

Matters of Life and Death: A Demographic Analysis of 18th Century Lancaster Reformed Church Records

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The First Reformed Church congregation, organized as a “consequence of lay initiative”¹ as early as 1733, emerged from the religious needs of the early migrant settlers who had taken up residence “in the island of Pennsylvania, in Connastocken in the new town, named Lengester.”² In 1736 the congregation began erecting a “small log and clay structure on Orange Street just above Queen,”³ and “by the help of God, it was so far completed, that on the 20th of June, 1736, or upon the festival of Holy Whitsuntide, we held Divine Worship in it for the first time. The Teacher, Preacher, or Pastor called to this office of God, was the Reverend and truly pious, John Jacob Hock.”⁴

In the meantime the qualified church members resolved that they would initially elect four elders and two deacons to guide and direct the congregation. The voting church members decided that each year after the first election two elders and one deacon should retire and new men would be elected to fill the vacancies, thus setting in motion a systematic rotation in office.⁵ Apparently, the procedure worked well for the first few years. Men voted into office dutifully performed their functions, at least until the election of 1747, when an elected deacon exercised independent judgment. There were exceptions, though. George Krebs, chosen to office on January 1, 1747, “was disobedient and did not serve” as deacon.⁶ This was not the first occasion on which Reformed Church people went their own way. The whole group “acted according to their own pleasure” and gave evidence that “they have never cared for church order.” It was one man’s judgment that the members “allowed themselves to be served by irregular men.” However, on the positive side, this observer reported that “it is a pretty strong congregation.”⁷

From these foundations, the officials of the Lancaster Reformed Church began registering baptisms, births, catechumens, marriages, and

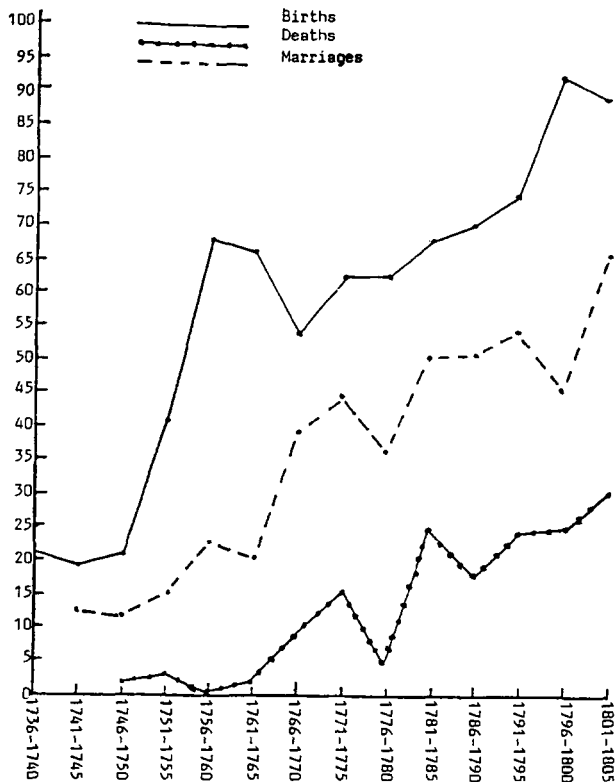
burials of congregation members, thus leaving for us an extremely valuable record of the religious community's development and progress. These church registers, initially having only religious significance, moreover, documented a series of vital data of concern to the colonial historical demographer, and attested to the growth and expansion of one segment of Pennsylvania's eighteenth century population so that by 1758 probably one hundred families composed the Congregation.⁸ Thirteen years later about one hundred and fifty families worshipped, contracted marriages, and baptised their children in the First Reformed Church.⁹ Some of these families, dissolved by the death of parents or reduced in size by childhood deaths, reflected the extent of those vital events registered in the church books. As children grew to young adulthood they absorbed religious instructions, made a confession of faith, and received First Communion. These events also figured in the extant documents of the Congregation. By 1783 the membership included one hundred and sixty-four families,¹⁰ and in 1789 there were an estimated one hundred and seventy-eight families affiliated with the First Reformed Church Congregation of Lancaster.¹¹

Despite its evident growth in membership, the congregation experienced more difficulties than other Lancaster denominations in engaging the services of permanent ministers. Jacob Hock, called by the church members to serve as pastor when the first church building had been completed, was "probably a layman," exercising "all pastoral duties except the performance of marriages."¹² The records of baptisms, marriages, and burials clearly show the periods when the congregation carried on without a minister. For example, from October 30, 1737, when Pastor Hock left Lancaster, until April 1739, a seventeen month vacancy in the pastorate occurred, and the church book revealed more gaps and omissions than usual. From February 1743 until November 1744 the Reformed congregation was again without a minister, and another pastoral vacancy occurred from January 1751 until after mid-1752.¹³ Pastoral changes conspicuously added to the difficulties of maintaining continuity and order in the congregation, and prevented the thorough recording of baptisms, marriages, and burials, since twelve different people made entries in the church registers between 1736 and 1752.¹⁴

II

Under-registration of baptisms, marriages, and burials before 1750 restricted the calculation of demographic indices before that time, since the first recorded marriages appeared in the books in February 1742 and baptismal registration began in February 1736. Not until 1750 did anyone systematically document the deaths and burials of congregation members.¹⁵

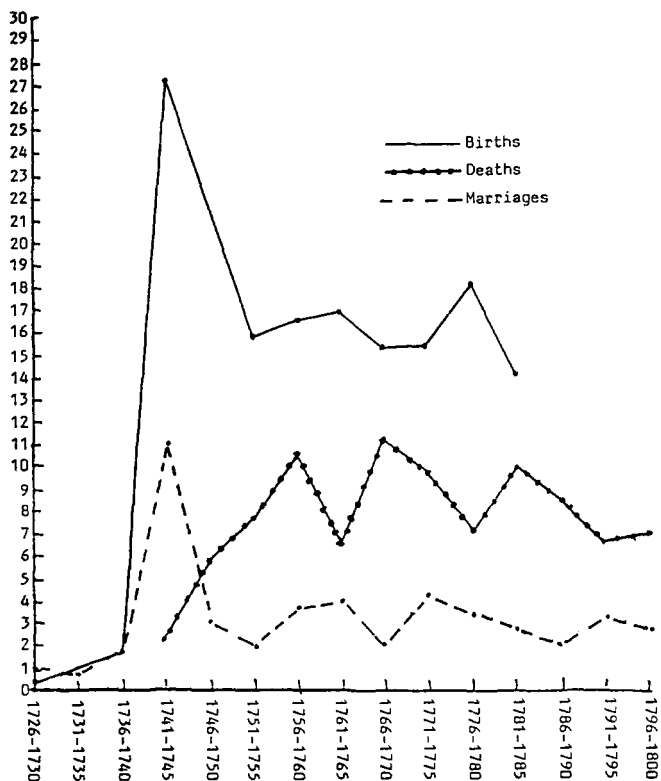
Figure 1. 5-Year Average, Births, Deaths, and Marriages, Lancaster Reformed Church, 1736-1806.



Source: William J. Hinke, "Transcripts of the Church Records of the First Reformed Church, Lancaster, Pennsylvania, 1736-1806."

