

Study	Year	Design	Evidence role	Assessment tool	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11	Overall judgement	Key strengths	Main limitations	Interpretive weight	Source file
Adebayo et al.		2020 Cross-sectional cohort analysis	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	Y	Y	Y	N				Low concerns	Large community cohort, standardized sequencing and multivariable analyses.	Prior UTI and clinical exposures were partly history-based; cross-sectional data cannot establish temporality.	Association only	Adebayo2020
Adu-Oppong et al.	2022	Mixed cross-sectional/longitudinal observational	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Clearly described symptomatic and asymptomatic cohorts; standardized metagenomic and culture methods.	Convenience clinical specimens and limited control of confounding; group overlap limits causal interpretation.	Association only	Adu-Oppong2022
Anglin et al.	2020	Prospective nonrandomized pre/post study	Interventional, nonrandomized	JSI Quasi-Experimental	Y	Y	Y	N	Y	U	Y	Y	Y			Some concerns	Prospective sampling before and after local estrogen with consistent laboratory methods.	No untreated concurrent control, small cohort, and incomplete follow-up create selection and confounding concerns.	Association only	Anglin2022
Bradley et al.	2022	Prospective longitudinal cohort	Longitudinal/prognostic	JSI Cohort	Y	Y	Y	Y	Y	A	Y	Y	N	N	Y	Some concerns	Prospective serial sampling with validated frailty/dementia measures and documented exposures.	Single nursing home, small cohort, and serial samples available for only a subset; attrition was not analytically addressed.	Greater temporal relevance; still observational	BradleyWard2022
Burnett et al.	2021	Cross-sectional	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Clear rUTI cohort, validated symptom questionnaire, and standardized paired urine cultures.	Single small cohort without a comparator and limited adjustment for confounding.	Association only	Burnett2021
Cepinja et al.	2021	Case series with mechanistic modeling	Mechanistic/hypothesis-generating	JSI Case Series	Y	Y	Y	U	U	Y	Y	Y	Y	Y		Some concerns	Defined cystitis population with standardized 16S sequencing and transparent modeling methods.	Small heterogeneous series; consecutive/complete inclusion unclear; longitudinal inference rests largely on one treated participant.	Hypothesis-generating	Cepinja2021
Chen et al.	2018	Longitudinal case series	Longitudinal/hypothesis-generating	JSI Case Series	Y	Y	Y	N	N	Y	Y	Y	Y	Y		Some concerns	Repeated sampling over two years with culture-independent profiling and strain typing.	The intensively followed subgroup comprised nine selected severe cases, limiting representativeness and generalizability.	Greater temporal relevance; still observational	Chen2018
Cheng et al.	2025	Cross-sectional comparative study	Mechanistic/hypothesis-generating	JSI Analytical Cross-Sectional	Y	Y	Y	Y	Y	Y	Y	N				Low concerns	Prespecified cohorts, detailed symptom characterization, and complementary culture/sequencing approaches.	Cross-sectional design and exploratory ecological analyses prevent causal conclusions.	Hypothesis-generating	Cheng2025
Hochstetler et al.	2022	Cross-sectional paired-specimen study	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Within-participant comparison of catheterized and voided specimens using standardized EQUIC.	Small symptomatic rUTI cohort and limited handling of confounding.	Association only	Hochstetler2022
Huang et al.	2022	Cross-sectional case-control study	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	Y	Y	Y	Y				Low concerns	Age-matched comparator group, defined rUTI criteria, standardized sequencing, and multivariable analyses.	Single-center cross-sectional design limits temporality and external validity.	Association only	Huang2022
Jiang et al.	2024	Cross-sectional case-control/diagnostic-model study	Associative/diagnostic exploratory	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	U	Y				Some concerns	Defined comparison groups with metagenomic analysis and reported discrimination metrics.	Confounding control was limited and the diagnostic model lacked independent external validation.	Hypothesis-generating	Jiang2024
Johnson et al.	2022	Cross-sectional human isolate study with ex vivo experiments	Mechanistic/hypothesis-generating	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Human isolates were linked to defined clinical cohorts and tested using reproducible laboratory assays.	Selection of isolates and limited confounder control restrict inference from ex vivo activity to clinical outcomes.	Hypothesis-generating	Johnson2022
Kelly et al.	2024	Cross-sectional	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Catheterized pediatric samples and species-level sequencing with clearly reported analyses.	Small convenience cohort, limited infant representation, antibiotic exposure, and no confounder adjustment.	Association only	Kelly2024
Neugent et al.	2023	Cross-sectional comparative study	Mechanistic/hypothesis-generating	JSI Analytical Cross-Sectional	Y	Y	Y	Y	Y	Y	Y	Y				Low concerns	Controlled postmenopausal cohort with quantitative biochemical measurements and prespecified clinical groups.	Single-time-point sampling precludes temporal or causal inference.	Hypothesis-generating	Neugent2023
Neugent et al.	2025	Cross-sectional biomarker-development study	Mechanistic/diagnostic exploratory	JSI Analytical Cross-Sectional	Y	Y	Y	Y	Y	Y	Y	N				Low concerns	Matched metagenomic-metabonomic data, defined groups, permutation testing, and internal cross-validation.	Biomarkers were derived and internally tested in the same cohort without independent external validation.	Hypothesis-generating	Neugent2025
Robino et al.	2024	Cross-sectional comparative study	Mechanistic/hypothesis-generating	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Defined symptomatic/asymptomatic groups and reproducible culture/correl methods.	Convenience recruitment, cross-sectional sampling, and limited adjustment for sex and other confounders.	Hypothesis-generating	Robino2024
Vaughan et al.	2021	Cross-sectional analysis of a longitudinal cohort	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	Y	Y	Y	Y				Low concerns	Defined comparison groups, catheterized sampling, and analyses of relevant clinical covariates.	Baseline cross-sectional analysis cannot establish whether microbiome differences preceded recurrence.	Association only	Vaughan2021
Vilko et al.	2022	Cross-sectional case-control study	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Sterile pediatric sampling with paired microbiome and metabolomic assays and defined clinical groups.	Pilot sample, multiple comparisons, and limited adjustment for treatment and disease-severity confounding.	Association only	Vilko2022
Yoo et al.	2021	Retrospective cross-sectional study	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Catheterized samples and consistent comparison of NCS with conventional culture.	Retrospective selection, small groups, and limited control of antibiotics and other confounders.	Association only	Yoo2021
Yoo et al.	2022	Retrospective cross-sectional human study	Associative, human component only	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Human groups and catheterized sequencing procedures were described; animal experiments were excluded from this appraisal.	Retrospective design, small Gardnerella-positive subgroup, selection bias, and limited confounder adjustment.	Association only	Yoo2022
Yoo et al.	2024	Retrospective cross-sectional study	Associative	JSI Analytical Cross-Sectional	Y	Y	Y	Y	N	N	Y	Y				Some concerns	Large clinical cohort with catheterized sampling and consistent NCS/culture procedures.	Retrospective selection and differential prior antibiotic/probiotic exposure were not fully controlled.	Association only	Yoo2024