MY PH1 HANDBOOK:
Management, monitoring, and more

Welcome to a guide that includes information and tips for taking on primary hyperoxaluria type 1 (PH1) in your daily life.

TAKE ON PH1™

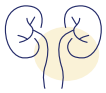
NAME: _____

Know your opponent: What is PH1?

Primary hyperoxaluria type 1 (PH1) is a rare, inherited disease that causes the **overproduction of oxalate.**

PRIMARY	HYPER OXAL URIA	TYPE 1
inherited	too much oxalate urine	a certain kind
A disease you are born with	that causes too much oxalate in the urine	and has different types. Type 1 is the most common and serious.

LIVER



KIDNEYS

What is oxalate?

Oxalate is a waste product normally present in small amounts in the body. It cannot be further broken down or used by the body for anything, and is primarily removed by the kidneys. **In PH1, the liver makes too much oxalate,** and the kidneys eventually can't keep up with removing it.

Too much oxalate can be a cause for concern

Oxalate overproduction can damage the kidneys and can affect your body's ability to filter waste from the blood. With or without symptoms, this damage is progressive, meaning it can be getting worse over time, and cause permanent damage.

Because of the progressive nature of the disease, it's important that PH1 is diagnosed as early as possible, so that you can take proactive steps with your healthcare provider to manage your PH1.

How does PH1 affect the body?

Kidney stones that form due to oxalate overproduction in the liver are the most common symptom of PH1.

Symptoms of kidney stones may include:

- Pain in the side of the body
- Painful and/or bloody urination
- Urinary tract infections

Other symptoms of PH1 may include:

- Crystal deposits in the kidneys known as nephrocalcinosis
- Kidney failure
- Crystal deposits in other organs (systemic oxalosis), including the eyes, bones, skin, heart, and central nervous system
- Failure to thrive in babies

Does everyone with PH1 have the same symptoms?

Patients with PH1 may experience different symptoms at different times in life; some will experience symptoms as babies, while others may not have symptoms until later in life. While symptoms vary from person to person, oxalate is always overproduced in the body and can cause damage to the kidneys and other organs.

PH1 is passed down through families.

It is important that **family members, especially siblings of a person with PH1, consider having a conversation with a healthcare provider about getting tested for the disease with a genetic test.** If a healthcare provider decides genetic testing is right for an individual, one option is Alnylam Act®, which you can read more about on page 11.

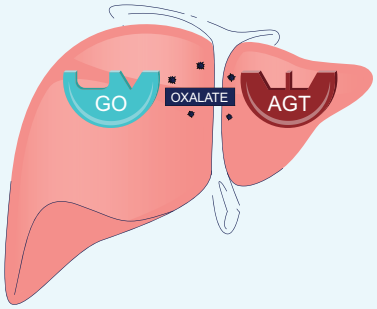
HAVE FAMILY MEMBERS BEEN GENETICALLY TESTED FOR PH1? ☐ Yes ☐ No

ADDITIONAL INFORMATION: _____

PH1 causes the liver to make too much oxalate.

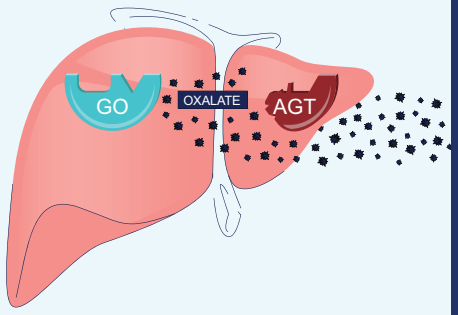
NORMAL PROCESS

GO and AGT enzymes in the liver work together to regulate levels of oxalate



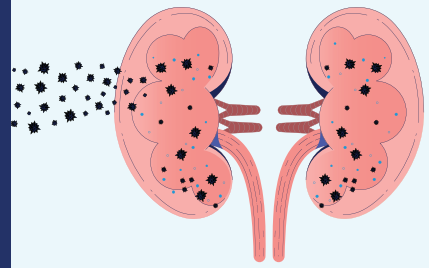
PH1 PROCESS

When AGT is broken, GO can cause problems leading to the overproduction of oxalate



