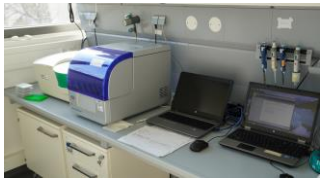
WASTEWATER-BASED EPIDEMIOLOGY FOR MONITORING COVID-19 AND ANTIMICROBIAL RESISTANCE: INSIGHTS FROM COMPREHENSIVE STUDIES

Johannes Ho, Claudia Stange, Andreas Tiehm

10th EU Town Hall | 17. November 2023 | Frankfurt

DVGW | TZW Technologiezentrum Wasser




Wastewater based Epidemiology SARS-CoV-2

BMBF funding no. 02WRS1557

Biomarker

Technische Universität München

DVGW

TZW Technologiezentrum Wasser

Blue Biolabs

NaWaM RiSKWa

GEFÖRDERT VOM Bundesministerium für Bildung und Forschung

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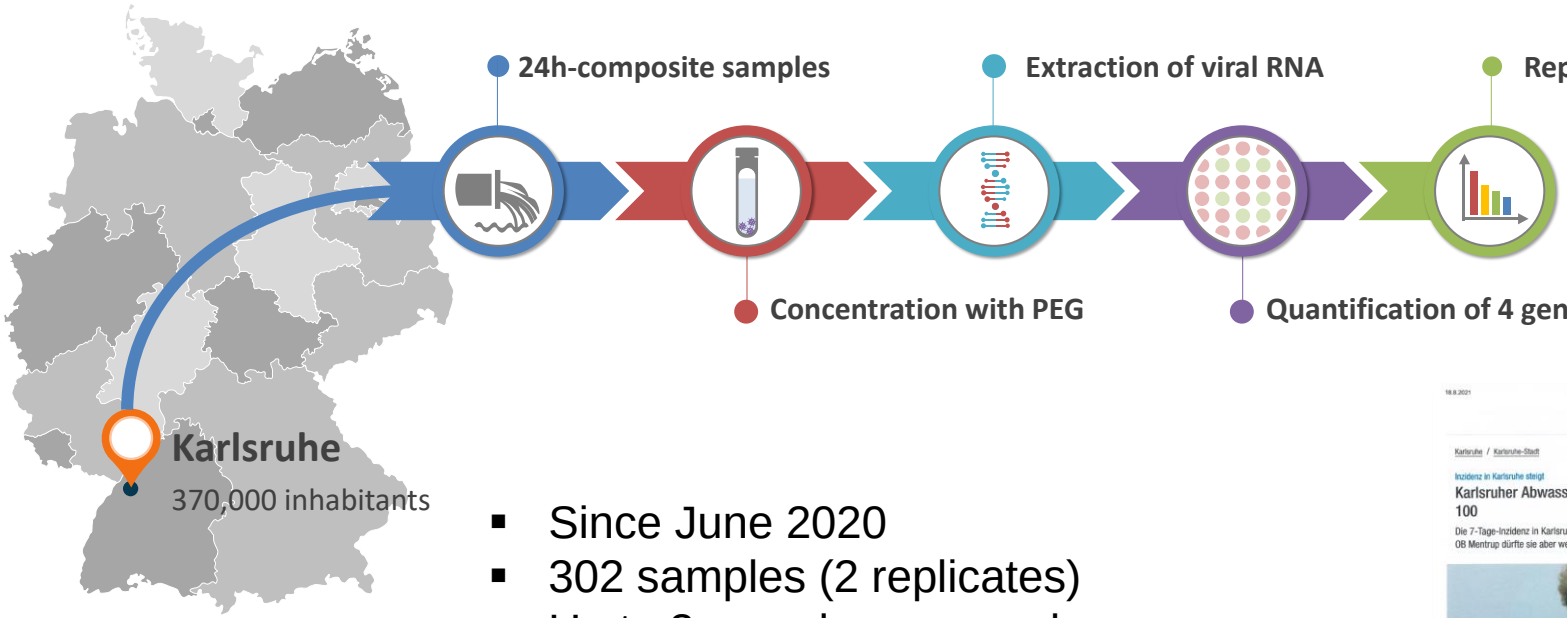
Timeline of SARS-CoV-2 Monitoring in Karlsruhe



- Since June 2020
- 302 samples (2 replicates)
- Up to 3 samples per week
- 3-4 Genes, PMMoV, CrAss (3,216 PCRs)
- results are reported to the city's crisis management team

NEUESTE NACHRICHTEN

Karlsruher Abwasserorakel prognostiziert baldige Inzidenz von 100

Die 7-Tage-Inzidenz in Karlsruhe steigt seit Tagen an und liegt aktuell bei 36,2. Nach Einschätzung von OB Mentrup dürfte sie aber weitaus höher liegen - und das hat Gründe.