However, membership grew by leaps and bounds, evident in the increasing, but irregular, upward trends in baptisms, marriages, and burials which first became visible before 1750, but much more pronounced through the second half of the eighteenth century. The five-year averages of births, deaths, and marriages, running in parallel fashion, signify a growing population. See Figure 1. Moreover, the dramatic bulge in births in the 1750s, suggestive of the causes of population increase, may reflect the impact of the ease of marriage in Pennsylvania.¹⁶ Or the unusual increase in births between 1751 and 1761 may best be explained in relation to immigration into Lancaster County, since the birth bulge followed on the heels of a sizeable movement of

Figure 2. 5-Year Average, Births, Deaths, and Marriages, Lancaster Moravian Church, 1726-1800.

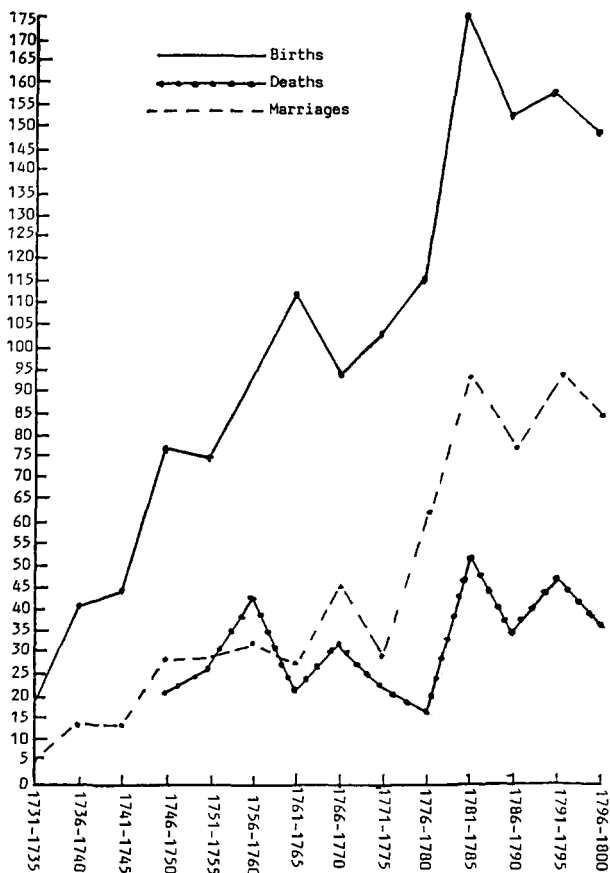


Source: Lancaster Moravian Congregation Records of Births, Baptisms, Marriages, and Burials on L.D.S. Genealogy Society Microfilm Nos. 20371, 49174.

Germans to Pennsylvania and Lancaster County,¹⁷ and paralleled a slight increase in marriages within the congregation. Newly wedded young couples may account for some of the increase in births, but recently arrived migrant couples perhaps brought with them young children who had not previously been baptized.

On the other hand, more parents than usual may have rushed their babies to church to receive baptism, since the decade of the 1750s was not the healthiest of the century. With evidence of smallpox, among other diseases, running rampant in the neighborhood, fear may have encouraged

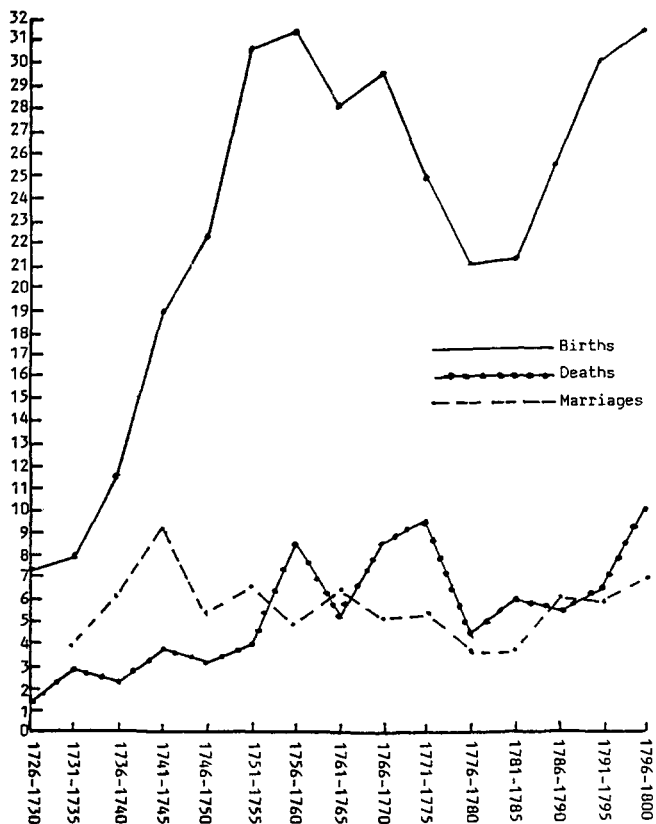
Figure 3. 5-Year Average, Births, Deaths, and Marriages,
Lancaster Lutheran Church, 1731-1800



Source: Trinity Lutheran Church Records of Births, Baptisms, Burials, and Marriages on L.D.S. Genealogy Microfilm Nos. 20371, 49173, 896897, and "Trinity Lutheran Church, Early Marriage Records, 1731-1850," Donegal Chapter of the National Society of the DAR (Lancaster, 1950).

more diligence in attending to parental responsibilities to see to it that children received baptism. Figures 2, 3, and 4 show clearly enough that increased numbers of people died between 1756 and 1760 among Moravians, Lutherans, and Quakers. It is doubtful that Reformed Church members were somehow immune to heightened sickness leading to death in this period. Failure to record such tragedies probably best explains the downturn in burials registered among Reformed Church members between 1756 and 1760

Figure 4. 5-Year Average, Births, Deaths, and Marriages, Sadsbury, Nottingham, and Little Britain Monthly Meetings of Friends, 1726-1800.



Source: Society of Friends Records of Births, Deaths, and Marriages on L.D.S. Genealogy Society Microfilm Nos. 389403, 20466.

Other periods of sickness and increased deaths are revealed by Figure 1, since the congregation's burials peaked in the span embraced between 1771 and 1775, and did so again from 1781 to 1785. Burials among Moravians, Lutherans, and Quakers also climbed in the first five years of the 1780s. However, a slightly different configuration developed in the previous decade for the four denominations. Friends, like Reformed Church members, deceased in greater numbers between 1771 and 1775. Bu

Lutherans and Moravians conducted more funerals during the period 1766 to 1770, then experienced less sickness and death in the first five years of the 1770s.

The period of the American Revolution engendered additional problems in interpretation of the data. The war may have discouraged marital unions and caused people who were considering matrimony to postpone such arrangements. Or the sharp drop in marriages contracted between 1776 and 1780 may simply mean that wartime disruptions took a toll on the quality of recordkeeping and many such events went unregistered.¹⁸ However, the tremendous surge in weddings in the postwar decade may imply that people found spouses in greater numbers when the social climate was more conducive. In support of this view it should be noticed that births and baptisms took a sharp upward turn in the decade of the 1790s in consequence, perhaps, of higher marriage rates in the previous decade.

