

Isala

citizen science on the vaginal microbiome

Camille Allonsius



What is the human microbiome?

Human microbiome = collection of microorganisms (bacteria, viruses, fungi, archaea, etc.) in and on the human body

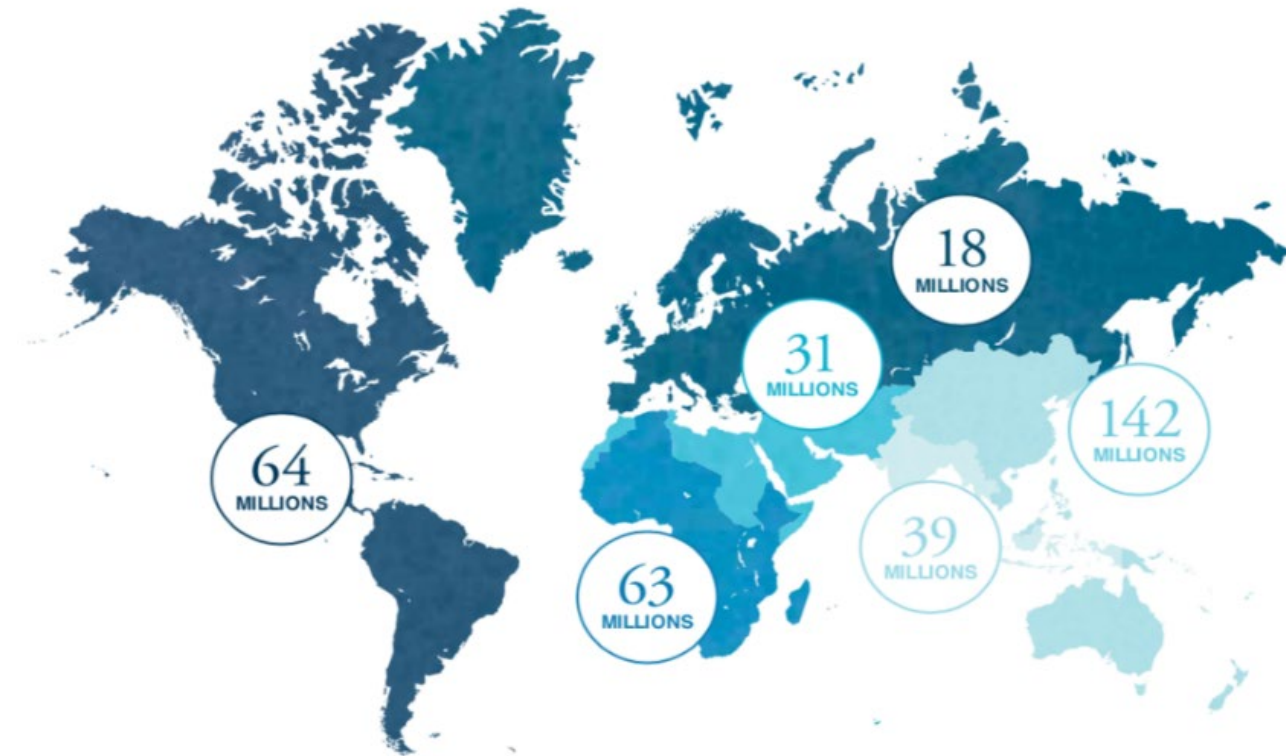


For 40 years no breakthroughs in the treatment of bladder and vaginal infections

- The vaginal microbiome is important for
 - Prevention of vaginal diseases
 - Successful fertilizations
 - Healthy pregnancies
- Also relevant for partners & children



→ Role for healthy vaginal microorganisms,
but more research is necessary



Frequency of vaginal infections ↗ ↗ (WHO)

The Isala project

■ Scientific goals

- Map the female microbiome & presence of lactobacilli in healthy women
- Correlate lifestyle & environment with the female microbiome
- Set up a large biobank with beneficial vaginal bacteria (lactobacilli) → LBPs, probiotics or related 'therapies'

■ Societal goals

- Break the taboo on vaginal health
- Stimulate women to co-create
- Empower women to take their health into their own hands
- Bring Women in Science more in the picture

**vrouwelijke
gezondheid
op de kaart**



#LetsSwab
isala.be

 Universiteit
Antwerpen

What is our story?

An activist, feminist and role model

A subtle yet taboo-breaking logo

Our inspiration ↘



Isala Van Diest
1842-1916



We got familiar with ethical and privacy regulations

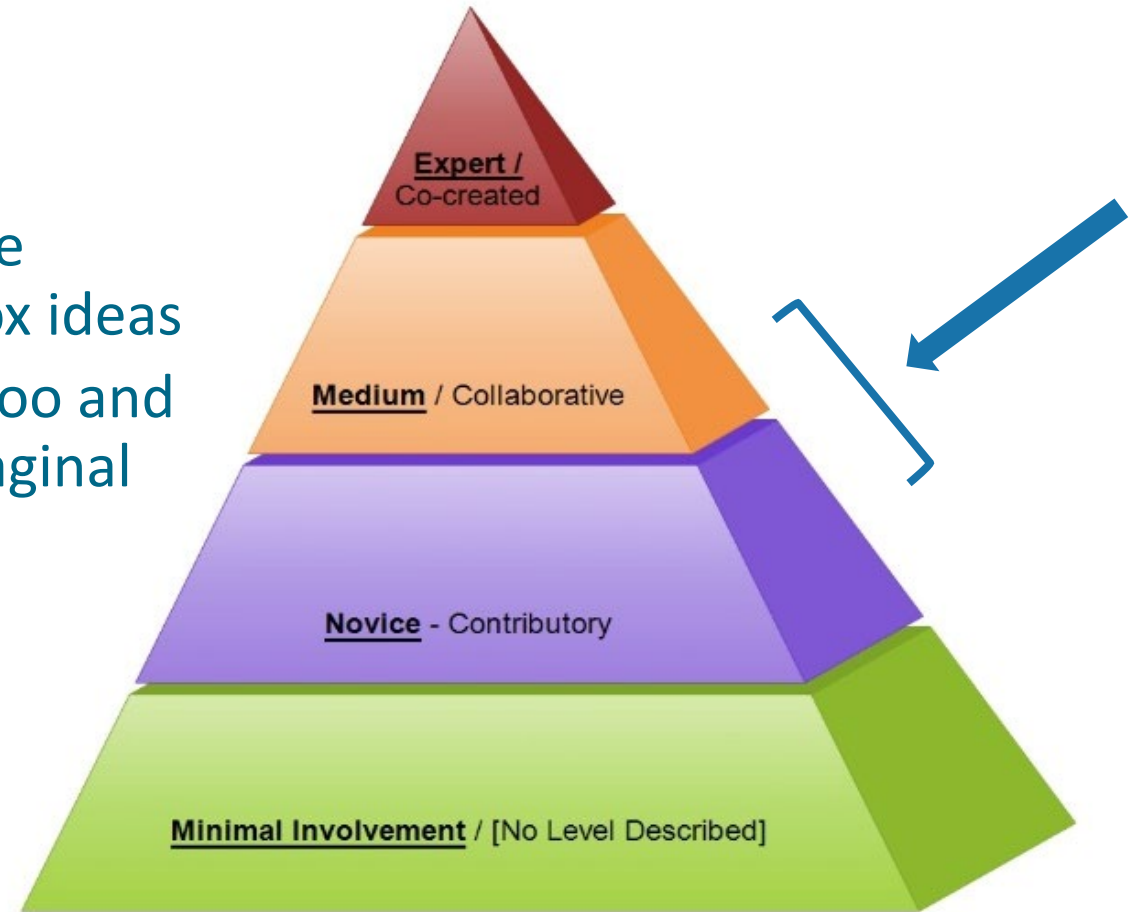
- Approval from our institute's Ethical Committee
- Data Protection Officer (DPO) for GDPR compliance
- We are legally obliged to store human samples in a Biobank



