interventions	**	*	**	7

[a] RCTs receive 1 star, unless evidence of selection bias (e.g. randomisation procedures not followed). Meaningful differences between groups at baseline in RCTs receive 0 stars. Rates of declining to participate >10% receive 0 stars. Non- or quasi-randomised studies receive 0 stars.

[b] If intervention recipient was not blinded to intervention status, 0 stars.

[c] <10% receives 1 star, greater than or equal to 10% receives 0 stars.

[d] Interventions delivered at the household/individual level receive 1 star. Interventions delivered at the community level that missed a substantial, i.e. greater than or equal to 10%, proportion of the target population receive 0 stars, including when there is insufficient information to verify whether this is the case. Interventions with substantial risk of contamination (control households receiving intervention) receive 0 stars.

[e] Parent / person recall (=0 stars). Fieldworker assessed (=1 star). Physician/microbiologically assessed (=2 stars)

[f] If outcome measurement staff were not blinded to intervention status, 0 stars.

[g] Scoring is based on losing stars (max. 2). Individual RCTs with baseline balance on covariates are unlikely to require adjustment (=2 stars). Cluster-RCTs and non-randomised trials may require adjustment for clustering (-1 star if not done). RCTs or cRCTs may require adjustment for covariates, with justification (-1 star if not done). Non-randomised studies require adjustment for covariates (-1 star if not done), but also adequate justification for covariate selection (-1 star if not included), and there can be too few or too many covariates.

Table S5. Prevalence of pathogens by sample type tested in each study

Study	Sample	Target	Percent positive (n/N)	PR (95% CI)
Odagiri 2016	Source water	V. cholerae	31.7% (19/60)	0.73 (0.34, 1.57)
-	-	Adenovirus	8.3% (5/60)	0.25 (0.03, 2.19)
-	-	Rotavirus	23.3% (14/60)	0.75 (0.29, 1.93)
Boehm 2016	Stored water	Rotavirus	0.6% (3/493)	-
-	Child hand rinse	Rotavirus	6.1% (30/493)	-
-	House soil	Rotavirus	1.4% (7/496)	2.52 (0.51, 12.42)
Reese 2017	Source water	Shigella	10.7% (161/1499)	0.73 (0.46, 1.15)
-	-	V. cholerae	13% (36/276)	0.93 (0.46, 1.85)
-	Stored water	Shigella	10.1% (190/1874)	1.08 (0.77, 1.51)
-	-	V. cholerae	23.7% (100/422)	1.03 (0.66, 1.6)
Steinbaum 2019	House soil	Ascaris	13% (273/2107)	0.88 (0.68, 1.13)
-	-	Trichuris	6.9% (146/2107)	0.86 (0.6, 1.23)
Fuhrmeister 2020	Stored water	Pathogenic E. coli	38.6% (286/741)	1 (0.84, 1.19)
-	Child hand rinse	Pathogenic E. coli	34% (127/373)	-
-	-	Giardia	4.8% (15/311)	-
-	-	Norovirus	4.2% (14/337)	-
-	Mother's hand rinse	Pathogenic E. coli	24% (177/737)	-
-	-	Giardia	2.3% (14/602)	-
-	-	Norovirus	3.1% (21/684)	-
-	House soil	Pathogenic E. coli	61.3% (453/739)	0.94 (0.84, 1.06)
Capone 2021	Latrine soil	C. difficile	14.8% (13/88)	0.9 (0.32, 2.48)
-	-	Campylobacter	6.8% (6/88)	2.09 (0.4, 11.05)
-	-	Pathogenic E. coli	56.8% (50/88)	0.89 (0.56, 1.42)
-	-	Salmonella	6.8% (6/88)	0.52 (0.1, 2.76)
-	-	Shigella	21.6% (19/88)	0.28 (0.1, 0.78)
-	-	V. cholerae	0% (0/88)	-

Table S5. Prevalence of pathogens by sample type tested in each study

Study	Sample	Target	Percent positive (n/N)	PR (95% CI)
-	-	Yersinia	4.5% (4/88)	-
-	-	Ascaris	60.2% (53/88)	0.65 (0.41, 1.02)
-	-	Trichuris	17% (15/88)	0.92 (0.36, 2.33)
-	-	Cryptosporidium	8% (7/88)	0.78 (0.18, 3.36)
-	-	Entamoeba histolytica	1.1% (1/88)	-
-	-	Giardia	31.8% (28/88)	0.47 (0.21, 1.07)
-	-	Adenovirus	20.5% (18/88)	0.21 (0.06, 0.68)
-	-	Astrovirus	29.5% (26/88)	1.27 (0.67, 2.43)
-	-	Norovirus	2.3% (2/88)	-
-	-	Rotavirus	4.5% (4/88)	-
-	-	Sapovirus	0% (0/88)	-
Capone 2022 in prep	Flies	Campylobacter	1.2% (1/86)	-
-	-	Pathogenic E. coli	30.2% (26/86)	-
-	-	Shigella	2.3% (2/86)	-
-	-	V. cholerae	2.3% (2/86)	-
-	-	Ascaris	0% (0/86)	-
-	-	Trichuris	3.5% (3/86)	-
-	-	Giardia	4.7% (4/86)	-
-	-	Adenovirus	4.7% (4/86)	-
-	-	Astrovirus	0% (0/86)	-
-	-	Norovirus	2.3% (2/86)	-
-	-	Pan enterovirus	0% (0/86)	-
-	-	Rotavirus	1.2% (1/86)	-
-	-	Sapovirus	0% (0/86)	-
Kwong 2021	House soil	Ascaris	62.1% (886/1426)	0.97 (0.87, 1.08)
-	-	Trichuris	56% (798/1426)	1.03 (0.91, 1.15)

