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Genetic disorder in European royaltyQueen Victoria's descendants with haemophilia and known female carriersInheritance by female carriersHaemophilia figured prominently in the history of European royalty in the 19th and 20th centuries. Queen Victoria and her husband, Prince Albert of the United Kingdom, through two of their five daughters Princess Alice and Princess Beatrice passed the mutation various royal houses across the continent, including the royal families of Spain, Germany and Russia. Victoria's youngest son, Prince Leopold, Duke of Albany, also had the disease, though none of her three elder sons did. Tests on the remains of the Romanov imperial family show that the specific form of haemophilia passed down by Queen Victoria was probably the relatively rare haemophilia B.[1] The presence of haemophilia B within the European royal families was well known, with the condition once popularly termed the 'royal disease'. The sex-linked X-chromosome bleeding disorder manifests almost exclusively in males, even though the genetic mutation causing the disorder is located on the X-chromosome and can be inherited from the mother by male children or from either mother or father by female children. This is because the trait is recessive, meaning that only one correctly functioning copy of the blood-clotting factor gene is necessary for normal clotting. Females have two X-chromosomes, and hence redundant copies of the blood-clotting factor gene located on them. A female who inherits a mutated copy on one X-chromosome has also inherited a second X-chromosome from the other parent that is likely to carry a non-mutated copy of the gene, capable of directing appropriate clotting. Such a female, with normal clotting but possessing a single mutated copy of the gene, is called a carrier. Males possess only a single X-chromosome, inherited from their mother, having received a Y-chromosome from their fathers instead of a second X. If their sole X-chromosome contains the haemophilia mutation they possess no second copy to provide for normal function, as in carrier females. Each child of a carrier will have a 50 percent chance of inheriting their mother's mutation, of being a haemophilic (sons) or carrier (daughters). The daughter of a male haemophilic will always inherit his mutation, while a son cannot ever inherit it. A female will be affected with haemophilia proper only in the rare circumstance that she inherits mutated X-chromosomes from both a haemophilic father and a carrier or a haemophilic mother. No case of such double inheritance is known among Queen Victoria's descendants, although there has been at least one symptomatic carrier.Although an individual's haemophilia can usually be traced in the ancestry, in about 30 percent of cases, there is no family history of the disorder, and the condition is speculated to be the result of spontaneous mutation in an ancestor.[2] Victoria's appears to have been a spontaneous or de novo mutation, most likely inherited from one of her parents, and she is usually considered the source of the disease in modern cases of haemophilia among her descendants. Queen Victoria's mother, Victoria, Duchess of Kent, was not known to have a family history of the disease, although it is possible that she was a carrier, but among her three children only Victoria received the mutated copy. Queen Victoria's father, Prince Edward, Duke of Kent, was not a haemophilic, but the mutation may have arisen as a germ-line mutation within him. The rate of spontaneous mutation is known to increase with paternal age (and is higher in fathers than in mothers at all ages); Victoria's father was 51 at her birth. The probability of Victoria's mother having had a lover with haemophilia is minuscule, given the low life expectancy of early 19th-century haemophiliacs, as well as the otherwise low possibility of illegitimacy in this instance.Victoria, German Empress (18401901) Issue: Wilhelm II of Germany, Charlotte, Duchess of Saxe-Meiningen, Prince Henry of Prussia, Prince Sigismund of Prussia, Viktoria, Princess Adolf of Schaumburg-Lippe, Prince Waldemar of Prussia, Sophia, Queen of the Hellenes, Margaret, Landgravine of Hesse-KasselEdward VII, King of the United Kingdom (18411910) Issue: Prince Albert Victor, Duke of Clarence and Avondale, George V, Louise, Princess Royal, Princess Victoria, Maud, Queen of Norway, Prince Alexander JohnPrincess Alice, Grand Duchess of Hesse and by Rhine (18431878) Issue: Victoria Mountbatten, Marchioness of Milford Haven, Grand Duchess Elizabeth Feodorovna of Russia, Irene, Princess Henry of Prussia, Ernest Louis, Grand Duke of Hesse and by Rhine, Prince Friedrich, Alexandra Feodorovna, Empress of Russia, Princess Marie of Hesse and by RhinePrince Alfred, Duke of Saxe-Coburg and Gotha (18441900) Issue: Victoria Prince of Saxe-Coburg and Gotha, Marie, Queen of Romania, Grand Duchess