Isala's place in the citizen science pyramid

Participants + ambassadors

- Contributory role in providing creative research questions and out-of-the-box ideas
- Collaborative role in breaking the taboo and spreading scientific information on vaginal health



It takes a village

Advisory board



This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant agreement 852600 Lacto-Be0)

open science

Launch on the 24th of March, 2020



Vagina kan wetenschap vooruithelpen: UAntwerpen zoekt 200 vrouwen voor intiem onderzoek



Flanders
State of the Art

Down there: Women respond enthusiastically to vagina study

Maandag 20/04/2020
DeMorgen.

Tweehonderd vagina's gezocht in Antwerpen

Libelle**mama**

De universiteit van Antwerpen zoekt 200 vrouwen voor een grootschalig vagina-onderzoek



UAntwerpen zoekt 200 vrouwen voor onderzoek naar vaginale gezondheid
Een staaltje van de intieme zone om ziektes beter te kunnen behandelen

dS De
Standaard

Bizar hoe weinig we weten over
vaginale gezondheid

Knack

Biedt het vaginaal microbioom mogelijkheden tegen virale infecties?

**MAISON
SLASH**

[Onderbroekenlol] Jouw vagina voor de wetenschap!

studentenblad Universiteit Antwerpen
dwars

een echt kutproject
vaginale gezondheid op de kaart



Help jij de wetenschap vooruit met ... jouw vagina?

eos
WETENSCHAP



200 vagina's gezocht voor wetenschappelijk onderzoek: vrouwelijke wetenschappers lanceren project 'Isala'

Hoe jouw vagina de wetenschap vooruit kan helpen



Logistic challenge

Practical & technical preparations

- Brainstorms + advisory board
- Ethical Committee approval (GDPR)
- Communication plan
- Funding applications
- Website: <https://isala.be/en>
- Experimental optimization