Fordert eine Umkehr des Denkens: Karlsruhes Oberbürgermeister Frank Mentrup setzt in der Corona-Krise jetzt mehr Selbstverantwortung und eine eigene Risikoeinschätzung. Foto: Jörg Donecker

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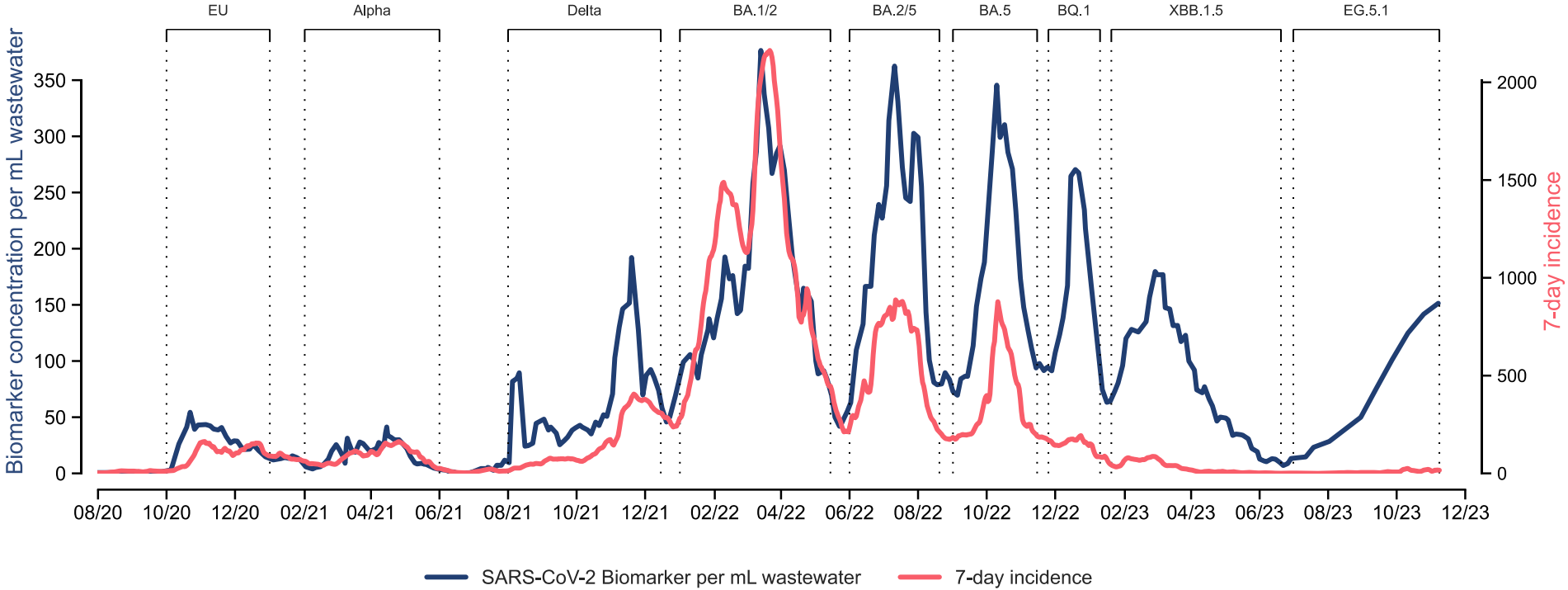

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Timeline of SARS-CoV-2 Monitoring in Karlsruhe