Table S6. Prevalence of microbial source tracking markers by sample type tested in each study

Study	Sample	Target	Percent positive (n/N)	PR (95% CI)
Odagiri 2016	Source water	Animal (BacCow)	91.7% (55/60)	1.04 (0.89, 1.21)
-	-	Human (BacHum)	71.7% (43/60)	1.05 (0.76, 1.45)
Boehm 2016	Stored water	Avian (GFD)	9.3% (46/493)	0.71 (0.37, 1.36)
-	-	Ruminant (BacR)	21.9% (108/493)	0.62 (0.43, 0.9)
-	-	Human (HumM2)	0% (0/493)	-
-	Child hand rinse	Avian (GFD)	16.2% (80/493)	-
-	-	Ruminant (BacR)	54.2% (267/493)	-
-	-	Human (HumM2)	2.4% (12/493)	-
-	House soil	Avian (GFD)	33.3% (165/496)	0.98 (0.76, 1.27)
-	-	Ruminant (BacR)	66.7% (331/496)	0.98 (0.85, 1.12)
-	-	Human (HumM2)	8.9% (44/496)	0.94 (0.5, 1.75)
Fuhrmeister 2020	Stored water	Animal (BacCow)	68.5% (482/704)	0.97 (0.87, 1.08)
-	-	Human (HumM2)	2.6% (17/651)	0.44 (0.16, 1.23)
-	Child hand rinse	Animal (BacCow)	97.5% (356/365)	-
-	-	Human (HumM2)	21.9% (74/338)	-
-	Mother's hand rinse	Animal (BacCow)	96.7% (702/726)	-
-	-	Human (HumM2)	18.1% (118/651)	-
-	House soil	Animal (BacCow)	90.6% (572/631)	0.99 (0.94, 1.04)
-	-	Human (HumM2)	20.1% (127/631)	1.24 (0.91, 1.7)
Holcomb 2021	Source water	Avian (GFD)	0% (0/41)	-
-	-	Human (HF183)	2.4% (1/41)	-
-	-	Human (M. smithii)	0% (0/41)	-
-	Stored water	Avian (GFD)	1.1% (1/94)	-
-	-	Human (HF183)	14.9% (14/94)	1.72 (0.57, 5.18)
-	-	Human (M. smithii)	0% (0/94)	-
-	Latrine soil	Avian (GFD)	3.3% (2/60)	-

Table S6. Prevalence of microbial source tracking markers by sample type tested in each study

	Study	Sample	Target	Percent positive (n/N)	PR (95% CI)
	-	-	Human (HF183)	50% (30/60)	0.88 (0.51, 1.52)
	-	-	Human (M. smithii)	45% (27/60)	0.74 (0.36, 1.55)
	-	House soil	Avian (GFD)	3.6% (3/83)	-
	-	-	Human (HF183)	42.2% (35/83)	0.81 (0.49, 1.34)
	-	-	Human (M. smithii)	24.1% (20/83)	1.3 (0.62, 2.73)
prep	Capone 2022 in	Flies	Animal (BacCow)	12.8% (11/86)	-
	-	-	Dog (BacCan)	30.2% (26/86)	-
	-	-	Human (BacHum)	72.1% (62/86)	-

able S7.

Unadjusted and adjusted results by study, sample type, and aggregated variables for pathogen targets (any pathogen, any bacteria, any viruses, any protozoa, any STH).