Victoria Feodorovna of Russia, Alexandra, Princess of Hohenzollern-Jagenburg, Princess Beatrice, Duchess of GallieraHelena, Princess Christian of Schleswig-Holstein (18461923) Issue: Prince Christian Victor, Albert, Duke of Schleswig-Holstein, Princess Helena Victoria, Princess Marie Louise, Prince HaraldPrincess Louise, Duchess of Argyll (18481939) No issuePrince Arthur, Duke of Connaught and Strathearn (18501942) Issue: Margaret, Crown Princess of Sweden, Prince Arthur of Connaught, Lady Patricia RamsayPrince Leopold, Duke of Albany (18531884) Issue: Princess Alice, Countess of Athlone, Charles Edward, Duke of Saxe-Coburg and GothaBeatrice, Princess Henry of Battenberg (18571944) Issue: Alexander Mountbatten, 1st Marquess of Carisbrooke, Victoria Eugenie, Queen of Spain, Lord Leopold Mountbatten, Prince Maurice of BattenbergQueen Victoria's eldest daughter, Victoria, Princess Royal, apparently escaped the haemophilia gene, as it did not appear in any of her matrilineal descendants. Victoria's fifth child, Princess Helena, may or may not have been a carrier; two healthy sons survived to adulthood, but one son died in infancy, another was stillborn, and her two daughters did not have issue. Victoria's sixth child, Princess Louise, died without issue. Queen Victoria's sons Edward VII, Alfred, Duke of Saxe-Coburg and Gotha, and Prince Arthur, Duke of Connaught and Strathearn were not haemophiliacs; however, her daughters Alice and Beatrice were confirmed carriers of the gene, and Victoria's son Leopold had haemophilia, making his daughter Princess Alice, Countess of Athlone a carrier as well.vtHaemophilia in European royaltyQueen Victoria XxAlberty XVVictoria XyEdward VII XyAlice XxLouis IV XyAlfred XyHelena XxLouis XyArthur XyLeopold XyHelen XXBeatrice XXHenry XVVictoria XyElizabeth XyIrene XxHenry XYErnest Louis XYFrederick xYAlx XxNicholas II XYAlice XxAlexander XYWaldemar XYSigismund XYHenry xYOlga XX? Tatiana XX?Maria Xx?Anastasia XX?Alexei xYMay XyRupert xYMaurice XYAlexander XYVictoria Eugenie XxAlfonso XIII XYLeopold xYMaurice XYAlfonso XyJaime XYBeatriz XYMaria Cristina XYJuanXYGonzalo xYLegend: X unaffected X chromosome; x affected X chromosome; Y Y chromosome;? - unknown carrier statusSource: Aronova-Tiuntseva, Yelena; Herreid, Clyde Freeman (20 September 2003). "Hemophilia: The Royal Disease" (PDF). SciLinks. National Science Teachers Association. Archived from the original (PDF) on 10 January 2018.Alice (18431878), Victoria's third child, and wife of the future Grand Duke Louis IV of Hesse and by Rhine (18371892), passed it on to at least three of her children: Irene, Friedrich, and Alix.Princess Victoria of Hesse and by Rhine (18631950), later Marchioness of Milford Haven, wife of Prince Louis of Battenberg (18541921), and maternal grandmother to Prince Philip, Duke of Edinburgh, apparently was not a carrier.Princess Elizabeth of Hesse and by Rhine (18641918), later Grand Duchess Elizabeth Feodorovna of Russia through her marriage to Grand Duke Sergei Alexandrovich (18571905), may or may not have been a carrier. Following her husband's assassination, she became a nun and was childless when killed by the Bolsheviks in 1918.Princess Irene of Hesse and by Rhine (18661953), later Princess Heinrich of Prussia, through her marriage to Prince Heinrich of Prussia (18621929), passed it on to two of her three sons:Prince Waldemar of Prussia (18891945). Survived to age 56; had no issue.Prince Henry of Prussia (19001904). Died at age 4.Prince Friedrich of Hesse and by Rhine (18701873). Died before his third birthday of bleeding on the brain resulting from a fall from a third-story window (which would almost certainly have not been fatal if he had not had haemophilia).Princess Alix of Hesse and by Rhine (18721918), later Empress Alexandra Feodorovna of Russia through her marriage to Tsar Nicholas II (18681918). Alix had a marriage proposal from her first cousin, Prince Albert Victor (18641928), eldest son of the then Prince of Wales (later King Edward VII), had she accepted, haemophilia could have returned to the direct line of succession in the United Kingdom.Grand Duchess Maria Nikolaevna (18891918), Nicholas and Alexandra's third daughter, was thought by some to have been a symptomatic carrier because she haemorrhaged during a tonsillectomy.[3] DNA testing of the Romanov family remains in 2009 showed that one of the four daughters, thought to be Maria by American researchers and Anastasia by Russian researchers, was a carrier.[1]Tsarevich Alexei (19041918) was murdered with his family by the Bolsheviks at the age of 13. Alexei's haemophilia was one of the factors contributing to the collapse of Imperial Russia during the Russian Revolution of 1917.[4]Princess Marie of Hesse and by Rhine (18471878), Alexei's severe and last child, may or may not have been a carrier. She died of diphtheria at the age of four.Leopold (18531884), Victoria's eighth child, was the first member of the family to manifest haemophilia; he died at age 30 from bleeding after a minor fall.