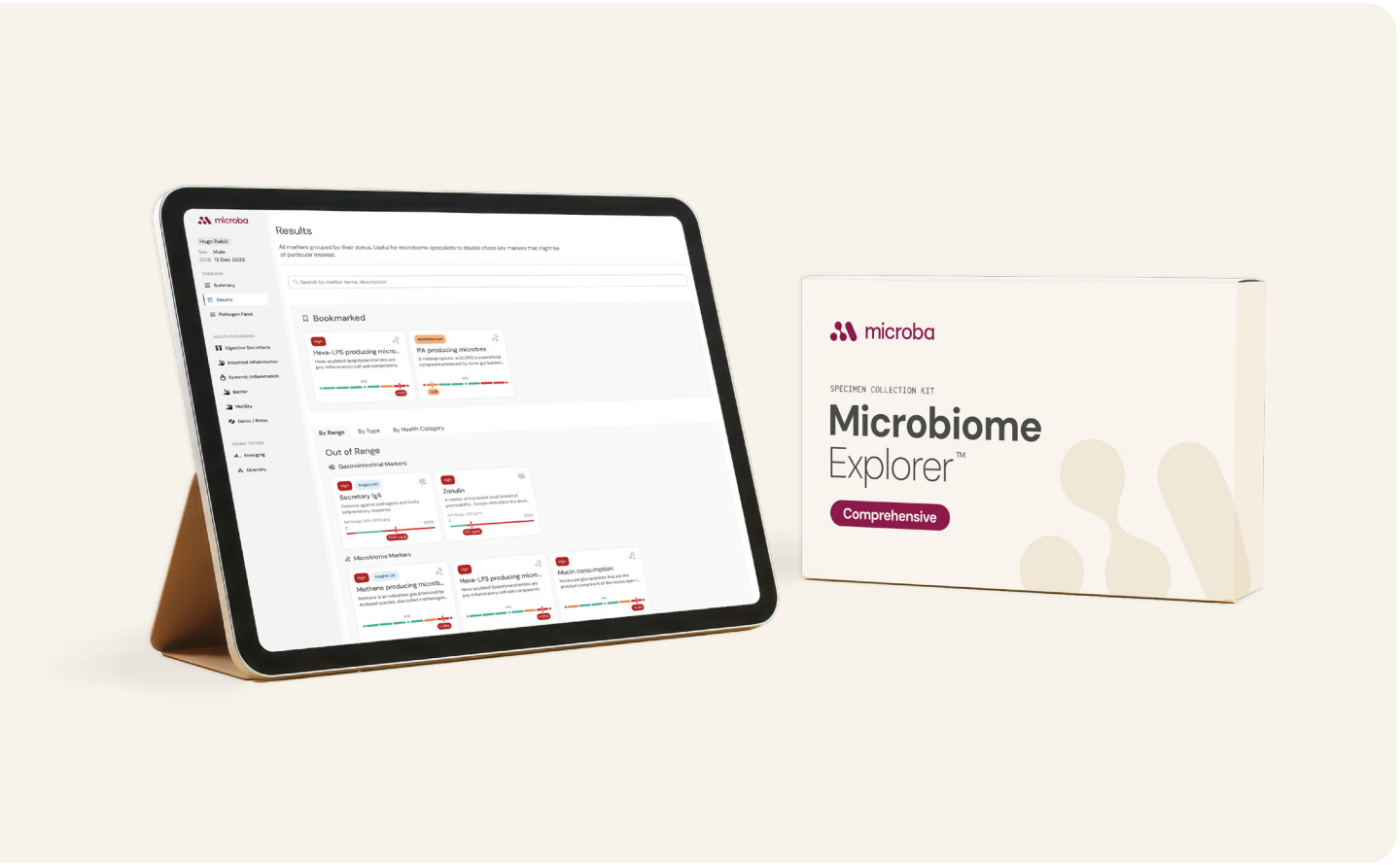
microba

CLINICAL GUIDE

Interpretation guide

Learn how to interpret the Microbiome Explorer range of gut microbiome and gastrointestinal health tests to support clinical decision-making.

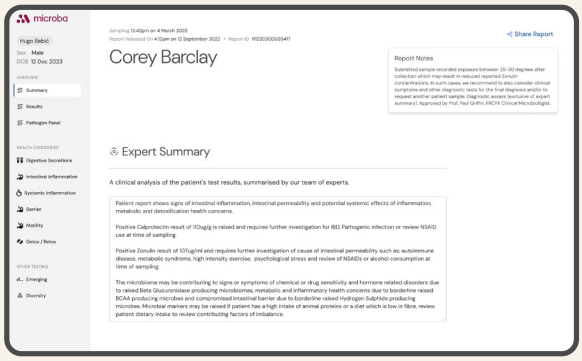


Contents

Key Sections of the Microbiome Explorer Report

Expert Summary

The Expert Summary provides a summary of the results of your microbiome report helping you to identify where to focus your patient management plan and to save you time. All summaries are reviewed and signed off by credentialed health professionals from the Microba Clinical team.



Results

You can display your results by range, type or health category.

By Range:

Results by range will display your patient's results by **out of range** at the top, then **borderline** and **in range**.

By Type:

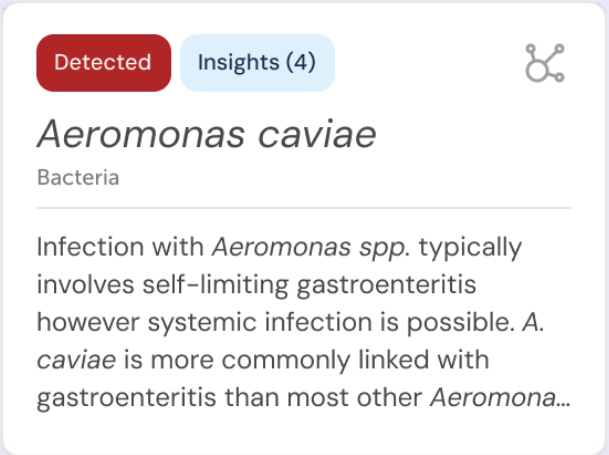
Results by type will display your patient's results by marker type – Pathogen Marker, Gastrointestinal Health Marker and Microbiome Marker.