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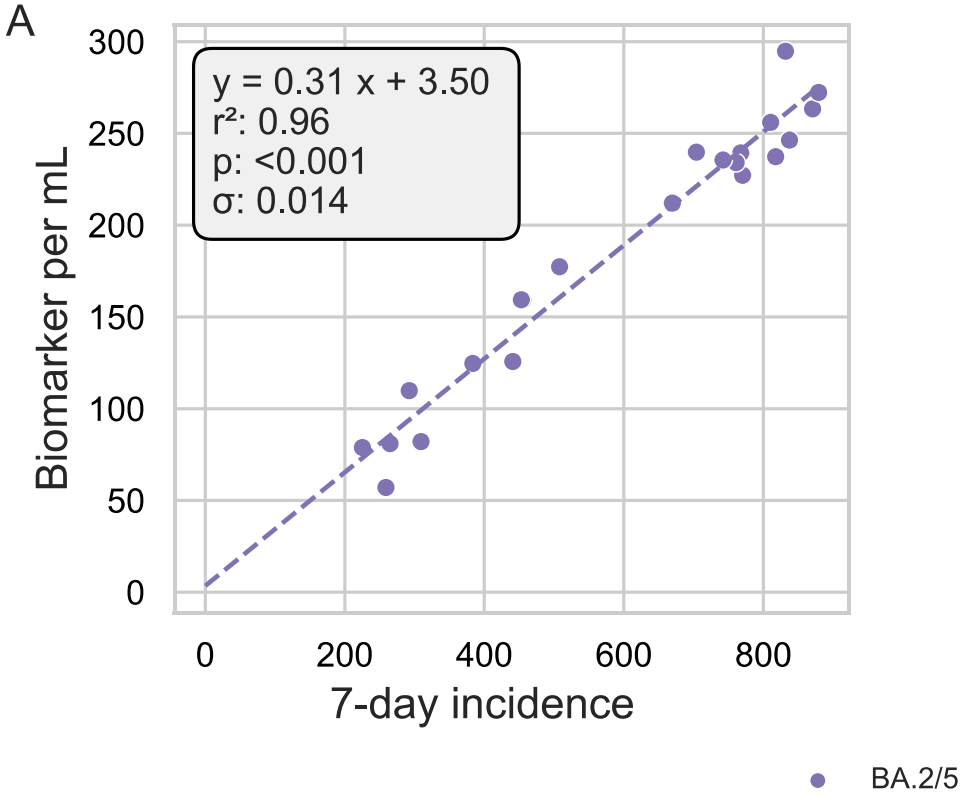

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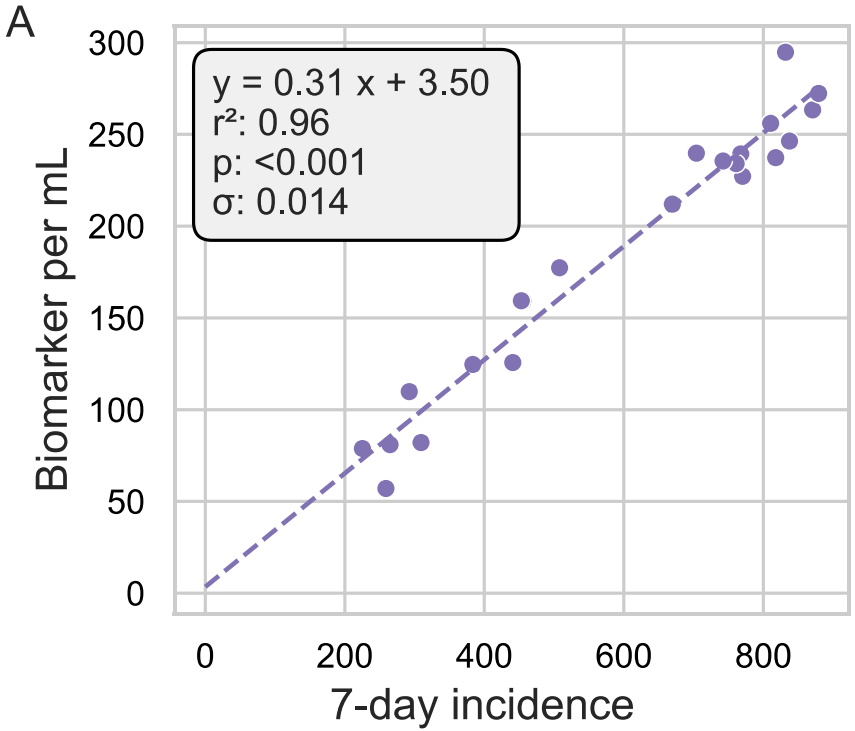