[5] only two years after marrying Princess Helen of Waldeck and Pyrmont (18611922).He passed the gene on to his only daughter:Princess Alice of Albany (18831981), later Countess of Athlone, who in turn passed it on to her elder son:Prince Rupert of Teck (19071928), later Rupert, Cambridge, Viscount Trematon, who died at age 20, bleeding to death after a car accident.Alice's younger son Prince Maurice of Teck died in infancy, so it is not known if he was a carrier of the gene. Her daughter Lady May Abel Smith (19061994), Leopold's granddaughter, has living descendants none of whom has been known to have or to transmit haemophilia.Leopold's posthumous son, Charles Edward (18841954), was unaffected, as a father cannot pass the gene to a son.Beatrice (18571944), Victoria's ninth and last child, and wife of Prince Henry of Battenberg (18581896) passed it on to at least two, if not three, of her four children:Princess Victoria Eugenie of Battenberg (18871969), later Queen Victoria Eugenia of Spain through her marriage to King Alfonso XIII (18861940), who passed it on to:Infante Alfonso, Prince of Asturias (19071938). Died at age 31, bleeding to death after a car accident.Infante Gonzalo (19411934). Died at age 19, bleeding to death after a car accident.Victoria Eugenie's two daughters, Infantas Beatriz (19092002) and Maria Cristina of Spain (19111996), both have living descendants none of whom has been known to have or to transmit haemophilia.Prince Leopold of Battenberg (18891922); later Lord Leopold Mountbatten. Died at age 32 during a hip operation.Prince Maurice of Battenberg (18911914). Killed in action in World War I at the age of 23. Maurice's haemophilia is disputed by various sources. It seems unlikely that a known haemophilic would be allowed to serve in combat.No living member of the present or past reigning dynasties of Europe is known to have symptoms of haemophilia or is believed to carry the gene for it. The last descendant of Victoria known to have the disease was Infante Gonzalo, born 1914, although hundreds of descendants of Queen Victoria's (including males descended only through females) have been born since 1914. However, because the haemophilia gene usually remains hidden in females who only inherit the gene from one parent, and female descendants of Victoria have left many descendants in royal and noble families, there remains a small chance that the disease could appear again.Queen Victoria died in 1901 and outlived her youngest son and a grandson, both of whom had the disease. The gene can be passed down the female line without a haemophilic son being born, but as the family line continues and no haemophilic sons are born, it becomes less likely that a certain ancestor had the gene and passed it on through the female line.Men who had haemophilia in order of death#NameDeathRelation to Queen Victoria1Prince Friedrich of Hesse and by Rhine29 May 1873(1873-05-29) (aged2)grandson2Prince Leopold, Duke of Albany28 March 1884(1884-03-28) (aged20)great-grandson3Prince Henry of Prussia26 February 1904(1904-02-26) (aged4)great-grandson4Tsarevich Alexei of Russia17 July 1918(1918-07-17) (aged13)great-grandson5Lord Leopold Mountbatten23 April 1922(1922-04-23) (aged32)grandson6Rupert Cambridge, Viscount Trematon15 April 1928(1928-04-15) (aged20)great-grandson7Infante Gonzalo of Spain13 August 1934(1934-08-13) (aged19)great-grandson8Alfonso, Prince of Asturias6 September 1938(1938-09-06) (aged31)great-grandson9Prince Waldemar of Prussia2 May 1945(1945-05-02) (aged56)great-grandsonBecause the last known descendant of Queen Victoria with haemophilia died a few months before the end of WWII, in 1945, the exact type of haemophilia found in this family remained unknown until 2009. Using genetic analysis of the remains of the assassinated Romanov dynasty, specifically those of Tsarevich Alexei, Rogaev et al. were able to determine that it was haemophilia B. Specifically, they found a single-nucleotide change in the gene for clotting Factor IX that causes incorrect RNA splicing and produces a truncated, nonfunctional protein.[6] a b "Case Closed: Famous Royals Suffered from Hemophilia". Archived April 12, 2010, at the Wayback Machine Michael Price, ScienceNOW, October 9, 2009. " Hemophilia B". Retrieved 2007-11-21. ~ Jan Vorres, The Last Grand Duchess, 1965 p. 115. ~ Massey, Nicholas and Alexandra, 1967 ~ Aronova-Tiuntseva, Yelena; Clyde Freeman Herreid (2003). "Hemophilia: The Royal Disease" (PDF). Science Cases. 17. Archived from the original (PDF) on 28 September 2013. Retrieved 23 March 2013. ~ Rogaev EI, Grigorenko AP, Fashkutdinova G, Kittler EL, Mollaka YK (November 2009). "Genotype analysis identifies the cause of the "royal disease"". Science. 