Pathogen Markers (GI Plus only)

Pathogens are bacteria, viruses or protists that can cause infection and disease.

Pathogens are tested using RT-PCR (real-time polymerase chain reaction) which is a highly sensitive method for detecting specific regions of DNA that typically indicate the presence of the pathogen, species or genus reported.

Results for each of the 18 Pathogen Markers are displayed on the marker card along with insights for patient management.

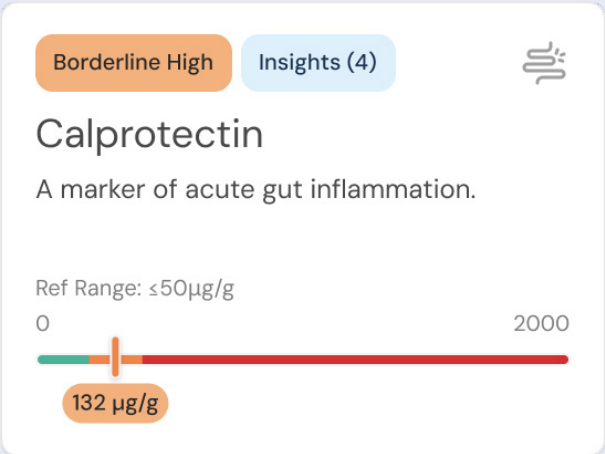


Not detected	Indicates the pathogen has been tested and not detected in the sample.
Indeterminate	Discrepant test results cannot be resolved as positive or negative. If clinically indicated, repeat sample collection and further testing recommended.
Detected	Pathogen has been detected.

Gastrointestinal Health Markers (GI & GI Plus only)

Gastrointestinal (GI) Health Markers are human proteins and compounds in stool that reflect key aspects of gut health. They are primarily measured using immunohistochemical assays and may act as an aid to diagnosis or monitoring treatment. The following GI Health Markers are CE certified and can be used to inform diagnoses: Calprotectin, Lactoferrin, Occult blood, Pancreatic elastase, Secretory IgA and Zonulin.

Results for each of the 7 GI Health Markers are displayed on the marker card along with insights for patient management.



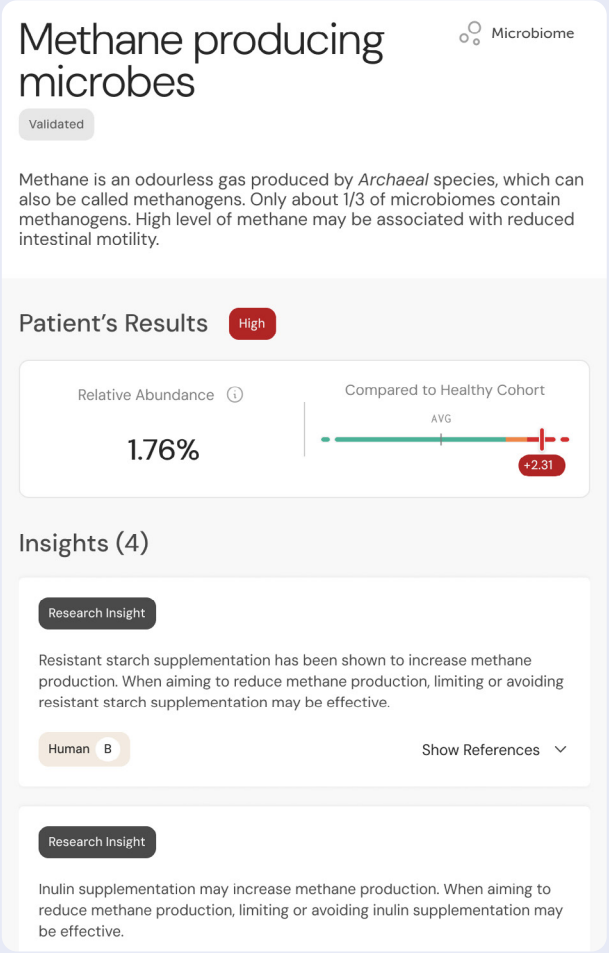
Low	Indicates the result is out of range and lower than the optimal reference range.
Borderline Low	Indicates the result is on the lower end of the optimal reference range.
Optimal	Indicates the result is within the reference range.
Borderline High	Indicates the result is on the higher end of the optimal reference range.
High	Indicates the result is out of range and higher than the optimal reference range.
Not detected	Indicates a negative result and has not been detected in the sample.
Indeterminate	Discrepant test results cannot be resolved as positive or negative. If clinically indicated, repeat sample collection and further testing are recommended.

Microbiome Markers

Microbiome Markers provide a community level view of how the overall gut microbiome is functioning. They are based on the combined abundance of microbial species in a patient's sample that are either capable of performing specific metabolic functions (such as producing butyrate or trimethylamine) or represent distinct microbial patterns (such as diversity or the abundance of oral bacterial species in the gut). These markers help translate complex microbiome data into actionable insights by highlighting microbial activities and community features linked to health and disease.

Microbiome markers are measured using (shotgun) metagenomic sequencing, which analyses the DNA isolated from all microorganisms in a sample.

Results for each of the 14 Microbiome Markers are displayed on the marker card along with insights for patient management.



Low	Indicates the result is lower compared to the average of the Microba Healthy Cohort.
Borderline Low	Indicates the result is on the lower end of the average compared to the Microba Healthy Cohort.
Optimal	Indicates the result is optimal compared to the average of the Microba Healthy Cohort.
Borderline High	Indicates the result is on the higher end of the average compared to the Microba Healthy Cohort.
High	Indicates the result is higher compared to the average of the Microba Healthy Cohort.
Not detected	Indicates no species producing or consuming this metabolite were detected in the sample.

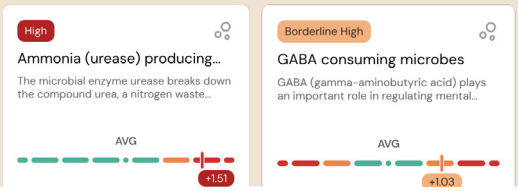
By Health Category:

Results by health category will display your patient's results by **health category**.

The **Health Categories** represent different aspects of gut function and health, as well as mechanisms by which the microbiome influences systemic health. Each health category groups associated microbiome markers and gastrointestinal (GI) health markers to support mechanism-driven assessment of gut and systemic health.

