

This Passionate Study: A Dialogue with Florence Nightingale

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Abstract

On her death in 1910, Florence Nightingale left a vast collection of reports, letters, notes and other written material. There are numerous publications that make use of this material, often highlighting Florence's attitude to a particular issue. In this paper we gather a set of quotations and construct a dialogue with Florence Nightingale on the subject of statistics. Our dialogue draws attention to strong points of connection between Florence Nightingale's use of statistics and modern evidence-based approaches to medicine and public health. We offer our dialogue as a memorable way to draw the attention of students to the key role of data-based evidence in medicine and in the conduct of public affairs.

1. Introduction

1.1 Who Was Florence Nightingale?

Florence Nightingale (1820 - 1910), hereafter referred to as FN, made remarkable use of her ninety years of life. She was the second of two daughters, born in England to wealthy and well-connected parents. There were varied religious influences. Her parents both came from a Unitarian religious tradition that emphasized "deeds, not creeds". The family associated with the Church of England ([Baly 1997b](#)) when property that FN's father had inherited brought with it parochial duties. A further religious influence was her friendship with the Irish Sister Mary Clare Moore, the founding superior of the Roman Catholic Sisters of Mercy in Bermondsey, London. Her father supervised and took the major responsibility for his daughters' education, which included classical and modern languages, history, and philosophy. When she was 20 he arranged, at FN's insistence, tutoring in mathematics. These and other influences inculcated a strong sense of public duty, independence of mind, a fierce intellectual honesty, a radical and unconventional religious mysticism from which she found succour in her varied endeavours, and an unforgiving attitude both toward her own faults and toward those of others.

At the age of 32, frustrated by her life as a gentlewoman, she found herself a position as Superintendent of a hospital for sick governesses. Additionally she cooperated with Sidney Herbert, a family friend who was by now a Cabinet minister, in several surveys of hospitals, examining defects in the working conditions of nurses. On the basis of this and related experience she was chosen, in 1854, to head up a party of nurses who

would work in the hospital in Scutari, nursing wounded soldiers from the newly declared Crimean war. Her energy and enthusiasm for her task, the publicity which the *Times* gave to her work, the high regard in which she was held by the soldiers, and a national appeal for a Nightingale fund that would be used to help establish training for nurses, all contributed to make FN a heroine. There was a huge drop in mortality, from 43% of the patients three months after she arrived in Scutari to 2% fourteen months later, that biographers have often attributed to her work.

Upon her return to England at the end of July 1856 FN become involved in a series of investigations that sought to establish the reason for the huge death rate during the first winter of the war in the Crimea. Theories on the immediate cause abounded; was it inadequate food, overwork, lack of shelter, or bad hygiene? In preparation for a promised Royal Commission, she worked over the relevant data with Dr William Farr, who had the title “Superintendent of the Statistical Department in the Registrar-General’s Office”. Farr’s analysis persuaded her that the worst affects had been in Scutari, where overcrowding had added to the effect of poor sanitation. Sewers had been blocked, and the camp around had been fouled with corpses and excrement, matters that were fixed before the following winter. The major problem had been specific to Scutari. FN did not have this information while she was in the Crimea. The data do however seem to have been readily available; they were included in a report prepared by [McNeill and Tulloch \(1855\)](#).

The strain of FN’s various involvements, and perhaps residual effects from an illness that she had suffered while in the Crimea, in due course took their toll. A year after her return to England, she suffered a nervous breakdown, emerging from this personal crisis with views that were often remarkably different from those that she had held earlier. Of particular interest is a change from her demand that nurses should follow to the letter instructions from doctors, to her view that nurses ought, within their proper area of responsibility, to make their own autonomous judgments. [Small \(1998, pp. 119 - 127, 178\)](#) has extensive and perhaps overly speculative comment on the reasons for the nervous breakdown, and an interesting analysis of ways in which her views changed.