326 (5954): 817. Bibcode:2009Sci...326..817R. doi:10.1126/science.1180660. PMID19815722. S2CID206522975.Potts, D. M. Queen Victoria's Gene. Sutton Publishing, 1999. ISBN0-7509-1199-9 "Hemophilia: The Royal Disease" Yelena Aronova-Tiuntseva and Clyde Freeman HerreidFamily tree of Queen Victoria and her descendantsHaemophilia in Queen Victoria's Descendants. Archived 2006-11-18 at the Wayback MachineVictor A. McKusick (August 1965). "The Royal Hemophilia". Scientific American. pp.8895. Retrieved 25 August 2022.Retrieved from " The King has started treatment after being diagnosed with cancer - with the monarch stepping back from public duties on the advice of doctors.Members of the Royal Family are thought to often keep their health problems a secret, but Buckingham Palace has said the King chose to "share his diagnosis to prevent speculation".The statement adds that he also shared his diagnosis in the "hope it may assist public understanding for all those around the world who are affected by cancer".Follow latest: King diagnosed with cancerHere, we look at other cases of British monarchs who have been diagnosed with a serious health condition.Queen Elizabeth II Image: Queen Elizabeth II. Pic: PA The King's mother, Queen Elizabeth II, generally lived a life of robust health, but was diagnosed with COVID in February 2022.In the months before her death aged 96 in September 2022, there were concerns about her mobility after she missed the State Opening of Parliament that year.In October 2021, the Queen spent a night in the King Edward VII Hospital in central London after cancelling a visit to Northern Ireland - it was not clear why she was in hospital.Buckingham Palace said she was admitted for "preliminary investigations" but returned to Windsor Castle a day later and "remained in good spirits".It was her first overnight hospital stay in eight years - with the previous time being due to a case of gastroenteritis in 2013.Read more:Health issues King has faced over the yearsHurry to travel to UK to see King in coming days:Analysis: King's treatment will bring focus to vital workPrince Philip Image: The Queen and Prince Philip at Windsor Castle ahead of his 90th birthday. Pic: PA Prince Philip, the husband of Queen Elizabeth II and the King's father, died aged 99 in April 2021. A month earlier he had a "successful procedure" for a pre-existing heart condition. In 2012, he missed the Queen's Diamond Jubilee celebrations as he was treated in hospital for several days with a bladder infection.In 2011, the Duke of Edinburgh was rushed to the hospital by helicopter from Sandringham due to chest pains. He was treated for a blocked coronary artery and underwent a minimally invasive coronary stent procedure.Two years earlier, Prince Philip was involved in a car crash when his vehicle was hit by another car.He was not injured but was seen by a doctor as a precaution.Princess MargaretThe Queen's sister had several strokes in the years before her death in 2002.In 1999, she severely scalded her feet in a hot bath, impacting her ability to walk. Image: Princess Margaret, right, with Queen Elizabeth II in 1993. Pic: Reuters Queen MotherQueen Elizabeth II's mother, who died aged 101 in 2002, suffered persistent ulcers on her left leg and problems with her hips which made walking difficult in later life.In 1995 she had her right hip replaced, before her left hip was replaced three years later.King George VIII 1951, King George VI, the father of Queen Elizabeth II, had part of his left lung removed.He never made a full recovery and died a year later, when it was revealed he had been suffering from lung cancer.King George VI was a heavy smoker and as a consequence had developed peripheral vascular disease causing intermittent claudication - meaning he experienced pain in his muscles due to a lack of oxygen. Image: King George VI died from lung cancer in 1952. Pic: AP Edward VIIIEDward VIII, who was King George VI's brother and Queen Elizabeth II's uncle, was King until he abdicated in January 1936.Like his brother, he was a heavy smoker, and died in 1936 after suffering from throat cancer. Image: Queen Elizabeth II, when she was a princess, with her uncle, Edward VIII, in 1933. Pic: AP Sarah, Duchess of YorkSarah, Duchess of York, who was married to Prince Andrew, was diagnosed with skin cancer in January 2024 - just six months after being treated for breast cancer.A spokesman for the duchess, 64, said she remained in "good spirits" despite the diagnosis. Image: Sarah, the Duchess of York Kate, Princess of WalesIn 2011, the Duchess of York Kate, Princess of WalesIn 2011, the Duchess of York Kate, Princess of Wales underwent abdominal surgery in London and was recovering at home after a stay in hospital.She has since returned home to Windsor, with Kensington Palace saying she is "making good progress".The royal families of Europe have been linked to each other by blood for hundreds of years. Intermarriage between royal households has brought about many benefits throughout history, such as the union