

Valerie Shrimplin and Channa N. Jayasena

Was Henry VIII Infertile? Miscarriages and Male Infertility in Tudor England

Societies throughout the world have traditionally viewed the production of healthy children as the responsibility of women. Such was evidently the view of King Henry VIII (1491–1547, Figure 1) who clearly blamed his wives for his lack of a healthy male heir. Henry is well-known for having married six times in his desperate quest for a son, disposing of wives who did not fulfill their royal and marital duty. Henry fathered three legitimate children—Mary I, Edward VI, and Elizabeth I—but what is less well-known is the significant number of unsuccessful pregnancies with which he was associated. Henry's first two wives, Catherine of Aragon and Anne Boleyn, had ten pregnancies between them from 1509 to 1519 and from 1533 to 1536, respectively, but six resulted in miscarriage. Henry's first son, Prince Henry, who was born in 1511, lived less than two months (see Table 1). Only two surviving daughters (Mary and Elizabeth) reached maturity; his son Edward died at age fifteen.

Henry, naturally for a monarch of this era, accused his wives. He also clung to the idea that his problems derived from his marriage to the widow of his brother Arthur, which contravened *Leviticus* 20:21—“If a man shall take his brother's wife they shall be childless.” As a result, Henry disposed of Catherine and Anne accordingly, without considering that his own fertility (or lack of it) may have played a role.

Valerie Shrimplin is Senior Research Associate, Gresham College. She is the author of *Anne Boleyn* (London, 2019).

Channa N. Jayasena is Reader in Reproductive Endocrinology, Section of Investigative Medicine, Imperial College London, Hammersmith Hospital, and Consultant in Reproductive Endocrinology & Andrology, Hammersmith & St. Mary's Hospitals, Imperial College Healthcare NHS Trust, London. He is the author of, with Richard Quinton, “Male Hypogonadism and General Practitioners in the UK: How to Increase Case Recognition, without Compromising Diagnostic Accuracy?” *Clinical Endocrinology*, available at <https://doi.org/10.1111/cen.14432>.

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Fig. 1 Portrait of Henry after Holbein, c 1530 (Wikimedia Commons)



The understanding at this time that men as well as women could suffer from problems of infertility was tentative and unlikely to have been countenanced by a Tudor monarch. Space does not allow a complete survey of the late medieval/early modern medical literature that included a mention of male infertility. Suffice it to say that it was usually, but not always, confined to an inability to perform. Yet, notwithstanding Rider's observation that scholars have tended to neglect males' reproductive disorders in the Middle Ages compared with females', early references to male infertility are available. Witness, for example, the late fourteenth-century treatise by John of Mirfield, St. Bartholomew's Hospital London, which warned, "When sterility happens between married people, the males are accused by many people of not having suitable seed." Similarly, Evans pointed out that the historical focus on female

Table 1 Reproductive History of Henry VIII: Wives, Children and Pregnancy Losses

WIFE	SEX OF OFFSPRING (IF KNOWN)	RECORDED BIRTH DATE OF OFFSPRING	MISCARRIAGE OR STILLBIRTH?	ADDITIONAL INFORMATION
Catherine of Aragon married to Henry 1509–1533	Female	31 January 1510	Yes	Miscarriage or stillborn
	Male (<i>Henry</i>)	1 January 1511	No	Prince Henry died aged 7 weeks
	Male	17 September 1513	Yes	Stillborn or died soon after birth
	Male	8 January 1515	Yes	Stillborn
	Female (<i>Mary</i>)	18 February 1516	No	Mary Tudor died without issue aged 42 (married to Philip II of Spain 1555)
	Unknown	1517	Yes	Miscarriage (unverified)
Anne Boleyn married to Henry 1533–1536	Female	10 November 1518	Yes	Stillborn or lived a few days/hours (8 months)
	Female (<i>Elizabeth</i>)	7 September 1533	No	Elizabeth I, died without issue aged 69 (unmarried; assumed not sexually active)
Jane Seymour married to Henry 1536–1537	Male	August/September 1534	Yes	Miscarriage or stillborn
	Male	29 January 1536	Yes	Miscarriage in 4th month (brought on by shock?)
Anne of Cleves married to Henry January–July 1540	Male (<i>Edward</i>)	12 October 1537	No	Jane died two weeks after giving birth. Edward died aged 15 without issue
		No pregnancies recorded		marriage was annulled on 9 July 1540, on the grounds of non-consummation. No issue
Katherine Howard married to Henry 1540–1542		No pregnancies recorded		Age at marriage was c 16 or 17. Henry was 49. No issue
Catherine Parr married to Henry 1543–47		No pregnancies recorded		No issue with Henry, but had baby with subsequent husband

NOTE Names of surviving children are indicated in *italic*.

infertility has largely relegated male reproductive failure to sexual performance and impotence. Male infertility was not recognized as a significant issue until the early modern period, roughly around the turn of the seventeenth century.¹

Undeterred by the small number of late medieval medical texts that did not entirely discount the male role, Henry's practice of disposing of his wives unmistakably demonstrates whom he considered to blame for infertility. Unfortunately for his wives, Henry was blissfully unaware that, as demonstrated by recent research, some men, particularly those with sperm deficiencies, may not only have a significant effect on pregnancy but also potentially be the cause of miscarriage and stillbirth.²

Identifiable reasons for miscarriage are not always easy or even possible to determine, but increasingly moving attention from women to men has recently led to investigations into male chromosomes, DNA, and lifestyle choices, such as diet and exercise. The traditional focus on women regarding recurrent miscarriage was also due to the fact that, although females normally produce single eggs, millions of male sperm are automatically subject to "natural selection," only the fittest among them able to reach and fertilize an egg. Male infertility (reduced sperm function) currently affects half of all couples seeking fertility treatment, and global sperm counts are reported to have halved since the 1970s. Furthermore, a growing body of research suggests that deficient sperm function in a male partner can predispose