Emerging Markers

The **Emerging Markers** provides microbiome markers which have historically been of clinical interest. These markers have an emerging evidence base leading to uncertainty around their role in human health.



Diversity

Diversity is a broad assessment of the number and spread of species within a sample. Microbial richness measures the number of species while the Shannon Diversity Index considers both richness and their relative abundance (evenness). Considering both indexes together reveals whether a microbiome has a low number of species (low richness) or whether any species dominate the microbiome (low evenness).

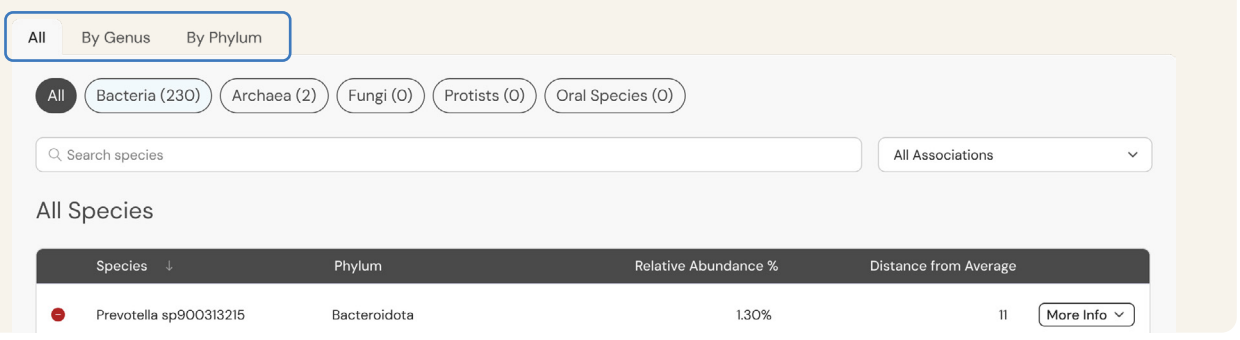
Species Explorer

The Species Explorer provides information on all species detected within the sample. It is recommended to avoid focusing on individual species in isolation and instead consider the overall balance of species within the microbiome.

Each person's microbiome is made up of different combinations of microbial species. The Species Explorer lists all species detected in the sample at a relative abundance of over 0.01%.

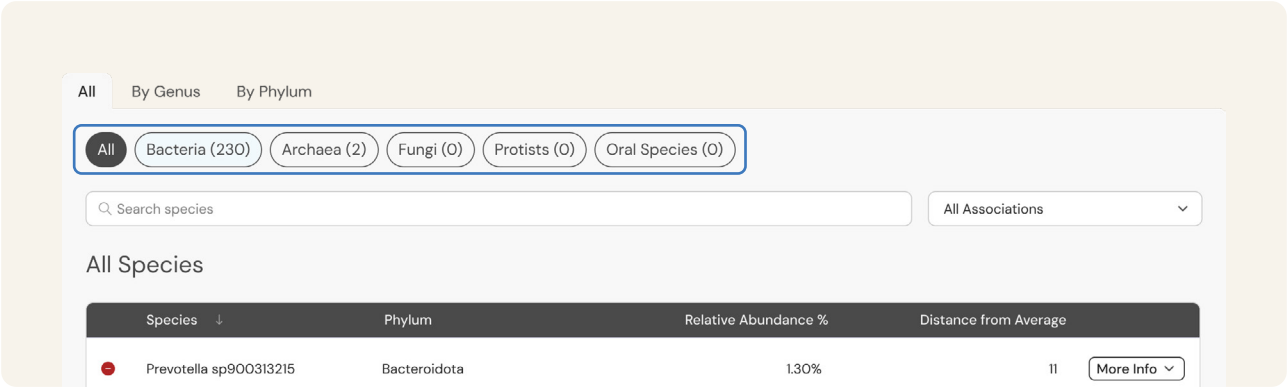
Navigating Species Explorer

You can display the species within the table by 'All', 'By Genus' or 'By Phylum.



Filtering Species Explorer

Filters in the species explorer can be used to identify if Archaea, fungi, protist/parasites or oral species were identified in your patient's microbiome.



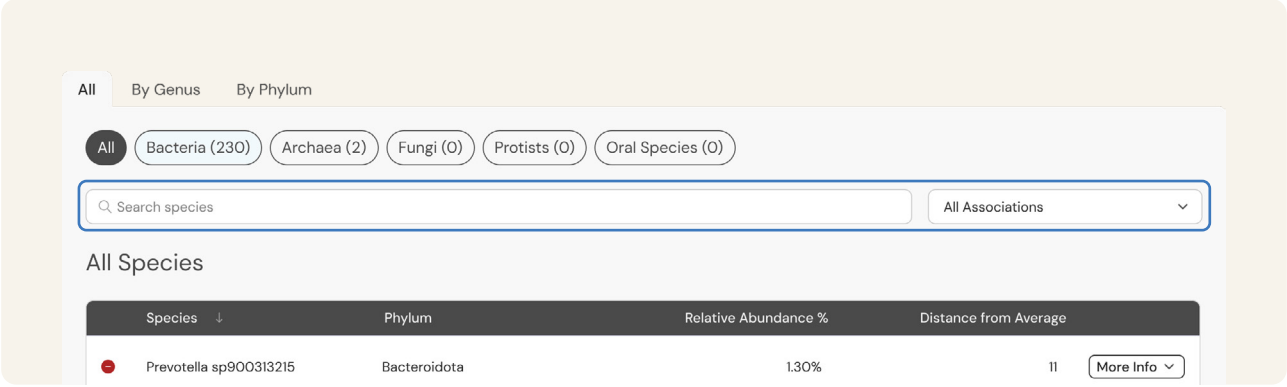
Sorting Species Explorer

The Species Explorer can be sorted by each column. Sorting by 'Relative Abundance' will identify the species which are most abundant (take up the largest proportion of the microbiome) while sorting by the 'Distance from Average' will identify the species which are most over-abundant (positive score) or under-abundant (negative score) compared to the healthy cohort.