St	Target	Sample	Positive, Intervention	Negative, Intervention	Positive, Control	Negative, Control	Total observations	Unadjusted Prevalence Ratio	Unadjusted p-value	Adjusted Prevalence R
Ca in	Any pathogen	Any sample	7	13	20	17	57	PR=0.65 (95% CI: 0.33, 1.28)	0.21	PR= (95% CI: 0.21, 1.19)
Ca	Any pathogen	Any sample	37	6	43	2	88	PR=0.9 (95% CI: 0.78, 1.03)	0.13	PR= (95% CI: 0.78, 1.03)
Fu	Any pathogen	Any sample	314	136	348	123	921	PR=0.94 (95% CI: 0.87, 1.02)	0.17	PR= (95% CI: 0.87, 1.02)
Ste 19	Any pathogen	Any sample	206	979	173	707	2,065	PR=0.88 (95% CI: 0.7, 1.11)	0.29	PR= (95% CI: 0.7,
Re	Any pathogen	Any sample	185	792	238	825	2,040	PR=0.85 (95% CI: 0.66, 1.08)	0.18	PR= (95% CI: 0.68, 1.09)
Bo	Any pathogen	Any sample	19	229	15	234	497	PR=1.27 (95% CI: 0.6, 2.68)	0.53	PR= (95% CI: 0.62, 2.66)
Od	Any pathogen	Any sample	12	18	15	15	60	PR=0.8 (95% CI: 0.45, 1.42)	0.45	
Re	Any pathogen	Ource water	68	588	122	747	1,525	PR=0.74 (95% CI: 0.49, 1.12)	0.15	PR= (95% CI: 0.5,
Od	Any pathogen	Ource water	12	18	15	15	60	PR=0.8 (95% CI: 0.45, 1.42)	0.45	
Fu	Any pathogen	Tored water	138	218	148	237	741	PR=1.01 (95% CI: 0.85, 1.2)	0.93	PR= (95% CI: 0.84, 1.19)
Re	Any pathogen	Tored water	134	786	147	860	1,927	PR=1 (95% CI: 0.75, 1.32)	0.99	PR= (95% CI: 0.77, 1.34)
Bo	Any pathogen	Tored water	2	243	1	245	491	Not estimated		Not estimated
Kw	Any pathogen	Ouse soil	363	125	687	221	1,396	PR=0.98 (95% CI: 0.91, 1.06)	0.67	PR= (95% CI: 0.91, 1.06)
Fu	Any pathogen	Ouse soil	217	144	236	142	739	PR=0.96 (95% CI: 0.86, 1.08)	0.53	PR= (95% CI: 0.84, 1.06)
Ste 19	Any pathogen	Ouse soil	209	1,000	173	725	2,107	PR=0.9 (95% CI: 0.72, 1.13)	0.35	PR= (95% CI: 0.71, 1.11)
Bo	Any pathogen	Ouse soil	5	242	2	247	496	PR=2.52 (95% CI: 0.51, 12.42)	0.26	PR= (95% CI: 0.51, 12.42)

able S7.

Unadjusted and adjusted results by study, sample type, and aggregated variables for pathogen targets (any pathogen, any bacteria, any viruses, any protozoa, any STH).

St	Target	Sample	Positive, Intervention	Negative, Intervention	Positive, Control	Negative, Control	Total observations	Unadjusted Prevalence Ratio	Unadjusted p-value	Adjusted Prevalence R
Ca	Any pathogen	Atrine soil	37	6	43	2	88	PR=0.9 (95% CI: 0.78, 1.03)	0.13	PR= (95% CI: 0.78, 1.03)
Ca in	Any pathogen		8	23	25	30	86	PR=0.57 (95% CI: 0.28, 1.15)	0.12	PR= (95% CI: 0.16, 0.85)
Fu	Any pathogen		75	113	72	116	376	PR=1.04 (95% CI: 0.8, 1.35)	0.76	PR= (95% CI: 0.81, 1.37)
Fu	Any pathogen		96	266	110	267	739	PR=0.91 (95% CI: 0.72, 1.15)	0.43	PR= (95% CI: 0.72, 1.16)
Bo	Any pathogen		16	231	14	232	493	PR=1.14 (95% CI: 0.52, 2.48)	0.75	PR= (95% CI: 0.52, 2.44)
Ca in	Any bacteria	Any sample	7	13	17	20	57	PR=0.76 (95% CI: 0.38, 1.54)	0.45	PR= (95% CI: 0.24, 1.46)
Ca	Any bacteria	Any sample	28	15	35	10	88	PR=0.84 (95% CI: 0.64, 1.1)	0.21	PR= (95% CI: 0.65, 1.11)
Fu	Any bacteria	Any sample	306	144	340	131	921	PR=0.94 (95% CI: 0.86, 1.03)	0.18	PR= (95% CI: 0.86, 1.02)
Re	Any bacteria	Any sample	185	792	238	825	2,040	PR=0.85 (95% CI: 0.66, 1.08)	0.18	PR= (95% CI: 0.68, 1.09)
Od	Any bacteria	Any sample	8	22	11	19	60	PR=0.73 (95% CI: 0.34, 1.57)	0.42	
Re	Any bacteria	Ource water	68	588	122	747	1,525	PR=0.74 (95% CI: 0.49, 1.12)	0.15	PR= (95% CI: 0.5,
Od	Any bacteria	Ource water	8	22	11	19	60	PR=0.73 (95% CI: 0.34, 1.57)	0.42	
Fu	Any bacteria	Tored water	138	218	148	237	741	PR=1.01 (95% CI: 0.85, 1.2)	0.93	PR= (95% CI: 0.84, 1.19)
Re	Any bacteria	Tored water	134	786	147	860	1,927	PR=1 (95% CI: 0.75, 1.32)	0.99	PR= (95% CI: 0.77, 1.34)
Fu	Any bacteria	Ouse soil	217	144	236	142	739	PR=0.96 (95% CI: 0.86, 1.08)	0.53	PR= (95% CI: 0.84, 1.06)
Ca	Any bacteria	Atrine soil	28	15	35	10	88	PR=0.84 (95% CI: 0.64, 1.1)	0.21	PR= (95% CI: 0.65, 1.11)

able S7.

Unadjusted and adjusted results by study, sample type, and aggregated variables for pathogen targets (any pathogen, any bacteria, any viruses, any protozoa, any STH).

