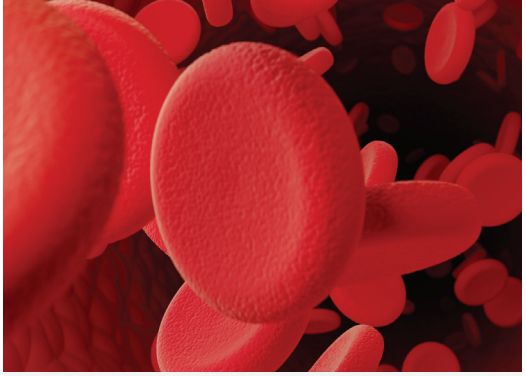
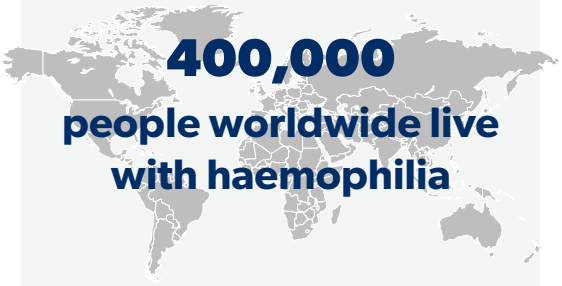


M3 GLOBAL RESEARCH **THERAPEUTIC REVIEW**

HAEMOPHILIA

QUICK FACTS



400,000
people worldwide live with haemophilia

Haemophilia occurs in approximately
1 in 5,000 live births

Haemophilia is primarily a
male disease

About
75%
of people with haemophilia worldwide receive inadequate treatment or have no access to treatment

In the early 1980s, about
8,000 people
with haemophilia in the UK contracted HIV after being exposed to contaminated clotting factor infusions from HIV-tainted blood donations

Haemophilia was given the nickname the **'Royal Disease'** because Queen Victoria, who reigned as the Queen of England from 1837 until 1901 carried the rare blood disorder gene.

WHAT IS HAEMOPHILIA?

Haemophilia is a bleeding disorder in which clotting factor deficiencies lead to bleeding in various areas of the body, with the most common types of bleeds being into the joints and muscles. A person with haemophilia can bleed inside or outside of the body. People with haemophilia do not bleed more than people without haemophilia, they just bleed longer.

The disease is caused by a missing or deficient protein needed for blood clotting. Patients with haemophilia who are not treated are at risk for bleeding and are especially vulnerable for permanent joint damage and deformities caused by bleeding into the joints and local tissue destruction from inflammation.

There are two main types of haemophilia, the most common is haemophilia A (protein clotting Factor VIII) and haemophilia B (protein clotting Factor IX). Haemophilia A is four times as common as haemophilia B while more than half of patients with haemophilia A have the severe form of haemophilia.

Factor VIII and Factor IX supplements for the treatment of haemophilia originated as clotting factor concentrates filtered out of porcine blood, but many patients eventually developed antibodies to foreign proteins and this resulted in treatment failures. Recombinant Factor products without animal proteins in the manufacturing process have been available for many years. The lower price animal sourced products remain an important treatment in less developed countries.

WHO GETS HAEMOPHILIA?

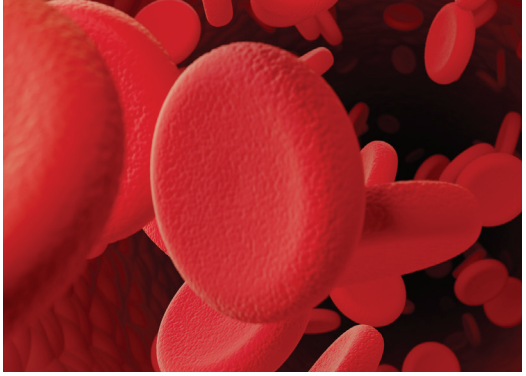
The US Center for Disease Control and Prevention reports that haemophilia occurs in approximately 1 in 5,000 live births. Haemophilia affects all races and ethnic groups. According to the National Hemophilia Foundation (NHF), there are approximately 20,000 individuals in the United States with haemophilia. Data elsewhere in the world are sparse, but NHF estimates there are more than 400,000 with the disease.