	Species	Phylum	Prevalence	Relative Abundance	Distance from Average
Sorting by the 'symbol' column will bring species which have been associated with health and disease in the scientific literature to the top of the species explorer.	Sorting by the 'species' column will sort the species names alphabetically	Sorting by the 'phylum' column will group the species by phylum.	Sorting by the 'prevalence' column will group the species by prevalence in the healthy cohort.	Sorting by the 'relative abundance' column will bring the most abundant species (largest proportion of the microbiome) to the top of the species explorer.	Sorting by the 'distance from average' column will identify the most overabundant (positive score) or underabundant (negative score) species compared to the healthy cohort.

Searching Species Explorer

The Species Explorer has a search function which will search the species name and description.

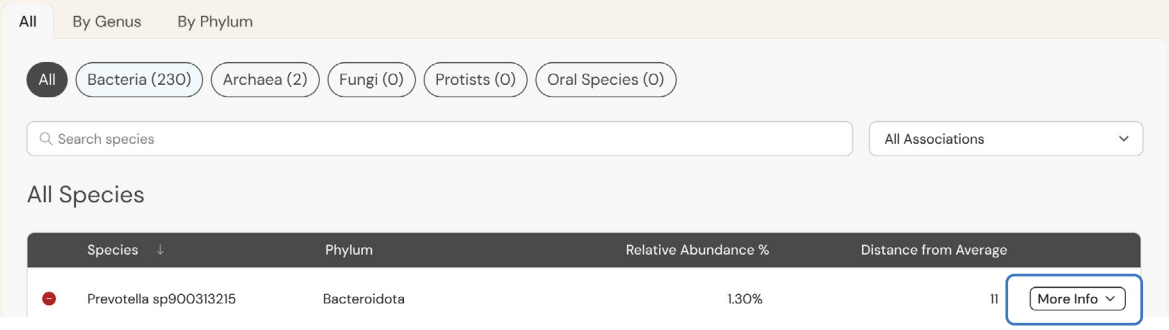


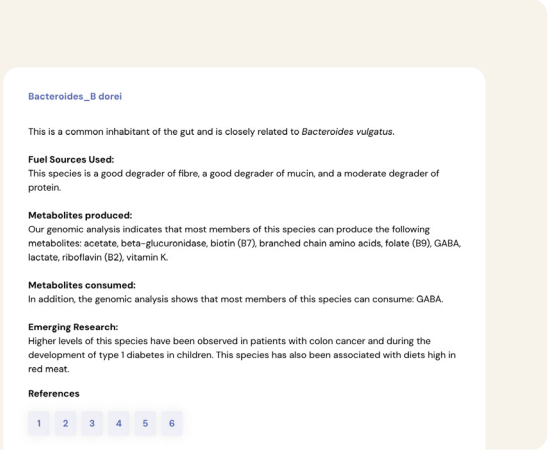
Search terms	Clinical use
Species name	Use the search function to identify the presence of a species of clinical interest. No genera or species must be present to ensure microbiome health.
Disease	Use the search function to identify species found to be associated, in the scientific literature, with a disease of clinical interest. This will select any species which have associations with that disease listed in the species description.
Microbiome marker	The search function can be used to search the species description for a microbiome marker of clinical interest. This will highlight any species which are contributing to the microbiome marker result. For example, by searching 'butyrate' you will identify all the species capable of producing butyrate in your patient's microbiome.

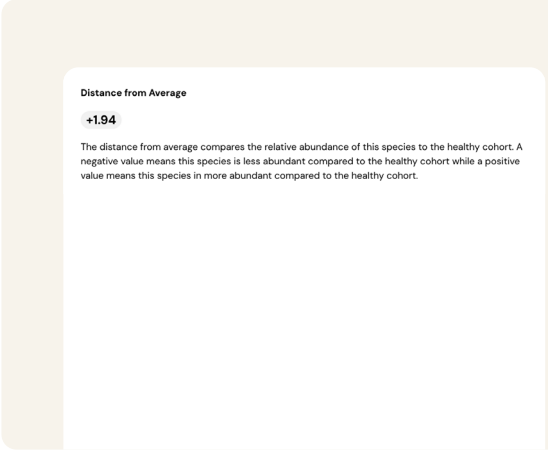
Symbols

Symbols are provided to highlight species which have been associated with health or disease in the scientific literature. This is often based on cross-sectional studies which show that a species is increased or decreased in a particular disease and does not imply causation.

Species role in your patient's microbiome







Species descriptions

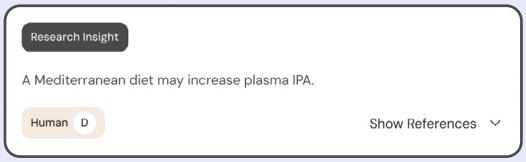
The species descriptions help inform the clinical role of that species in your patient's microbiome. Species which have been associated with health outcomes in the scientific literature contain a summary of this research in their description.

For all species, the predicted functional capacity to produce microbial metabolites and consume compounds is provided. This information can be used to guide your understanding on the microbe's contribution to overall microbiome function, as well as provide insight into the fuel sources it utilises to thrive.

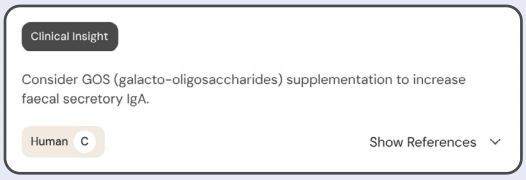
Insights

Insights, derived from Microba's extensive review of the available scientific evidence to support intervention options, are personalised to your patient's results.

The Microba science review process involved an extensive review of the scientific literature for interventions to shift GI health markers and microbiome markers. Available evidence was graded using the NHMRC Levels of Evidence and Grades for Recommendations. The results of this review are provided as "Research Insights" or "Clinical Insights" to help clinicians identify and assess intervention options for their patient.



Research Insights:
Scientifically graded and evidence-based statements for interventions to modify microbiome markers. They are shown in the report if a microbiome marker is different from the healthy cohort, or if faecal pH is outside of the literature derived reference range.



Clinical Insights:
Scientifically graded practice recommendations. They are shown in the report if a diagnostic gastrointestinal health marker is outside of the reference range.

Filtering Insights

You can explore all of your patient's personalised insights by visiting the Insights page in the Microbiome Explorer report. Insights can be filtered by marker, recommendation type, evidence type (human, in vitro) and evidence grade.