The data that showed that the high mortality was specific to Scutari were included in FN’s 1858 report, but omitted from the 1857-1858 Royal Commission report. It was feared that continuing and acrimonious attempts to assign blame would jeopardise ongoing efforts at army reform. FN, unhappy at this suppression of her evidence, sent copies of her report to a number of carefully chosen recipients, each time with instructions to keep it confidential. One of the recipients was the freethinking popular journalist Harriet Martineau. With FN’s help, she wrote a book ([Martineau 1859](#)), ostensibly based on information from public documents but using FN’s confidential report for additional background information, that gave the facts as FN understood them. FN’s biographers, perhaps relying too much on official documents, have not until recently been mindful of these nuances. See [Small \(1998, p.198 - 200\)](#) for further discussion is one of the first to recognise them.

A comprehensive biography of FN, that will do justice to the wide-ranging sympathies and interests of this remarkable woman and show how her views changed and developed over time, has yet to be written. [Small](#) (see the note on his web site) and [Baly \(1997b, pp. 1-19\)](#) both draw attention to inaccuracies in earlier biographical accounts. [Vicus and Nergaard \(1989\)](#) have much carefully documented biographical information. Among the numerous web sites that have material on FN note [C.J. McDonald \(2001\)](#) who emphasises connections between Nightingale and the experiences of soldiers in the Vietnam War; [L. McDonald \(2002\)](#) who is leading a project to publish all Nightingale’s writings; and [Small \(1998\)](#). Small’s web site has the data (from [Nightingale 1858](#)) that the Royal Commission suppressed.

1.2 Hospitals and Hospital Nursing

FN had remarkably radical views on hospitals and on hospital nursing. Both in 1860 and in 1876, she describes hospitals ([Baly 1997b, p.25](#); [Nightingale 1876](#)) “as an intermediate stage of civilisation.” In 1867 she wrote ([Baly 1997b, p.21](#))

“my view you know is that the ultimate destination is the nursing of the sick in their own homes. ... I look to the abolition of all hospitals and workhouse infirmaries. But it is no use to talk about the year 2000.”

Consistent with these views, FN's *Notes on Nursing* (1859) are not intended "as a manual to teach nurses to nurse", but are "meant simply to give hints for thought to women who have personal charge of the health of others."

It may thus seem ironic that, in her work with the Nightingale fund, FN was deeply involved in the development of hospital nursing training. She opposed the British Nurses' Association's 1890 proposals to make nursing into an accredited profession (Baly 1997b, pp.184-196). She noted that there was no widespread agreement on what constituted an adequate training or what the minimum qualification should be, and argued that a much longer experience was needed before a register could be contemplated. The qualities that were required in nurses were not amenable to test by public examination. FN did however see an important role for women medical professionals. She wanted women to take leading roles in midwifery and in the diseases of women and children, and to be as well or better trained for these tasks as the men who at that time had a professional monopoly. It was her view that "There is a better thing than making women into medical men, and that is making them into medical women" (Nightingale 1871). She looked to a time when, as had happened in France, women would be professors of midwifery. She set out the immediate steps that she thought would best achieve that end.

FN worked relentlessly for reform, in the army, in the hospitals, and in public health. She was meticulous in researching the reforms that she proposed. Where, as often, data were unavailable or inadequate, she pressed for their collection. Data inadequacies are strong themes in her *Notes on Hospitals* and in her *Introductory Notes on Lying-In Institutions*, i.e., on maternity institutions. She made strong, consistent and carefully argued cases for enlightened and data-based public decision-making.

This is not to say that FN was always correct in her judgments. In her next to final contribution to the dialogue, FN comments on a controversy that erupted following the publication of the third edition of her *Notes on Hospitals*. Her use of the term *mortality percent for deaths per hundred beds per day*, which she copied from Farr's report as Registrar-General, was unfortunate. As she seems to admit a page later in the *Notes*, these figures were not a good basis for comparing the sanitary states of different hospitals.