of kingdoms and strategic alliances. But it has also brought some negatives, one of them being a rare blood disease known as haemophilia, which has been commonly found among members of these households, including the Windsors. Haemophilia is a genetic mutation that affects the sufferer's ability to form blood clots, which is necessary for scabbing to take place on wounds that would otherwise continue to bleed. This prevents wounds from healing properly, so even a simple nose bleed or scratch could prove deadly. The disease is hereditary, meaning it can be passed from parent to child, hence the reason why it has affected the Royal Family for generations. However, the disorder tends to affect men more than it affects women. READ MORE: The Queen's Spanish ancestor who makes the Royal Family possible descendants of the Prophet Muhammad At least ten Queen Victorias descendants have been stricken with haemophilia, including her son Prince Leopold, but her daughter Princess Alice and Princess Beatrice were also carriers of the disease despite not suffering from it themselves. Leopold died in France at the age of 31, a day after falling down some stairs and hitting his head, causing a cerebral hemorrhage. But by that point he had already passed the disease on to his German descendants. The disease was next seen in Leopolds grandson Rupert, who died in hospital after a car accident in 1928. Princess Alice, meanwhile, had a son called Friedrich who died from haemophilia after cutting his ear on a window and bleeding nonstop for three days. Two of her daughters were also carriers. Through X-chromosome descent, two of Prince Alice's grandsons suffered from the disease as well. Do you want to stay up to date with the latest in news, features and opinion from across the city? MyLondon's brilliant news newsletter is jam packed with all the latest to keep you entertained, informed and uplifted. You'll get 12 stories straight to your inbox at around 12pm. Its the perfect lunchtime read. And what's more - it's FREE! The MyLondon team tells London stories for Londoners. Our journalists cover all the news you need - from City Hall to your local streets, so you'll never miss a moment. Don't skip a beat and sign up to The 12 newsletter here. One was Prince Henry of Prussia, who died of a brain hemorrhage after falling off a chair when he was just four. The other was Prince Waldemar, who died in 1945 in Bavaria, Germany because of a lack of blood transfusion facilities. (Image: Wikipedia / Shakko) Princess Alices other daughter Alix married into Russian royalty and wound up passing on the disease to her descendant Alexei Nikolaevich. Because of the disease, the Russian royal suffered critical ruptures that could not be treated, leaving his father Tsar Nicholas II with no choice but to turn to mystical peasant healer Grigori Rasputin. While Rasputin was able to treat Alexei, in doing so he earned the trust of his father and became his closest confidant. His ill-informed advice to the tsar in state matters however led to the downfall of the Russian monarchy and the entire families execution in the Russian revolution. As for Princess Beatrice, her two sons Leopold and Maurice were identified as being sufferers of the disease. Both of them died young - Leopold in battle during the First World War, and Maurice in complications while undergoing a hip operation. Beatrices daughter Ena, also a carrier, grew up to marry into Spanish royalty. Two of her sons with King Alfonso XIII, Prince Alfonso and Infante Gonzalo both had haemophilia. Both princes died young, just four years apart in 1934 and 1938, both following car accidents. There have been no known recent cases of haemophilia in the British Royal Family for a while, but it may be possible that some future descendants of Queen Victoria could still be carriers of the disease. Do you want the latest crime, sport, or breaking news in London straight to your inbox? Fail your needs to suit you here. Genetic disorder in European royaltyQueen Victoria's descendants with haemophilia and known female carriersInheritance by female carriersHaemophilia figured prominently in the history of European royalty in the 19th and 20th centuries. Queen Victoria and her husband, Prince Albert of the United Kingdom, through two of their five daughters Princess Alice and Princess Beatrice passed the mutation to various royal houses across the continent, including the royal families of Spain, Germany and Russia. Victoria's youngest son, Prince Leopold, Duke of Albany, also had the disease, though none of her three elder sons did. Tests on the remains of the Romanov imperial family show that the specific form of haemophilia passed down by Queen Victoria was probably the relatively rare haemophilia B.