DIAGNOSIS OF HHT

COMPANION FACTSHEET TO
MY HHT CARE CHECKLISTS

DIAGNOSING HHT

GENETIC TESTING

CLINICAL DIAGNOSTIC CRITERIA (OR "CURAÇAO CRITERIA")

FACTSHEET **FS**

SOME IMPORTANT FACTS TO REMEMBER ABOUT HHT ARE:

Making the diagnosis of **HHT (Hereditary Hemorrhagic Telangiectasia)** in a patient allows for the appropriate screening and preventative treatment to be undertaken in the patient and their affected family members. The cornerstone of an HHT diagnosis is the clinical diagnosis, but HHT can now also be diagnosed using genetic testing. The clinical diagnostic criteria are called the "Curaçao Criteria" and are based on the typical signs and organ involvement in HHT, as well as the family history. The goal of genetic testing for HHT is to clarify the specific HHT mutation in an HHT family, allowing diagnosis among those relatives (often children and young adults) who do not meet clinical diagnostic criteria.

cure hht
The Cornerstone of the HHT Community

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HOW HHT IS DIAGNOSED

> Genetic testing for HHT:

HHT (Hereditary Hemorrhagic Telangiectasia) is caused by a mutation (change) in one of several HHT-associated genes. There are hundreds of different mutations in each of the three known genes that can cause HHT. HHT is an autosomal dominant genetic disease (it does not skip a generation), and each child born to an HHT parent has a 50% chance of inheriting the genetic change. Once genetic testing has established the gene mutation which causes HHT within a particular family, this information can be used to help diagnose other members of the family.

- 80% of people who meet the clinical diagnostic criteria for HHT are found to have a mutation in either the **ENG (HHT type 1)** or **ACVRL1 (HHT type 2)** gene.
- **Endoglin (ENG)** - A mutation in the ENG gene causes HHT1. Pulmonary and brain AVMs are more common in patients with HHT1.
- **Activin Receptor-like Kinase 1 (ACVRL1 or ALK1)** - A mutation in ALK1 causes HHT2. Liver VMs are more common in people with HHT2.
- **SMAD-related Protein 4 (SMAD4)** - 3-5% of HHT cases are caused by a mutation in SMAD4. A mutation in SMAD4 causes a combined syndrome of juvenile polyps of the GI tract and HHT, also known as JP-HHT.
- About **10-15% of patients will not have a mutation detected** in a known HHT gene, and in these cases a diagnosis is made based on clinical evaluation alone. Therefore, negative genetic testing does not necessarily mean that a person does not have HHT.
- Although a handful of people in the world with HHT have been reported to have a mutation in the **BMP9/GDF2 gene**, it is so rare (<1%) that it is not typically a part of routine genetic testing for HHT.
- Cure HHT strongly encourages individuals and families to arrange genetic testing through a health care provider who understands all of the complexities and limitations of genetic testing for HHT. In most cases this means having an appointment with a medical geneticist or genetic counselor.

HERE ARE SOME THINGS TO DISCUSS WITH YOUR PHYSICIAN:

Whether you meet the criteria for a definite clinical diagnosis of HHT *(using the Curaçao Criteria)*.

If you have a family history of HHT and/or a HHT mutation has been identified in your family.

A referral for genetic testing to determine if you carry the family mutation if a HHT mutation has been identified in your family.

A referral for genetic counseling and genetic testing if a HHT mutation has not been identified in your family.

Clinical evaluation and/or genetic testing for your children.

Getting screening and/or treatment at an HHT Center of Excellence.

> Diagnosis with clinical diagnostic criteria, or "Curaçao Criteria":

The four Curaçao Criteria that HHT physicians use to determine if a person has HHT are listed below. A person has definite HHT if they meet at least three criteria and possible HHT if they meet two. Persons with less than two criteria are unlikely to have HHT.

- Recurrent and spontaneous **epistaxis** (nosebleeds), which may be mild to severe.
- Multiple **telangiectasias** on the skin of the hands, lips or face, or inside of the nose or mouth. Telangiectasias are small red spots that disappear when pressure is placed on them.
- **Arteriovenous malformations (AVMs)** or telangiectasias in one or more of the internal organs, including the lungs, brain, liver, intestines, stomach, and spinal cord.
- A **family history** of HHT (i.e. first-degree relative such as brother, sister, parent or child who meets these same criteria for definite HHT or has been genetically diagnosed).