1 Catherine Rider, "Men and Infertility in Late Medieval English Medicine," *Social History of Medicine*, XXIX (2016), 245–266; *idem*, "Men's Responses to Infertility in Late Medieval England," in Gale Davis and Tracey Loughran (eds.), *A Handbook of Infertility in History: Approaches, Contexts and Perspectives* (London, 2017); *idem* and Daphna Oren-Magidor, "Introduction to Infertility and Medicine in Medieval and Early Modern Medicine," *Social History of Medicine*, XXIX (2016), 211–223; Jennifer Evans, *Aphrodisiacs, Fertility and Medicine in Early Modern England* (Woodbridge, 2014), 192–193. Oren-Magidor—in *Infertility in Early Modern England* (London, 2017)—provides further evidence but also states that "while early modern medicine recognized the existence of male infertility, in practice women were usually 'blamed' for childlessness and treated for it" (6). For comparisons with continental Europe, see Danielle Jacquart and Claude Tømmasset (trans. Matthew Adamson), *Sexuality and Medicine in the Middle Ages* (New York, 1988).

2 Guidance in female medicine circulated via the twelfth-century Latin *Trotula* texts. The earliest English text for midwives dates from 1540. For the practical handbook on midwifery produced in 1554 by Jacob Rueff (1500–1558) of Zurich, see Audrey Eccles, *Obstetrics and Gynaecology in Tudor and Stuart England* (London, 2019; orig. pub. 1982), esp. 11–22. The possible male role in infertility and miscarriage was not seriously recognized, however, until the early modern period (1550–1780), postdating the current case study of Henry VIII and demonstrating the need for its consideration.

couples to recurrent pregnancy loss (RPL) or miscarriage, which is commonly defined as three or more consecutive pregnancy losses prior to twenty weeks' gestation, affecting 1 to 2 percent of couples. Recent studies highlight that damaged sperm from men may be the reason why women suffer repeated miscarriages.³

Factors impairing male fertility, such as semen oxidative stress and sperm DNA fragmentation, are normally elevated in male partners of women with RPL when compared with other men. Currently, the only approved therapy for affected couples with male infertility is assisted reproductive technology (ART), such as in-vitro fertilization therapy (IVF) or intracytoplasmic sperm injection (ICSI). However, only a minority of health-care systems and couples worldwide can afford the high costs of ART, and only limited research has been performed in recent decades on the development of novel therapies for couples with male infertility. Due to the historical idea that producing healthy children is the exclusive responsibility of women, male infertility remains an emasculating condition carrying a powerful social stigma, which often impairs the ability of men and their partners to seek appropriate support. An exploration of the historical background of male infertility helps to challenge the image of male infertility as a condition of weakness in affected men.⁴

3 Hagai Levine et al., "Temporal Trends in Sperm Count: A Systematic Review and Meta-Regression Analysis," *Human Reproduction Update*, XXIII (2017), 646–659; Royal College of Obstetrics and Gynaecology, "Recurrent Miscarriage, Investigation and Treatment of Couples" (Green-top Guideline No. 17), available at <https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg17/>; Holly B. Ford and Danny J. Schust, "Recurrent Pregnancy Loss: Etiology, Diagnosis, and Therapy," *Reviews in Obstetrics & Gynecology*, II (2009), 76–83. See also <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2709325/>.

4 Syed N. Imam et al., "Idiopathic Recurrent Pregnancy Loss: Role of Paternal Factors: A Pilot Study," *Journal of Reproductive Infertility*, XII (2011), 267–276; Ralf Henkel, "Leukocytes and Oxidative Stress: Dilemma for Sperm Function and Male Fertility," *Asian Journal of Andrology*, XIII (2011), 43–52; *idem* et al., "Influence of Deoxyribonucleic Acid Damage on Fertilization and Pregnancy," *Fertility and Sterility*, LXXXI (2004), 965–972; Jordi Ribas-Maynou et al., "Alkaline and Neutral Comet Assay Profiles of Sperm DNA Damage in Clinical Groups," *Human Reproduction*, XXVII (2012), 652–658; Luke Simon et al., "Sperm DNA Damage Measured by the Alkaline Comet Assay as an Independent Predictor of Male Infertility and in Vitro Fertilization Success," *Fertility and Sterility*, XCV (2011), 652–657; Jayasena et al., "Reduced Testicular Steroidogenesis and Increased Semen Oxidative Stress in Male Partners as Novel Markers of Recurrent Miscarriage," *Clinical Chemistry*, LXV (2019), 161–169; "Fertility Problems: Assessment and Treatment," Clinical guideline [CG156], February 2013, Updated September 2017, National Institute of Clinical Excellence, available at <https://www.nice.org.uk/guidance/cg156>; Shafali Talisa Arya and Bridget Dibb, "The Experience of Infertility Treatment: The Male Perspective," *Human Fertility*, XIX (2016), 242–248.

This interdisciplinary article provides the first detailed investigation of miscarriage rates before the modern era that centers on males. It uses historical records to document miscarriage rates among a sample of noblemen, including Henry VIII, and their wives in Tudor England during the late fifteenth and early sixteenth century. Evidence suggests that at least part of the cause for the multiple miscarriages of Henry's wives may have been male infertility.

METHODOLOGY Details of Henry VIII's marriages and progeny derive from primary and secondary historical sources and are further evaluated via extensive twenty-first-century medical research into male infertility. Scrutiny focused first on Henry's known progeny before turning to his antecedents and possible genetic traits.

Information about Henry's medical records is widely available in the literature, including his known diseases, physical injuries, and psychological inclinations. Most importantly, the records of the Tudor Royal household for banquets, kitchens, and dining provide information about his diet. We compared the backgrounds of his wives' families with those of his contemporaries, specifically thirty-one noblemen with extant marriage and birth documentation whose wealth and social standing were similar to Henry's. Records of pregnancies and births permit the calculation of miscarriage rates for individual couples and further analysis of the descriptive statistics.