Launch
March 2020
call for 200



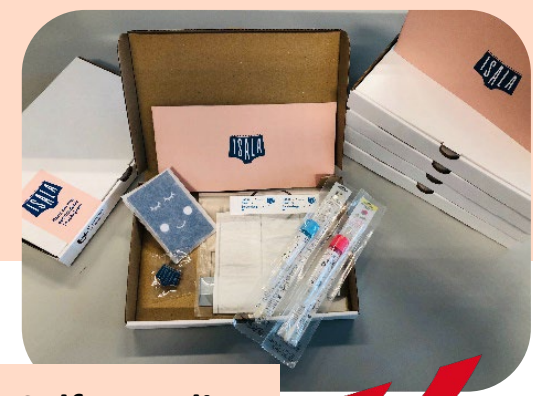
Recruitment
5528 in 10 days



Press
release



Online survey
>4600



**Self-sampling
kit - 3345**



Vaginal
microbiome
profiles

Vaginal
isolates



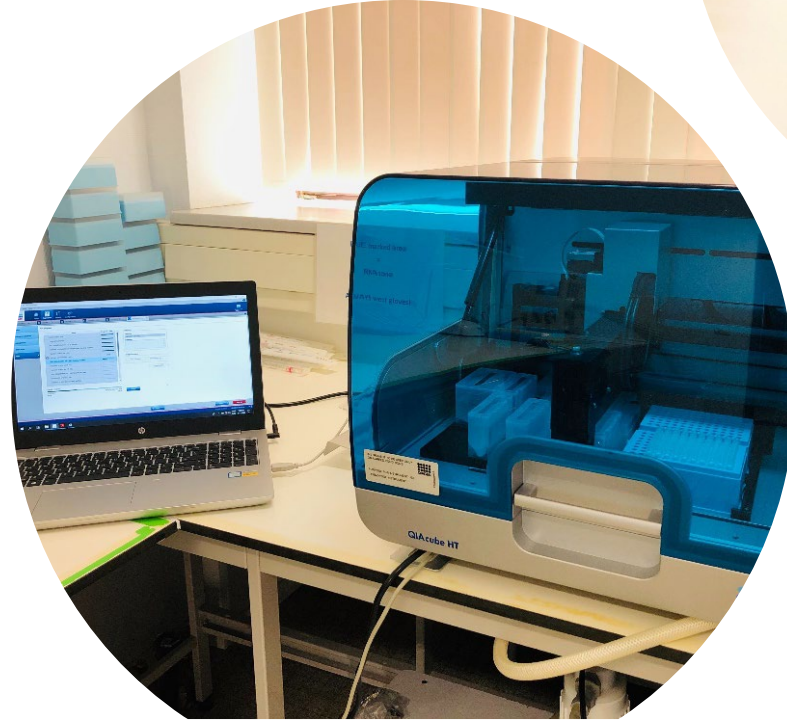
16S rRNA amplicon sequencing



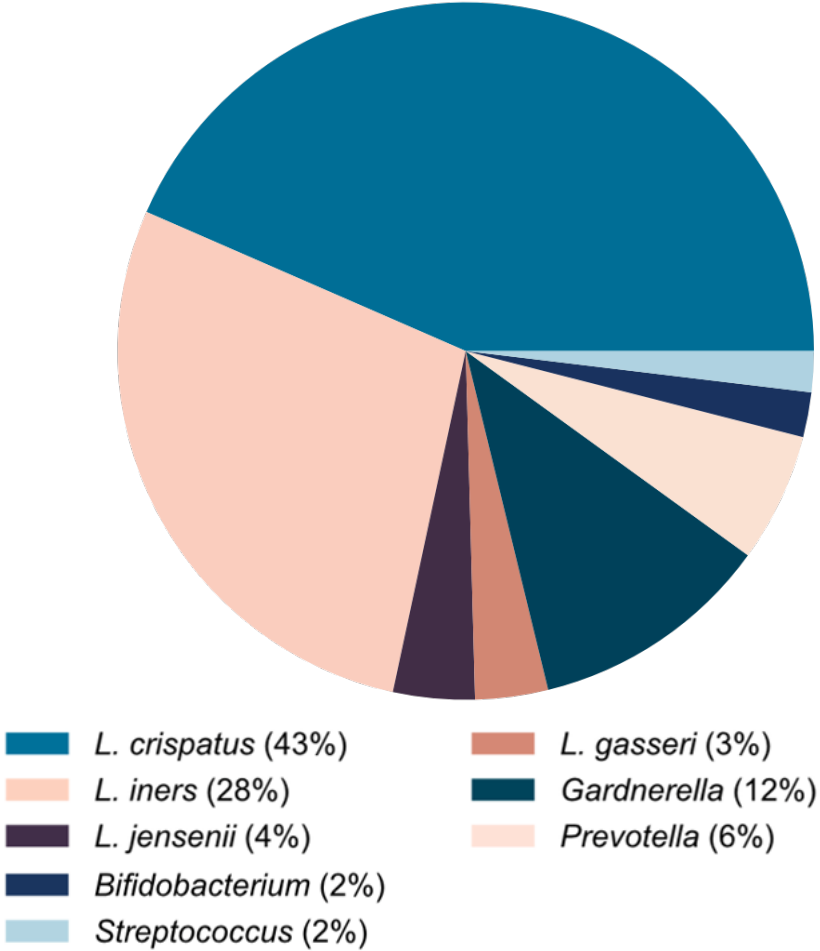
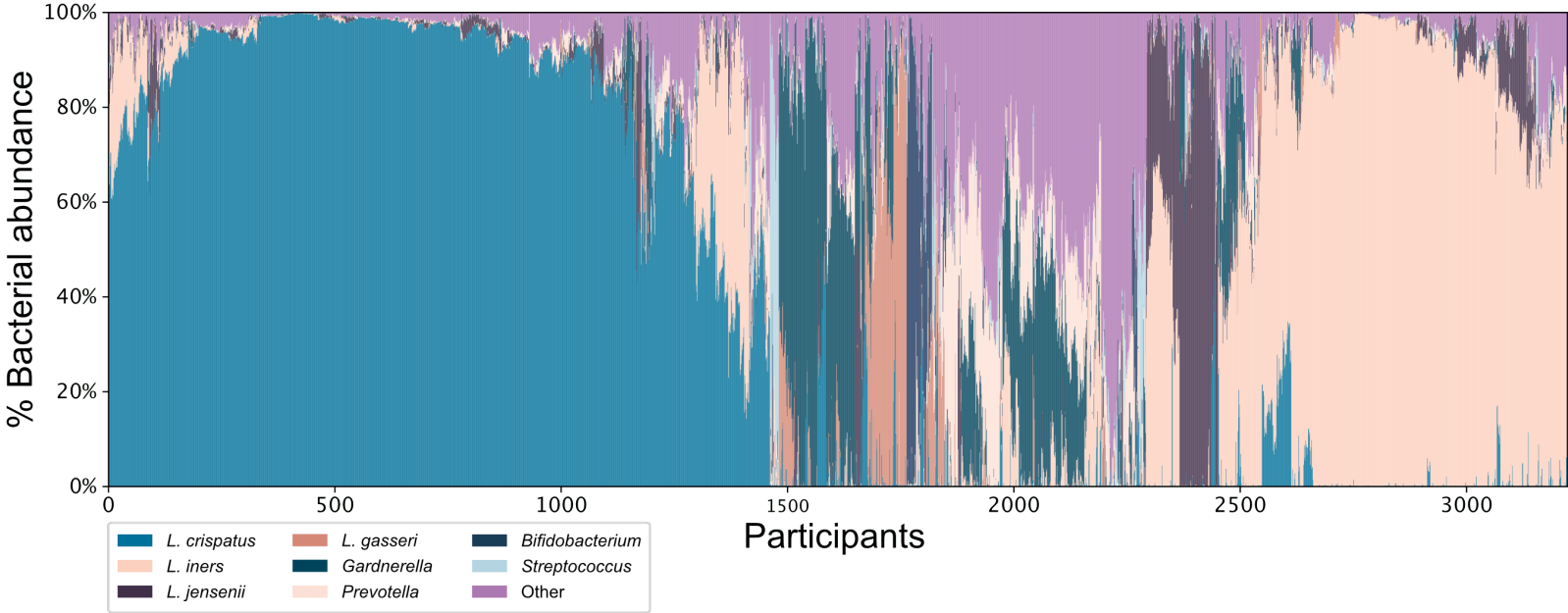
DNA
extraction