1.3 Evidence and Statistics

FN's contribution to statistics has attracted wide interest, as evidenced by papers that discuss her work: see Kopf (1916) and more recently Diamond and Stone (1981), Smith (1996), and Spiegelhalter (1999). Her graphical innovations have been important for statistical practice. Note especially two of the graphs that appeared in Nightingale (1858). The first, invented in collaboration with Farr, displayed the effect of her efforts in the Crimea on soldiers' death rates. This graph is reproduced in Cohen (1984, p.99) and Small (1999). The second, reproduced in Cohen (1984, p.102) and Small (1999) is an early version of a bar chart, used with the aim of influencing public policy. (For an earlier example of a bar chart, see Tufte 1983, p.33).

FN relied on such statistical evidence as she could obtain to convince those in power of the necessity of her proposed reforms. She argued strongly that only by collecting and analysing pertinent data was it possible to determine the extent to which hospitals and other public institutions were effective in serving those who relied on their help. The knowledge thus gained must then be the basis for effective action. These same motivations are the basis for evidence-based approaches in medicine, in public health and in nursing.

Sackett et al. (1997, p.2) define evidence-based medicine as "the conscientious, explicit and judicious use of the current best evidence in making decisions about the care of individual patients." In practice this means that the professional judgements that clinicians make must be informed, whenever this is possible, by the best available data-based evidence. There has been a heavy reliance on Cochrane Collaboration studies, which provide expert summaries of the evidence in the research literature: see Sackett and Oxman (1994). Irwig et al. (1999) is an accessible exposition of the ideas of evidence-based medicine, aimed at the lay person.

Since FN's time, there has been substantial progress in getting an insistence on a secure evidence-based foundation for at least some medical treatments. There is however very limited use of evidence-based approaches in deciding between surgical treatments, and steps that have been taken to collect and analyse data on medical practice variations remain inadequate. Variability in medical practices, and consequences for variations in childbirth mortality are the major theme of her *Notes on Lying-In Institutions* (1871). As an

example of a recent investigation that has these same themes - variability in medical practices, and consequences for variations in mortality - note [Chassin et al. \(1996\)](#), who report extensive mortality data from coronary artery bypass graft operations in New York State. It took the release of the data to the press to draw attention to the large differences in mortality rate between part-time and full-time surgeons; 12% as against 3%. It was important, for the comparisons that Chassin et al. report, of working with risk-adjusted mortality rates. FN well understood the importance, when comparing different groups of patients, of making such adjustments for prior risk.

On her death in 1910, FN left a vast collection of reports, letters, notes and other written material. These reveal FN's considered judgements on a wide range of issues, from the construction of barracks in India through the registration of nurses in England to the character of God. Collections of these quotations have been published e.g. [Baly \(1997a\)](#). Here, we construct a dramatic dialogue around quotes from FN that bear upon the collection and use of statistical evidence. We offer our dialogue as a useful and memorable way to draw the attention of students to the key role of data-based evidence in medicine and in the conduct of public affairs.

2. The Dialogue

We next present an imaginary dialogue between ourselves (I = Interviewer) and Florence Nightingale (FN), imagining that she has travelled in time to meet us. Words taken from FN's own writings are in italics. Where necessary, we have changed the tense, from *is* to *was*, etc. The [Appendix](#) has a full list of references.

I: Miss Nightingale, thank you for taking the trouble to "time travel" and join us. We would like to raise with you some issues relating to statistics, public health and the hospital system that are as important now as they were in your time. We are particularly keen to talk about the use of data-based evidence in decision-making.

FN: Thank you for inviting me. It is a pleasure to talk with you about these issues - subjects about which I feel passionately.

I: You are famous for your work as leader of a group of nurses who went to work in the Crimea in 1854, in the hospital at Scutari. You were held in high esteem by both English soldiers and the English populace. The poet Henry Wadsworth Longfellow praised you in his poem "Santa Filomena", referring to you as "a lady with a lamp". What were your feelings when you returned to England?

FN: I am grateful that you did not embarrass me by reading through Longfellow's poem. From the way that he writes, you might think that the horror that was Scutari became, after I arrived there, sweetness and light. It was not like that. But you asked about my feelings on returning to England. The excitement quickly wore off, as I became involved in preparations for a promised Royal Commission into the conditions in the army. This forced me to look back over events in the Crimea with a critical eye.