St	arget	T	ample	Posi tive, Intervention	Nega tive, Intervention	P ositive, Control	N egative, Control	Tot al observation s	Unadjust ed Prevalence Ratio	Un adjusted p-value	Adj d Prevalence R
Ca in	ny bacteria	A		8	23	21	34	86	PR=0.68 (95% CI: 0.32, 1.41)	0.3	PR= (95% CI: 0.28, 1.38)
Fu	ny bacteria	A		64	122	63	124	373	PR=1.02 (95% CI: 0.78, 1.35)	0.8	PR= (95% CI: 0.78, 1.35)
Fu	ny bacteria	A		81	281	96	279	737	PR=0.87 (95% CI: 0.68, 1.13)	0.3	PR= (95% CI: 0.67, 1.09)
Ca in	ny virus	A	ny sample	0	20	4	33	57	Not estimated		Not estimated
Ca	ny virus	A	ny sample	16	27	22	23	88	PR=0.76 (95% CI: 0.46, 1.25)	0.2	PR= (95% CI: 0.35, 1.14)
Fu	ny virus	A	ny sample	17	330	14	338	699	PR=1.23 (95% CI: 0.63, 2.4)	0.5	PR= (95% CI: 0.63, 2.34)
Bo	ny virus	A	ny sample	19	229	15	234	497	PR=1.27 (95% CI: 0.6, 2.68)	0.5	PR= (95% CI: 0.62, 2.66)
Od	ny virus	A	ny sample	7	23	10	20	60	PR=0.7 (95% CI: 0.3, 1.62)	0.4	
Od	ny virus	A	ource water	7	23	10	20	60	PR=0.7 (95% CI: 0.3, 1.62)	0.4	
Bo	ny virus	A	tored water	2	243	1	245	491	Not estimated		Not estimated
Bo	ny virus	A	ouse soil	5	242	2	247	496	PR=2.52 (95% CI: 0.51, 12.42)	0.2	PR= (95% CI: 0.51, 12.42)
Ca	ny virus	A	atrine soil	16	27	22	23	88	PR=0.76 (95% CI: 0.46, 1.25)	0.2	PR= (95% CI: 0.35, 1.14)
Ca in	ny virus	A		0	31	5	50	86	PR=0 (95% CI: 0, 0)	0	PR= (95% CI: 0, 0)
Fu	ny virus	A		7	162	7	161	337	PR=0.99 (95% CI: 0.37, 2.69)	0.9	PR= (95% CI: 0.37, 2.69)
Fu	ny virus	A		11	331	10	332	684	PR=1.1 (95% CI: 0.47, 2.57)	0.8	PR= (95% CI: 0.45, 2.46)
Bo	ny virus	A		16	231	14	232	493	PR=1.14 (95% CI: 0.52, 2.48)	0.7	PR= (95% CI: 0.52, 2.44)

able S7.

Unadjusted and adjusted results by study, sample type, and aggregated variables for pathogen targets (any pathogen, any bacteria, any viruses, any protozoa, any STH).

St	Target	Sample	Positive, Intervention	Negative, Intervention	Positive, Control	Negative, Control	Total observations	Unadjusted Prevalence Ratio	Unadjusted p-value	Adjusted Prevalence R
Ca in	Any protozoa	Any sample	0	20	3	34	57	Not estimated		Not estimated
Ca	Any protozoa	Any sample	15	28	19	26	88	PR=0.83 (95% CI: 0.48, 1.42)	0.49	PR= (95% CI: 0.48, 1.42)
Fu	Any protozoa	Any sample	12	293	16	291	612	PR=0.75 (95% CI: 0.35, 1.65)	0.48	PR= (95% CI: 0.35, 1.67)
Ca	Any protozoa	atrine soil	15	28	19	26	88	PR=0.83 (95% CI: 0.48, 1.42)	0.49	PR= (95% CI: 0.48, 1.42)
Ca in	Any protozoa		0	31	4	51	86	Not estimated		Not estimated
Fu	Any protozoa		7	147	8	149	311	PR=0.89 (95% CI: 0.33, 2.38)	0.82	PR= (95% CI: 0.33, 2.38)
Fu	Any protozoa		5	296	9	292	602	PR=0.56 (95% CI: 0.14, 2.13)	0.39	PR= (95% CI: 0.14, 2.13)
Ca in	Any STH	Any sample	0	20	3	34	57	Not estimated		Not estimated
Ca	Any STH	Any sample	20	23	34	11	88	PR=0.62 (95% CI: 0.43, 0.89)	0.01	PR= (95% CI: 0.45, 1.07)
Ste 19	Any STH	Any sample	206	979	173	707	2,065	PR=0.88 (95% CI: 0.7, 1.11)	0.29	PR= (95% CI: 0.7,
Kw	Any STH	ouse soil	363	125	687	221	1,396	PR=0.98 (95% CI: 0.91, 1.06)	0.67	PR= (95% CI: 0.91, 1.06)
Ste 19	Any STH	ouse soil	209	1,000	173	725	2,107	PR=0.9 (95% CI: 0.72, 1.13)	0.35	PR= (95% CI: 0.71, 1.11)
Ca	Any STH	atrine soil	20	23	34	11	88	PR=0.62 (95% CI: 0.43, 0.89)	0.01	PR= (95% CI: 0.45, 1.07)
Ca in	Any STH		0	31	3	52	86	Not estimated		Not estimated

Table S8.

Unadjusted and adjusted results by study, sample type, and aggregated variables for MST targets (any MST, any general MST, any human MST, any animal MST).