Talented bio-informaticians &
biostatisticians in-house

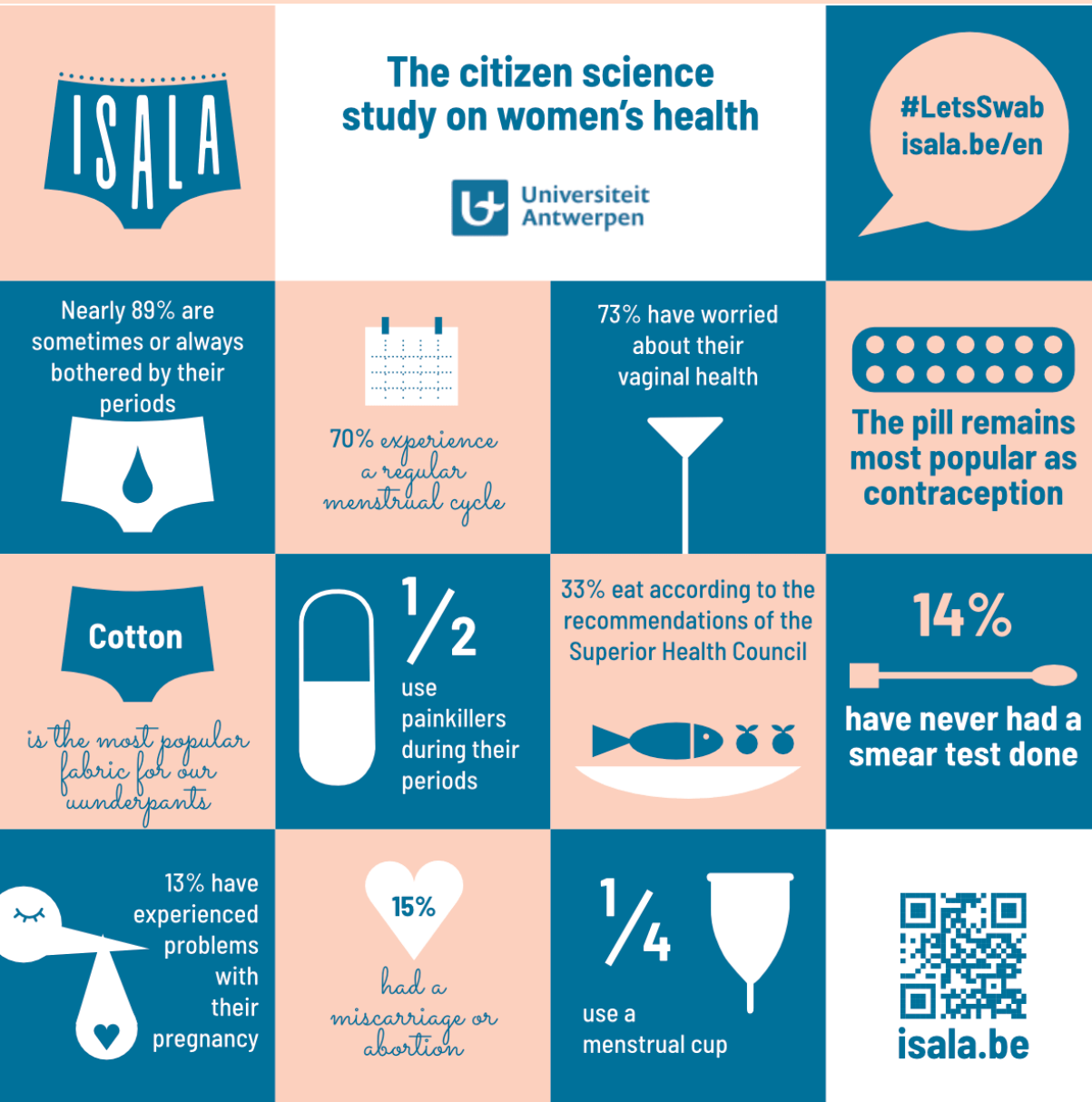
Yes, really an entire village!



First results are positive: lactobacilli prevalent



Communication on different levels



Peer-reviewed publications



Preprints are preliminary reports that have not undergone peer review. They should not be considered conclusive, used to inform clinical practice, or referenced by the media as validated information.

Citizen-science map of the vaginal microbiome



iScience

Volume 24, Issue 11, 19 November 2021, 103306



Article

Microbial enrichment and storage for metagenomics of vaginal, skin, and saliva samples

Sarah Ahannach^{1, 2}, Lize Delanghe^{1, 2}, Irina Spacova¹, Stijn Wittouck¹, Wannes Van Beeck¹, Ilke De Boeck¹, Sarah Lebeer^{1, 3}



in Microbiology | Systems Microbiology

At the Interface of Life and Death: Post-mortem and Other Applications of Vaginal, Skin, and Salivary Microbiome Analysis in Forensics

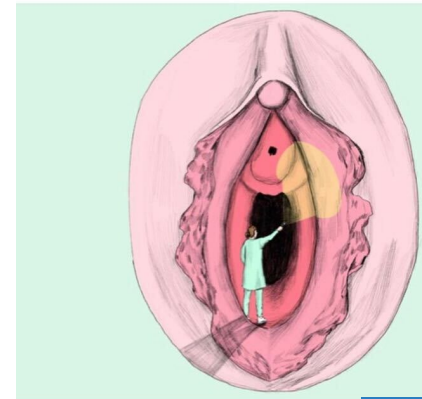
Sarah Ahannach¹, Irina Spacova¹, Ronny Decorte^{2, 3}, Els Jehaes⁴ and Sarah Lebeer^{1*}

Isala project in Belgian press

ds De Standaard

ONDERZOEK

De vagina: iedereen kent de weg, niemand de bewoners



© Jip van den Toorn



Grootste vaginale burgeronderzoek in Vlaanderen: "Vooraf goed nieuws"

vrt NWS

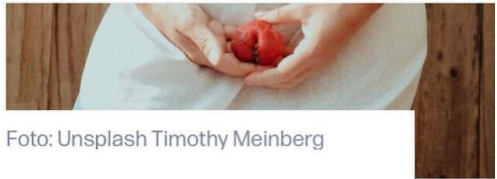


Foto: Unsplash Timothy Meinberg

Vlaamse vagina is gezonder dan gedacht: "Gezonde voeding speelt grote rol"

eos WETENSCHAP

Gezondheid

Het vrouwelijk microbiom in kaart gebracht



Universiteit van Vlaanderen

Waarom lijkt je vagina op een potje yoghurt?

prof. dr. Sarah Lebeer



Universiteit Antwerpen

Afspelen

Donderdag 24/06/2021
DeMorgen.

Nieuws Gezondheid

Grootschalig onderzoek naar vaginale gezondheid van Belgische vrouwen: dit zijn de conclusies



The Brussels Times

Nine in ten women in Belgium suffer from their period, large-scale study finds

Friday, 25 June 2021

By Lauren Walker



HLN NINA ABONNEREN LOGIN



Meer dan 73 procent van de vrouwen maakte zich al eens zorgen over hun vaginale gezondheid. © Polina Zimmerman via Pexels

Belgische wetenschappers achterhalen voor het eerst hoe een gezond vaginaal

Flair

oef, het gaat goed met de



foef

Facts, figures & tips voor een gezonde vagina

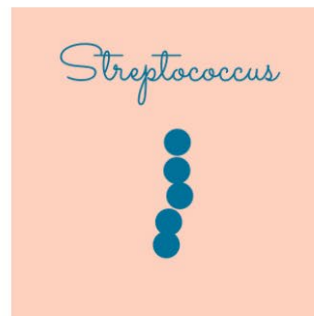
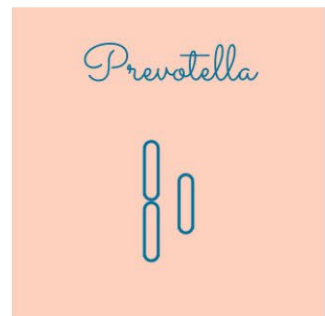
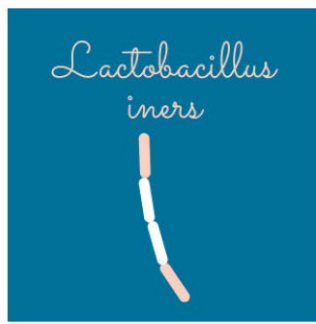
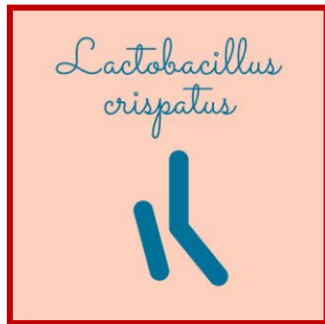
Groot vaginaonderzoek: wie zijn de bewoners en zijn ze gezond?