PH1 PROCESS

With PH1, the body makes more oxalate than usual and the kidneys can't keep up with the amount being produced. This causes continuous damage and can get worse over time

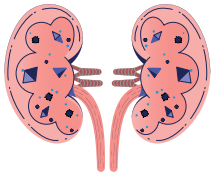


GO enzyme: glycolate oxidase enzyme
AGT enzyme: alanine:glyoxylate aminotransferase enzyme

PH1 is considered a disease of oxalate overproduction, so oxalate levels are one of the things your healthcare provider likely tracks.

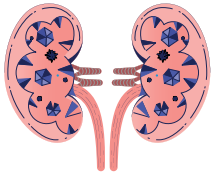
The kidneys fight to get rid of oxalate, but it can still build up.

In PH1, there can be too much oxalate and the kidneys can't get rid of it all, causing the symptoms of the disease.



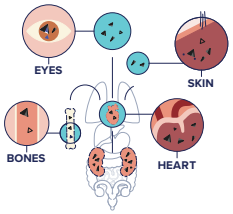
Oxalate forms into crystals in the kidneys

Once in the kidneys, oxalate combines with calcium in urine. When oxalate and calcium combine, crystals are formed. Over time, more and more crystals are made that get trapped in the kidneys.



Oxalate crystals cause damage to the kidneys

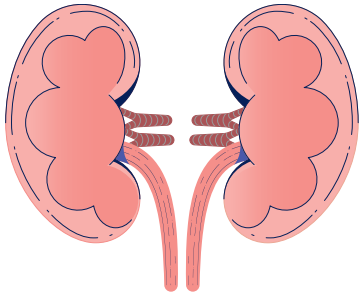
Crystals can clump together to create hard masses (kidney stones), or they can be deposited in the kidneys themselves (nephrocalcinosis).



PH1 tends to worsen over time

The buildup of crystals in the kidneys can lead to chronic kidney disease (CKD) or even kidney failure.

As kidney function worsens, the kidneys are no longer able to remove oxalate properly, and it starts to spread and cause damage elsewhere—a process called "systemic oxalosis."



Symptoms of Kidney Failure:

- Producing less urine
- Nausea or vomiting
- Pale skin color
- Swelling of the hands and feet
- Fatigue and weakness

Patients experiencing these symptoms should see a doctor immediately.

People with PH1 should strive to keep up with the management plan they have developed with their healthcare provider.

Making a game plan to manage your condition.

Your doctor will work with you to develop a management plan to try to reduce symptoms and try to prevent the disease from getting worse.

The goal: slow progression

As part of your management plan, your healthcare provider may measure different things, including your **oxalate levels** (how much oxalate is in your urine and/or blood) and your **kidney function** (how well your kidneys are able to filter waste products).

Your healthcare provider may recommend that you use **multiple PH1 management options at the same time.** Your doctor's recommendations may shift or change over time, depending on how your disease is progressing.

PH1 management options your healthcare provider may recommend

- Lifestyle changes
- Hydration (drinking a lot of water)
- Medications and supplements
  - These work by reducing the formation of oxalate crystals or reducing the amount of oxalate that your body is producing
- Surgery
- Other approaches

Your doctor can help you understand which management options are best for you.

> *We feel like it's been really important to her health to be consistent with her diet, to be consistent with her medications, and to be consistent with her hydration.*

DAN W.
DAD OF A CHILD WITH PH1

Patients with PH1 should always talk to their doctor before making changes to their disease management plan.

It takes a team to take on PH1.