Diverse intervention options

Insights include diet and lifestyle interventions as well as probiotic, prebiotic, nutrient and polyphenol supplementation.

Evidence grade to rate quality and consistency of research

The grades provide clinicians with a simple method to understand the research and how much they can apply the results in clinical practice. The evidence grading below (A-D) is based on the NHMRC guidelines.

Grades / Codes	Description
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation, but care should be taken in its application
D	Body of evidence is weak, and recommendation must be applied with caution
PP, H	Body of evidence is observational only and must be applied with caution
PP, IV	Body of evidence is in vitro and must be applied with a high degree of caution

Marker Reference Guides

Pathogen Markers (GI Plus only)		
IND	Discrepant test results cannot be resolved as positive or negative.	If clinically indicated, repeat sample collection and further testing are recommended.
Yersinia enterocolitica	*Yersinia enterocolitica* is a foodborne pathogen that can cause invasive gastroenteritis and is often associated with bloody diarrhoea. Colonisation with non-toxigenic strains is possible.	Most cases are self-limiting, with treatment typically needed only for immunocompromised or severely symptomatic patients. However, consideration of the patient's clinical presentation is recommended. Positive faecal occult blood or suspected haemorrhagic colitis warrants urgent investigation and specialist consultation.
Vibrio spp.	*Vibrio* species (*V. cholerae*, *V. parahaemolyticus* and *V. vulnificus*) are waterborne pathogens that can cause watery diarrhoea, fever, and occasionally bloody diarrhoea. Colonisation with non-toxigenic strains is possible.	Most cases are self-limiting, with treatment usually needed only for immunocompromised or severely symptomatic patients. However, consideration of the patient's clinical presentation is recommended. Positive faecal occult blood or suspected haemorrhagic colitis warrants urgent investigation and specialist consultation.
Salmonella spp.	*Salmonella* spp. are foodborne pathogens that can cause gastroenteritis and sometimes bloody diarrhoea.	Most cases are self-limiting, with treatment usually needed only for immunocompromised or severely symptomatic patients. However, consideration of the patient's clinical presentation is recommended. Positive faecal occult blood or suspected haemorrhagic colitis warrants urgent investigation and specialist consultation.
Enterotoxigenic *E. coli* (ETEC)	*Escherichia coli*, a natural coloniser of the gut, includes harmless strains and foodborne pathogens. Enteropathogenic *E. coli* (EPEC) is a major cause of infantile diarrhoea in developing countries.	Medical treatment is recommended for symptomatic patients.
Shigella spp./ Enteroinvasive *E. coli* (EIEC)	*Escherichia coli*, a natural coloniser of the gut, includes both harmless strains and foodborne pathogens. *Shigella* spp./ Enteroinvasive *E. coli* (EIEC) can cause diarrhoea with fever, and sometimes bloody diarrhoea.	Medical treatment is advised for symptomatic patients. Positive faecal occult blood or suspected haemorrhagic colitis warrants urgent investigation and specialist consultation.
Shiga toxin	*Escherichia coli,* a natural coloniser of the gut, includes both harmless strains and foodborne pathogens. Shiga toxin-producing *E. coli* (STEC) can cause acute diarrhoea, haemorrhagic colitis, and haemolytic uremic syndrome (HUS).	Medical treatment is advised for symptomatic patients. Positive faecal occult blood or suspected haemorrhagic colitis or HUS warrants urgent investigation and specialist consultation.

E. coli O157	*Escherichia coli*, a natural coloniser of the gut, includes both harmless strains and foodborne pathogens. *E. coli* O157 can cause acute diarrhoea, haemorrhagic colitis, and haemolytic uremic syndrome (HUS).	Medical treatment is advised for symptomatic patients. Positive faecal occult blood or suspected haemorrhagic colitis or HUS warrants urgent investigation and specialist consultation.
Enteroaggregative *E. coli* (EAEC)	*Escherichia coli,* a natural coloniser of the gut, includes both harmless strains and foodborne pathogens. Enteroaggregative *E. coli* (EAEC) can cause traveller's or persistent diarrhoea.	Traveller's diarrhoea is typically self-limiting, with rehydration as the main treatment. Anti-diarrhoeal drugs may help but should not be used in children. Antibiotics are effective for moderate to severe cases.
Enterotoxigenic *E. coli* (ETEC)	*Escherichia coli*, a natural coloniser of the gut, includes both harmless strains and foodborne pathogens. Enterotoxigenic *E. coli* (ETEC) causes traveller's diarrhoea and cholera-like illness in areas with poor sanitation.	Traveller's diarrhoea is usually self-limiting, with rehydration as the primary treatment. Anti-diarrhoeal drugs may help but should not be used in children. Antibiotics are effective for moderate to severe cases.
Hypervirulent *Clostridium difficile*	*C. difficile* is a leading cause of healthcare-associated infections, with hypervirulent strains producing elevated levels of toxins A and B, which drive its pathogenicity. Risk factors include antibiotic or proton pump inhibitor use, advanced age, immunosuppression, and inflammatory bowel disease.	Infections can result in severe gastroenteritis, requiring treatment for symptomatic patients. Positive faecal occult blood or suspected haemorrhagic colitis requires urgent investigation and specialist consultation.
Clostridium difficile toxin B	*C. difficile* is a major cause of healthcare-associated infections, with toxin B central to its pathogenicity. Risk factors include antibiotic or proton pump inhibitor use, advanced age, immunosuppression, and inflammatory bowel disease.	Infections can cause severe gastroenteritis, requiring treatment for symptomatic patients. Positive faecal occult blood or suspected haemorrhagic colitis warrants urgent investigation and specialist consultation.
Campylobacter spp.	*Campylobacter jejuni* and *C. coli* are foodborne pathogens that can cause gastroenteritis.	Most cases are self-limiting, with treatment typically needed only for immunocompromised or severely symptomatic patients. However, consideration of the patient's clinical presentation is recommended. Positive faecal occult blood or suspected haemorrhagic colitis warrants urgent investigation and specialist consultation.
Aeromonas spp.	*Aeromonas* spp. are food and waterborne pathogens that are common in fresh and brackish water. Clinical presentations include asymptomatic carriage and traveller's diarrhoea.	Most cases are self-limiting, with treatment typically needed only for immunocompromised patients and those with severe or persistent symptoms. However, consideration of the patient's clinical presentation is recommended.
Giardia lamblia	*Giardia lamblia* is a waterborne parasite that can cause gastroenteritis. Clinical presentation ranges from asymptomatic carriage to acute or chronic gastrointestinal infections.	Medical treatment is recommended for symptomatic patients.