N Het Nieuwsblad

Communication on different levels

- General & personal results
- More background per bacterium
- Web page for medical professionals



With Isala, we have found that this bacterium was dominant in the vagina of 1,398 women. That is about 43% of all participants that donated a sample.



What does this bacterium look like?

Lactobacillus crispatus is a fairly long rod of 2 to 11 micrometers in size with a thick wall. That's not that big when you know that 1000 micrometers fit into one millimeter. The name comes from the English 'curled, crisped'. This bacterium was first discovered by Brygoo and Aladame in 1953.



What does science already know about this bacterium?

Kind of a lot! This bacterium has a very extensive genome of about 2 million base pairs with more than 2000 genes, which means that this bacterium can make more than 2000 different proteins. She also seems to be well equipped to survive in a relatively wide variety of animal and human environments.



What is this bacterium doing in my vagina?

Lactobacillus crispatus is very often associated with a healthy vagina. This bacterium produces a lot of lactic acid and therefore ensures acidity in the vagina. In this way, this bacterium protects your vagina against infections or pathogenic bacteria and fungi. *Lactobacillus crispatus* also makes other molecules that act as natural antibiotics or protect against inflammation, but not all these molecules are well known. When researching a healthy vaginal microbiome, we often focus on lactic acid, but each strain of *Lactobacillus* also produces an array of protective or beneficial molecules for our health.

Unravelling these molecules is something that Isala's team is happy to work on in the future. For example, we already know that *Lactobacillus crispatus* has a very good and active immune system so that this bacterium can protect itself against bacteriophages. These are viruses that can make (healthy) bacteria sick.



Does this bacterium occur elsewhere?

Yes, *Lactobacillus crispatus* is also found in your gut and scientists have also found it in chickens. If you enter this bacterium in a search engine on the internet, you will probably come across a number of probiotics. After all, a lot of scientific research has already been done into the health effects of this bacterium.

Communication on different levels: personal results



Je dominant type:

Lactobacillus crispatus

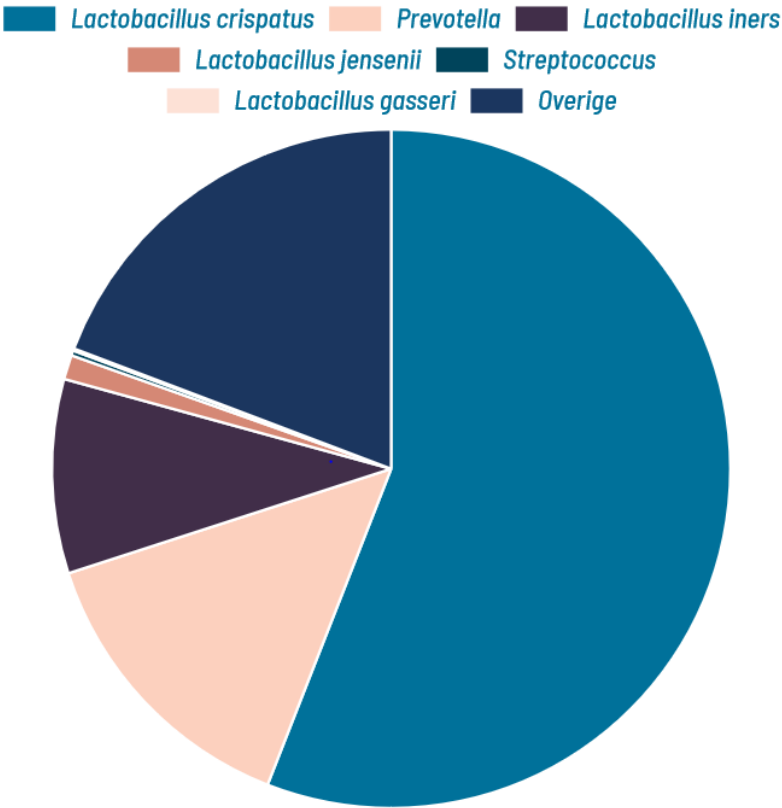
LEES MEER

[Ontdek alle bacteriën](#)

Deze bacteriën vonden we in jouw swab

Vaginale bacteriën	Verdeling
<i>Lactobacillus crispatus</i>	55,93%
<i>Prevotella</i>	14,08%
<i>Lactobacillus iners</i>	9,25%
<i>Lactobacillus jensenii</i>	1,16%
<i>Streptococcus</i>	0,24%
<i>Lactobacillus gasseri</i>	0,10%
<i>Gardnerella</i>	0
<i>Bifidobacterium</i>	0
Overige bacteriën	19,23%

Jouw persoonlijk overzicht



Who did we reach?

We first set up a demographic profile of the Isala participant

High socio-economic status

Belgian origin



On average 18-36 years

Well-educated

**In a relationship/does
not live alone**

How can we be more inclusive?

So we interviewed women with a Moroccan and Turkish migration background



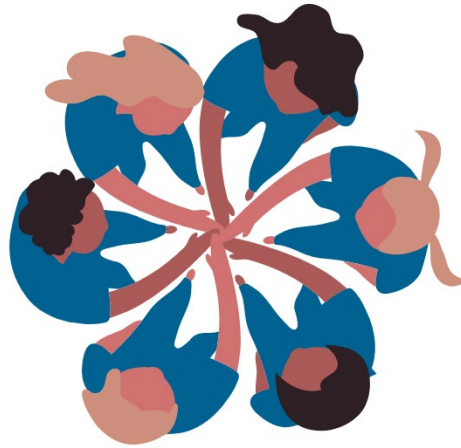
Awareness

Be aware of our diverse community, do not only communicate from your background



Language

Consider communicating in various languages
“Not only the words count, but also the message”