Moravians, Lutherans, and Quakers experienced somewhat different patterns. Moravians wedded in greater numbers between 1771 and 1775 and then saw the numbers of marital unions per year dwindle during the next fifteen years. Births and baptisms, as would be expected, increased between 1776 and 1780, but thereafter tumbled to lower levels, reflective of decreasing matrimonial contracts. Lutherans had entered wedlock less frequently before the Revolution, after a peak in nuptials between 1766 and 1770, but the war apparently encouraged increased marriages through the latter part of the decade of the 1770s. Friends experienced a twenty year decline in nuptials contracted after a peak interval between 1761 and 1765. Not until the late 1780s did Quakers marry in the numbers they had in the early 1760s. This sequence may reflect extensive migration by Friends out of the area before the era of the Revolution. The long-run tendency of fewer marriages between 1761 and 1781 among Friends, as well as the reduced numbers of births after the 1750s until the 1780s, corresponds closely with a period of mass trekking out of Lancaster County to areas southward in Virginia and the Carolinas.¹⁹ Migration rather than disruption of recordkeeping by the Revolution perhaps best explains the patterns of births, deaths, and marriages among Quakers, Lutherans, Moravians, and Reformed Church members as well.

The most remarkable feature of all the series of data, of course, is the dramatic excess of births in relation to deaths. Among each of the denominations and for the duration of the eighteenth century the wide gap between burials and births lends support to the conclusion that high birth rates,²⁰ in consequence of the ease of marriage,²¹ and in conjunction with relatively low death rates,²² contributed to the remarkable population growth rates in Pennsylvania.²³ Not all communities in the eighteenth century American colonies could claim such a record.²⁴

III

The quality of the Reformed Church records, although more complete after 1750, may have been influenced by factors other than pastoral vacancies. "According to a resolution of the Reformed Congregation, the pastor for this year shall receive £40 cash, Pennsylvania currency. For Proclamation and Marriage he shall receive 7 shillings and 6 pence. For preaching a funeral sermon, from those who are able, 5 shillings. For baptizing Children he shall receive nothing."²⁵ With this schedule in operation one might anticipate under-recording of baptisms, but the records of baptisms are more regular and complete, and begin earlier than the other vital data. Without a regular pastor, of course, marriages could not be legally performed in the church. Furthermore, since ministers traveled about the neighborhood, some marriages performed on the circuit included members of nearby Reformed Congregations. Then, too, people residing in communities that surrounded Lancaster came to town in order to be married,²⁶ thus introducing discrepancies in the marriage registers. The expense of burial may in fact have discouraged people from requesting funeral sermons, and perhaps had some bearing on the apparent underregistration of burials, especially those of infants and children.

The vital data contained in the Church's records from 1750 onward provide the basis for the calculation of some valuable demographic indices suggestive of the quality of life in eighteenth century Lancaster. The ratio of births to marriages registered in this congregation from 1736 to 1806 probably does not accurately reveal the actual fertility of women during the last half of the eighteenth century. See Table 1. However, it should be noticed that in all periods, births per marriage approached a range acceptable for possible family reconstitution.²⁷ The low proportion of births to marriages suggested some "laxity toward religious observances," especially in the area of baptismal registration.²⁸ Contemporaries frequently complained that "there are many hundreds of adults who not only are unbaptized, but who do not even want baptism." Many infants, especially if they died during their first year of life, may never have been noticed by church officials, since "newborn children are sometimes not brought to Church to be baptized" until they were well over one year old.²⁹ Parental laxity about baptism and religious instructions encouraged young people to "go into heathenism."³⁰ Even though it was recognized that registration of baptisms was important for religious as well as social reasons, there appears to be considerable negligence, evident in the gaps in the church books. Citizenship rested upon being born in Pennsylvania, apprentices had to be able to establish their ages upon majority, and inheritance was dependent on years of maturity. "In short, church books which properly record the dates of

Table 1. Births Per Marriage, First Reformed Church, Lancaster, Pennsylvania, 1736-1806

<u>Marriages</u>		<u>Births</u>		<u>Births/ Marriage</u>
<u>Years</u>	<u>Number</u>	<u>Years</u>	<u>Number</u>	
1740-1749	104	1745-1754	298	2.9
1750-1759	181	1755-1764	641	3.5
1760-1769	278	1765-1774	628	2.3
1770-1779	236	1775-1784	617	2.6
1780-1789	505	1785-1794	722	1.4
1790-1799	443	1795-1804	891	2.0

Source: William J. Hinke, "Transcripts of the Church Records of the First Reformed Church, Lancaster, Pennsylvania, 1736-1806."

children's births are necessary, useful, and important in . . . civil life."³¹ Such diligence was not the practice, however, and thus contributed to incomplete baptismal registers.

Social custom, legal requirements, and economic developments influenced the quality of eighteenth century church records. Rapid population growth, urbanization, transportation problems, ministerial vacancies, and out-migration probably militated against complete record-keeping for the Reformed Congregation. Other factors may have encouraged more complete registration of marriages and less thorough recording of baptismal and burial entries. The threat of lawsuits and fines, for example, encouraged careful attention to marriage proceedings. Legal action might arise if the bride or groom were under age and the guardian had not given his consent to the marriage contract. "In such cases the preacher must pay a fine of £50." If intended spouses were not free to marry because of previous marriages, the preacher likewise had to exercise caution. Young couples coming to the minister to be united in matrimony had to produce a license or must have previously published their banns of marriage, but in certain circumstances "they must first produce written permission of their parents."³² These strict conditions plus the additional nuptials of people who were not members of the Congregation swelled the averages of marriages in proportion to births as shown in Table 1. Mittelberger called attention to another practice which may account for partial under-registration of births. When someone died and the "general burial ground is too far away, burial takes place in the dead person's own field." Such funeral customs no doubt encouraged under-recording of many deaths, especially those of unbaptized infants, which then went unnoticed by church officials.³³ The social circumstances of the colony accounted for some laxity in religious obser-

vances, so that it became "proverbial to say of a man who [did] not concern himself about God and His Word: He has the Pennsylvania religion."³⁴ Relaxed standards of behavior, reflected in the church books, distressed the Churchmen. The strange customs of Pennsylvanians caused one preacher to write of them, "in those days there was no king in Israel, but every man did that which was right in his own eyes."³⁵

Arranging deaths recorded in the burial register of the Lancaster Reformed Congregation on the basis of age, sex, and marital status brought to light some significant demographic tendencies. First, the number of single men of prime marriageable age, that is, those who were twenty years and older whose deaths were recorded, amounted to only 6.8 percent of all males buried and only 3.4 percent of total deaths. See Table 2. However, 11.7 percent of the men of marriageable age died single. But only one of these could definitely be described as an old, confirmed bachelor, suggesting, of course, fairly universal marriage as the accepted norm among Reformed Church men. However, the general tendency of young men in this age category to be in the vanguard of migratory shuffling may mean that some young men passed away unmarried elsewhere and so their deaths would not appear in the registers.³⁶ Second, the proportion of single women who deceased while of prime marriageable ages, that is, from fifteen years of age to and including age twenty-nine, amounted to 6.2 percent of all females buried, but only 3.1 percent of total deaths. However, 11.5 percent of the women above age fifteen died before they found husbands. But only two women whose deaths are recorded succumbed unmarried over age twenty-five which supports the notion that marriage and family life constituted an important aspect of Reformed Church women's values.³⁷ Even so, twenty-six men between ages twenty and thirty-four died single. They might have eventually married later in life and had families of their own, but these prospects were cut short by early death. This was also true for twenty-four unmarried women who passed away between the ages of fifteen and twenty-nine.