Haemophilia is primarily a male disease, because it is an X-chromosome-linked condition, and females are rarely found with the disease. Most are diagnosed as children; CDC data reveals the median age at diagnosis is 36 months for people with mild haemophilia, eight months for those with moderate hemophilia, and one month for those with severe haemophilia.

While haemophilia is often passed down from parents to their children, approximately one-third of cases are caused by a spontaneous mutation in a gene that provides instructions for making the clotting factor proteins needed to form a blood clot. According to the World Federation of Hemophilia, when the father has haemophilia, but the mother does not, none of the sons will have haemophilia, while all the daughters will carry the haemophilia gene. For each child, there is a 50% chance that a son will have haemophilia and a 50% chance that a daughter will carry the gene.

The World Federation of Hemophilia created the "World Bleeding Disorders Registry (WBDR)" in 2018. The WBDR is an online web-based entry system designed to provide a network of haemophilia treatment centres to collect standardised patient data and guide clinical practice. They hope that patient enrollment will exceed 10,000 patients from 50 countries.

Last updated on 07/11/2018



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HAEMOPHILIA

HOW IS HAEMOPHILIA TREATED?

While there is no cure for haemophilia, there are effective treatments available. However, these treatments often require lifelong infusion of drugs manufactured from human plasma or through recombinant biotechnology. Patients with severe haemophilia often require infusions several times a week. Older patients are often able to manage their condition with less frequent infusions. Advances to create longer lasting clotting factors have reduced infusion frequency for some patients.

The CDC advises that good quality medical care from doctors and nurses who know a lot about the disorder can help prevent some serious problems. A haematologist specialises in blood disorders, including haemophilia. In the US, often the best choice for care is to visit a comprehensive haemophilia treatment centre (HTC). A HTC not only provides care to address all issues related to the disorder, but also provides health education to help people with haemophilia stay healthy.

Along with haematologists, patients may also be treated by orthopaedic specialists in disorders of the bones and joints, which are commonly affected by haemophilia, as well as physical therapists.

Recent advances in gene technology offer the promise of correcting the basic genetic defect with DNA sequences coding for normal proteins and having the patient produce their own Factor VIII or Factor IX proteins.

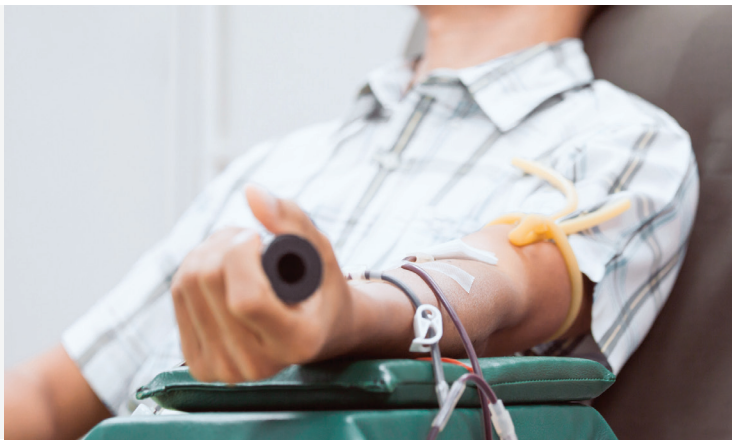
> "I feel very positive about developments in haemophilia treatment. I'm hopeful that I will be invited to participate in a new gene therapy treatment trial which could result in an effective cure. I know that progress is being made, which is reassuring."
>
> M3 Global Research Patient Panelist
> Hitchin, United Kingdom
> (45-year-old with severe haemophilia B)

M3 KNOWS HAEMOPHILIA

In the most recent 16-month period*, M3 Global Research fielded 205 blood disorder studies globally, with 19,203 respondents. Of the 205 studies, 69 studies were focused on haemophilia specifically, with 5,728 respondents.

For additional information on accessing our robust global panel of haematologists, paediatric haematologists, patients, and caregivers, contact research@usa.m3.com.

*Studies were fielded between January 2017 and May 2018



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