St	t	Targe	ample	Pos itive, Intervention	Neg ative, Intervention	P ositive, Control	N egative, Control	To tal observation s	Unadjus ted Prevalence Ratio	Un adjusted p-value	Ac ed Prevalence
Ca in	MST Marker	Any	ny sample	20	0	3 2	5	57	PR=1.16 (95% CI: 1.02, 1.32)	0.0 3	PF 6 (95% CI: 1 1.32)
Ho 1	MST Marker	Any	ny sample	41	28	4 4	1 7	13 0	PR=0.82 (95% CI: 0.62, 1.09)	0.1 8	PF 6 (95% CI: 0 1.13)
Fu	MST Marker	Any	ny sample	421	26	4 38	2 9	91 4	PR=1 (95% CI: 0.97, 1.04)	0.8	PF 1 (95% CI: 0 1.04)
Bo	MST Marker	Any	ny sample	220	28	2 22	2 7	49 7	PR=0.99 (95% CI: 0.93, 1.06)	0.8 8	PF 9 (95% CI: 0 1.06)
O s	MST Marker	Any	ny sample	30	0	2 8	2	60	Not estimated		
Ho 1	MST Marker	Any	ource water	1	21	0	1 9	41	Not estimated		No estimated
O s	MST Marker	Any	ource water	30	0	2 8	2	60	Not estimated		
Ho 1	MST Marker	Any	tored water	9	39	6	4 0	94	PR=1.44 (95% CI: 0.51, 4.08)	0.5	PF 4 (95% CI: 0 4.08)
Fu	MST Marker	Any	tored water	230	119	2 56	1 19	72 4	PR=0.97 (95% CI: 0.87, 1.07)	0.5 2	PF 7 (95% CI: 0 1.08)
Bo	MST Marker	Any	tored water	57	188	8 2	1 64	49 1	PR=0.7 (95% CI: 0.51, 0.96)	0.0 3	PF 9 (95% CI: 0 0.95)
Ho 1	MST Marker	Any	ouse soil	21	18	2 6	1 8	83	PR=0.91 (95% CI: 0.6, 1.38)	0.6 6	PF 9 (95% CI: 0 1.28)
Fu	MST Marker	Any	ouse soil	283	38	2 97	3 6	65 4	PR=0.99 (95% CI: 0.93, 1.05)	0.7	PF 9 (95% CI: 0 1.05)
Bo	MST Marker	Any	ouse soil	180	67	1 87	6 2	49 6	PR=0.97 (95% CI: 0.87, 1.08)	0.5 9	PF 7 (95% CI: 0 1.08)
Ho 1	MST Marker	Any	atrine soil	21	9	2 2	8	60	PR=0.95 (95% CI: 0.69, 1.32)	0.7 8	PF 5 (95% CI: 0 1.32)
Ca in	MST Marker	Any		27	4	4 2	1 3	86	PR=1.14 (95% CI: 0.93, 1.39)	0.2	PF 4 (95% CI: 0 1.39)
Fu	MST Marker	Any		174	11	1 82	1	36 8	PR=0.95 (95% CI: 0.91, 0.98)	0.0 1	PF 5 (95% CI: 0 0.98)

Table S8.

Unadjusted and adjusted results by study, sample type, and aggregated variables for MST targets (any MST, any general MST, any human MST, any animal MST).

St	t	Targe	ample	Pos itive, Intervention	Neg ative, Intervention	P ositive, Control	N egative, Control	To tal observation s	Unadjus ted Prevalence Ratio	Un adjusted p-value	Ad ed Prevalence
Fu		Any MST Marker		346	14	3 59	9	72 8	PR=0.99 (95% CI: 0.96, 1.01)	6	0.2	PF 9 (95% CI: 0 1.01)
Bo		Any MST Marker		145	102	1 48	9 8	49 3	PR=0.98 (95% CI: 0.82, 1.16)	8	0.7	PF 7 (95% CI: 0 1.15)
Ca in		Any human MST Marker	ny sample	17	3	3 0	7	57	PR=1.05 (95% CI: 0.82, 1.34)	1	0.7	PF 5 (95% CI: 0 1.34)
Ho 1		Any human MST Marker	ny sample	41	28	4 3	1 8	13 0	PR=0.84 (95% CI: 0.63, 1.12)	4	0.2	PF 9 (95% CI: 0 1.18)
Fu		Any human MST Marker	ny sample	124	313	1 33	3 30	90 0	PR=0.99 (95% CI: 0.8, 1.22)	1	0.9	PF 1 (95% CI: 0 1.25)
Bo		Any human MST Marker	ny sample	26	222	2 6	2 23	49 7	PR=1 (95% CI: 0.57, 1.75)	9	0.9	PF (95% CI: 0.5 1.76)
O 6		Any human MST Marker	ny sample	22	8	2 1	9	60	PR=1.05 (95% CI: 0.76, 1.45)	8	0.7	
Ho 1		Any human MST Marker	ource water	1	21	0	1 9	41	Not estimated			No estimated
O 6		Any human MST Marker	ource water	22	8	2 1	9	60	PR=1.05 (95% CI: 0.76, 1.45)	8	0.7	
Ho 1		Any human MST Marker	tored water	9	39	5	4 1	94	PR=1.72 (95% CI: 0.57, 5.18)	3	0.3	PF 2 (95% CI: 0 5.18)
Fu		Any human MST Marker	tored water	5	310	1 2	3 24	65 1	PR=0.44 (95% CI: 0.16, 1.23)	2	0.1	PF 4 (95% CI: 0 1.23)
Bo		Any human MST Marker	tored water	0	245	0	2 46	49 1	Not estimated			No estimated
Ho 1		Any human MST Marker	ouse soil	20	19	2 6	1 8	83	PR=0.87 (95% CI: 0.57, 1.32)		0.5	PF 6 (95% CI: 0 1.24)
Fu		Any human MST Marker	ouse soil	68	243	5 9	2 61	63 1	PR=1.19 (95% CI: 0.87, 1.61)	8	0.2	PF 4 (95% CI: 0 1.7)
Bo		Any human MST Marker	ouse soil	21	226	2 3	2 26	49 6	PR=0.92 (95% CI: 0.5, 1.71)	9	0.7	PF 4 (95% CI: 0 1.75)
Ho 1		Any human MST Marker	atrine soil	21	9	2 2	8	60	PR=0.95 (95% CI: 0.69, 1.32)	8	0.7	PF 5 (95% CI: 0 1.32)