IV

William Penn suggested that economic circumstances in the colonies encouraged early and fairly universal marriage as the custom of the land. Living conditions in Pennsylvania assured the general well-being of colonial families. Penn enticed prospective settlers with the idea that "such as could not only not marry here, but hardly live and allow themselves Cloaths, do marry there, and bestow thrice more in all Necessaries and Conveniences . . . for themselves their Wives and Children."³⁸ Other observers thought

Table 2. Burials, First Reformed Church, Lancaster, Pennsylvania, 1750-1806.

Age	Male		Female		Total
	Married	Single	Married	Single	
< 1	--	44	--	54	98
1	--	38	--	54	92
2- 5	--	50	--	48	98
6- 9	--	14	--	14	28
10-14	--	8	--	8	16
15-19	--	16	1	11	28
20-24	3	13	4	11	31
25-29	8	10	7	2	27
30-34	8	3	13	--	24
35-39	14	--	14	--	28
40-44	14	--	11	--	25
45-49	13	--	7	--	20
50-54	16	--	15	--	31
55-59	27	1	11	--	39
60-64	18	--	21	--	39
65-69	25	--	18	--	43
70-74	24	--	19	--	43
75-79	12	--	21	--	33
80-84	13	--	16	--	29
85-89	7	--	5	--	12
90-94	1	--	2	--	3
Totals	203	197	185	202	787

Source: William J. Hinke, "Transcripts of the Church Records . . . , Burials," 349-375. The transcripts show 812 burials but twenty-five whose age was not assigned, or identification by marital status impossible have been excluded from Table 2.

they noticed that marriage was fairly near universal, since "that great curiosity, an Old Maid, is seldom seen in this country." It was claimed that women who married, generally did so before they were twenty-two years old, and others entered marriage before they reached age sixteen, making Pennsylvania "a paradise on Earth for women."³⁹ Thomas Malthus reasoned that if there were social "encouragements to have a family," and

“that early marriages were consequently very prevalent, and that few persons remained single,” population would increase rapidly even to the point of doubling in twenty-five years or less.⁴⁰

A very high rate of marriage may have prevailed in eighteenth-century Pennsylvania. In Germantown only five percent of the men of eligible age remained single and a maximum of 7.4 percent of women of marriageable age never took spouses. Some women included in the sample were in fact widows and “other evidence indicates almost universal marriage.”⁴¹ Another study found exceptions to these general patterns, revealing that 15.9 percent of the women who lived to age fifty never wedded and 12.1 percent of the men surviving to age fifty remained unmarried. Furthermore, a marked increase in the proportion of women who never exchanged vows has been detected among those Quaker women born after the American Revolution.⁴²

Another configuration to the ages at death for those members whose burials are recorded in the Reformed Congregation registers emerged from the data, demonstrating that 42.5 percent of the deceased met their end before they achieved age twenty; 21.6 percent died and were buried when they reached ages twenty through forty-nine; and 36.1 percent of the males died after reaching age fifty. The proportions of females whose deaths are recorded in the same age categories were: 49.1, 17.8, and 33.1 percent, respectively. These proportions of deaths at various ages may not be unusual, since in Philadelphia, William Currie noticed that “more than one-fifth of all the children in this city die under two years of age.”⁴³ Children under two years of age buried between 1750 and 1806 at the Lancaster Reformed Church amounted to 24.1 percent of all registered burials. In late eighteenth century Philadelphia, William Barton calculated that about 44.5 percent of the children died by age five.⁴⁴ Comparable figures from Lancaster’s Reformed Church data indicate that 36.5 percent of all burials were children five years of age and under. However, Barton’s calculations suggest that over sixty percent of Philadelphia’s children did not survive to age twenty.⁴⁵ But only 45.7 percent of Lancaster Reformed Church burials were for those under age twenty, meaning, of course, that 54.3 percent probably survived to age twenty or more. Whereas 19.6 percent of Lancaster’s Reformed Church registered burials were for men and women aged twenty to forty-nine, nearly twenty-nine percent of Philadelphia’s deaths occurred within the same age range.⁴⁶

The data lead to the tentative conclusion that Lancaster may have been a somewhat more healthy environment in which to live than Philadelphia. The greater compression of population in the larger city increased the possibilities of contracting contagious diseases. Lancaster’s Reformed Church members resided in a smaller community surrounded by dispersed

farm settlements which reduced the potential for infection. Perhaps it was because "some one or more contagious disease, being always more or less prevalent in the city, is one reason why a greater proportion of children die annually in the city than in the country."⁴⁷ Estimated annual crude death rates per thousand population in Philadelphia after 1750 and up to 1775 ranged from a low of 28.3 per thousand in 1755 to a high of 71.3 per thousand in 1759. During the twenty-five year period 1750-1775, annual death rates exceeded thirty to forty per thousand, while higher rates prevailed in epidemic years,⁴⁸ and Philadelphia's death rates were exacerbated by its function as a reception center for large numbers of immigrants.

Such circumstances lend further support to the contention that country people enjoyed longer life than Philadelphians. Other evidence points in the same direction. For example, of 787 burials recorded in the Lancaster Reformed Church Registers, forty-four men and women achieved eighty years of age, which by calculation suggests that about fifty-six per thousand survived to age eighty. But in eighteenth-century Philadelphia, William Barton reckoned that about twenty people per thousand attained the ages between seventy and eighty. Of these twenty survivors, over fourteen died between ages eighty and ninety, with 5.6 apparently dying above ninety years of age.⁴⁹ Elsewhere, the lower percentage of children in the city was "attributed to a greater proportion of children dying in large cities, than in country places,"⁵⁰ which drastically reduced the chances of long life in cities.⁵¹ For the year 1789 "the numbers of those who die . . . after completing the 80th year of their age, compared with the total number of deaths . . . will stand in the proportion of 24½ of the former, to 1,000 of the latter."⁵² Opportunities for longer life may very well have been improved for early Pennsylvanians who dwelt in the interior regions rather than in the major port city.