I: What did you find, then?

FN: I learned that it was only at Scutari, not at the other hospitals in the Crimea, that the death rate was an appalling 43% during that first winter. *Even in the hospital tents of the Crimea, although the sick were almost without shelter, without blankets, without proper food or medicines, the mortality was not above one half what it was at Scutari. ... The subject is almost too painful to dwell on, especially as we must take it for granted that the administration of the period acted according to the best of its judgement. Only let the warning be taken. And let us not reproduce, even on a small scale, the same structural defects of mismanagement which led to such terrible loss of life.* [Source](#)

I: How did you come to this conclusion? What were the structural defects of which you speak?

FN: In reaching this conclusion, I had extensive help from Dr Farr, who was in charge of statistics at the Registrar-General's office. Explanations that I considered included poor food and living conditions, overwork, poor hygiene, and so on. In the end, I decided that Dr Farr's explanation was correct, that the appalling sanitation and overcrowding at Scutari during the first winter, when sewers were blocked and dead bodies were left lying around on the site, was the reason for the high mortality. Dr Farr knew what data to look for, and how to interpret them. This was the start of my serious education in statistics.

I: What did you do with that information?

FN: The Government promised to set up a Royal Commission that would investigate health in the army. When nothing seemed to be happening, I threatened that unless they proceeded with the Royal Commission, I would release my figures to the public. When the commission did start its work, I provided it with an 800-page book that had very detailed facts and figures. In the end, though, the Royal Commission suppressed key information from my report. The data were, so to speak, too explosive. Still, I was determined to get the information out. I sent copies to key people up and down the country.

I: One of the people who received a copy of the report was the journalist Harriet Martineau. Why did you send the information to her?

FN: I knew that Miss Martineau would make good use of it. She wrote to ask permission to publicise the information. I wrote back to say: *"I shall be very grateful if you will make use of my report in the way you mention. All such help is most valuable to us. ... I hope that I can in this way secure some hold upon the minds of those who hold in their hands the remedies that we are seeking. I hope that they will hear our crying for relief from sufferings so pressing."* Eventually, Miss Martineau wrote a book called *England and her Soldiers*. I myself bought fifty copies, and donated them to lending libraries. [Source](#)

I: After coming back from the Crimea, you expended great energy battling with the British military establishment. I believe you once said that the British War Office *deserved a Victoria Cross for its cool intrepidity in the face of the facts*. Is that really what you said? [Source](#)

FN: That is a long time ago and I have trouble remembering back that far, although it certainly expresses what I thought. You would have thought the army top brass would have been desperate to make improvements. Instead they resisted me at every turn. But I was able to make improvements, and the Sanitary Commissioners who arrived in March 1855 made huge improvements in the conditions.

I: But your interest in statistics went much further than trying to find the real causes for the high mortality at Scutari. It seems a big step from nursing in the Crimea to your work in army and hospital reform, in public health, and in statistics.

FN: I had begun to see that good quality data, properly interpreted, can be a power for good in all areas of medicine and health. I collected as much evidence on hospitals and public health as I could to form the basis of my knowledge. I devoured published works on statistics and *however exhausted I might be, the sight of long columns of numbers was perfectly reviving to me*. [Source](#)

I: What did you learn about mortality in army barracks?

FN: I learned that the mortality rates in army barracks in England were not much better than they'd been in the Crimea. 20-30 year old soldiers in army barracks in England were about twice as likely to die as 20-30 year olds in the general population - 18 per thousand per year among soldiers, against 9 per thousand per year among those who were fortunate enough not to be conscripted. My bar chart makes the situation clear. It was a scandalous state of affairs.

I: You clearly like to quote figures to back up your case. Is it really necessary to go into so much detail?