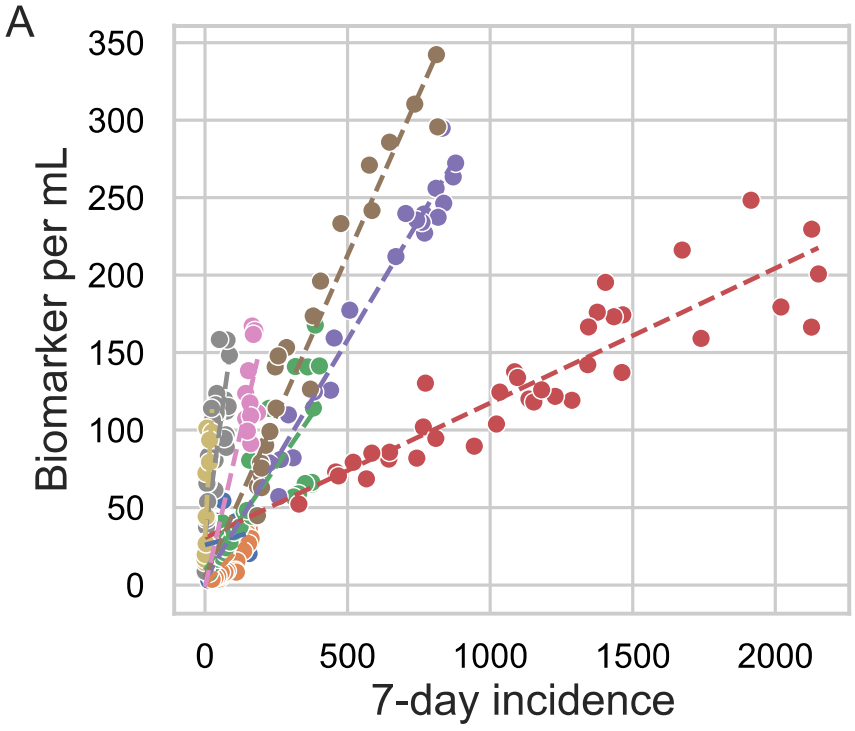

EU Alpha Delta BA.1/2 BA.2/5 BA.5 BQ.1 XBB.1.5 EG.5.1