HENRY VIII'S MARITAL AND REPRODUCTIVE HISTORY Having become just the second monarch of a shaky new dynasty at the age of seventeen in 1509, Henry VIII was obsessed with producing a healthy male heir. Table 1 lists his wives, children, and failed pregnancies, so far as known. Henry married his brother's widow Catherine of Aragon (born 1485), who was six years his senior, almost immediately on becoming king. Catherine fell pregnant regularly within the first ten years of the marriage; the announcement of her first pregnancy occurred just two months after the wedding (when she was twenty-four). As detailed in Table 1, her first miscarriage/still birth in 1510 was followed by further miscarriages and the loss of an infant son. As Starkey noted, rumors had circulated since 1514 that "the King of England meant to repudiate his present wife . . . since he is unable to have children by her," thus ascribing blame to Catherine. A healthy child (Mary)

was not produced until 1516, seven years after the marriage, at a time when Henry was emphasizing his sexual prowess (epitomized by the size of his codpieces) and trying to produce a male heir. In 1519, King Francis I bluntly stated that Henry “had an old deformed wife.” By the 1520s, Catherine was in her mid-thirties and probably menopausal since she had become overweight and had not fallen pregnant since 1518. Henry later stated, as cited by Weir, that by early 1525, when Catherine’s periods had ceased, he had stopped having sexual relations with her. He banished her from court and annulled the marriage in 1533.⁵

Henry’s evidence that his wife was at fault for the absence of a male heir was the son that he had fathered with another woman, Bessie Blount, his acknowledged mistress from roughly 1514 to 1522. He bragged heartily about his illegitimate son (Henry Fitzroy, 1519–1536), showering him with titles and honors from the age of six. Blount had six more children with two husbands after Henry, all of whom lived to maturity. Henry may have had other illegitimate children—following his affairs with Anne Boleyn’s older sister Mary, Madge Shelton, and other mistresses—but since he did not acknowledge any others (to assert his own fertility), any putative ones are excluded from this study. Mary Boleyn became pregnant when she married after the affair ended, as did Catherine Parr, Henry’s sixth wife, when she married after Henry died. In spite of the birth of his daughter Mary and that of an illegitimate son, Henry never questioned his own fertility, apparently to save face and protect a conviction about his own virility, and he could always fall back on the curse of Leviticus dating to his marriage with Catherine.

Anne Boleyn seems to have come to Henry’s attention in 1525. He proposed to her in 1527, but the couple seems to have abstained from intercourse until their marriage in 1532/3, as verified by Henry’s letters to her (which also confirm his passion for intimate relations), probably to ensure that any child would be legitimate.

5 David Starkey, *Six Wives: The Queens of Henry VIII* (New York, 2004), 24–26, 161, 197–198. For the need to produce dynastic heirs, the *raison d’être* of medieval and Renaissance royalty, see also Robert Bartlett, *Blood Royal: Dynastic Policies in Medieval Europe* (New York, 2020), 2–88 (esp. 69), 89–108. Eric Ives, *The Life and Death of Anne Boleyn: The Most Happy* (Oxford, 2005), 83; Alison Weir, *Henry VIII: King and Court* (New York, 2008; orig. pub. 2001), 247. For further information about women, aging, and the cessation of fertility at menopause in the sixteenth century, see Lynn Botelho and Pat Thane (eds.), *Women and Ageing in British Society since 1500* (London, 2001); Sara Read, *Menstruation and the Female Body in Early Modern England: Genders and Sexualities in History* (New York, 2013), 171–180.

Henry's letters refer to multiple mistresses; most likely they were not with women of noble birth thus to avoid complicating the succession if any of them were to bear a son while he waited to marry Anne. After marriage, Anne, like Catherine, became pregnant annually, as would have been the couple's aim. The birth of a girl, Elizabeth, in September 1533 was a disappointment, but at least it proved Anne to be fertile. Miscarriages followed in 1534 and 1536. Anne's story repeated Catherine's; Henry (now in his mid-forties) still had no male heir. Rumors about Anne's incapacity to bear children emerged, and her last miscarriage was the final blow.⁶

During about fourteen years of "active" marriage, Henry's first two wives experienced ten pregnancies and seven miscarriages/neonatal deaths and no surviving sons. The reasons for the king's lack of success were never fully explained, notwithstanding his allocation of blame to the women. During Anne Boleyn's treason trial, in which she was accused of having affairs with as many as seven other men, allegations about Henry's impotence surfaced. Anne's brother George suggested that Henry was incapable of sexual intercourse ("was no good in bed with women, and that he had neither potency nor force"). Anne Boleyn, her brother, and four others were executed a few days later in May 1536.⁷

Henry married Jane Seymour in the same month as Anne Boleyn's execution (May 1536). She swiftly became pregnant but died in 1537 of complications following the birth of Edward VI on October 12, 1537. Henry married Anne of Cleves in 1540 but claimed that they did not consummate their marriage, citing his lack "of the will and power to consummate the same." Katherine Howard, Henry's fifth wife, aged about sixteen, was married to Henry for just two years before she, too, was executed. She and Catherine Parr, Henry's last wife, also failed to become pregnant by Henry.⁸

6 The couple had two marriage ceremonies, on November 14, 1532, and January 25, 1533. See Starkey, *Six Wives*, 463, 474; Ives, *Life and Death of Anne Boleyn*, 162. Starkey, *Six Wives*, 553–554.

7 Starkey, *Six Wives*, 580; Ives, *Life and Death of Anne Boleyn*, 191. Considering Anne's machinations to gain Henry as a husband, the idea that she had affairs with five to seven men, including her brother (possibly to fall pregnant if Henry failed), seems ludicrous. See Shrimplin, *Anne Boleyn* (London, 2019), 23.

8 Ives, *Life and Death of Anne Boleyn*, 191, 393 n. Incidentally, no record of Henry having been treated for syphilis (unlike his contemporary Francis I King of France) appears to exist.