[1] The presence of haemophilia B within the European royal families was well known, with the condition once popularly termed the 'royal disease'. The sex-linked X-chromosome bleeding disorder manifests almost exclusively in males, even though the genetic mutation causing the disorder is located on the X-chromosome and can be inherited from the mother by male children or from either mother or father by female children. This is because the trait is recessive, meaning that only one correctly functioning copy of the blood-clotting factor gene is necessary for normal clotting. Females have two X-chromosomes, and hence redundant copies of the blood-clotting factor gene located on them. 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Queen Victoria's mother, Victoria, Duchess of Kent, was not known to have a family history of the disease, although it is possible that she was a carrier, but among her three children only Victoria received the mutated copy. Queen Victoria's father, Prince Edward, Duke of Kent, was not a haemophilic, but the mutation may have arisen as a germ-line mutation within him. The rate of spontaneous mutation is known to increase with paternal age (and is higher in fathers than in mothers at all ages); Victoria's father was 51 at her birth. 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"Genotype analysis identifies the cause of the "royal disease"". Science. 326 (5954): 817. Bibcode:2009Sci...326..817R. doi:10.1126/science.1180660. PMID19815722. S2CID206522975.Potts, D. M. Queen Victoria's Gene. Sutton Publishing, 1999. ISBN0-7509-1199-9 "Hemophilia: The Royal Disease" Yelena Aronova-Tiuntseva and Clyde Freeman HerreidFamily tree of Queen Victoria and her descendantsHaemophilia in Queen Victoria's Descendants. Archived 2006-11-18 at the Wayback MachineVictor A. McKusick (August 1965). "The Royal Hemophilia". Scientific American. pp.8895. Retrieved 25 August 2022.Retrieved from " book discusses two familial diseases affecting the royal houses of Europe: haemophilia and variegate porphyria. On haemophilia (16 pages) the author is on reasonably firm ground. He examines the effects of haemophilia on the royal houses in Russia and Spain with devastating political consequences for both. Nevertheless it would be useful, for the medical and non-medical readership, to have more detail about the process of the blood clotting and, in particular, the nature of the clotting-defect in the families (haemophilia A or B). A new mutation in Queen Victoria's elderly father Edward, Duke of Kent (aged 50 when she was conceived) is postulated quite reasonably as the source of the problem. More discussion on paternal age effects, mechanism of X chromosome inactivation and the molecular genetics of haemophilia would increase the value of this aspect of the book.The major part of Rushton's study (84 pages) is, however, devoted to variegate porphyria. Here the author is on shaky ground. There are serious errors both of omission and commission. Thus he attempts to outline the pathway of haem biosynthesis, vital to the understanding of the nature, severity and cause of the acute porphyrias. In 1980 Battersby and colleagues clarified the steps between porphobilinogen and the uroporphyrins. These steps are not shown and thus the reader is confused on the nature of the defect in acute intermittent porphyria and its key relationship to the symptomatology of variegate porphyria.Rushton bases his diagnosis of porphyria on the work of the psychiatrists and amateur historians, mother and son duo, Ida Macalpine and Richard Hunter, who categorically stated that King George III was not mad at all but suffered from the undiagnosed medical condition acute intermittent porphyria. In a second paper they altered the diagnosis, again categorically, to the milder condition variegate porphyria on the history of skin lesions in the King (adolescent acne, an instance of sunburn and a possible episode of urticaria).In spite of authoritative and well argued doubts expressed at the time by experts in the field, this dubious claim has entered the canon of historical fact and is a widely-accepted interpretation that features in academic and popular history books, television documentaries and notably Alan Bennett's award-winning play and film. Only recently has a detailed re-evaluation of the King's medical records shown that the claims of Macalpine and Hunter and their adherents are seriously flawed and they were guilty of being economical with the truth.1.Rushton has not taken on board these serious doubts and has based his book on a diagnosis of variegate porphyria in the King. He has wandered over the European relatives of George III and, using any symptoms of sudden or early death, an episode of diarrhoea or constipation, spasms, mental health issues and any skin problems as diagnostic of variegate porphyria in the individual. On this basis he has traced George's defect backwards to William the Conqueror and his antecedents, and forward to Victoria's great, great grandson William, Duke of Kent. Rushton has undertaken a large amount of work: a morning in the British Library would have exposed the fallacy of the porphyria hypothesis.Rushton also claims to have identified the molecular defect in George III in an American family some 21 il- defined generations distant from the King! This defect in living patients is quite distinct from that claimed in a possible DNA sample from Queen Victoria's granddaughter, Princess Fedora, recently analysed by John Rohl and his colleagues and thus further confounds the issue.2.This book provides some interesting what if speculations about these diseases and their political consequences but as a serious authoritative work leaves much to be desired. 