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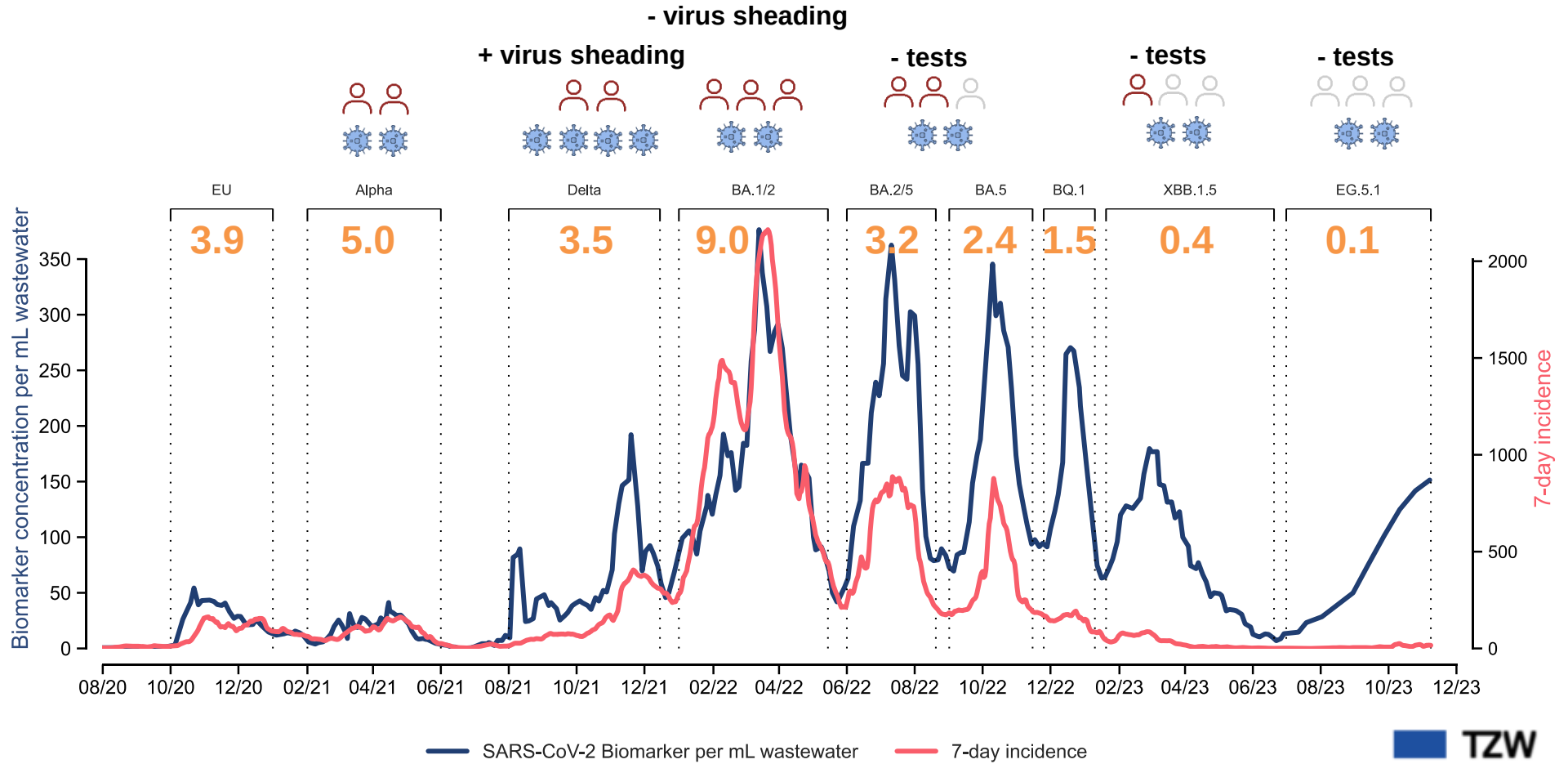
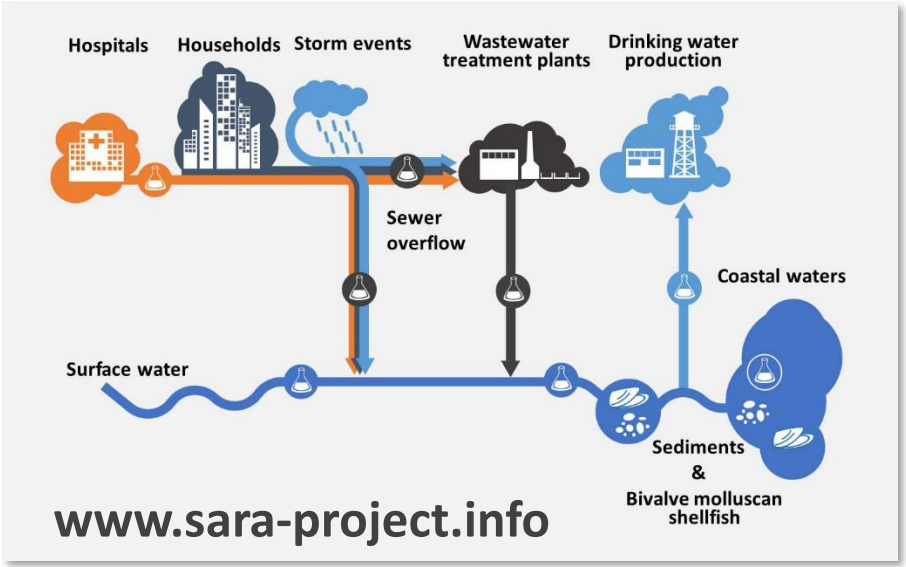