Could it be mere coincidence that, although Henry's first three wives became pregnant easily and regularly, so high an incidence of fertility problems (70 percent failure rate) occurred and that none of Henry's last three wives was even able to conceive? Can the finger point to Henry as the common factor and cause of his own misfortune? The fact that Henry was responsible for at least eleven known pregnancies (including the birth of Henry Fitzroy) from 1509 to 1519 and from 1532 to 1536) might bode well for his fertility and fitness. But, in fact, his many failures with different partners could well suggest otherwise. The loss of five sons must have weighed heavily.⁹

POSSIBLE REASONS FOR HENRY'S PLIGHT Regardless of the extent or efficacy of Henry's sexual performance in his last years (1540–1547), the evidence from earlier in his life cannot rule out some liability on Henry's part. As he lamented, why could he not produce a child when the least of his subjects could? In 1533, he exclaimed to Eustace Chapuys, the Spanish ambassador, "Am I not a man like any other?" In sixteenth-century terms, sexual potency was associated with having children—something that would not be the case if sperm were impaired. The fact that none of Henry's surviving children had any issue is further evidence that the problem lay with him rather than (or at least as much as) with his wives.¹⁰

Hence, Henry's medical records, genetic disposition, and lifestyle merit investigation, in comparison with those of men of a similar class and standing during the same era. Old age undoubtedly contributes to infertility. Other risk factors contributing to it, of which Henry and his physicians would not have been aware, are stress, lack of exercise, obesity, and illness. Lifestyle choices linked to weight, diet, nutrition, alcohol intake, medication, and drug use

9 If, as has been suggested, Henry carried the Kell antigen, and his wives were Kell-negative, miscarriages could have been the result. The McLeod syndrome, related to Kell blood-group disorders, is also a cause of psychosis, perhaps explaining Henry's transformation in his later years. Brain damage from a serious fall while jousting in 1536 is another possible explanation for it. See Peter Stride and Kylie Lopes Floro, "Henry VIII, McLeod Syndrome and Jacquetta's Curse," *Journal of the Royal College of Physicians of Edinburgh*, XLIII (2013), 353–360. See also Miles F. Shore, "Henry VIII and the Crisis of Generativity," *Journal of Interdisciplinary History*, II (1972), 359–390, for further discussion of Henry's psychology.

10 Starkey, *Six Wives*, 503; Ives, *Life and Death of Anne Boleyn*, 191–192. Henry's line stopped with his children, who all died childless. The members of the British royal family have included no descendants from Henry VIII, only from his father Henry VII via his sister Margaret (mother of Mary Queen of Scots, grandmother to James I).

affect sperm viability and thus have a significant effect on the health of a pregnancy. Like a complete lack of exercise, highly intense, competitive-level training may also decrease sperm health. As a young man, Henry favored hunting, jousting, and other high-impact sports of his era. On many occasions, he suffered severe wounds, and in 1524 and 1536, he narrowly escaped being killed. The assumption in Henry's time that men remain fertile while women lose fertility dramatically with age is not entirely accurate. Apart from the inability to "perform" (erectile dysfunction), the fertility of men also declines as they get older, and the risk of miscarriage may sometimes increase, even with young female partners. This finding could be pertinent to Henry, as well as to many modern couples who start families later in life, although today's pressures probably cannot compare with the stresses on medieval and early modern kings and queens.¹¹

HENRY'S MEDICAL RECORDS AND GENETIC HISTORY Henry's antecedents on his mother's side appeared to have been exceptionally fertile. Edward IV, his maternal grandfather, had fifteen children, ten legitimate and five illegitimate. Only one died in infancy (other than the "Princes in the Tower," who were murdered). Richard Plantagenet, Edward IV's father, had twelve legitimate children with Cecily Neville, of whom eight lived to maturity. Henry's paternal antecedents, however, were less fertile. Henry VII and Elizabeth of York (daughter of Edward IV), Henry's

11 Sarah Toulalan, "'Elderly Years Cause a Total Dispaire of Conception': Old Age, Sex and Infertility in Early Modern England," *Social History of Medicine*, XXIX (2016), 333–359; James Wall and Jayasena, "Diagnosing Male Infertility," *British Medical Journal*, October 4, 2018, 363, available at <https://doi.org/10.1136/bmj.k3202>. Imperial College, which conducted a study of men whose partners miscarried multiple times, found sperm problems that could be linked to age, weight, and diet, concluding that sperm health can have a significant effect on pregnancy. Smoking, which is now also included as a major risk, would not have been applicable to the early sixteenth century. Paweł Józków and Marco Rossato, "The Impact of Intense Exercise on Semen Quality," *American Journal of Men's Health*, XI (2017), 654–662; Rakesh Sharma et al., "Effects of Increased Paternal Age on Sperm Quality, Reproductive Outcome, and Associated Epigenetic Risks to Offspring," *Reproductive Biology and Endocrinology*, XIII (2015), 35, available at doi: 10.1186/s12958-015-0028-x. According to the Office for National Statistics, for marriages of opposite-sex couples in the United Kingdom, the average (mean) age for men marrying in 2015 was 37.5 years; for women, it was 35.1 years. See <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/marriagecohabitationandcivilpartnerships/bulletins/marriagesinenglandandwalesprovisional/2015#the-average-age-at-marriage-continued-to-rise>.

parents, had six children, one of whom died young, and his older brother Arthur lived only to age fifteen. Henry VII was an only child, since his father died when he was twenty-six, leaving a pregnant thirteen-year-old widow, Margaret Beaufort, who had no further children from subsequent marriages. That Henry VIII's paternal great-grandfather was also an only child was unlikely to have been by choice. The survival rate was admittedly lower, and childbirth riskier, in that era than in modern times, but (as shown by Henry VIII's maternal lineage) many families of all classes and strata of society successfully produced multiple offspring.¹²