What constituted old age in early Pennsylvania is not altogether clear. One traveler observed that Pennsylvanians "seldom reach old age . . . I . . . saw few natives who had lived to sixty or seventy."⁵³ Another visitor thought it was "an almost unheard-of thing that a person born in this country lives to be eighty or ninety years of age."⁵⁴ But according to the Reformed Church Burial Records 15.3 percent of all burials were people who died when they were seventy or more years old. Indeed, 5.6 percent attained at least eighty years of age.⁵⁵ In January, 1749 the pastor of the Lancaster Lutheran Church recorded the death of a seventy-five year old man who "died after a lingering sickness, being old and full of days." Twenty years later in August, 1769 it was simply noticed of a man eighty-nine years old that "he died of old age." Twelve men who died of "old age" between 1771 and 1800 averaged 74.9 years old. Five women who succumbed to "old age" in the same period achieved an average of 74.8 years when they passed

away. The average age at death in cases attributed specifically to old age between 1801 and 1820 registered 80.3 for twelve men and 84.6 for seven women.⁵⁶ Reaching seventy years of age seemed to be commonly accepted as the customary condition of old age. People who deceased in Philadelphia in 1807-1808 after having reached their seventieth birthday amounted to 6.4 percent of all recorded burials. Of these, 103 have been listed as having succumbed to "old age," rather than from other commonly attributed causes, as poor health, diseases, or accidents. These elderly people simply expired of "old age," and that was defined as seventy years or more of life.⁵⁷ On November 14, 1780 Henry Muhlenberg wrote his last will and testament, and sketched into his *Journal* on the occasion, his reflection that "When a man enters the seventies he, above all, may well sing 'who knoweth how near is my end?'"⁵⁸

Some people resigned themselves to passive acceptance of old age and the prospects of death in the near future. For many it was a lonely time of life. "Nothing is apt to sour the Temper, of aged People, than the Apprehension that they are neglected; and they are extremely apt to entertain such Suspicions."⁵⁹ For others, "having got things comfortably about them,"⁶⁰ living their last years in the surroundings of family and friends brought joys and benefits. But, "the Ties I had . . . are loosened one by one, and I shall soon have no Attachment left to make me unwilling to follow."⁶¹ Old age and imminent death for those "being lowe and weak of Body" or "being weak and Sick of Body" were the last steps before beginning a better life after the "General Resurrection."⁶² Young people, however, feared old age and death. On Friday, February 2, 1728, at about four o'clock in the morning, William Becket

dreamed that all the Teeth of my upper-jaw became loose upon which with my finger & thumb I took ym out & put them in my Pocket, immediately after which I thought I also felt all the Teeth in my under jaw loose & ready to drop out as the others . . . Upon which in my dream I made this reflexion to myself, What a great misfortune is this? That I who am now but 30 years of Age should loose all my teeth and be obliged to wear the face of an old man in the prime of my time. I then started and awoke out of my sleep in a great consternation & it immediately came into my memory that my Father has often told me that a little before his mother died (our Grandmother) he dreamed yt all his teeth came out of his head so yt I concluded with myself that my Mother or at least some near relation was dead which I believed I should hear of in a little time.⁶³

Young women had similar fears. The prospects of giving birth aroused well-founded fears in expectant mothers. Aletta Clarke reported that on October 31, 1789 she went to visit her sister Sally who "told me of two dreams she had dreamed. In one she was dressed in white, and her company told her she did not look as if she belonged to this world. In the other her child was born, and she was to die three days afterward."⁶⁴

V

Additional data from the Reformed Church Records permit the calculation of child mortality rates that prevailed in the last half of the eighteenth century. In 1750 there were forty-two births recorded in the registers, but four infants and children under six years of age died during that year, which by computation yields a child (0-6) mortality rate of 95.2 per thousand. If it is assumed that recorded child deaths were only one-half of the actual deaths, which is not altogether unlikely,⁶⁵ then, of an estimated forty-six births, eight infants and children died between birth and six years of age which yielded a rate of 173.9 infant and child deaths per thousand births at mid-century. Two decades later, during the five-year period 1771-1775, 314 babies received baptism. In the same period nine infants under one year old and twenty-seven children aged one to six died, which by calculation produced an infant and child (0-6) mortality rate of 114.6 deaths per thousand births. Again if one assumes a fifty percent rate of under-registration, seventy-two youngsters died of 350 born, which computed to a combined infant and child mortality rate of 205.7 children per thousand.⁶⁶

The records of "those who were born and buried in the congregation in the town as well as in the bush"⁶⁷ between 1795 and 1806 support the view of consistent child mortality rates for Reformed Church members in the range of 150 to 200 child deaths per thousand population. Infant and child mortality rates calculated on the basis of these data yield a rate of 176.8 child deaths per thousand births, since 154 children who died, divided by 871 who were born and received baptism, with the result multiplied by one thousand, equaled 176.8. However, when the greatest number of births and burials of children under six years old, mentioned either in the pastoral notes or recorded in the baptismal and burial books are taken together, one finds that of 1,106 children born and baptized between 1795 and 1806, at least 169 of these succumbed as infants and children. These revised figures disclosed a mortality rate of 152.8 infant and child deaths per thousand births. See Table 3.

The extent of under-registration of vital data is not altogether clear. Forty-six burials of infants and children between 1796 and 1800 appear in the burial register. However, the pastor's separate records claimed sixty-one children deceased, indicating that about twenty-five percent of child deaths went unrecorded. On the other hand, the pastor noted that he performed 359 baptisms; but, during the period 1795-1800, 467 children received baptism according to the church registers. If it is assumed that twenty-five percent of the infant deaths went undocumented, then the infant and child mortality rate for the period may have been 183.7 deaths per thousand births.⁶⁸

Table 3. Births and Deaths, First Reformed Church, Lancaster, Pennsylvania, 1759-1806.

	Births	All Burials	Child Burials	Annual Child Death Rate
1795	66-R	32-R	12-R	181.8
1796	85-R	24-R	14-R	164.7
1797	104-R	26-P	7-R	67.3
1798	91-R	32-RP	18-P	197.8
1799	89-R	23-P	8-P	89.9
1800	98-R	27-P	12-P	122.4
1801	81-R	41-P	26-P	320.9
1802	82-R	40-R	15-R	182.9
1803	98-R	30-P	16-P	163.3
1804	108-P	34-RP	16-P	148.1
1805	120-P	32-P	11-RP	91.7
1806	84-P	25-P	14-P	166.7
Total	1,106	366	169	152.8

Source: William J. Hinke, "Transcripts of the Church Records of the First Reformed Church." "R" signifies that the data came from the Register; "P" means the numbers came from pastoral notes included in the "Transcript of the Church Records."