Surveillance of emerging pathogens and ARGs

Research Project SARA



SARA

Water JPI

jpiamr

JPI OCEANS

Aquatic Pollutants

GEFÖRDERT VOM

Bundesministerium für Bildung und Forschung

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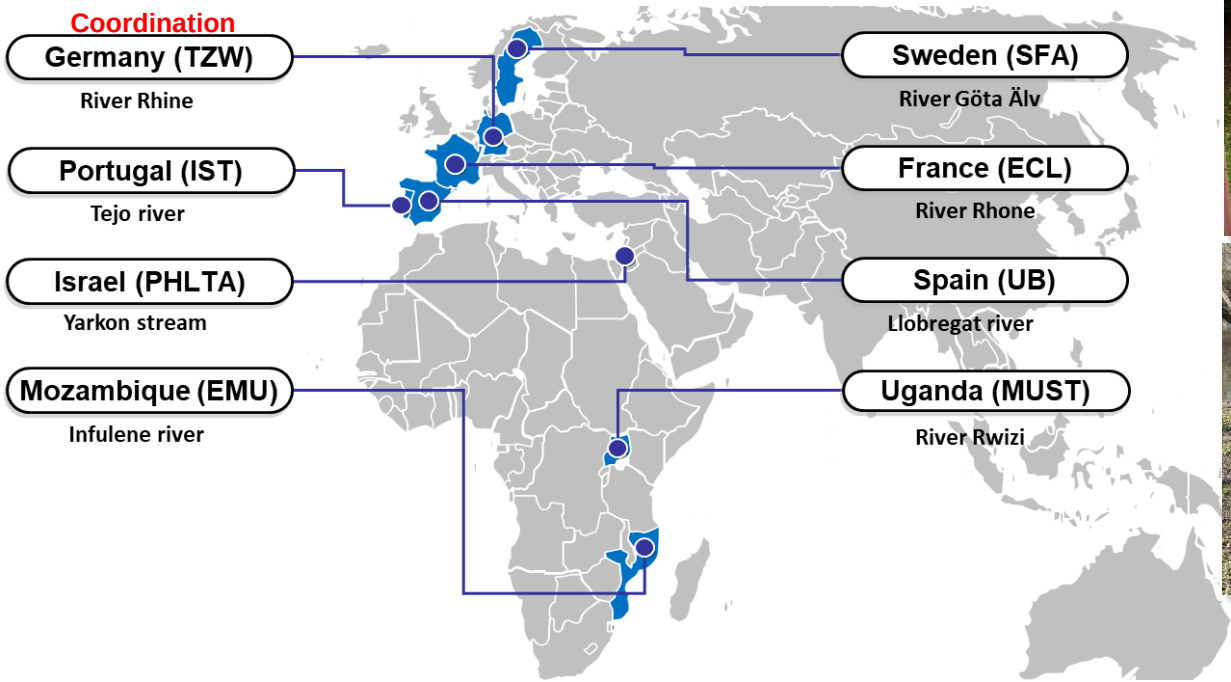
Research Project SARA

Surveillance of emerging pathogens and antibiotic resistances in aquatic ecosystems



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www.sara-project.info

Microbiological parameters

Culture

E. coli
ESBL-producing *E. coli*
Somatic coliphages
F-specific coliphages

DNA/RNA

Isolation of bacterial DNA
Isolation of viral DNA and RNA

Molecular based methods

SARS-CoV-2
Adenoviruses
Noroviruses
Hepatitis A and E virus
Enteroviruses
Microbial source tracking markers
CrAssphage
Antibiotic resistance genes
Metagenomics

Analyses are carried out promptly by
all partners
and have therefore been
Harmonized

→ **Booklet of methods**
available on SARA website
(www.sara-project.info)

Nucleic acid extracts are
exchanged
and
analyzed in specialized laboratories

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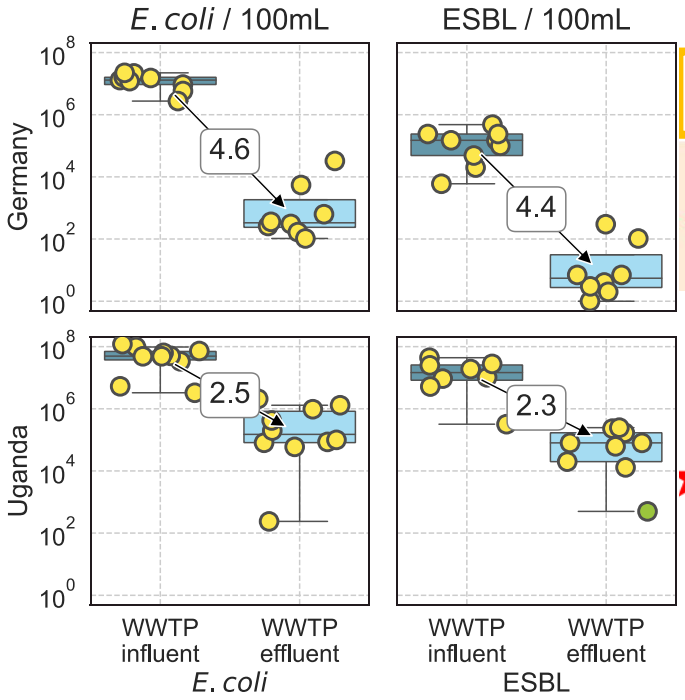
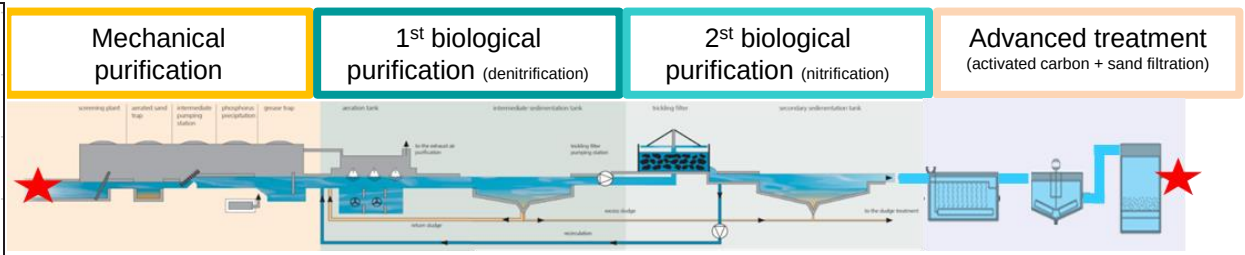
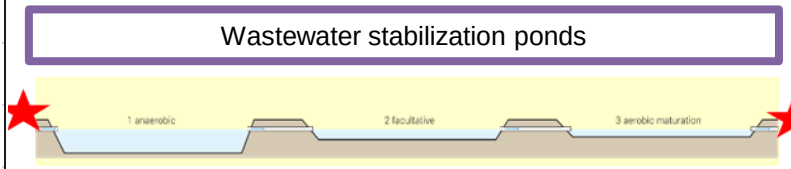
Antimicrobial resistance Analysis