PH1 requires lifelong management and monitoring. Since PH1 is a personal experience and affects everyone differently, your doctors and healthcare team will help you approach the different aspects that managing PH1 can involve and work with you to create a personalized plan. Because your care plan is based on how your disease is progressing, it is important that you attend all appointments with the various members of your healthcare team. You can use this page to help keep track of their names and their contact info.

Your nephrologist

A nephrologist specializes in diseases like PH1 that affect the kidneys. Typically, a nephrologist will take the lead role in the overall management of your disease. However, other specialists may be involved in your care as well.

NAME: _____

CONTACT INFO: _____

The extended healthcare team in your corner

These are some of the specialists you may meet in your journey with PH1.

UROLOGIST A surgeon who specializes in disorders of the urinary tract and often addresses kidney stones in patients with PH1.	NAME: _____ CONTACT INFO: _____
GENETIC COUNSELOR A specialist who can answer questions you might have about genetic testing and interpret your results.	NAME: _____ CONTACT INFO: _____
OTHER (Dialysis Nurse, Transplant Team, Primary Care, Radiology, etc.) Other healthcare providers who help along the way.	NAME: _____ CONTACT INFO: _____

As you are working with your healthcare team, friends and family may also be able to provide invaluable emotional and practical support.

Taking control of your PH1 management plan.

It can be challenging to manage PH1—from taking multiple medications to drinking substantial amounts of water to attending frequent dialysis sessions. However, there are techniques you can try to help you feel more in control when managing PH1 seems overwhelming. **Just remember to always discuss your management plan with your healthcare provider before making any changes to your routine.**

Tips for drinking enough water

If hydration is part of your management plan, it's essential to be aware of situations that can make you dehydrated, such as sickness (as with diarrhea, vomiting, or fever), intense physical activity, and not drinking enough water.

You should always talk to your doctor before making changes to your disease management plan.

> *My advice would be to just keep moving forward, to accept the support that so many people want to give you.*

PAT C.
MOM OF AN ADULT WITH PH1

Check off all of the things you are currently doing or would like to do:

PREPARATION

- ☐ Make sure you always have plenty of water available by keeping bottles filled up around the house, in your car, and in all your bags
- ☐ Bring water with you when going to a new place

REMINDERS

- ☐ Set alarms on your phone to remind yourself to drink water
- ☐ Set deadlines for yourself to drink a certain amount by a particular time

GET CREATIVE

BRAINSTORM WITH YOUR HEALTHCARE TEAM

- ☐ Eat foods with high water content, especially fruits and vegetables
- ☐ Though drinking water is the preferred way to staying hyperhydrated, you can ask your healthcare team about including other fluids like milk and orange juice

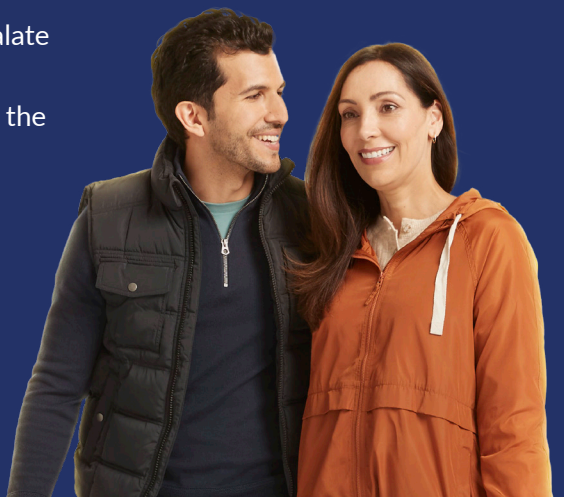
Getting others involved to help you manage your PH1 can help you feel supported and motivated to take on your disease.

Preparing for your journey with PH1.

Although consistent management may make a difference in slowing kidney damage, some people with PH1 may experience continued disease progression and transplant surgery may eventually be necessary.