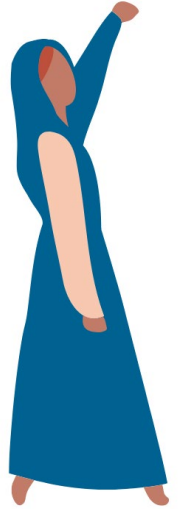
Trust

Many groups do not trust the science world.
Use trusting channels such as GPs



Taboo

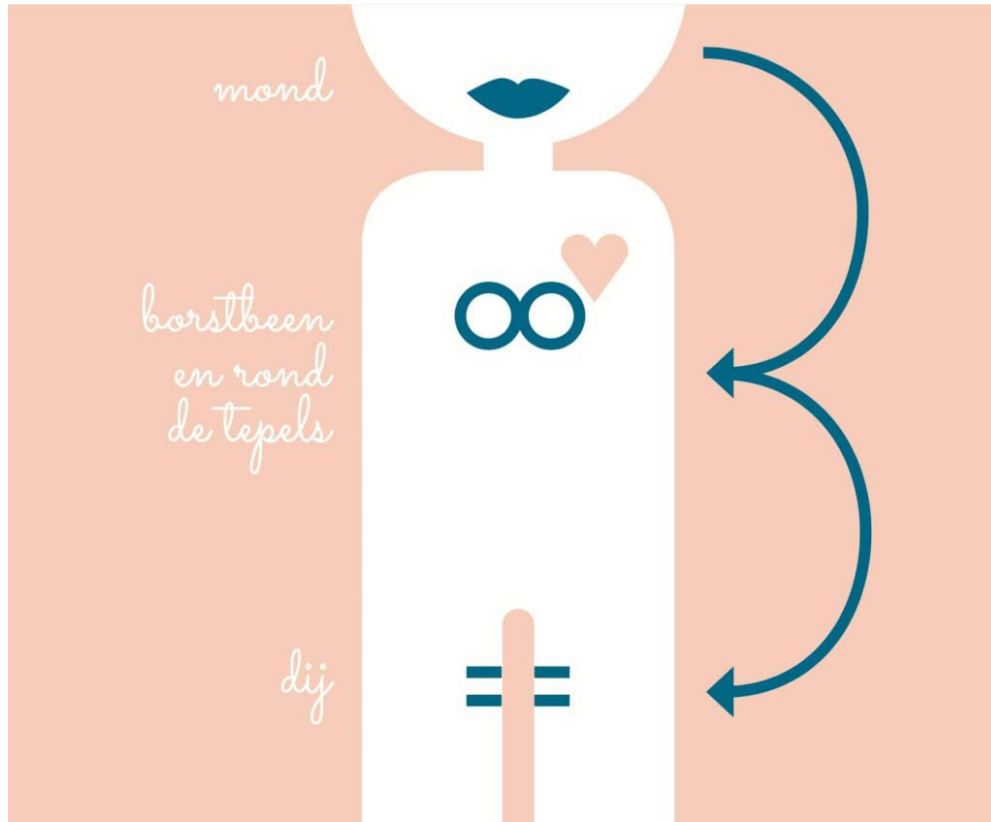
Understand why and how some subjects are taboo. Some groups just need more information



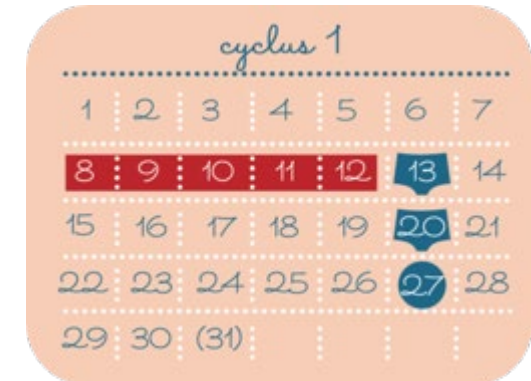
Subtlety

Keep communication tools sober and do not provoke anyone

Second phase of Isala



- 6 vaginal swabs over 2 menstrual cycles
- 3 skin swabs
- 1 saliva swab



Communicating results (part 2 - July 2022)



Het grote burgeronderzoek naar vrouwelijke gezondheid

 Universiteit Antwerpen

#LetsSwab
isala.be

Factoren die invloed hebben op het vaginaal microbiom:



Je leeftijd en levensfase




Het natuurlijke verloop van de menstruatiecyclus

Of je kinderen hebt of niet




Gebruik van hormonale anticonceptie


Gebruik van menstruatie-producten

Sommige voedingsmiddelen hebben een positieve impact...




.... andere lijken minder positief

Seksuele activiteit



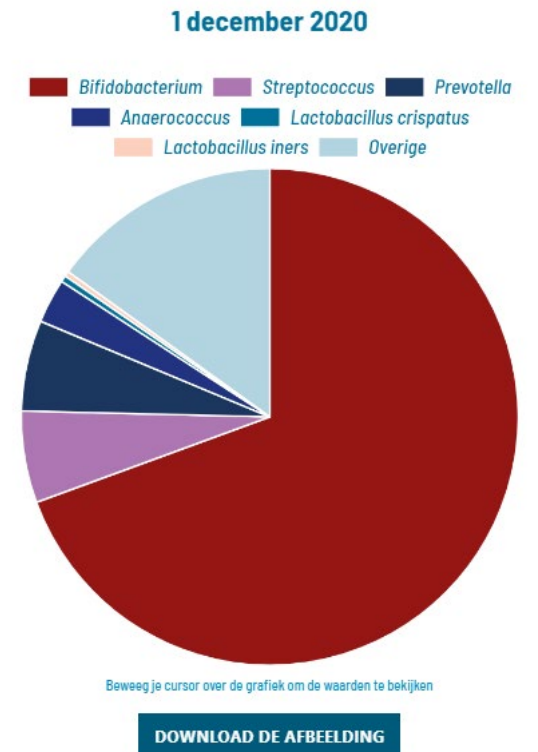
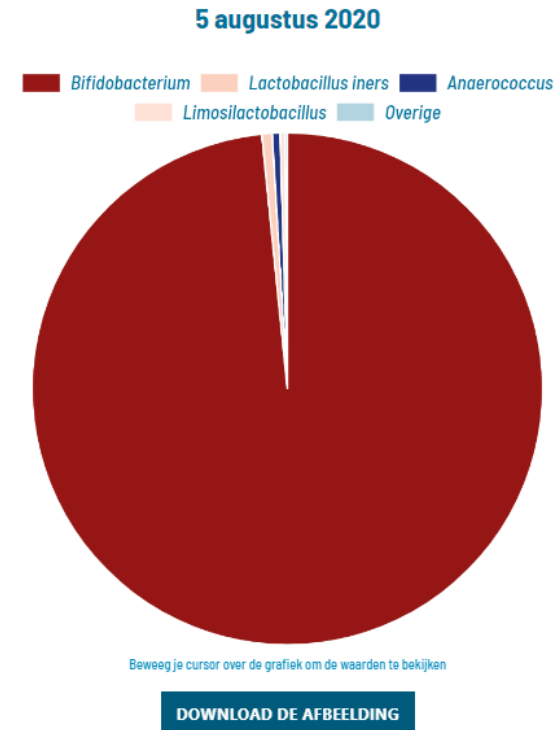
Het vaginaal microbiom is dynamisch...