1. Peters TJ, Wilkinsons D King George III and porphyria: a clinical re-examination of the historical dence. History of Psychiatry2009 10.1177/0957154X09102616 [DOI] [PubMed]2.Roh J, Rogaev EI, Warren M, Hunt D.Purple secret. Genes, madness and the royal houses of Europe. Bantam Press: London, 1998:192207. [Google Scholar]Both King Charles and the Princess of Wales revealed their cancer diagnoses weeks apart(Image: PA)The Princess of Wales has revealed that she has been diagnosed with a form of cancer, following her major abdominal surgery in January.While the form of cancer has been kept private, it is said that she has started "preventative chemotherapy" and wishes to focus on getting better while also keeping her family's privacy.Only in February, Buckingham Palace announced that King Charles was diagnosed with a form of cancer one week after he received treatment for an enlarged prostate. However, a number of royals have been diagnosed with various forms of cancer since the start of the family's reign.READ MORE: Kate Middleton news latest: How Prince William 'found out' about Princess of Wales' cancer diagnosisThe Princess of Wales addressed the nation in an emotional videoBack in 1901, Princess Victoria, the daughter of Queen Victoria and Prince Albert died from breast cancer at the age of 60.King Edward VII had a basal-cell carcinoma removed close to his nose, which was reportedly cured with radium in 1907. However, his death three years later, aged 68, was due to an infection following appendix surgery. King Victor VIII, who reigned for a small period of time before abdicating the throne, died after being diagnosed with throat cancer in 1917 - partly due to a very long history of smoking. He died at the age of 77.King George VI reigned from 1936 until his death in 1952 at age 56. According to a study from the University of Oxford in 2018, the late king developed lung cancer due to his history as a heavy smoker. As a result, his left lung including a malignant tumour was removed during a 1951 surgery. The Queen Mother was also diagnosed with multiple forms of cancer throughout her life, but they were not made public until her death in 2002, aged 101. According to Biographer William Shawcross, the Queen Mother had a tumour removed in 1966, following a colon cancer diagnosis. She was later diagnosed with breast cancer in 1984 and had surgery to remove a lump in her breast.Sarah Ferguson has been diagnosed with cancer twice in less than a year(Image: Dave Benett/Getty Images for The Wolseley Hospitality Group)Another royal who developed breast cancer was Sarah Ferguson - who was diagnosed with the disease in June 2023. Less than a year later, the Duchess of York revealed in January 2024 that she had received a second cancer diagnosis, malignant melanoma.Last month, Buckingham Palace revealed that the King has been diagnosed with a form of cancer. While the type of cancer hasnt yet been revealed, the palace said the King has begun "regular treatments" and will postpone public duties as a result. The Monarch, 75, "remains wholly positive about his treatment and looks forward to returning to full public duty as soon as possible," it added in the statement, released on February 5.King Charles announced last month he was fighting cancer himself(Image: Getty Images)Kate Middleton, Princess of Wales, announced yesterday she has been diagnosed with a form of cancer following a planned abdominal surgery that took place in January. In an emotional address to the public, Kate, 42, said: "This course of cure as a huge shock, and William and I have been doing everything we can to process and manage this privately for the sake of our young family", adding she is undergoing a course of preventative chemotherapy while she steps down from her royal duties.In February, King Charles shared he had been diagnosed with cancer following treatment for a benign enlarged prostate.The Royal Family did not specify the form of cancer but he is still undergoing regular treatment and has postponed public duties.The monarch was diagnosed with the disease while undergoing separate treatment for an enlarged prostate in January at the London Clinic.Expressing his gratitude to the medical team for their quick intervention, the King said he was feeling positive