FN: It certainly is. I could have complained about unsanitary conditions in the hospital in Scutari, or in army barracks in England, till I was blue in the face. But when I used the data to point out that the bad sanitary and medical conditions in the Crimea had probably led to 9000 unnecessary deaths, the politicians had to sit up and take notice, and do something about the appalling health conditions in the army. Even so, I had to browbeat them to get anything done.

I: You achieved a great deal. Was it time to relax a little?

FN: Not at all. We needed proper nursing training. We needed uniform and accurate statistics that could be the basis for reform in public hospitals. There was a desperate need for huge improvements to public health.

I: Perhaps you would tell us about your work on hospital reform.

FN: My book - *Notes on Hospitals* - described the reforms that were needed. *It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm. It was quite necessary, nevertheless, to lay down such a principle, because the actual mortality in hospitals, especially in those of the large crowded cities, was very much higher than any calculation founded on the same class of diseases among patients treated out of hospital would lead us to expect.* [Source](#)

I: You devoted a whole chapter, 21 pages, to the collection of statistical information. Why was that so important?

FN: I made an urgent appeal for adopting [my own] ... or some uniform system of publishing the statistical records of hospitals. There was a growing conviction that in all hospitals ... there was a great and unnecessary waste of life ... In attempting to arrive at the truth, I ... applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit for any purposes of comparison. [Source](#)

I: The use of such information requires care. What are some of the issues?

FN: *In comparing the deaths of one hospital with those of another, any statistics are justly considered absolutely valueless which do not give the ages, the sexes and the diseases of all the cases. ... There can be no comparison between old men with dropsies and young women with consumptions.* [Source](#)

I: Hospital records are still a problem - we are still searching for that uniform system that you mention, despite the energy you poured into the search.

FN: That is disappointing. As I wrote in my book, data are needed that will enable us to ascertain ... what diseases and ages press most heavily upon the resources of particular hospitals. For example, it was found that a very large proportion of the resources of one particular hospital was swallowed up by one preventable disease, - rheumatism. [Source](#)

I: Eight years later you wrote another book, *Notes on Lying-In Institutions*, on childbirth facilities. This makes many different statistical comparisons - between childbirth at home and childbirth in an institution, between different institutions, and between different countries.

FN: There were large deficiencies in the statistical data. Predominately, it was the wealthy whose children were delivered at home, while the destitute poor were delivered in childbirth facilities. Reliable data are terribly important for ascertaining whether any particular cause of death predominates in lying-in [childbirth] institutions; and, if so, why so? But, with all their defects, midwifery statistics pointed to one truth; namely that there was a large amount of preventable mortality in midwifery practice, and that, as a general rule, the mortality was far, far greater in lying-in hospitals than among women lying-in at home. [Source](#)

I: You are saying that childbirth wards could be dangerous places.

FN: Overall, the data indicated a mortality rate of 4.7 per thousand for women delivered at home, against 34 per thousand for women delivered in hospitals. *For every two women who would die if delivered at home, fifteen must die if delivered in lying-in hospitals. ... The evidence was entirely in favour of home delivery, and of making better provision ... for this arrangement among the destitute poor.* [Source](#)

I: I'm sure you'd be delighted to know that even now modern authors are citing your work and employing techniques very similar to your ones for comparing death rates between hospitals. Perhaps you would comment a bit more on about the way that you used statistical data?

FN: You can see the power of careful, accurate, statistical information from the way that I used them in my pleas to Government to improve the conditions of ordinary soldiers and of ordinary people. *I collected my figures with a purpose in mind, with the idea that they could be used to argue for change. Of what use are statistics if we do not know what to make of them? What we wanted at that time was not so much an accumulation of facts, as to teach the men who are to govern the country the use of statistical facts.* [Source](#)

I: You clearly had a huge energy and enthusiasm for the use of statistical information.

FN: *For me, as I wrote to the Belgian statistician Quetelet, "this passionate study is not at all based upon love of science, which I can hardly claim. I have seen so much of the sufferings and the miseries of humanity, of . . . the stupidity of our political system, of the dark blindness of those who guide our body social that . . . frequently it comes to me like a flash of light across my spirit that the only study worthy of the name is that whose principles you have so clearly put forward."* [Source](#)

I: I believe you thought a lot of Quetelet.