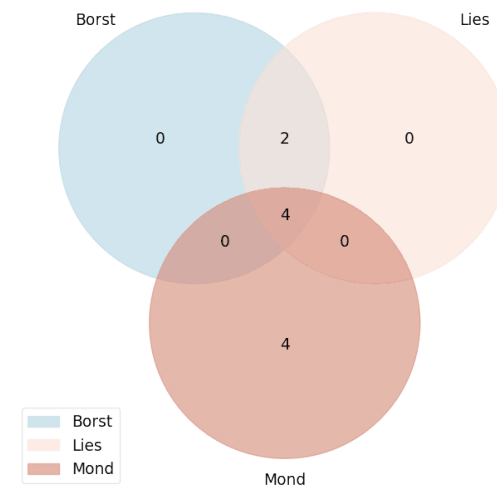
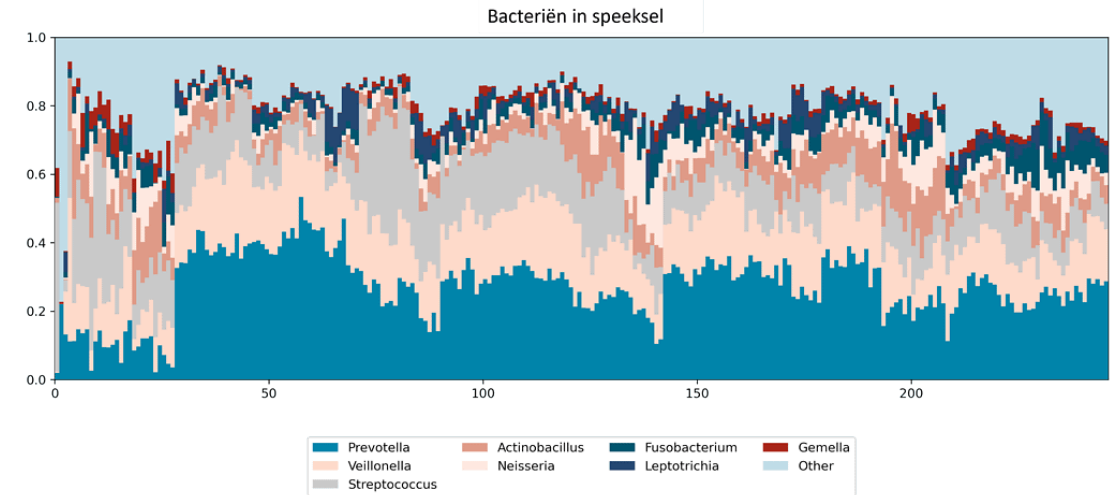
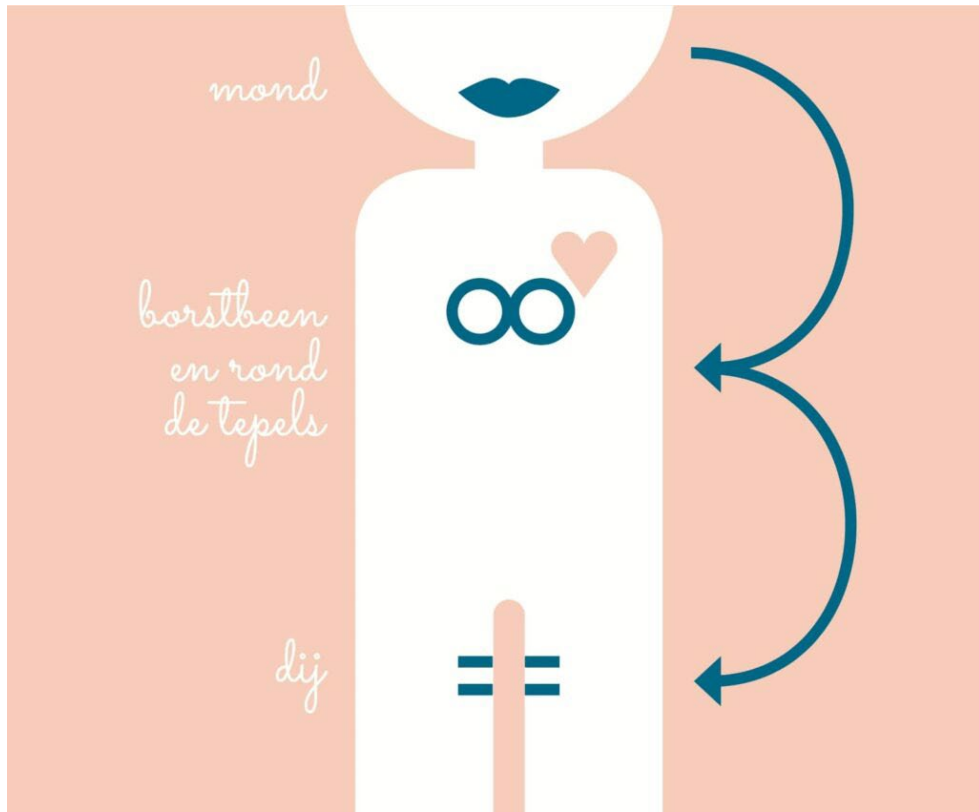
.... maar gezonde lactobacillen blijken vrij stabiel