about his treatment and hoped to return to his royal duties sooner rather than later.In a statement, the family said: His Majesty has chosen to share his diagnosis to prevent speculation and in the hope it may assist public understanding for all those around the world who are affected by cancer.Here is a look back at the history of health issues in the Royal Family.Kate Middleton, Princess of Wales, announced yesterday she has been diagnosed with a form of cancer following a planned abdominal surgery that took place in January. In an emotional address she had been diagnosed with an unspecified cancer and would be stepping back from frontline royal duties while undergoing treatment. Kate also said she was undergoing preventative chemotherapy. Chemotherapy is a term used to describe the treatment of someone diagnosed with cancer and is used to kill cancerous cells although Kate specifically used the term preventative chemotherapy.Kate Middleton has been both praised and criticised for reportedly working from her hospital bed following abdominal surgery (Getty Images)Sarah FergusonOn Sarah Ferguson, the Duchess of York, was diagnosed with skin cancer in January 2024, just months after she received treatment for breast cancer.In July 2023, the 64-year-old had an eight-hour mastectomy but unfortunately last month, during the follow-up surgery, dermatologists, when removing several moles, found one to be malignant melanoma.The Duchess is now undergoing further tests to see if the cancer has spread to other parts of her body but it is said to be in good spirits.Sarah Ferguson was diagnosed with skin cancer after treatment for breast cancer (Scott Garfitt/Invision/AP)Queen Elizabeth IIThe much-loved Queen Elizabeth II died on 8 September 2022 after a record-long reign of over 70 years, aged 96. The Queen was hospitalised in October 2021 shortly after the death of her husband Prince Philip. The monarch then did not attend several public appearances due to dwindling health, as she reportedly suffered from low energy and weakness.In February 2022, she tested positive for Covid after suffering from mild cold-like symptoms, the Palace reported at the time. She was pronounced dead at 3.10pm on 8 September 2022 by Dr Douglas James Allan Glass. Her cause of death was deemed to be old age.Concerns were raised for Queen Elizabeth II when she was seen with a walking stick in a rare appearance before her death (PA/Prince Philip)The Queens beloved husband died at the age of 99 in April 2021, his cause of death was officially recorded as old age.Leadung up to his passing, the King had been discharged from hospital following treatment for a pre-existing heart condition.In 2012, he missed the Queen's Diamond Jubilee celebrations due to a bladder infection.In 2011 he was helicopter from Sandringham to the hospital by helicopter to chest pains - he was treated for a blocked coronary artery and underwent a minimally invasive coronary stent procedure.Two years earlier, Prince Philip was involved in a car crash when his vehicle was hit by another car.He was not injured but sought medical advice out of precaution.Queen MotherQueen Elizabeth I, the Queen Mother, died aged 101 in 2002 after suffering from ulcers on her left leg and persistent hip problems which led to mobility issues in her old age.In 1995, she had a right hip replacement and three years later, her left hip was replaced.Queen Elizabeth (later the Queen Mother), Princess Elizabeth (the present Queen Elizabeth II), Princess Margaret and King George VI after his coronation, on the balcony of Buckingham Palace, London (PA)King George VIOn February 6 1952, King George VI died in the middle of the night.He had survived a major operation to remove his left lung in September 1951, but succumbed to a blood clot just a few months later.It caused a coronary thrombosis, the blockage of the coronary arteries that carry blood to the heart, leading to a sudden collapse and fatal heart failure.His death came as a shock to the public and the royal family, as even the King was not informed of the full extent of his illness.It later came to light he had been suffering from lung cancer after smoking heavily all his life.The Queen with her father, King George VI, and Prince Philip watching a young King Charles sitting on a statue at Balmoral in 1951 (PA) (PA Media)Edward VIIKing George VI's brother was the reigning monarch until he abdicated the throne in January 1936.Like his brother, he was a frequent smoker and died in 1972 after battling throat cancer.

What genetic disease does the royal family have. Does the royal family have haemophilia. Illness royal family. What genetic disease runs in the royal family. What disease do the royal family have. What is the royal disease. What blood disorder does the royal family have. What disease does the british royal family have. What blood disorder does the royal family have. Genetic disease royal family.