Entamoeba histolytica	*Entamoeba histolytica* is a food and waterborne parasite that can cause amoebic dysentery. Clinical presentation ranges from asymptomatic carriage to invasive gastroenteritis.	Medical treatment is advised even for asymptomatic cases to prevent disease spread. Positive faecal occult blood or suspected haemorrhagic colitis warrants urgent investigation and specialist consultation.
Dientamoeba fragilis	The pathogenic role of *Dientamoeba fragilis* has not been established.	Antimicrobial treatment is usually unnecessary and may disrupt the gut microbiome without clearing the protozoa. For symptomatic cases, other causes (e.g., infections, IBS, food intolerances) should be excluded. Screening for organism clearance or testing family members is not recommended.
Cyclospora cayetanensis	*Cyclospora cayetanensis* is a waterborne parasite that can cause gastroenteritis.	Most cases are self-limiting, with treatment typically needed only for immunocompromised patients and those with severe or persistent symptoms. However, consideration of the patient's clinical presentation is recommended.
***Cryptosporidium* spp.**	Some species of the waterborne parasite *Cryptosporidium* can cause cryptosporidiosis in humans, primarily *C. hominis* and *C. parvum*.	Most cases are self-limiting. Treatment is generally needed only for immunocompromised patients or those with severe or persistent symptoms. However, consideration of the patient's clinical presentation is recommended. Specialist medical advice is recommended for treatment.

Gastrointestinal Health Markers (GI & GI Plus only)

Marker	Description	Health Category	Health/Disease Associations	Result	Insights
Calprotectin	Calprotectin is a marker for acute intestinal inflammation and can estimate the degree of inflammation. It is commonly used to distinguish active inflammatory bowel disease (IBD) from irritable bowel syndrome (IBS) and is used to monitor disease activity and predict relapse in conditions like IBD and colorectal cancer.	Intestinal inflammation	• Inflammatory bowel diseases (A) • Bacterial diarrhoea (C) • *C. difficile* infection (C)	High	• Further investigation is warranted if the cause is unknown • Clinical Insights will be triggered.
				Borderline	• Repeat the measurement at a later date to monitor inflammation • Clinical Insights will be triggered

Faecal pH	Faecal pH is a measure of the acidity or alkalinity of the stool, reflecting the metabolic activity of gut microbes and the fermentation of dietary components.	Intestinal motility	• Short chain fatty acid levels (B) • Gut transit time (C) • Methane production (D)	High	• Slower gut transit time • Research Insights will be triggered
				Low	• Faster gut transit time • Research Insights will be triggered
Lactoferrin	Lactoferrin is a marker of intestinal inflammation. It is commonly used to monitor disease activity, treatment response and relapse prediction in inflammatory bowel disease.	Intestinal inflammation	• Inflammatory bowel diseases (C) • Bacterial infection (C) • *C. difficile* toxin (C)	High	• Further investigation is warranted if the cause is unknown • Clinical Insights will be triggered
Faecal occult blood	Faecal occult blood is a marker of intestinal bleeding.	Intestinal inflammation	• Colorectal cancer risk (A) • Inflammatory bowel disease risk (B) Negative: Mucosal healing in ulcerative colitis (A)	Detected	• Further investigation is warranted if the cause is unknown
				Not detected	• No occult blood detected
Pancreatic elastase	Pancreatic elastase is used to assess exocrine pancreatic function in conditions like cystic fibrosis, diabetes, and chronic pancreatitis.	Digestive secretions	• Severe pancreatic insufficiency (C)	Low	• Further investigation warranted if clinically indicated • Consider clinical symptoms and other diagnostic tests • Liquid stools may yield falsely low results
				Borderline	• Consider clinical symptoms and other diagnostic tests • Liquid stools may yield falsely low results

Secretory IgA	Secretory IgA plays a major role in preventing adherence of microbes to mucosal sites, in activation of the alternative complement pathway and in activating inflammatory reactions.	Intestinal inflammation Intestinal barrier	• Irritable bowel syndrome-D (D) • Systemic lupus (D) • High calprotectin levels (D) • High zonulin levels (D)	High	• Consider in the context of the patient's clinical presentation
			• Obesity with increased fasting blood glucose (D)	Low	• Consider in the context of the patient's clinical presentation • Clinical Insights will be triggered
Zonulin family peptides	Zonulin family peptides is a marker of increased intestinal permeability. It binds to a specific receptor on the surface of intestinal epithelia and triggers a cascade of biochemical events which induces tight junction disassembly and a subsequent increase in permeability across the intestinal epithelium.	Intestinal barrier	• High intensity exercise (C) • High faecal histamine (C) • Acute psychological stress (D) • Tight junction disassembly (PP, IV)	High	• Consider in the context of the patient's clinical presentation • Clinical Insights will be triggered

Microbiome Markers

Marker	Description	Health Category	Result	Insights
Acetate producing microbes	Acetate, the most abundant short-chain fatty acid, can be converted to butyrate. Low levels may be associated with intestinal inflammation.	Intestinal inflammation (PP, IV)	Low	Research Insight will be triggered
***B. fragilis* toxin producing microbes**	The *B. fragilis* toxin (*fragilysin*) gene is present in enterotoxigenic *B. fragilis*. High *B. fragilis* toxin levels may be associated with impaired intestinal barrier integrity.	Intestinal barrier (PP, IV)	High	Research Insights will be triggered
BCAA producing microbes	Branched chain amino acids (BCAAs) are supplied by diet and produced by gut microbes. High blood levels may be associated with systemic inflammation.	Systemic inflammation (D)	High	Research Insights will be triggered

