Welcome to your personalized guide to taking on primary hyperoxaluria type 1 (PH1) in your daily life.
Know your opponent: What is PH1?

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

What is oxalate?
Oxalate is a waste product normally present in small amounts. It cannot be further broken down or used by the body for anything, and is primarily eliminated 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 and to create urine. With or without symptoms, this damage is progressive, meaning it can be getting worse over time, and the damage can be permanent. However, management options can help slow progression.

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 to manage your PH1.
PH1 puts your kidneys at risk.

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

Symptoms of kidney stones can include:
- Pain in the side of the body
- Painful and/or bloody urination
- Urinary tract infections

Even if you can’t feel it, oxalate can be causing harm

Not everyone with PH1 will get kidney stones. Even if you are not making kidney stones, your kidneys are still at risk for damage because oxalate is continuously being overproduced. Eventually, other body parts may start to be damaged as well.

Genetic testing

PH1 is passed down within families, so it is important that family members, especially siblings, of a person with PH1 consider getting tested for the disease with a genetic test. If your healthcare provider decides genetic testing is right for you, 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.

In PH1, oxalate is overproduced due to a broken process that involves the liver enzymes glycolate oxidase (GO) and alanine glyoxylate aminotransferase (AGT).

Think of your liver as a factory, and these enzymes that work there as machines that help your body make or break down substances.

PH1 is considered a disease of oxalate overproduction, so oxalate levels are one of the things your doctor likely tracks.
The kidneys fight to get rid of oxalate, but it can still build up.

Typically, your body tries to get rid of oxalate by sending it to your kidneys.

**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, also known as end-stage renal disease (ESRD).

As kidney function worsens, the kidneys are no longer able to eliminate oxalate properly, and it starts to spread and form crystals throughout the body—a process called “systemic oxalosis.” Crystals cause damage where they are deposited. This can occur in multiple organs in the body, including the bones, eyes, skin, and heart.

ESRD symptoms can include:

- Producing little or no urine
- Nausea or vomiting
- Pale skin color
- Swelling of the hands and feet

If you think you are experiencing these symptoms, you may consider contacting your healthcare provider or a nephrologist.

People with PH1 should strive to keep up with their management plan.
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). To determine your kidney function, blood tests will measure your glomerular filtration rate (GFR). When looking at your results, it’s important to note that higher GFR numbers are associated with better kidney function.

You may be prescribed multiple PH1 management options at the same time. The way your PH1 is managed may shift or change over time, depending on how your disease is progressing.

Making a game plan to manage your condition.

There is a lot more to managing PH1 beyond removing stones. Most management options cannot keep up with the continuous oxalate overproduction. However, consistent management of PH1 may help you slow progressive loss of kidney function.

PH1 management options your healthcare provider may prescribe

- **HYPERHYDRATION**
  means drinking a lot of water to help dilute oxalate in your urine

- **DIALYSIS**
  can mechanically remove oxalate from your body when your kidneys are no longer able to handle it on their own

- **VITAMIN B6**
  may help the mutated enzyme try to work the way it should

- **ALKALI CITRATE**
  may help reduce crystal formation

*These medications should only be taken if prescribed by your nephrologist, who will recommend specific dosages.

Consistent management is important in PH1. Some of the options may seem challenging, but they can make a difference.

“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.”

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DAN W.
DAD OF A CHILD WITH PH1
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 care 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 care 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.

The extended care team in your corner

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

| UROLOGIST | NAME: ____________________________ | CONTACT INFO: ____________________________ |
| A surgeon who specializes in disorders of the urinary tract and often addresses kidney stones in patients with PH1. |

| GENETIC COUNSELOR | NAME: ____________________________ | CONTACT INFO: ____________________________ |
| A specialist who can answer questions you might have about genetic testing and interpret your results. |

| DIALYSIS NURSE | NAME: ____________________________ | CONTACT INFO: ____________________________ |
| A nurse specially trained to support and monitor a person undergoing dialysis. These nurses can work in hospitals or in separate dialysis centers. |

| OTHER (Transplant Team, Primary Care, Radiology, etc) | NAME: ____________________________ | CONTACT INFO: ____________________________ |
| Other healthcare providers who help along the way. |

As you are working with your care 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

Because dehydration can negatively impact kidney function, hyperhydration is crucial. It’s important 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.

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**
- Eat foods with high water content, especially fruits and vegetables
- Though drinking water is the preferred way to staying hyperhydrated, you can ask your care 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.

*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
Preparing for your journey with PH1.

Although consistent management can make a difference in slowing kidney damage, most management approaches cannot overcome liver oxalate overproduction, and transplant surgery may eventually be necessary.

Today, liver transplant is the only way to stop oxalate overproduction.*

Only a liver transplant is curative, because it resolves oxalate overproduction in the liver. Most other management options cannot do this.

Because PH1 primarily causes damage to the kidneys, both the liver and the kidneys may need to be replaced, either at the same time or during separate surgeries. This is called a dual liver-kidney transplant.

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 you are not fully responsive to vitamin B6
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, as it can have little to no impact on the disease. You should, however, talk to your care team, as they may have some specific guidance. For example, eating foods with calcium is still important. You may also be advised to avoid having too much vitamin C and D.

“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.”

**MENTAL HEALTH PROFESSIONAL:**

**CONTACT INFO:**

Keeping your body and mind healthy and strong can help you take on 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 CKD or ESRD, the outlook on their disease can influence symptoms of anxiety and depression that they may experience. If you are feeling overwhelmed, consider speaking to a mental health professional.

If you are already working with a mental health professional, you can use the space below to write down his or her name and contact information.
Expand your circle of support.

Healthcare providers, advocacy groups, and other people living with PH1 can be great resources for additional tips and guidance. Below are 3 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)**

The OHF is an advocacy group dedicated to finding treatments and a cure for all forms of hyperoxaluria, and supports thousands of healthcare professionals, patients, and their families.

**Alnylam Act®: Genetic testing and counseling offered at no charge**

Your doctor can request genetic testing and counseling through the Alnylam Act® program if you meet certain criteria. The test is simple—it’s done using a blood or saliva sample.

The Alnylam Act® program was created to provide access to 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 Canada. 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 payers, including government payers, are billed for this program
With the right information, support, and mindset, you can feel motivated to get ahead of your PH1.