Results for *E. coli* and ESBL *E. coli*



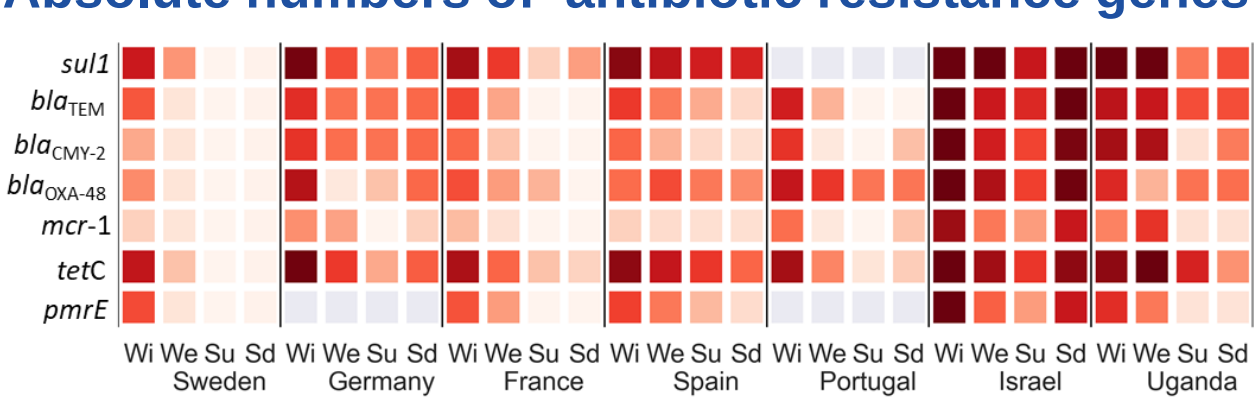




★ Sampling points

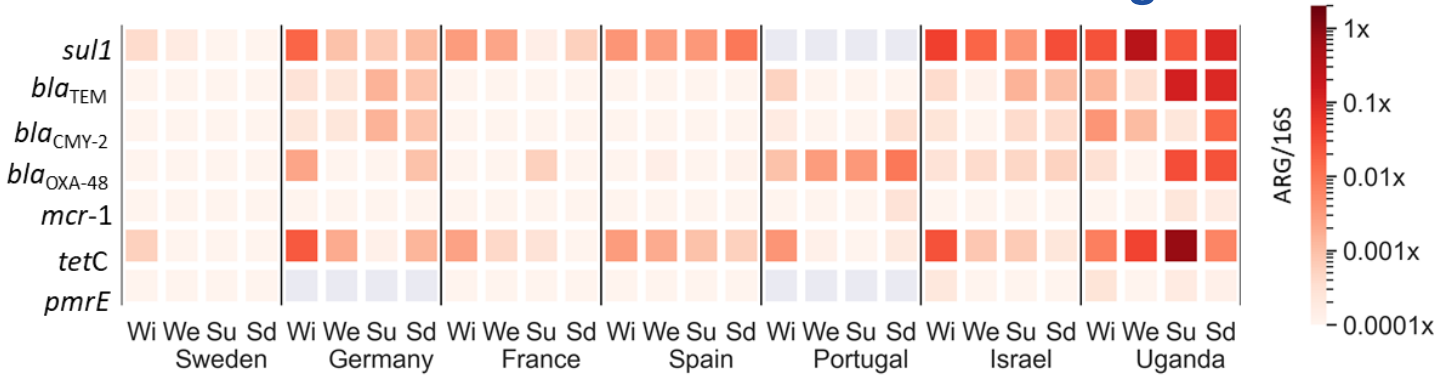
Antimicrobial resistance Analysis

Absolute numbers of antibiotic resistance genes



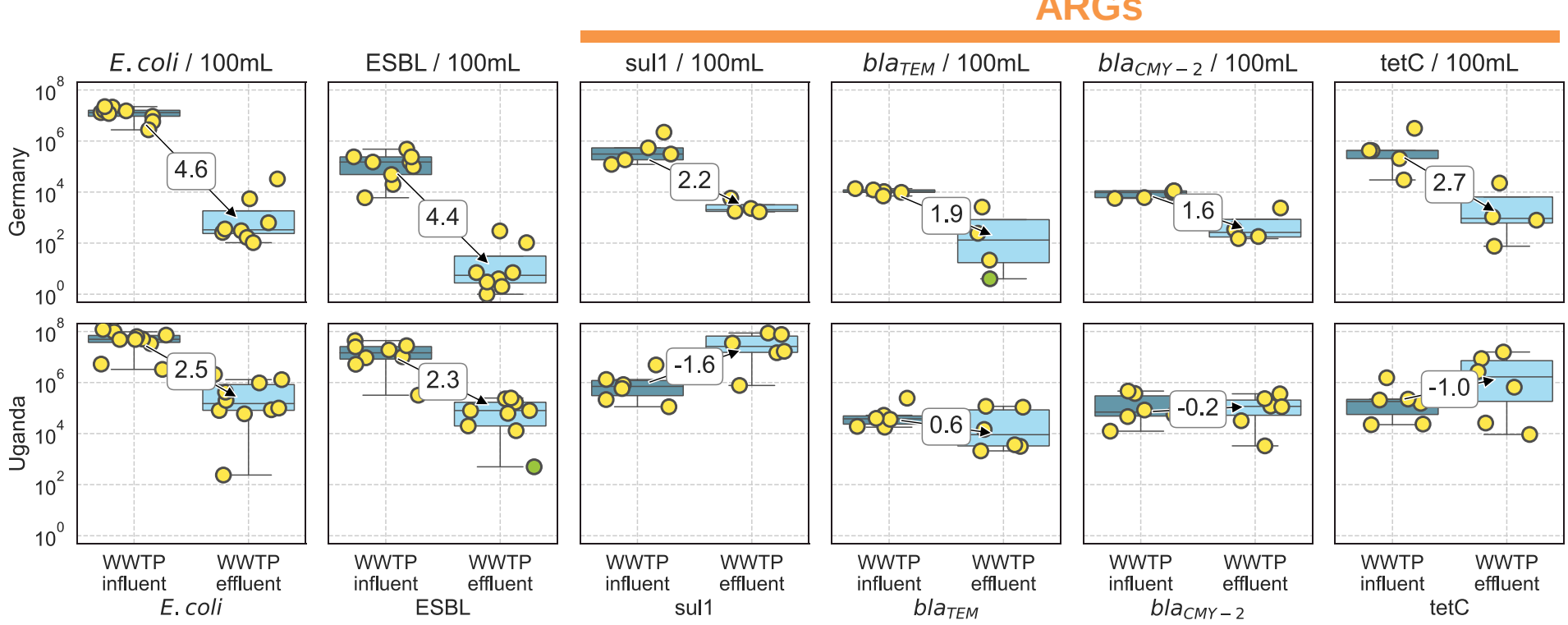
Wi: WWWTP influent
We WWTP effluent
Su: Surface water upstream
Sd: Surface water downstream

Relative abundance of antibiotic resistance genes



Antimicrobial resistance Analysis

LOG removal



Some more information

SARA

Project website

Detailed information | book of methods

www.sara-project.info

SARS-CoV-2 wastewater surveillance in Germany: Long-term RT-digital droplet PCR monitoring, suitability of primer/probe combinations and biomarker stability

Johannes Ho, Claudia Stange, Rabea Suhrborg, Christian Wurzbacher, Jörg E. Drewes, Andreas Tiehm

Wastewater-Based Epidemiology for SARS-CoV-2 Biomarkers: Evaluation of Normalization Methods in Small and Large Communities in Southern Germany

Alexander Mitranescu, Anna Uchaikina, Anna-Sonia Kau, Claudia Stange, Johannes Ho, Andreas Tiehm, Christian Wurzbacher, and Jörg E. Drewes

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THANK YOU FOR YOUR ATTENTION !

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