Table S8.

Unadjusted and adjusted results by study, sample type, and aggregated variables for MST targets (any MST, any general MST, any human MST, any animal MST).

St	t	Targe	ample	Pos itive, Intervention	Neg ative, Intervention	P ositive, Control	N egative, Control	To tal observation s	Unadjus ted Prevalence Ratio	Un adjusted p-value	Ac ed Prevalence
Ca in	Any human MST Marker			24	7	3 8	1 7	86	PR=1.12 (95% CI: 0.83, 1.51)	6	0.4 PF 2 (95% CI: 0 1.41)
Fu	Any human MST Marker			30	142	4 4	1 22	33 8	PR=0.66 (95% CI: 0.44, 0.99)	4	0.0 PF 2 (95% CI: 0 1.07)
Fu	Any human MST Marker			58	268	6 0	2 65	65 1	PR=0.96 (95% CI: 0.68, 1.37)	4	0.8 PF 6 (95% CI: 0 1.35)
Bo	Any human MST Marker			7	240	5	2 41	49 3	PR=1.39 (95% CI: 0.46, 4.2)	6	0.5 PF 9 (95% CI: 0 4.2)
Ca in	Any animal MST Marker		ny sample	12	8	1 7	2 0	57	PR=1.31 (95% CI: 0.78, 2.17)		0.3 PF (95% CI: 0.7 1.99)
Ho 1	Any animal MST Marker		ny sample	3	66	2	5 9	13 0	PR=1.33 (95% CI: 0.18, 9.59)	8	0.7 PF 3 (95% CI: 0 9.59)
Fu	Any animal MST Marker		ny sample	419	26	4 37	2 8	91 0	PR=1 (95% CI: 0.97, 1.04)	1	0.9 PF (95% CI: 0.9 1.04)
Bo	Any animal MST Marker		ny sample	219	29	2 21	2 8	49 7	PR=0.99 (95% CI: 0.93, 1.06)	8	0.8 PF 9 (95% CI: 0 1.06)
O 6	Any animal MST Marker		ny sample	28	2	2 7	3	60	PR=1.04 (95% CI: 0.89, 1.21)	5	0.6
Ho 1	Any animal MST Marker		ource water	0	22	0	1 9	41	Not estimated		No estimated
O 6	Any animal MST Marker		ource water	28	2	2 7	3	60	PR=1.04 (95% CI: 0.89, 1.21)	5	0.6
Ho 1	Any animal MST Marker		tored water	0	48	1	4 5	94	Not estimated		No estimated
Fu	Any animal MST Marker		tored water	229	113	2 53	1 09	70 4	PR=0.96 (95% CI: 0.86, 1.07)	3	0.4 PF 7 (95% CI: 0 1.08)
Bo	Any animal MST Marker		tored water	57	188	8 2	1 64	49 1	PR=0.7 (95% CI: 0.51, 0.96)	3	0.0 PF 9 (95% CI: 0 0.95)
Ho 1	Any animal MST Marker		ouse soil	2	37	1	4 3	83	Not estimated		No estimated
Fu	Any animal MST Marker		ouse soil	281	30	2 91	2 9	63 1	PR=0.99 (95% CI: 0.94, 1.05)	2	0.8 PF 9 (95% CI: 0 1.04)

Table S8.

Unadjusted and adjusted results by study, sample type, and aggregated variables for MST targets (any MST, any general MST, any human MST, any animal MST).

St	Target	ample	Positive, Intervention	Negative, Intervention	Positive, Control	Negative, Control	Total observations	Unadjusted Prevalence Ratio	Unadjusted p-value	Ad Prevalence
Bo	Any animal MST Marker	ouse soil	178	69	186	63	496	PR=0.96 (95% CI: 0.86, 1.08)	0.53	PR 6 (95% CI: 0 1.08)
Ho 1	Any animal MST Marker	atrine soil	2	28	0	30	60	Not estimated		No estimated
Ca in	Any animal MST Marker		12	19	18	37	86	PR=1.18 (95% CI: 0.7, 2)	0.53	PR 3 (95% CI: 0 2.86)
Fu	Any animal MST Marker		174	8	182	1	365	PR=0.96 (95% CI: 0.93, 1)	0.03	PR 6 (95% CI: 0 1)
Fu	Any animal MST Marker		344	15	358	9	726	PR=0.98 (95% CI: 0.96, 1.01)	0.17	PR 8 (95% CI: 0 1.01)
Bo	Any animal MST Marker		144	103	147	99	493	PR=0.98 (95% CI: 0.82, 1.16)	0.78	PR 7 (95% CI: 0 1.15)

Table S9.