Dialysis and Transplant

- If the kidneys become damaged, dialysis may be needed to remove oxalate and other waste products from the blood
- Patients may be considered for a liver and/or kidney transplant to stop the overproduction of the oxalate and/or replace the damaged kidney
- Your doctor can help you understand which management options are best for you



Transplant surgeries are major surgeries that require preparation, long-term follow-up, and lifelong medications. Talk to your healthcare provider about developing a detailed plan to help you recover from your surgery.

Wherever you are in your PH1 journey, you may have to teach others about your disease.

Not all people, including some members of your healthcare team, may be familiar with PH1. However, you can play an important role in educating others about your disease. Try coming up with a quick description of PH1 that you can share with others.
You can use the space to the right to jot it down.

IF ASKED ABOUT PH1, I'LL SAY:

It's more than caring for your kidneys—it's caring for yourself, too.

Navigating your overall health is important as you continue to take on PH1.

Nutrition

There is no particular diet for people with PH1 to follow. Strictly avoiding foods high in oxalate is not typically necessary in PH1. You should talk to your healthcare team to discuss the most appropriate nutrition plan.

> *We're doing all we can to preserve her kidneys and do things that help to keep them going and not damaged. So, drinking water, eating the right diet, taking her medicine routinely and not forgetting.*

LAURA W.
MOM OF A CHILD WITH PH1

Mental health

For people with PH1, being unable to recognize when you're experiencing symptoms of kidney disease can make you feel as if you are not in control. It's been shown that in people with kidney disease, the outlook on their disease can influence symptoms of anxiety and depression that they may experience. **Consider speaking to a mental health professional if you feel like you need extra support.**

If you are already working with a mental health professional, you can use the space below to write down their name and contact information.

MENTAL HEALTH PROFESSIONAL:

CONTACT INFO:

Keeping your body and mind healthy and strong can help you take on PH1.

Expand your circle of support.

Healthcare providers, independent advocacy groups, and other people living with PH1 can be great resources for additional tips and guidance. Below are 4 resources that are just a search away.

TakeOnPH1.com
An educational website, brought to you by Alnylam, that includes real patient stories, videos, tips, and downloadable resources for anyone looking to learn more about PH1 and living with PH1.

The Oxalosis & Hyperoxaluria Foundation (OHF)
www.ohf.org
The OHF is an independent advocacy group dedicated to finding treatments and a cure for all forms of hyperoxaluria, and supports thousands of healthcare professionals, patients, and their families.

American Kidney Fund (AKF)
www.kidneyfund.org
AKF works on behalf of the 37 million Americans living with kidney disease and millions more at risk, providing resources that support people in their fight against kidney disease, including rare diseases such as PH1.

Alnylam Act®: One option for genetic testing and counseling
www.invitae.com/en/alnylam-act-hyperoxaluria-type-1

If you haven't been diagnosed with PH1, you or your healthcare provider can request genetic testing and counseling through the Alnylam Act® program if you meet certain criteria. The test is done using a blood, saliva, or buccal sample. Eligible siblings and family members may also be tested through Alnylam Act®.

The Alnylam Act® program was created to provide access to no-charge genetic testing and counseling to patients as a way to help people make more informed decisions about their health.

- While Alnylam provides financial support for this program, tests and services are performed by independent third parties
- Healthcare professionals must confirm that patients meet certain criteria to use the program
- Alnylam receives de-identified patient data from this program, but at no time does Alnylam receive patient-identifiable information. Alnylam uses healthcare professional contact information for research and commercial purposes
- Genetic testing is available in the US and certain other countries. Genetic counseling is only available in the US
- Healthcare professionals or patients who use this program have no obligation to recommend, purchase, order, prescribe, promote, administer, use, or support any Alnylam product
- No patients, healthcare professionals, or payers, including government payers, are billed for this program

For more information and program rules, download the Alnylam Act® Genetic Testing and Counseling Brochure for PH1.
AlnylamActPH1.com

TAKE ON PH1™

With the right information, support, and mindset, you can feel motivated to **get ahead of your PH1**.

Alnylam® PHARMACEUTICALS