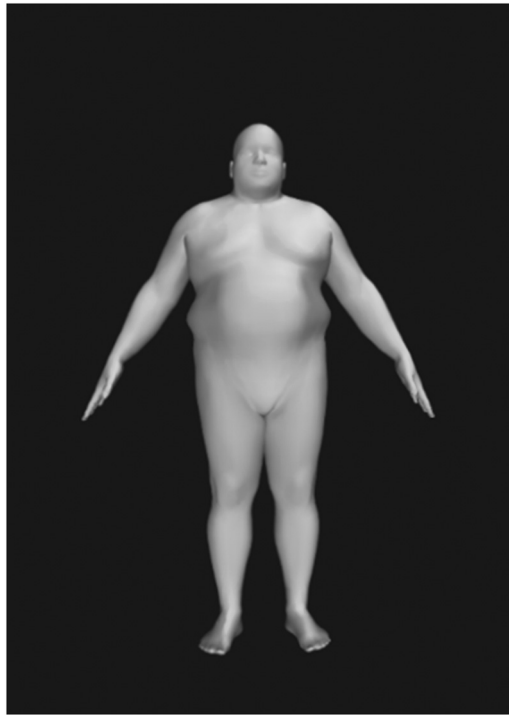
The fertility of Catherine of Aragon's family was by no means impaired. Catherine was one of eight siblings, six of whom reached maturity, and her father also had many confirmed illegitimate children. One of Catherine's sisters died young in childbirth, but the other two produced sixteen children between them, only two of whom did not survive to maturity. Likewise, Anne Boleyn was one of five siblings. Her paternal grandfather had ten children; all but one lived to maturity. Her mother was one of seventeen siblings and step-siblings.

Henry's Health, Medical Condition, and Lifestyle The potential causes of Henry's male infertility could have been related to any of the risk factors outlined earlier. In his youth, he was a strapping sport enthusiast with a muscular build and a forty-two-inch chest. By his thirties, however, Henry had become grossly overweight. Estimates gleaned from his clothing and armor indicate that he eventually attained a height of 6', 1" (185 cm), a waist of fifty-four inches (137 cm), a chest of fifty-eight inches, and a weight of 400 lb (28 stone or 180 kilos) (see Figure 2). A recent meta-analysis identified obesity as strongly associated with poor sperm quality in men; Henry VIII was almost certainly morbidly obese with a body mass index (BMI) of 51.9 kg/m².¹³

Henry's court was notorious for its continuous celebrations, lavish parties, and banquets, during which alcohol flowed freely.

12 Cecily Neville's father had an amazing twenty-two children, eight with his first wife and fourteen with his second. Only four died in the year of birth. Information relating to Henry's antecedents comes from accessible online sources for ease of reference.

13 Wall and Jayasena, "Diagnosing Male Infertility." For the estimate of Henry's measurements, see, for example, software at <https://bodyvisualizer.com/> (accessed February 2019). Sermondade et al., "BMI in Relation to Sperm Count: An Updated Systematic Review and Collaborative Meta-Analysis," *Human Reproduction Update*, XIX (2013), 221–231.

Fig. 2 Visualization of Henry VIII's Body

SOURCE <https://bodyvisualizer.com/> (accessed February 17, 2019.)

Although, as king, Henry would have had access to the best food, medical care, and sanitation, he would also have suffered from poor nutrition. His diet was excessively rich in meat/protein, comprised of game (lamb, venison, and swan), along with much bread and other carbohydrates. It was almost bereft of the vegetables and pulses (beans, peas, and lentils, which were considered to be peasant food) that supply vitamins and fiber. Fruit was included on menus but normally cooked or crystallized with sugar; fresh fruit was thought to cause fever. According to Historic Royal Palaces, “Meals were not just about eating. They were a display of the monarch’s power. . . . Exotic foods demonstrated wealth. . . . Poorer families would have rarely enjoyed meat, eating a diet of stewed vegetables and pulses. But the luxury of the court was fresh meat. Tudor courtiers enjoyed a wide variety of food, with freshly slaughtered, roasted meat every day. . . . Courtiers were served a

menu of dishes containing around 5000 calories a day! . . . The Oxford scholar, Thomas Starkey noted [around 1529] that “if they do not have 20 varied meat dishes at supper they consider themselves slighted.”¹⁴

Figure 3 displays a typical menu, as recorded in the Ordinances for Eltham Palace. At Hampton Court, about 600 meals were prepared twice a day. No meal was without roasted meat, and wine “fountains” were common. Even when he ate alone in his chamber, as he often did, Henry chose from a huge buffet of meats (roasted or served in pies), followed by sweet preserves. Not surprisingly, even in his youth but increasingly as he aged, Henry had a seriously compromised diet, over-rich in protein and almost completely lacking in vitamins. He possibly suffered from scurvy, caused by lack of vitamin C, due to the absence of fresh fruit and vegetables (not unlike modern meat/bread and fast-food diets). His poor nutrition must have contributed to his medical problems of constipation, gout, diabetes, massive open sores/ulcers on his legs, and high blood pressure—not to mention his fertility/sperm quality. Given his probable genetic heritage, his increasingly unhealthy diet, and possible injuries from his active years, Henry seems likely to have suffered from damage to sperm (DNA fragmentation). Hence, the consistent problems with miscarriage and stillbirth probably originated with him.¹⁵

14 Robert Hutchinson, *The Last Days of Henry VIII: Conspiracy, Treason and Heresy at the Court of the Dying Tyrant* (London, 2005), 139. For the information about meals, see <https://www.hrp.org.uk/hampton-court-palace/history-and-stories/tudor-food-and-eating/#gs.fiuTqlPH>; David Gentilcore, *Food and Health in Early Modern Europe: Diet, Medicine and Society 1450–1800* (New York, 2016), 9–26, 54; Alison Sim, *Food and Feast in Tudor England* (Stroud, 2011; orig. pub. 1997), 6–11, 41–42, 74; for Henry’s gluttony, Joan Thirsk, *Food in Early Modern England: Phases, Fads, Fashions, 1500–1760* (New York, 2006), 18–19.