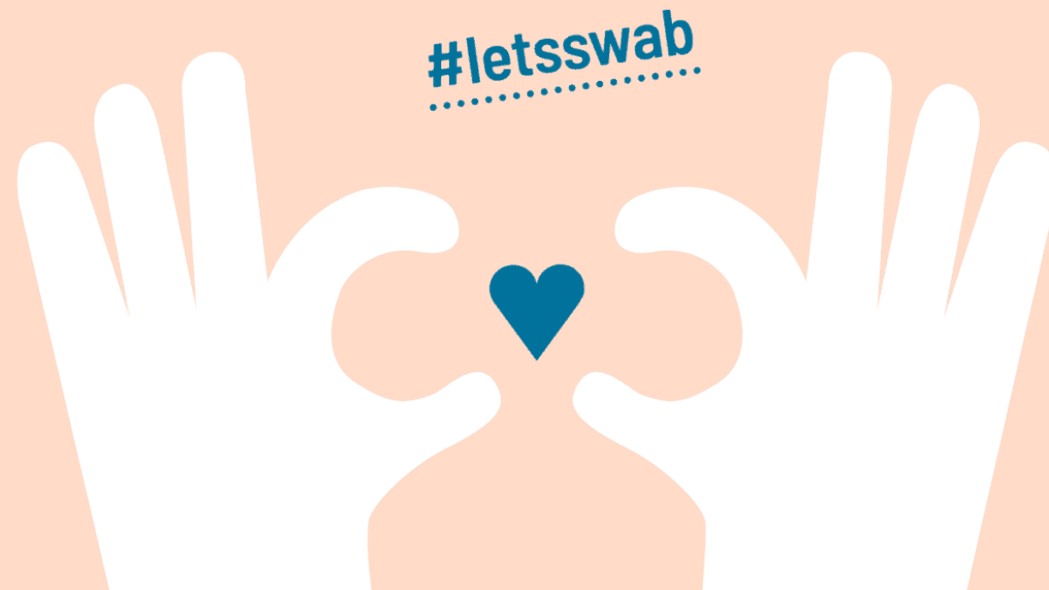

isala.be



Communicating results (part 3 – March 2023)



Isala inspires: sisterhood on vaginal microbiome research



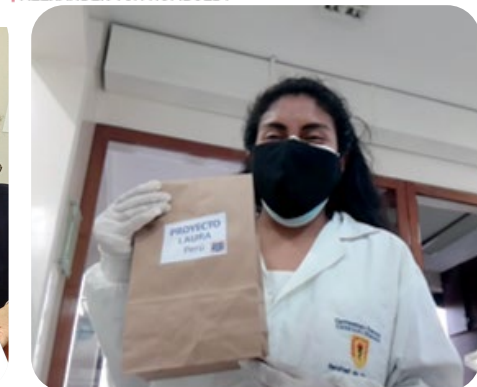
Isala's sister in Peru, Laura

- Two regions: **Coast** (Lima), **The Amazon** (Iquitos) – 112 volunteers
- Additional project in **the Highlands** (Arequipa) – 110 volunteers



Insights on the diversity of a "healthy" vaginal microbiota composition and the influence of ethnicity

Build capacities on bioinformatics data analysis applied to female microbiota research



Laura Esther
Rodríguez Dulanto
(1872-1919)

first female
physician in Peru

Isala's sister in Switzerland, Marie

Department of Epidemiology and Public Health
Unit: Society, Gender and Health

Swiss TPH



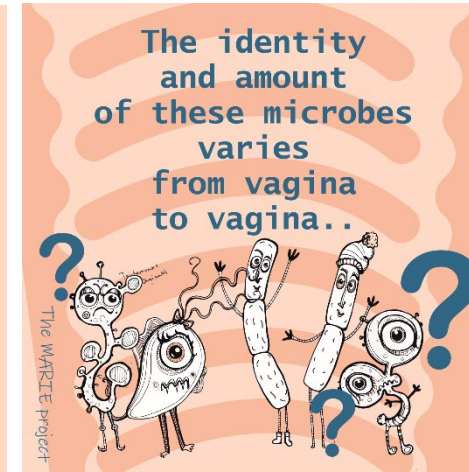
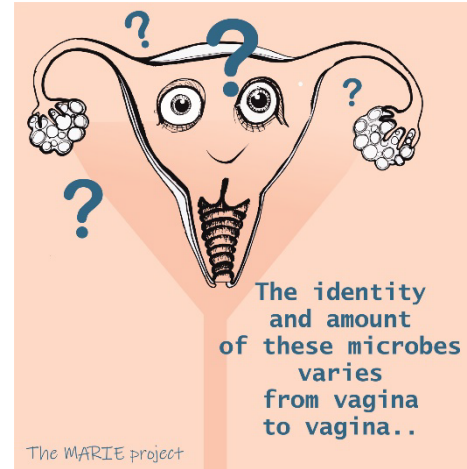
PhD Monica
Ticlla



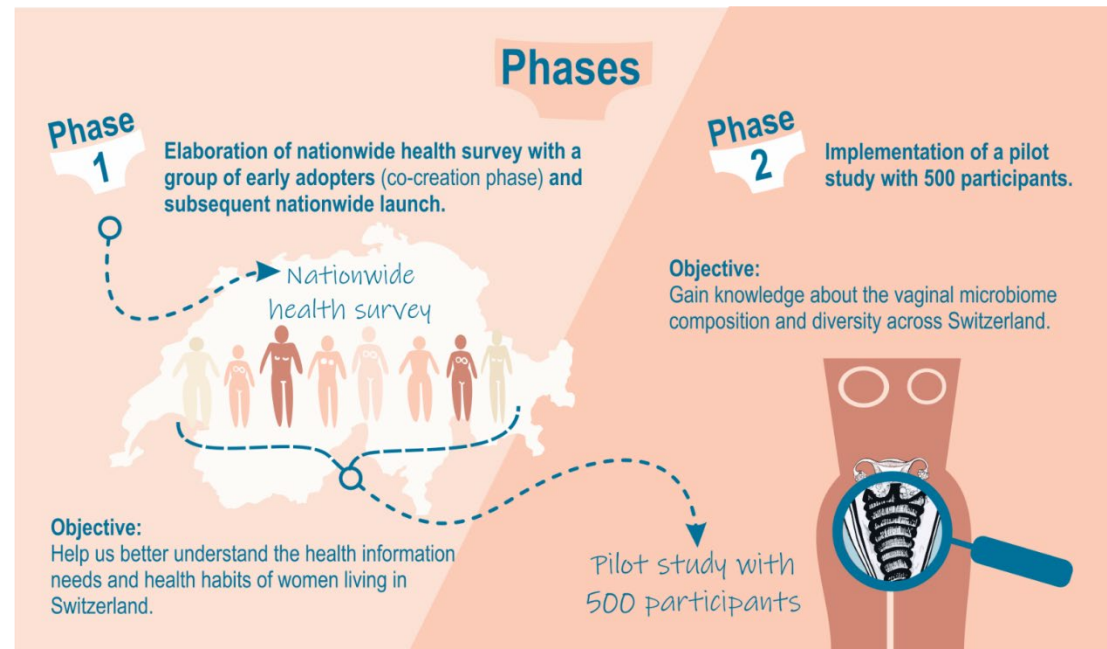
PhD Ethel
Mendocilla



Prof. Sonja
Merten



Marie Heim-Vögtlin
(1845-1916)



Isala inspires!



Sisterhood projects have been initiated in **12** other countries across the globe by local research teams:

Peru, Switzerland, Cameroon, France, Spain, UK, South-Africa, Canada, Nigeria, Morocco, USA, Oeganda

Acknowledgements

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Nele Van de Vliet

Laboratory of Applied Microbiology and Biotechnology



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