Epidemic contagious diseases periodically swept through Pennsylvania's colonial communities, leaving behind a trail of death which shattered families, sometimes by carrying off parents, but more frequently by taking a toll on infants and children. Smallpox prevailed in the nursery at Nazareth, Pennsylvania, killing nine of the eleven children who died between May 11, and July 14, 1761.⁶⁹ Smallpox took a toll on Lutheran infants and children in Lancaster in 1766 as thirty-three infants and children under seven years of age died that year, many of whose deaths are attributable to smallpox. In 1769 scarlet fever took the lives of at least fourteen children who breathed their last between May and August, all of whom were under seven years of age. The only lasting bits of evidence are brief notations in the burial book that "he died of purples," or "she died of purples or Scarlet Fever." Apparently this scourge attacked again, for in 1781 eighty-five members of the Lutheran Congregation died, "of which thirty-three were of Scarlet fever or purples." In all, sixty infants and children died in 1781.⁷⁰

Infant and child mortality rates calculated on the basis of the number of deaths per births in given years provide a perspective on the death toll during known epidemic years. Thirty-three infants and children died of 281 born between 1748 and 1750 which yielded a rate of 117.4 per thousand. Between 1772 and 1775 sixty-nine infants and children of 396 born succumbed which produced a rate of 174.2 deaths per thousand births. Of 589 babies born between 1796 and 1799, sixty-six ceased living by their sixth birthday, suggesting an infant and child mortality rate of 112.1 per thousand. Rates calculated on the same basis for known epidemic years disclosed that 370.8 infants and children per thousand met their end by age six in 1766; 200.0 per thousand in 1769; and 352.9 children per thousand born attained ages under six in 1781. Epidemic disease swelled the infant and child mortality rates, in some years more than doubling the death toll.⁷¹

Other evidence points in the direction that the infant and child mortality rates for Lancaster's Lutheran and Reformed Church members are close to the mark. In a sample of eight families drawn from the *Journals* of Henry Muhlenberg, eight couples had seventy-seven children. From evidence revealed in the *Journals* about the parents at the time of their death it would appear that fifteen of the seventy-seven children died as infants or very young children. Or 80.5 percent probably survived infancy and early childhood, but 19.5 percent did not. Expressed in another way, if one assumes all fifteen children deceased as infants less than one year of age, then 194.8 infants died per thousand.⁷² The records of 1,253 Schwenkfelders, 246 of whom lived less than one year, disclosed an infant mortality rate of 196.3, very similar to the previously calculated rates.⁷³ In support of this view infant mortality rates computed for Lancaster Moravians between 1741-1750, 1751-1755, and 1776-1786, yielded results of 108.3, 258.1, and 166.7, respectively.⁷⁴

VI

A recent study of Quaker marriages concluded that "childbearing had nowhere near the effect on the life expectancy of married women as has been thought."⁷⁵ Another study has determined that the "risks of childbirth have been much exaggerated," but then revealed other evidence that wives died before their husbands on the ratio of about three to one, and deaths of women in their fertile years occurred more frequently than men in the same age range.⁷⁶ The dangers inherent in giving birth during the eighteenth century were not based on unfounded "assumptions" or "exaggerations" in the minds of contemporaries. Letters, diaries, journals, bills of mortality, and church burial registers, not to mention gravestone inscriptions, show

that it was a dangerous situation, and that women did frequently die in childbirth⁷⁷ or from its complications, such as puerperal fever.⁷⁸

Another important measure of the quality of life in eighteenth-century Lancaster may be taken from the proportions of women who lost their lives giving birth. Comparison of the numbers of married women who deceased during their fertile years with the number of children born to these women suggests the relative importance of childbirth as a cause of death. The extent of maternal mortality in proportion to all female deaths which occurred between the ages of fifteen and forty-nine provides another perspective from which to view the issue. Another important measure of the problem is the number of mothers who apparently died in parturition or its complications compared with married women who deceased due to other causes during their childbearing years. Between 1751 and 1806 women who were members of the Lancaster Reformed Congregation gave life to over 3,871 babies. Based on data in the burial register, it would appear that twenty-one women succumbed while giving birth during this period. Expressed as a rate per thousand, if the 3,871 deliveries are taken as the total number of times at risk, then 5.4 women per thousand deceased in childbirth.

Other evidence implies that the maternal mortality rate may have exceeded the foregoing computed levels. The preceding may not present the whole story, since there are gaps in the burial records during the 1750s and 1760s. But, during the decade 1766 and 1775, five mothers lost their lives in parturition when it is documented that 587 births and baptisms occurred, which yields a rate of 8.5 deaths of women in childbirth per thousand times at risk. In the decade 1776-1785, five women passed away while bringing forth life at the conclusion of 649 pregnancies, indicating that 7.7 married women succumbed per thousand births. During the decade of the 1790s the rate, based on 839 recorded births and eight deceased women, reached 9.5 mothers' deaths in childbirth per thousand babies born. Three women apparently died in childbirth between 1801 and 1806 when 573 children were born, which produced a rate of 5.2 per thousand. Rates calculated on this basis appeared uniform and consistent during the second half of the eighteenth century.⁷⁹

Taking the entire period, 1750 to 1806 and considering only the proportions of women's deaths between age fifteen and forty-nine, a different view of the matter emerged. Eighty-one Reformed Church women died between 1750 and 1806 when they were between the ages of fifteen to forty-nine. Of these, it would seem likely that twenty-one died in confinement, or from complications arising from giving birth, suggesting that 25.9 percent of the women aged fifteen to forty-nine died in parturition. But twenty-four of the eighty-one deaths were single women aged fifteen to twenty-nine, so that actually twenty-one married women or 36.8 percent of fifty-seven died during

their childbearing years. However, this is obviously excessive, since it does not account for the women who survived through their fertile years, many of whom lived to advanced ages. With this consideration in mind the more plausible estimate of maternal mortality would be that 11.4 percent of married women died giving birth or from its complications. The maximum rate approached 30.8 percent, assuming that all fifty-seven married women between ages fifteen and forty-nine died in childbed.⁸⁰

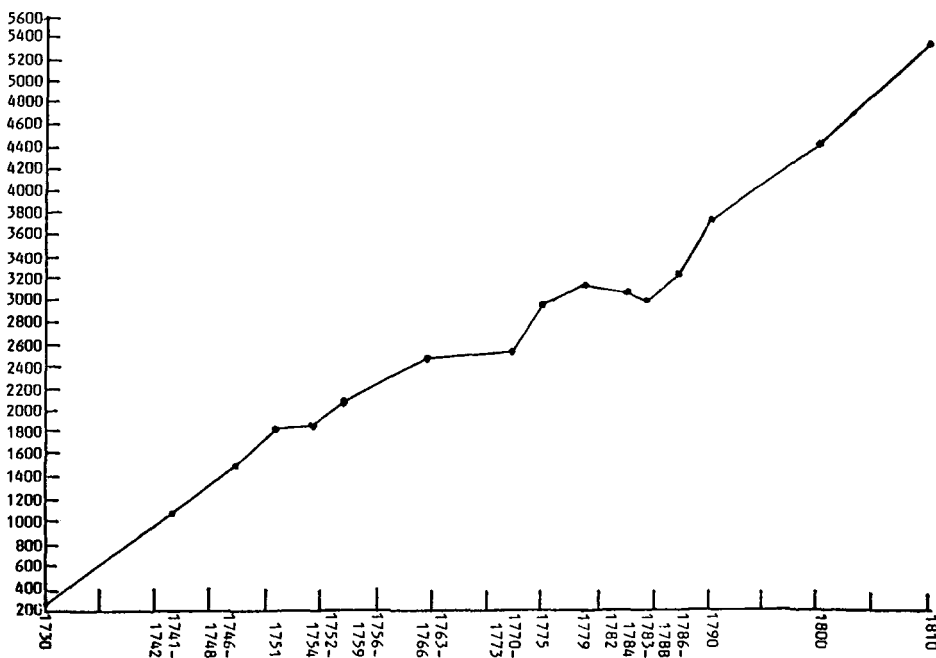
Childbirth was not the only serious health problem for women aged fifteen to forty-nine in eighteenth-century Pennsylvania. Tuberculosis also took its toll on lives and health as "the Pulmonary Consumption appears to be the most frequent, as well as the most fatal of the Chronic Diseases which occur,"⁸¹ not only in Philadelphia, but in Lancaster as well. Although consumption appeared in children and older persons, the greatest susceptibility occurred "generally between the 18th and 36th years of life."⁸² Among other characteristics of this disease, "women . . . are most subject to the consumption,"⁸³ perhaps on the order of "three females to one male."⁸⁴ Consumption accounted for at least one-fifth to one-fourth of all deaths each year during the colonial period and up to 1800.⁸⁵