15 See *Ordinances for the Household made at Eltham in the XVIIIth year of King Henry VIII*, 1526 A. D. (174), available at https://books.google.co.uk/books?id=WcU_AAAAaAAJ&pg=RA2-PA174&lpg=RA2-PA174&dq=pestells+of+reed+deere&source=bl&ots=2VXR_9szo&sig=ACfU3U3xiGsJ-6CVeyHunhkvwczFfu_ZEQ&hl=en&sa=X&ved=2ahUKEwjuu4XborjgAhWDSRUIHeSWCgEQ6AEwDXoECACQAQ#v=onepage&q=pestells%20of%20reed%20deere&f=false. Krissi Danielsson, “Sperm Quality Issues and Miscarriage,” available at <https://www.verywellfamily.com/can-problems-in-sperm-cause-miscarriage-2371837>. A recent study at the University of Reading, in association with Historic Royal Places, created a simulated model of Henry’s gut, concluding that Henry probably consumed about 226 gm of protein per day, around four times the current recommended daily allowance. See <https://www.futurelearn.com/courses/royal-food/0/steps/17046>.

Fig. 3 Typical Menu Served at a Banquet Held by Henry VIII (Ordinances for Eltham Palace)

174 ORDINANCES MADE AT ELTHAM			
A DECLARACION OF THE PARTICULAR ORDINANCES OF FARES FOR THE DIETTS TO BE SERVED TO THE KING'S HIGHNESSE, THE QUEEN'S GRACE, AND THE SIDES, WITH THE HOUSEHOLD, AS HEREAFTER FOLLOWETH.			
THE DIETT FOR THE KING'S MAJESTY AND THE QUEEN'S GRACE, OF LIKE FARE, IN ALL TWO MESSES, AS FOLLOWETH.			
ON A FLESH DAY.			
Dinner.		Supper.	
	£. s. d.		£. s. d.
Cheat Bread and Manchett,	16 8	Cheat Bread and Manchett,	16 8
Beere and Ale,	6 gal' 9	Beere and Ale,	6 gal' 9
Wyne,	1 fext' 2 0	Wyne,	1 fext' 2 0
Flesh for Pottage,	8	Flesh for Pottage,	8
Chines of Beef,	2 8	Chickens in crumery, Larkes	
Rammners in stew or cap',	1 mefs 6	Sparrows or Lambe stewed, with Chynes of Mutton,	1 13
Venison in brewz' or mult',	1 4	Giggois of Mutton or Venison, stopped with Cloves,	1 6
Pettells of Reed Deere	1 2	Capons of gr',	2 4
Mutton,	2 6	Conyes of gr',	1 mefs 12
Carpes or Yong Veale in Arm' farced,	1 10	Pheasant, Herne, Shovelard,	1 3 4
Swanne, gr' Goofe, Storke or Capons of gr',	2 4	Cocks, Plovers or Gullcs,	1 2
Conyes of gr',	1 12	Swete dowcetts or Orange,	1 10
Fryanders, baked Carpe,	1 20	Quinces or Pippins,	1 2
Cullard garnishe', or Fritters,	1 8		
Second Course.			
	£. s. d.		£. s. d.
Jelly, Ipcoras, Creame of Almonds,	1 mefs 8	Blank-mange or other dish,	1 mefs 4
Pheasant, Herne, Bitterne, Shovelard,	1 3 4	Kydd, Lambe or Pejcons,	1 12
Partridges, Quailes or Mewz',	1 3	Partridge or Quailes,	1 2 6
Cocks, Plovers or Gullcs,	1 2	Godwits Brewcz', or Teales, Pullets, Chic' pip'	1 18
Kydd, Lambe or Pigeons,	1 14	Rabbetts or Larkes,	1 12
Larkes or Rabbetts,	1 12	Tarte,	1 12
Snyters, Pullets or Chickens,	1 12	Fruite,	1 9
Venison in fine pait,	1 12	Butter and Eggs,	3 4
Tarts,	1 12	Venison or other Baked Meates,	1 12
		Fritter,	

REPRODUCTIVE HISTORY OF HENRY'S NOBLE CONTEMPORARIES The extent to which the fertility problems experienced by Henry and his wives were abnormal for his era is evident in an investigation of other contemporary couples with social backgrounds similar to those of Henry and his wives. Table 2 provides details of the pregnancy/fertility success rate of Henry's antecedents and peers (noble courtiers and favorites) based on their verified legitimate children. Data about miscarriages and neonatal deaths for nobles

Table 2 Reproductive Histories of Noblemen Contemporaries of Henry VIII

NAMES	DATES (CHRONOLOGICAL ORDER)	WIVES	BABIES SURVIVED	PREGNANCIES		RATE OF PREGNANCY LOSS	NOTES
				RESULTING IN MISCARRIAGE OR STILLBIRTH	LOSS		
Owain Tudor	c 1400–61	1	3	0/3		0%	Henry VIII paternal great-grandfather (+1 illegitimate)
Richard 3 rd duke of York	1411–60	1	8	4/12		33%	Henry VIII maternal great-grandfather (his wife one of 22 siblings/step siblings)
Edmund Tudor	1430–56	1	1	0/1		0%	Henry VIII paternal grandfather (died of plague age 26)
Edward IV	1442–1483	1	8	2/10		20%	Henry VIII maternal grandfather (plus 5 illegitimate)
Henry VII	1457–1509	1	4	3/7		43%	Henry VIII father
Thomas Wolsey	1473–1530	0	2	0/2		0%	Both illegitimate (was a cardinal; rich diet)
Thomas Howard	1473–1554	2	4	1?/8		12.5%	3rd duke of Norfolk. Anne's uncle who presided at her trial. One of 16 siblings/step siblings
John Seymour	1474–1536	1	7	3/10		30%	Father of Jane Seymour (Henry's 4th wife)
Edward Howard	1476/7–1513	2	0	n/a		n/a	2nd son Duke Norfolk, naval (d. sea battle). 2 illegitimate
Thomas Boleyn	1476–1539	1	3	2/5		40%	Inner ring of Henry VIII
Thomas Parr	1483–1517	1	3	0/3		0%	Henry VIII circle, and intimate (Catherine's father; his son had 3 wives, no issue)