FN: Yes indeed. . . *I cannot say how the death of Quetelet, this old friend of mine, touched me. He was the founder of the most important science in the world: ... he did not live to see it perceptibly influence in any practical manner statesmanship or government.* [Source](#) From corresponding with Quetelet and reading his book I gained real insight into the difference between good and bad statistical arguments. The first two words of the title of his book translate, in English, as *Social Physics*. You can't say whether or not a hospital is doing its job properly based on haphazardly collected evidence of occasional deaths or mishaps. One needs to get together data that is as complete as possible, so that one can see the outcome for the tens of thousands of people who may go through in a year. It is then that you see the regularities that Quetelet talked about.

I: And what about presentation of statistical information? How did you go about presenting it in a way that could press your case?

FN: I used diagrams and tables to present my evidence. I believe you have examples of my diagrams at hand.

I: Yes, your graphical presentations were great innovations at the time - you are to be congratulated, Miss Nightingale, for coming up with such elegant yet powerful graphs.

FN: Many people will try to tell you that statistics are impenetrable and cloud the issue rather than enlightening it. I beg to differ - and use my diagrams as an example. *I want everyone to understand - no hiding behind the supposed incomprehensibility of statistics. The figures must be as clear as a picture - they must tell a story as clearly as does a picture of the Crucifixion.* [Source](#) At a superficial level, I was agitating for reform in Army administration. But on a deeper level, I truly felt I was acting as an agent of God, revealing his character in a particular sphere. *The true foundation of theology is to ascertain the character of God. It is by the aid of such diagrams in particular, and Statistics in general that law in the social sphere can be ascertained and codified, and certain aspects of the character of God thereby revealed. The study of statistics is thus a religious service.* [Source](#)

I: If only all graphic designers and newspaper editors could take a hand in advancing Quetelet's and your desires! I'd be so grateful if you could turn your attention now to talk about the use of evidence in nursing and medicine.

FN: Ah, evidence! Evidence is the most important tool we have for decision-making. *We ... do not consider the human mind capable of receiving what, strictly speaking, can be called proof. Evidence, which we have means to strengthen for or against a proposition, is our proper means for attaining truth.* [Source](#)

I: That can't always be easy! Did you ever strike any difficulties with getting a grip on the evidence?

FN: Well yes it wasn't all plain sailing. I did not always have the right statistics at hand to use in comparisons. In a report as Registrar-General, Farr gave deaths per hundred beds per annum for the principal hospitals of England. In the third edition of *Notes on Hospitals*, I quoted these figures, followed Farr in calling them "mortality percent", and used them to compare hospitals in country towns with hospitals in London and large provincial towns. This caused a huge controversy. It was misleading to call these figures "mortality percent". I well understood that such statistical comparisons need to allow for the different severities of the cases treated at the different hospitals, but did not consider this a plausible explanation of rate differences of a factor of more than two.

I: What then is the right way to make comparisons between hospitals?

FN: *The proportion of recoveries, the proportion of deaths, and the average time in hospital, must all be taken into account in discussions of this nature, as well as the character of the cases and the proportion of*

different ages among the sick. For me, this experience emphasised the great importance of correct hospital statistics as an essential element in hospital administration. [Source](#)

I: You know, statistical thinking may be having more of an impact on medical practice and public health nowadays though the concept of evidence-based approaches, but debate continues as to how to go about it. Your ideas have had a large impact on public health planning. Thank you, Miss Nightingale. Evidence-based approaches are surely the way of the future!

FN: *Too kind, too kind.* [Source](#)

3. Educational Ideas

Dialogue as an educational tool has a history almost as old as education itself. The Greek philosopher and teacher Socrates (470 - 399 BC) questioned his students. An example of the exchanges appears in [Cole \(1950\)](#). [Solomon and Higgins \(1997\)](#) remind us that although Socrates himself wrote none of these conversations down, Plato (427 - 347) recorded extensive dialogues between Socrates and other philosophers of Socrates' time.