Consumption was a common cause of death in Lancaster. Although no attribution of cause of death is indicated in some cases, it is clear enough that many young men and women in their twenties and thirties succumbed to this malady. In a sample of 135 men and women who died of consumption in Lancaster it became apparent that men lost their lives in sixty-nine, and women in sixty-six instances. The incidence of consumption fell evenly on men and women less than twenty years old. Young males died in 8.1, and young females in 7.4 percent of the total consumption cases. However, the women between twenty and fifty years old suffered forty-two deaths (31.1 percent) while thirty-four men in this age group became victims of consumption (25.2 percent). The greater incidence of consumption shifted back to men fifty years and older (17.8 percent), but women suffered 10.4 percent of the deaths at this age level. The average age of women who died of consumption was 34.5 years, but men who passed away of the same sickness were slightly older, registering an average age at death of 36.7 years.⁸⁶ The most important consideration, however, is that thirty-seven women deceased of consumption in their prime childbearing years between twenty and up to forty years of age.⁸⁷

VII

Population estimates for the Borough of Lancaster, as well as the proportion of Reformed Church people who composed that population, used

Figure 5. Estimated Population Growth, Lancaster, Pennsylvania, 1730-1810.



Source: See Footnote No. 88.

in conjunction with congregation records, permit the calculation of crude annual birth, marriage, and death rates. It must be understood, of course, that the figures are not to be taken as actual rates but approximations based on available data. The rates presented are, therefore, projections based on Lancaster's estimated population at various intervals from 1730 to 1810.⁸⁸ See Figure 5. For that reason they should perhaps be considered tentative at best, but upon closer examination, quite plausible. The patterns revealed by the computations are, of course, more significant than the numbers themselves. Throughout the series of birth, marriage, and death rates per thousand population, the numbers form the same configuration. First, marriage rates were relatively high in relation to the estimated size of the congregation and to other colonial data. Secondly, birth rates remained high throughout the eighteenth century and appear, at least at the end of the century, to be fairly plausible. Third, death rates in the Middle Colonies have generally been pictured as surprisingly low. The rates for the Lancaster Reformed Congregation confirm the suspicion that the back-country Pennsylvania community was fairly healthy with the reservation in mind that death rates were much higher than previously thought, due in part to ex-

Table 4. Marriage Rates Per 1,000 Population, First Reformed Church, Lancaster, Pennsylvania, 1745-1810.

Years	Estimated Church Membership	Estimated Annual Average Marriages	Rate/1,000
1751	617 (530)	1746-1755 = 14	23 (26)
1758	700 (600)	1754-1763 = 24	34 (40)
1771	850 (900)	1765-1774 = 39	46 (43)
1783	1,025 (984)	1781-1785 = 51	50 (52)
1790	1,258 (1,068)	1787-1791 = 53	42 (50)
1800	1,483 (1,261)	1796-1800 = 46	31 (37)
1810	1,902 (1,532)	1801-1805 = 66	37 (43)

Source: Estimated church membership is explained in the text and notes. Annual average marriages have been drawn from William J. Hinke, "Transcripts of the Church Records."

cessive infant and child mortality.

Two sets of marriage rates, calculated on the basis of average annual nuptials in selected five and ten year periods pegged to estimated congregation size in specific years, brought out the fact that members wedded at rates of thirty to forty per thousand annually. The first series of estimates, based on the assumption that the Reformed Congregation was approximately one-third of Lancaster's population,⁸⁹ showed marriage rates which rose gradually from 1751 onward, peaked in 1783, and then exhibited a tendency to decline after the Revolution. See Table 4. The second series of approximate marriage rates (shown in parentheses) generally conformed to the first series but have been based on various estimates of congregation size.

Estimates of the age when young people took first communion and the proportions of males and females above and below sixteen years old in the general population pave the way for another assessment of congregation size on which to compute marriage rates. It has been suggested that communicants multiplied by three would provide a rough calculation of baptized membership.⁹⁰ The second estimated marriage rate for 1751, is grounded on the evidence that in 1748, 265 members received Holy Com-

munion.⁹¹ However, that would mean there were about 795 members of the Reformed Congregation in Lancaster about 1750, which appeared excessive. A multiplier of two times the number of communicants provided a more plausible guess of 530 total Reformed Church membership, based on the judgment that communicants normally were sixteen years of age or older and composed about one-half the population. A sample of thirty-two young men and thirty young women “admitted to the Lord’s Supper for the first time”⁹² by Caspar L. Schnorr on December 25, 1745 and by Ludwig Ferdinand Vock in 1750 produced evidence that while young men were 16.8 years of age, young women averaged 16.3 years old at the completion of their religious instruction and reception of First Communion. In the 1770s seventy-eight young men and sixty-eight young women received instructions, “and after having made their Confession of Faith, were admitted to the Holy Communion.” Both young men and women averaged 16.7 years old.⁹³ Since the numbers of people in the general population are known to be divided so that half are sixteen years old and above, and half below sixteen,⁹⁴ the multiplier of two times communicants seems a reasonable basis on which to judge congregation size. The marriage rate of twenty-six per thousand population for mid-century may indeed be fairly close to the mark.

The second marriage rates estimated for the years 1758, 1771, 1783, and 1790 have been based on the approximate numbers of families who belonged to the Reformed Congregation at those dates. In 1758 there were one hundred families who were members of the congregation, which grew to include one hundred and fifty families in 1771. In 1783 about one hundred and sixty-four families worshipped in the Reformed Church, and by 1789 one hundred and seventy-eight families claimed membership in the congregation.⁹⁵ These numbers have simply been multiplied by six⁹⁶ providing an approximated church membership for each year selected. The second assessments of church membership for 1800 and 1810 have simply been reduced by fifteen percent from the first estimate on the basis that church membership probably did not grow as rapidly as the general population. Although there was a close relationship between the two estimates for 1771 and for both the 1783 projections, amounting to only 5.5 percent and 4.0 percent differences, respectively, by 1790 a 15.1 percent discrepancy emerged, suggesting that the congregation was probably smaller than first projected. Even so, altering the estimated congregation size by five to fifteen percent did not radically modify the pattern and direction, nor for that matter the estimated numbers of marriage rates.⁹⁷

Birth rates per thousand population calculated for the same years and on the same basis of estimated congregation size were quite high, but consistent with Lancaster’s demographic experience in the eighteenth century. See

Table 5. Birth Rates Per 1,000 Population, First Reformed Church, Lancaster, Pennsylvania, 1745-1810.