Table 2 (Continued)

NAMES	DATES (CHRONOLOGICAL ORDER)	WIVES	BABIES SURVIVED	PREGNANCIES RESULTING IN		RATE OF PREGNANCY LOSS	NOTES
				MISCARRIAGE OR STILLBIRTH	LOSS		
William Parr	1483–1547	1	5	0/5	0%	Royal favorite, soldier	
William Compton	1482–1528	2	4	0/4	0%	Close to the king	
Charles Brandon	1484–1545	4	8	0/8	0%	Very close to Henry VIII, married Henry's sister, Mary. Some died as children aged around 6+	
Thomas Cromwell	1485–1540	1	3	0/3	0%	Minister of Henry VIII (2 daughters died young but not as babies; plus one illegitimate)	
Thomas Knyvett	1485–1512	1	5	0/5	0%	Favorite, soldier, died in battle	
Henry Guildford	1489–1532	2	0	No issue	n/a	Close friend Henry VIII. Comptroller of royal household.	
Francis Bryan	c 1490–1550	1	0	No Issue	n/a	No issue (was overweight) Favorite of Henry VIII. Promiscuous, rake (illegitimate children). Married at age 58 (1548)	
Wymond Carew	1493–1549	1	5	0/5	0%	Courtier, treasurer of household; 5 sons one daughter	
Richard Cecil	1495–1553	1	4	0/4	0%	Father of William Cecil (3 were sons)	
Nicholas Carew	1496–1539 (ex)	1	4	1/5	20%	Close friend of Henry VIII	

Edward Seymour	1500–52 (ex)	2	11	1/12	8%	1st duke of Somerset (his sons had very few offspring)
William Carey	1500–28	1	2	0/2	0%	Married to Mary Boleyn (Henry may have fathered them but no evidence). Died age 28
Thomas Wyatt	1503–1542	1	4	0/4	0%	Poet (in love with Anne Boleyn in 1520s)
Nicholas Poyntz	1510–1567	1	9	0/9	0%	Prominent courtier (Holbein portrait)
Anthony Lee	1510–1549	2	11	0/11	0%	Courtier, MP, JP. Related to Wyatt
Nicholas Bacon	1510–79	2	8	0/8	0%	Granted several manors by Henry VIII (rose further under Elizabeth)
Edmund Denny	?–1520	1	4+	0/4	0%	Courtier and politician
Francis Knollys	1511/4–1596	2	13	0/15	0%	Courtier to Henry VIII and others. MP
John Shelton	1476–1539	1	10	0/10	0%	Courtier etc.
William Stafford	1500–1556	2	5	1/6	17%	1st wife Mary Boleyn (her 2 nd ; no issue)

may not have been as carefully recorded as those for royals, but the success rates (the survival of children past the age of about two) are capable of reasonable estimation. The study is restricted to children born within marriage due to the lack of consistent data about illegitimate pregnancies; early methods of contraception are irrelevant in these cases since the production of heirs in both royal and noble families was paramount.¹⁶

The eminent Howard and Seymour families (which both supplied Henry with a wife) serve as prime examples, as can other known courtiers and colleagues of Henry for whom detailed information is available. Results show that among thirty-one noblemen closely associated with Henry, the mean number of children fathered was 5.6; only 18 of 179 documented pregnancies (10.05 percent) resulted in either miscarriage or stillbirth. Thomas Howard, third duke of Norfolk (1473–1554), uncle and judge of Anne Boleyn, who was one of sixteen siblings and step-siblings, produced eight children from two wives. Edward Seymour, first duke of Somerset (1500–1552) had twelve children by two wives (one baby died in infancy). Staying at Wolf Hall, the Seymour country seat, Henry commented that Seymour's ability to father so many children was unfair, given that he, the king, had so little success.

Tables 1 and 2 show that Henry had significantly fewer surviving children than his married and “active” courtiers and colleagues, with a success rate of only 30 percent (three survivors among his ten legitimate pregnancies). According to column 4 of Table 2, even if the records of the miscarriages and stillbirths of courtiers are incomplete, and their illegitimate births unrecorded, Henry undeniably produced far fewer offspring than did his contemporaries, in spite of his multiple partners. The pregnancy/fertility success rates (as reasonably estimated in column 7) are generally much higher for others than for him. All members of the royal court would have had a generally similar lifestyle, with or without Henry's

16 Bartlett, *Blood Royal*, 52–88. Rudimentary contraception was available at the time but unlikely to have been deployed in families that desired large families with male heirs (and females to clinch family alliances). For discussion of herbal medications, leather/gut condoms, lemon cups as “caps,” etc. (all contrary to Catholic and Protestant dogma), see Lesley Smith, “Contraception in the 16th Century,” *Journal of Family Planning and Reproductive Health Care*, XXXII (2006), available at <https://srh.bmj.com/content/32/1/59>; Angus McLaren, *History of Contraception: From Antiquity to the Present Day: Family, Sexuality & Social Relations in Past Times* (Oxford, 1992).

well-known excesses. Furthermore, early death or late marriage are ready explanations for why some of his contemporaries had few documented children; infertility was not the issue for them.¹⁷

MALE FERTILITY FROM PLATO TO THE SEVENTEENTH CENTURY As already mentioned, male reproductive failure throughout history has usually been attributed to a lack of sexual prowess or impotence; the ridicule that affected men feared that they might receive for sexual inadequacy resulted in a taboo on any discussion of the subject. Plato, in the *Republic* (Book III, 415B ff) drew attention to how “the best men must cohabit with the best women in as many cases as possible and the worst with the worst in the fewest.” The need for “young men who excel” to “beget as many children as possible” (*Republic*, Book V, 460B) indicated a recognition that some males reproduced more effectively than others. In the medieval period, the idea that a man might be sexually inadequate surfaced in the “fops” that Geoffrey Chaucer and, later, William Shakespeare described, indicating men with impaired sexual performance, with no consideration of male infertility. The ability of a man to perform removed any doubt about his fertility, leaving reproductive failure exclusively as the fault of women.¹⁸