Our dialogue has already been used as set reading by Biostatistics students, including pre-medicine students, in a biology major at Loyola College in Maryland (Elizabeth Walters, personal communication). It can help de-mystify the notions of evidence-based nursing and show its historical continuity with concerns that were important to the founder of modern nursing, FN. [Decker and Farley \(1991\)](#) used an exchange of letters with FN to achieve the broader aim of assuring nurses of the continuing importance of FN's opinions on such topics as training, observation and testing of nursing students. We have found anecdotally that students welcome contact with the history of the subject they are studying. Future work could focus on obtaining empirical evidence for the usefulness of the interview as an educational device.

Similar dialogues could be constructed, where relevant documentation has survived, between other statisticians to highlight other important moments in statistical history, or to demonstrate the opinions of statisticians of the past on important topics. Additionally, there is a large amount of interesting material in FN's writings that could be used to extend our dialogue. The material in *Notes on Lying-In Institutions* ([1871](#)) warrants a dialogue all of its own. FN confined herself to her bed for much of her life, and became deaf in her old age. Her prime means of communication was the written word, which helps explain the extent of her writing.

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References

Baly, M.E. ed. (1997a), *As Miss Nightingale said*, 2nd ed., London: Baillière Tindall.

Baly, M.E. (1997b), *Florence Nightingale and the nursing legacy*, 2nd ed., London: Whurr Publishers.

- Bibby, J. (1986), *Notes Towards a History of Teaching Statistics*, Edinburgh: John Bibby (Books).
- Chassin, M.R., Hannan, E.L., and DeBuono, B.A. (1996), "Benefits and hazards of reporting medical outcomes publicly," *New England Journal of Medicine*, 334, 394 - 398.
- Cohen, I.B. (1984), "Florence Nightingale," *Scientific American*, 250, 128 - 137.
- Cole, L. (1950), *A History of Education: Socrates to Montessori*, New York: Rinehart.
- Cook, E.T. (1913), *The Life of Florence Nightingale*, London: Macmillan.
- David, F.N. (1962), *Games, Gods and Gambling. A History of Probability and Statistical Ideas*, London: Charles Griffin & Co. Ltd. Reprinted by Dover Publications, 1998.
- Decker, B., and Farley, J.K. (1991), "What would Nightingale say?," *Nurse Educator*, 16, 12 - 13.
- Diamond, M., and Stone, M. (1981), "Nightingale on Quetelet. I: The passionate statistician. II: The marginalia. III: Essay in memoriam," *Journal of the Royal Statistical Society, Series A* 144, 76-79, 176-213 and 332-351.
- Irwig, J., Irwig, L., and Swift, M. (1999), *Smart Health Choices: How to Make Informed Health Decisions*, Sydney: Allen and Unwin.
- Kopf, E.W. (1916), "Florence Nightingale as statistician," *Journal of the American Statistical Association*, 15, 388 - 404.
- McDonald, C.J. (2001), "Country Joe McDonald's Tribute to Florence Nightingale" [On line] www.countryjoe.com/nightingale
- McDonald, L. (2002), *The Collected Works of Florence Nightingale* [On line] www.sociology.uoguelph.ca/fnightingale
- McNeill, J., and Tulloch, A. (1855), *Report Of The Commission Of Inquiry Into The Supplies of The British Army in the Crimea, With the Evidence Annexed*, London: Harrison and Sons.
- Martineau, H. (1859), *England and Her Soldiers*, London: Smith Elder.
- Nightingale, F. (1858), *Notes on Matters affecting the Health, Efficiency and Hospital Administration of the British Army*, London: Harrison & Sons.
- Nightingale, F. (1859), *Notes on Nursing: What It Is and What It Is Not*, Harrison: London.
- Nightingale, F. (1860), *Suggestions for Thought to the Searchers After Truth Among the Artizans of England*, London: Eyre and Spottiswoode.
- Nightingale, F. (1863), *Notes on Hospitals* (3rd ed), London: Longman, Green, Longman, Roberts, and Green.
- Nightingale, F. (1871), *Notes on Lying-In Institutions*, London: Longmans, Green and Co.
- Nightingale, F. (1876), *Letter to The Times, April 14*.
- Open University (1995), *The Passionate Statistician [video recording]*, Milton Keynes: Open University Educational Enterprises.
- Quetelet, A. (1869), *Physique sociale ou Essai sur le développement des facultés de l'homme*, Brussels: Muquardt.
- Royal Commission (1858), *Report of the Commissioners Appointed to Inquire into the Regulations Affecting the Sanitary Conditions of the Army, the Organization of Military Hospitals, and the Treatment of the Sick*