Baseline covariates by study. Note that Odigari et al. 2016 is not included as data shared from this study were fro village water sources and did not have associated covariates from individual households; therefore all estimates

.	m 2016	Boeh	eese 2017	R	einbaum 2019	St	meister 2020	Fuhr	olcomb 2021	H	apone 2021	C	ne 2022 in prep.	Capo	ng 2021	Kwo
Number of rooms in the household																
Household wealth																
Low	125 (25.2%)		2 8 (11.6%)		86 1 (40.9%)		153 (25.6%)		4 5 (27.6%)		2 2 (25.0%)		14 (24.6%)		355 (25.4%)	
Medium-low	124 (24.9%)		5 1 (21.1%)		43 9 (20.8%)		145 (24.3%)		4 6 (28.2%)		2 3 (26.1%)		18 (31.6%)		343 (24.6%)	
Medium-high	125 (25.2%)		3 9 (16.1%)		40 2 (19.1%)		147 (24.6%)		3 5 (21.5%)		2 2 (25.0%)		12 (21.1%)		351 (25.1%)	
High	123 (24.7%)		6 5 (26.9%)		40 3 (19.1%)		152 (25.5%)		3 7 (22.7%)		2 1 (23.9%)		13 (22.8%)		347 (24.9%)	
Missing	0 (0%)		5 9 (24.4%)		2 (0.1%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)	
Number of people in the household																
<5	271 (54.5%)		1 7 (7.0%)		61 2 (29.0%)		335 (56.1%)		3 8 (23.3%)		0 (0%)		0 (0%)		783 (56.1%)	
5-8	199 (40.0%)		1 71 (70.7%)		11 49 (54.5%)		224 (37.5%)		4 4 (27.0%)		7 (8.0%)		3 (5.3%)		528 (37.8%)	
5-8	199 (40.0%)		1 71 (70.7%)		11 49 (54.5%)		224 (37.5%)		4 4 (27.0%)		7 (8.0%)		3 (5.3%)		528 (37.8%)	
>8	27 (5.4%)		5 4 (22.3%)		24 5 (11.6%)		38 (6.4%)		8 1 (49.7%)		8 1 (92.0%)		54 (94.7%)		85 (6.1%)	
Missing	0 (0%)		0 (0%)		10 1 (4.8%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)	
Number of rooms in the household																
1-2	0 (0%)		0 (0%)		0 (0%)		0 (0%)		9 8 (60.1%)		6 1 (69.3%)		41 (71.9%)		0 (0%)	
>3	0 (0%)		0 (0%)		0 (0%)		0 (0%)		6 5 (39.9%)		2 7 (30.7%)		16 (28.1%)		0 (0%)	
Missing	497 (100%)		2 42 (100%)		21 07 (100%)		597 (100%)		0 (0%)		0 (0%)		0 (0%)		1396 (100%)	
Improved roof																
0	8 (1.6%)		0 (0%)		69 3 (32.9%)		8 (1.3%)		0 (0%)		0 (0%)		0 (0%)		23 (1.6%)	

Table S9.

Baseline covariates by study. Note that Odigari et al. 2016 is not included as data shared from this study were fro village water sources and did not have associated covariates from individual households; therefore all estimates

.	m 2016	Boeh	eese 2017	R	einbaum 2019	St	meister 2020	Fuhr	olcomb 2021	H	apone 2021	C	ne 2022 in prep.	Capo	ng 2021	Kwo
1	(98.4%)	489	(0%)	0	14 (67.1%)	14	(98.7%)	589	(0%)	0	(0%)	0	0 (0%)		(98.4%)	1373
Missing	(0%)	0	42 (100%)	2	(0%)	0	(0%)	0	63 (100%)	1	8 (100%)	8	(100%)	57	(0%)	0
Father in agriculture																
0	(66.8%)	332	26 (52.1%)	1	(0%)	0	(70.2%)	419	(0%)	0	(0%)	0	0 (0%)		(68.2%)	952
1	(33.2%)	165	9 (36.8%)	8	(0%)	0	(29.8%)	178	(0%)	0	(0%)	0	0 (0%)		(31.8%)	444
Missing	(0%)	0	7 (11.2%)	2	07 (100%)	21	(0%)	0	63 (100%)	1	8 (100%)	8	(100%)	57	(0%)	0
Land owned																
0	(0%)	0	7 (40.1%)	9	(0%)	0	(0%)	0	(0%)	0	(0%)	0	0 (0%)		(0%)	0
1	(0%)	0	17 (48.3%)	1	(0%)	0	(0%)	0	(0%)	0	(0%)	0	0 (0%)		(0%)	0
Missing	(100%)	497	8 (11.6%)	2	07 (100%)	21	(100%)	597	63 (100%)	1	8 (100%)	8	(100%)	57	(100%)	1396
Acres of land owned																
Mean (SD)	(0.128)	0.110	issing	M	ssing	Mi	(0.206)	0.150	issing	M	issing	M	g	Missin	(0.212)	0.142
Median [Min, Max]	0 [0.0100, 1.23]	0.070	issing	M	ssing	Mi	0 [0.0100, 2.10]	0.080	issing	M	issing	M	g	Missin	0 [0.0100, 3.15]	0.080
Missing	(2.6%)	13	42 (100%)	2	07 (100%)	21	(3.5%)	21	63 (100%)	1	8 (100%)	8	(100%)	57	(4.4%)	62
Maternal education																
No education	(17.1%)	85	(0%)	0	(0%)	0	(14.4%)	86	(3.7%)	6	(0%)	0	0 (0%)		(14.8%)	207
Incomplete Primary	(0%)	0	3 (34.3%)	8	95 (52.0%)	10	(0%)	0	8 (23.3%)	3	(0%)	0	0 (0%)		(0%)	0
Primary	(36.2%)	180	0 (12.4%)	3	1 (24.3%)	51	(30.7%)	183	4 (8.6%)	1	(0%)	0	0 (0%)		(32.2%)	449
Secondary	(46.7%)	232	0 (28.9%)	7	9 (23.7%)	49	(54.9%)	328	1 (25.2%)	4	(0%)	0	0 (0%)		(53.0%)	740
More than secondary	(0%)	0	1 (4.5%)	1	(0%)	0	(0%)	0	(0%)	0	(0%)	0	0 (0%)		(0%)	0