Rider’s work on male/female fertility and infertility in the Middle Ages provides some evidence that the male role attracted little more consideration beyond mere performance. In the sixteenth century, dramatic medical progress ensued after the legalization of human dissection for anatomical purposes, the revival of work by the Roman physician Galen, and the new ideas of Vesalius. But as Evans highlights, not until the seventeenth century did the first detailed discussions and descriptions of male infertility emerge in England, particularly by the surgeon John Tanner in his *The Hidden Treasures of the Art of Physick* (1659). Tanner still regarded the role of women in pregnancy failure as dominant, but he addressed male infertility as distinct from erectile function,

17 Edmund Tudor, Edward Howard, and William Carey, for example, all died relatively young (around the age of thirty) and thus were not sexually active for long. Francis Bryan, although known as a promiscuous “rake,” did not marry until age fifty-eight. Judging from portraits, only one courtier (Henry Guildford) looks significantly overweight; Cromwell just looks heavy.

18 Olwen Hufton, *The Prospect Before Her: A History of Women in Western Europe 1500–1800* (New York, 1995), 177.

thus initiating the recognition of male infertility as a condition requiring identification and treatment. The present study complements these historical descriptions by analyzing Henry's predicament in the context of contemporary noblemen with similar lifestyles.¹⁹

Henry's marital and reproductive history had a pivotal effect on English history and the Reformation, the repercussions of which persist to this day. By using multiple sources of historical data, with the observations about the miscarriages and/or stillbirths that plagued Henry's multiple female partners, the evidence points to Henry unknowingly suffering from male infertility. The risk of poor nutrition in matters of fertility is no secret nowadays, whether in several developing countries (with some conditions not unlike those of sixteenth-century England) or anywhere else where people indulge in excessive meat and carbohydrate intake and avoid fruits, legumes, and vegetables.

Obesity, physical infirmity, diabetes, and sexually transmitted infections can reduce the quality of sperm, either blocking pregnancy or auto-aborting it; malnutrition, poor sanitation, and infections can lead to foetal or neonatal death. Poor sperm quality is an especially under-appreciated cause of miscarriage in contemporary times.

MEDICAL RESEARCH Despite the evidence, the limitations of this study make it impossible to prove conclusively that Henry was infertile. Chance or the highly unlikely coincidence that Henry married six women with fertility problems are not outside the realm of possibility. The unusual preponderance of bad pregnancy outcomes, or no pregnancy at all, involving multiple female partners, however, strongly implicates Henry as the source of the problem, regardless of the numerous pregnancies for which he was also partly

19 Evans, "'They Are Called Imperfect Men': Male Infertility and Sexual Health in Early Modern England," *Social History of Medicine*, XXIX (2014), 311–332; John Tanner, *The Hidden Treasures of the Art of Physick* (1659), 346, as cited by Evans, "'They Are Called Imperfect Men,'" 311. For miscarriage and the demographics of stillbirth and childlessness in the early modern period, see Evans and Read, "'Before Midnight She Had Miscarried': Women, Men and Miscarriage in Early Modern England," *Journal of Family History*, XL (2015), 3–23; Helen Berry and Elizabeth Foyster, "Childless Men in Early Modern England," in *idem* (eds.), *The Family in Early Modern England* (New York, 2007), 158–183; Chris Galley, "The Stillbirth Rate in Early Modern England," *Local Population Studies*, LXXXI (2008), 75–83, the seventeenth-century focus of which shows the importance of further research on the Tudor period.

responsible. Not until the modern era has research been able to discover that sperm health plays a significant role in miscarriage and that the causes of miscarriage, stillbirth, and neonatal death do not lie with women alone. The results of this study demonstrate for the first time that Henry's peers and their wives were far less affected by infertility and pregnancy loss, strongly indicating, ironically, that Henry's infertility led to his wives' difficulties with pregnancy.

Paternally imprinted genes contribute heavily to the regulation of the placentation that is critical to embryo viability. Furthermore, adverse sperm characteristics such as reduced sperm count, low percentage of amotile and progressively motile sperm, elevated sperm DNA fragmentation, and semen reactive oxidative species (ROS) are known to be associated with male infertility and RPL. Clinical risk factors such as obesity and diabetes mellitus increase the risk of male infertility. Because no pharmacological therapies are available to improve sperm quality, the customary treatment of male infertility is to provide IVF or ICSI to the female partners of affected men. A recent qualitative study found that men with infertility problems often fall prey to a social stigma of being "less of a man" while engaging in treatment. Participants also sometimes complain of a lack of support from professionals and family members, leading to further adverse emotional reactions. Although male infertility affects 10 percent of the male population, it has no major public role models and still carries an aura of social exclusion.²⁰

This interdisciplinary study raises issues that are relevant for the public—patients and medical professionals alike. Henry VIII by all accounts suffered from male infertility, but no such diagnosis existed at the time. Although male infertility has now acquired a distinct etiology, it remains a taboo subject. Health-care and research programs targeting male infertility remain underdeveloped when compared with those oriented toward female fertility, which

20 Jan Tesarik, Ermanno Greco, and Carmen Mendoza, "Late, but Not Early, Paternal Effect on Human Embryo Development Is Related to Sperm DNA Fragmentation," *Human Reproduction*, XIX (2004), 611–615; Imam et al., "Idiopathic Recurrent Pregnancy Loss"; Henkel et al., "Influence of Deoxyribonucleic Acid Damage"; Jayasena et al., "Reduced Testicular Steroidogenesis and Increased Semen Oxidative Stress in Male Partners"; Arya and Dibb, "Experience of Infertility Treatment."

have led to such breakthroughs as IVF therapy. Increased recognition of the importance of male infertility to human health deserves increased recognition, diagnosis, and treatment to ensure that affected couples receive proper support. Furthermore, maybe the knowledge that Henry VIII, one of the most powerful rulers in European history, was almost certainly affected by this condition, will alleviate the emasculation and social stigma that is still attached to male infertility.