Beta-glucuronidase producing microbes	Beta-glucuronidases are enzymes that can re-activate some drugs and hormones. High levels may affect drug response and toxicity.	Detox/retox (PP, IV)	High	Research Insights will be triggered
Butyrate producing microbes	Butyrate, a short chain fatty acid produced from fibre fermentation, is the primary energy source for colon cells. Low levels may be associated with intestinal and systemic inflammation and impaired intestinal barrier integrity.	Intestinal inflammation (PP, IV) Systemic inflammation (D) Intestinal barrier (PP, IV)	Low	Research Insights will be triggered
Hexa-LPS producing microbes	Hexa-acylated lipopolysaccharides (hexa-LPS) are cell wall components in Gammaproteobacteria. High hexa-LPS may be associated with intestinal and systemic inflammation and impaired intestinal barrier integrity.	Intestinal inflammation (PP, IV) Systemic inflammation (D) Intestinal barrier (PP, IV)	High	Research Insights will be triggered
Hydrogen sulphide producing microbes	Hydrogen sulphide is a malodorous gas produced by some gut microbes from sulphur-containing compounds. Optimal levels may be associated with intestinal barrier integrity.	Intestinal barrier (PP, IV)	High	Research Insights will be triggered
IPA producing microbes	3-indolepropionic acid (IPA) is a beneficial metabolite produced from tryptophan. Low IPA may be associated with intestinal and systemic inflammation and impaired intestinal barrier integrity.	Intestinal inflammation (PP, IV) Systemic inflammation (B) Intestinal barrier (PP, IV)	Low	Research Insights will be triggered
Methane producing microbes	Methane is an odourless gas produced by Archaeal species, also known as methanogens. High levels may be associated with reduced intestinal motility.	Intestinal motility (C)	High	Research Insights will be triggered
Microbial diversity	A measure of species count and evenness. Low microbial diversity may be associated with microbiome instability, systemic inflammation and faster gut transit time.	Systemic inflammation (D) Intestinal motility (C)	Low	Research Insights will be triggered
Mucin consuming microbes	Mucin is the primary component of mucus that protects the gut barrier. High levels of mucin degrading microbes may be associated with intestinal inflammation.	Intestinal inflammation (D)	High	Research Insights will be triggered
Oral species	Species commonly found in the mouth. High levels may be associated with intestinal inflammation, PPI use, reduced bacterial load or poor dental health.	Intestinal inflammation (D)	High	Research Insights will be triggered

Oxalate consuming microbes	Oxalate is a key component in kidney stones. Low oxalate consuming microbes may be associated with increased urinary oxalate excretion.	Detox/retox (D)	Low	Research Insights will be triggered
Propionate producing microbes	Propionate, a short-chain fatty acid produced from fibre fermentation, regulates the immune system. High propionate producing microbes may be associated with slow gut transit.	Intestinal inflammation (PP, IV)	Low	Research Insights will be triggered
		Intestinal motility (D)	High	
Trimethylamine producing microbes	Trimethylamine is a disease-associated metabolite produced from carnitine or choline and is converted to trimethylamine-n-oxide (TMAO) in the liver. High plasma TMAO may be associated with systemic inflammation.	Systemic inflammation (C)	High	Research Insights will be triggered

Emerging Markers	
Ammonia (urease) producing microbes	The enzyme urease breaks down urea into ammonia. The role of microbial urease remains unclear.
GABA producing microbes	GABA (gamma-aminobutyric acid), a neurotransmitter, is proposed to play a role in gut motility and gut-brain communication. While mostly produced in the brain, the role of microbially produced GABA is unclear.
GABA consuming microbes	GABA (gamma-aminobutyric acid), a neurotransmitter, is proposed to play a role in gut motility and gut-brain communication. While mostly produced in the brain, the role of microbial GABA consumption is unclear.
Histamine producing microbes	Histamine, produced by immune cells and some microbes, may modulate immune function and gut motility.
Human DNA	Most faecal DNA is microbial. Human DNA sources include mucus, epithelial cells, blood, or contamination during sampling. High levels may be associated with ulcerative colitis, colorectal cancer or *C. difficile* infection.
Lactate producing microbes	Lactate, produced by microbial fermentation of carbohydrates, can be converted to propionate or butyrate.
Vitamin K producing microbes	Vitamin K, a fat-soluble vitamin essential for blood clotting, is sourced from the diet or the microbiome.

Health Categories			
Name		Description	Markers linked to health categories
Intestinal motility		Intestinal motility is defined as the movement of contents through the gastrointestinal tract. The microbiome markers can be used to assess the relationship between the microbiome and gut transit time. The GI health marker (pH) can be utilised to evaluate gut transit time.	**GI health marker:** • Faecal pH **Microbiome markers:** • Diversity • Methane • Propionate
Intestinal inflammation		Intestinal inflammation refers to immune activation occurring within the gastrointestinal system. The microbiome markers can be utilised to assess the potential for the microbiome to prevent or exacerbate intestinal inflammation. The GI health markers provide a measure of the level of active intestinal inflammation.	**GI health markers:** • Calprotectin • Lactoferrin • Occult blood • Secretory IgA **Microbiome markers:** • Acetate • Butyrate • Hexa-LPS • IPA • Mucin • Propionate
Intestinal barrier		The intestinal barrier separates the contents of the intestinal lumen from the rest of the body. The microbiome markers can be used to assess the potential for the microbiome to protect or impair intestinal barrier integrity. The GI health markers provide a measure of intestinal barrier integrity within the small intestine.	**GI health markers** • Secretory IgA • Zonulin family peptides **Microbiome markers** • *B.fragilis* toxin • Butyrate • Hexa-LPS • Hydrogen sulphide • IPA
Systemic inflammation		Systemic inflammation can be detected via elevated markers of immune activation within the blood. The microbiome markers can be utilised to assess the potential for the microbiome to prevent or exacerbate systemic inflammation.	**Microbiome markers** • BCAA • Butyrate • Diversity • Hexa-LPS • IPA • Trimethylamine
Detox/retox		Detox represents the role of the microbiome in detoxification and elimination of compounds from the body. The microbiome markers can be used to assess the potential for the microbiome to influence oxalate, drug and hormone excretion.	**Microbiome markers** • Oxalate • Beta-glucuronidase
Digestive secretions		Digestive secretions reflect the role of exocrine functions in determining environmental conditions within the gastrointestinal tract.	**GI health marker** • Pancreatic elastase