Table S9.

Baseline covariates by study. Note that Odigari et al. 2016 is not included as data shared from this study were fro village water sources and did not have associated covariates from individual households; therefore all estimates

.	m 2016	Boeh	eese 2017	R	einbaum 2019	St	meister 2020	Fuhr	olcomb 2021	H	apone 2021	C	ne 2022 in prep.	Capo	ng 2021	Kwo
	Missing	0 (0%)		4 8 (19.8%)		2 (0.1%)		0 (0%)		6 4 (39.3%)		8 8 (100%)		57 (100%)		0 (0%)
age	Maternal															
	Mean (SD)	23.7 (5.18)		M issing		26 .4 (6.32)		23.7 (5.08)		M issing		M issing		Missin g		24.0 (5.03)
Max]	Median [Min,	23.0 [15.0, 42.0]		M issing		25 .5 [14.9, 47.9]		23.0 [15.0, 41.0]		M issing		M issing		Missin g		24.0 [15.0, 43.0]
	Missing	0 (0%)		2 42 (100%)		11 (0.5%)		0 (0%)		1 63 (100%)		8 8 (100%)		57 (100%)		2 (0.1%)
	Improved wall															
	0	78 (15.7%)		0 (0%)		20 19 (95.8%)		197 (33.0%)		4 1 (25.2%)		1 6 (18.2%)		10 (17.5%)		369 (26.4%)
	1	419 (84.3%)		0 (0%)		88 (4.2%)		400 (67.0%)		1 22 (74.8%)		7 2 (81.8%)		47 (82.5%)		1027 (73.6%)
	Missing	0 (0%)		2 42 (100%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)
	Improved floor															
	0	461 (92.8%)		0 (0%)		19 99 (94.9%)		524 (87.8%)		4 (2.5%)		1 (1.1%)		1 (1.8%)		1253 (89.8%)
	1	36 (7.2%)		0 (0%)		10 8 (5.1%)		73 (12.2%)		1 59 (97.5%)		8 7 (98.9%)		56 (98.2%)		143 (10.2%)
	Missing	0 (0%)		2 42 (100%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)
	Electricity															
	0	234 (47.1%)		3 4 (14.0%)		19 58 (92.9%)		246 (41.2%)		3 (1.8%)		4 (4.5%)		2 (3.5%)		584 (41.8%)
	1	263 (52.9%)		2 02 (83.5%)		14 7 (7.0%)		351 (58.8%)		1 60 (98.2%)		8 4 (95.5%)		55 (96.5%)		812 (58.2%)
	Missing	0 (0%)		6 (2.5%)		2 (0.1%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)
ownership	Animal															
	Mean (SD)	0.956 (0.206)		0 .423 (0.495)		0. 899 (0.302)		0.955 (0.208)		0 .896 (0.307)		0 .966 (0.183)		0.982 (0.132)		0.968 (0.177)

Table S9.

Baseline covariates by study. Note that Odigari et al. 2016 is not included as data shared from this study were fro
village water sources and did not have associated covariates from individual households; therefore all estimates

.	m 2016	Boeh	eese 2017	R	einbaum 2019	St	meister 2020	Fuhr	olcomb 2021	H	apone 2021	C	ne 2022 in prep.	Capo	ng 2021	Kwo
Median [Min, Max]	[0, 1.00]	1.00	[0, 1.00]	0	00 [0, 1.00]	1.	[0, 1.00]	1.00	.00 [0, 1.00]	1	.00 [0, 1.00]	1	[0, 1.00]	1.00	[0, 1.00]	1.00
Missing	(0.2%)	1	9 (12.0%)	2	(0%)	0	(0.2%)	1	(0%)	0	(0%)	0	0 (0%)		(0.1%)	1