and Wounded, London: Eyre and Spottiswood.

Sackett, D. L., Richardson, W. S., Rosenberg, W. M. C., and Haynes, R. B. (1997), *Evidence-Based Medicine* New York: Churchill Livingstone.

Sackett, D. L., and Oxman, A. D., eds. (1994), *The Cochrane Collaboration Handbook*, Oxford: Cochrane Collaboration.

Small, H. (1998), *Florence Nightingale: Avenging Angel*, London: Palgrave Macmillan. See also www.florence-nightingale-avenging-angel.co.uk/index.html

Small, H. (1999), "Florence Nightingale's statistical diagrams," paper presented at the Stats & Lamps Research Conference organised by the Florence Nightingale Museum at St. Thomas' Hospital, 18th March 1998. www.florence-nightingale.co.uk/

Smith, A.F.M. (1996), "Mad cows and ecstasy: chance and choice in an evidence-based society," *Journal of the Royal Statistical Society, Series A*, 159, 367 - 383.

Solomon, R.C., and Higgins, K.M. (1997), *A Passion for Wisdom: a Very Brief History of Philosophy*, New York: Oxford University Press.

Speigelhalter, D.J. (1999, "Surgical audit: statistical lessons from Florence Nightingale," *Journal of the Royal Statistical Society, Series A*, 162, 45 - 58.

Tufte, E.R. (1983), *The Visual Display of Quantitative Information*, Cheshire, CO: Graphics Press.

Vicinus, M., and Nergaard, B., eds (1989), *Ever Yours, Florence Nightingale. Selected Letters*, London: Virago Press.

Woodham-Smith, C. (1952), *Florence Nightingale 1820 - 1910*, London: The Reprint Society.

Appendix: Sources of Quotes in the Dialogue

In the hospital tents of the Crimea ... [Nightingale \(1871, pp. 12,13\)](#)

I shall be very grateful ... [Vicinus and Nergaard, ed. \(1989, p. 222\)](#)

deserved a Victoria Cross ... [Woodham-Smith \(1952, p. 315\)](#)

however exhausted ... [Woodham-Smith \(1952, p. 268\)](#)

It may seem a strange principle ... [Nightingale \(1863, p. iii\)](#)

... an urgent appeal ... [Nightingale \(1863, p. 175\)](#)

In comparing the deaths ... [Nightingale \(1859, p. 97\)](#)

enable us to ascertain ... what diseases. [Nightingale \(1863, p. 159\)](#)

ascertaining whether any particular cause of death ... [Nightingale \(1871, pp. 1,3\)](#)

For every two women who would die ... [Nightingale \(1871, p. 68\)](#)

I collected my figures ... [Cook \(1913, vol. 2, p. 396\)](#)

For me, this passionate study ... [Bibby \(1986, p. 115\)](#)

I cannot say how the death of Quetelet ... [Cook \(1913, vol.2, p. 238\)](#)

I want everyone to understand ... [Open University_\(1995\)](#)

The true foundation of theology ... [David \(1962,.p. 103\)](#)

We ...do not consider the human mind capable ... [Nightingale \(1860,.p. 58\)](#)

The proportion of recoveries ... [Nightingale \(1863,.p. 5\)](#)

Too kind, too kind. [Woodham-Smith \(1952,.p. 430\)](#)

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