Glossary

Glossary	
Archaea	A domain of life consisting of single celled organisms that are distinct from bacteria. In humans, Archaea are detected in approximately one-third of gut microbiome samples.
Bacteria	Microscopic, single-celled organisms. The human body hosts a vast number of these microorganisms. While the majority of bacteria living in and on the body are harmless or beneficial, only a small proportion are responsible for causing illnesses.
CE certified	The CE marking certifies that a medical device or in vitro diagnostic device (IVD) meets European Union (EU) regulatory requirements and is safe and effective for its intended use.
Clinical Insights	Scientifically graded practice recommendations. They are shown in the report if a diagnostic gastrointestinal health marker is outside of the reference range.
Compared to Healthy Cohort	This compares the relative abundance of each species within your patient's microbiome to the healthy cohort. It shows whether the species in your patient's microbiome accounts for a higher or lower proportion of the microbiome than is seen in healthy microbiomes that contain that species. To ensure clinically relevant comparisons, each species is compared only to members of the healthy cohort who are colonised with that species. A negative value means the microbial group is less abundant compared to the healthy cohort. A positive value means the microbial group is more abundant compared to the healthy cohort. A comparison to the healthy cohort is not provided for rare species. As rare species are found in less than 5% of the healthy cohort, insufficient data is available to provide a reliable score.
Distance from Average	The distance from average compares the relative abundance of each species within your patient's microbiome to the healthy cohort. It shows whether the species in your patient's microbiome accounts for a higher or lower proportion of the microbiome than is seen in healthy microbiomes that contain that species. To ensure clinically relevant comparisons, each species is compared only to members of the healthy cohort who are colonised with that species. A negative value means the microbial group is less abundant compared to the healthy cohort. A positive value means the microbial group is more abundant compared to the healthy cohort. No distance from average is provided for rare species. As rare species are found in less than 5% of the healthy cohort insufficient data is available to provide a reliable score.
Emerging Marker	An Emerging Marker is a microbiome marker which has historically been of clinical interest. These markers have emerging evidence leading to uncertainty around their role in human health.
Evidence grade A	Body of evidence can be trusted to guide practice.
Evidence grade B	Body of evidence can be trusted to guide practice in most situations.
Evidence grade C	Body of evidence provides some support for recommendation, but care should be taken in its application.
Evidence grade D	Body of evidence is weak, and recommendation must be applied with caution.
Evidence grade PP, H	Body of evidence is observational only and must be applied with caution.

Evidence grade PP, IV	Body of evidence is in vitro and must be applied with a high degree of caution.
Expert Summary	The Expert Summary provides a summary of the results of your microbiome report helping you to identify where to focus your patient management plan and to save you time. All summaries are reviewed and signed off by credentialed health professionals from the Microba Clinical team.
Fungi	A kingdom of organisms which includes single-celled yeasts. Fungi are a component of the gut microbiome, although the proportion (when compared to all other organisms in the gut microbiome) is typically less than 0.01% (Evidence Grade: D). As a result of the low overall proportion of fungi in the gut microbiome, they are only detected in approximately 2% of samples.
Gastrointestinal (GI) Health Marker	Gastrointestinal (GI) Health Markers are standard laboratory tests measuring compounds that represent aspects of gut health. They may act as an aid to diagnosis or monitoring treatment.
Genus	A taxonomic group that consists of a number of similar or closely related species.
Graded Statements	Summarise the evidence for how microbial markers and gastrointestinal markers are associated with the health categories.
Microbiome Marker	Microbiome Markers provide a community level view of how the overall gut microbiome is functioning. They are based on the combined abundance of microbial species in a patient's sample that are either capable of performing specific metabolic functions (such as producing butyrate) or represent distinct microbial patterns (such as diversity). They are measured using (shotgun) metagenomic sequencing. Results for each of the 14 Microbiome Markers are displayed on the marker card along with insights for patient management.
Oral Species	Species identified in faecal samples that typically inhabit the human mouth. Microbiome Explorer can assess a total of 410 oral microbial species within a stool sample.
Pathogen	Pathogens are harmful bacteria, viruses or protists that can cause infection and disease.
Pathogen Marker	Pathogens are tested using RT-PCR (real-time polymerase chain reaction) which is a highly sensitive method for detecting specific regions of DNA that typically indicate the presence of the pathogen, species or genus reported. Results for each of the 18 Pathogen Markers are displayed on the marker card along with insights for patient management.
Phylum	A taxonomic grouping of organisms based on their fundamental characteristics.
Prevalence	Prevalence categorises how commonly a species is found in the healthy cohort. There are no species which all microbiomes must contain however, more common species are better researched and therefore better understood by the scientific community.
Protist/Parasites	A diverse group of organisms within the eukaryotic Domain of life. Some protists are parasitic and can cause infections. Metagenomics can provide high-resolution identification of some protists, such as Blastocystis subtypes.
Relative Abundance	The relative abundance reflects the percentage of total microbial cells identified as the listed microbial group. For example, if the most common species in your patient's microbiome has a relative abundance of 20% this means that one in five microbial cells are classified as this species.
Research Insights	Scientifically graded and evidence-based statements for interventions to modify microbiome markers or faecal pH. They are shown in the report if a microbiome marker is different from the healthy cohort, or if faecal pH is outside of the literature derived reference range.
Species alpha-numeric identifier	Uncultured microbes are identified via an alphanumeric identifier. E.g., CAG-302 sp001916775.

Species Latin name	Cultured species are given Latin scientific names which consist of the genus followed by the species name. E.g., *Escherichia coli*.
Species MIC number	Microba uses its world leading database to mine new genomes which are identified using a MIC number. These MIC species names are only found in Microba supported products.
Species names	The species list will contain Latin scientific species names as well as species identified by alphanumeric and MIC numbers. The type of name which a species has does not reflect the importance of that species in your patient's microbiome.
+	The plus symbol indicates health-associated species that have been shown to be reduced in the microbiomes of people with a certain disease compared to healthy controls.
−	The minus symbol indicates disease-associated species that have been shown to be increased in the microbiomes of people with a certain disease compared to healthy controls.
− +	The plus/minus symbol indicates species that have been shown to be increased in the microbiomes of people with some diseases while reduced in the microbiomes of people with other diseases compared to healthy controls.

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