Years	Estimated Church Membership	Births	
		Annual Average	Rate/1,000
1751	617 (530)	1746-1755 = 31	50 (59)
1758	700 (600)	1754-1763 = 65	93 (108)
1771	850 (900)	1765-1774 = 63	74 (70)
1783	1,025 (984)	1781-1785 = 67	65 (68)
1790	1,258 (1,068)	1787-1791 = 74	59 (69)
1800	1,483 (1,261)	1796-1800 = 93	63 (74)
1810	1,802 (1,532)	1801-1805 = 98	54 (64)

Source: See Figure 5 for the first estimate at each date and note number 88. The second estimates for each date are discussed in the text and notes. Annual average births are taken from Hinke, "Transcripts of the Church Records."

Table 5. High marriage rates swelled the birth rates, as did the influx of immigrants at mid-century. The rates for 1751 probably approached fifty per thousand and do not appear unusual. "Marriage is the source of population. Therefore the greater is the proportion of marriages in any country, the greater will be its proportion of births."⁹⁸ At Philadelphia in the 1790s, fertility was such that the community experienced one "birth in 22½ inhabitants,"⁹⁹ which converted to a rate of forty-four births per thousand population. The rates for the Reformed Congregation are extremely high and a portion of the rate must be attributed to immigration, especially in the period 1754-1763, which came in the wake of a very large migration to Lancaster County.¹⁰⁰ For the remainder of the century the rates remained consistent and high. Probably, if the impact of immigration were sorted from the calculated rates, birth rates for Reformed Church people would have been in the range of fifty to sixty per thousand population. The birth rate for the United States in 1800 was 55.0 births per thousand population, but in 1810 the rate dropped slightly to 54.3 per thousand.¹⁰¹ Estimated birth rates per thousand population in Philadelphia for the years 1751, 1758, and

1771 were 45.5, 50.8 and 47.1, respectively. Rates over sixty births per thousand population prevailed in the 1760s, probably a consequence of immigration, particularly in the period 1761-1765.¹⁰² Taking all the evidence together, Lancaster Reformed Church women were extremely fertile, even discounting the impact of immigration on elevated birth rates.

High and low estimated age-specific fertility rates for Reformed Church women between the ages of fifteen and forty-four matched fairly closely with figures derived from other sources. The proportion of women aged fifteen to forty-four in the Lancaster Reformed Congregation was probably twenty to twenty-five percent of the total church membership since the number of women aged fifteen to forty-four recorded in the burial registers was about twenty percent of all registered deaths.¹⁰³ Assuming that women above age sixteen composed one-fourth of the population also helped set some boundaries around the fertile years of the Reformed Church women. This made possible some estimate of fertility rates for women aged fifteen to forty-four. Ninety-three babies born in 1800 to 334 women between fifteen and forty-four yielded a fertility rate of 278.4. The 334 women equaled 22.5 percent of the estimated population 1,483. If 22.5 percent is multiplied by 1,261 and the result, 284 women aged fifteen to forty-four, is used as the basis of computation, then ninety-three babies born to 284 women, produced a fertility rate of 327 births per thousand women. The comparable rate for the United States in 1800 was 278.¹⁰⁴ In 1810, ninety-eight babies born to 345 Reformed Church women produced a fertility rate of 284.0 births per thousand women between the ages of fifteen and forty-four. The 345 women equaled 22.5 percent of an estimated congregation of 1,532 members. On the basis of the higher 1810 population estimate the calculated fertility rate was 241.3 births per thousand women between fifteen and forty-four years of age. The comparable rate for United States women in 1810 was 274.0.¹⁰⁵

Death rates per thousand population, calculated as average annual burials for five and ten year periods per estimated congregation membership, formed the following configuration. From 1751 to 1810 the rates appeared consistently low, usually hovering about twenty deaths per thousand population, except in periods of heavier mortality due to epidemic disease, such as the 1750s and early 1780s, when such conditions elevated the rates to higher levels of twenty-five to thirty-five deaths per thousand population. See Table 6. The estimates for 1751 and 1758 are probably too low, so that a double estimate has been provided. Eight deaths recorded in the burial register for 1750 divided by 617 provided the rate of thirteen deaths per thousand population. Eight deaths divided by 530 and multiplied by one thousand yielded a higher annual rate of fifteen deaths per thousand population.

Table 6. Death Rates Per 1,000 Population, First Reformed Church, Lancaster, Pennsylvania, 1750-1810.

Years	Estimated Church Membership	Deaths	
		Annual Average	Rate/1,000
1751	617 (530)	1750 = 8-12	13 (19) (15)(23)
1758	700 (600)	1754-1763 = 3-22	4 (31) (5)(37)
1771	850 (900)	1765-1774 = 14	17 (16)
1783	1,025 (984)	1781-1785 = 25	24 (25)
1790	1,258 (1,068)	1787-1791 = 17	14 (16)
1800	1,483 (1,261)	1796-1800 = 26	18 (21)
1810	1,802 (1,532)	1801-1805 = 35	19 (23)

Source: The first estimate of congregation size is based on one-third of Lancaster's population. The second estimate is drawn from the number of families in the congregation. Annual average deaths are taken from Hinke, "Transcripts of the Church Records."

Comparison of the Reformed Church books with those of the neighboring Lutheran Congregation showed that Lutheran ministers married fifty percent more couples than Reformed ministers did in 1750, and baptized nearly three times more babies than their Reformed colleagues did in 1750.¹⁰⁶ The Lutherans buried twenty-three people in the same year. Using the proportions of fifty and thirty-four percent as guidelines, Reformed people should have experienced between eight deaths (34 percent) and twelve deaths (50 percent), on the assumption that death visited Reformed Church members and Lutherans evenly in the same community. The higher estimated rates of nineteen and twenty-three per thousand have been derived in this manner and are probably closer to the mark.

The Reformed Church Registers for the period 1754-1763 are severely underrecorded, registering an annual average of only three deaths at the same time smallpox and other diseases took a much heavier toll of Lutherans and Moravians. These conditions do not appear in the Reformed Church registers. Again assuming that deaths fell evenly on Moravians, Lutherans, and Reformed people alike, a double set of death rates have been presented for 1758. The low rates of four and five per thousand

population are based on an annual average of three deaths recorded in the Reformed Burial Register, and are not accurate. During the period 1754-1763, the number of Lutherans was probably one-fourth to one-third larger than the Reformed Church membership. On this basis of comparison the Reformed congregation may have actually buried twenty-two to twenty-five members, since the larger Lutheran congregation buried an annual average of thirty-three members between 1754-1763. These speculations suggest a more probable rate of about thirty deaths per thousand population for Reformed people in the late 1750s. The remaining rates through 1810 are based on the annual average of burials among Reformed Church members per estimated congregation size.

The mortality experience of late eighteenth century Lancaster Reformed Church people may make more sense when looked at from a historical and comparative perspective. Some evidence from New Jersey in the same period "suggested an astonishingly low infant mortality rate" and a death rate in the range of ten per thousand for the white population.¹⁰⁷ Life expectancy was high in America compared to Europe, "because . . . only one in forty-five die annually, even in the city of Philadelphia,¹⁰⁸ which converted to a death rate of twenty-two per thousand population. But in France and England the speculation was, that about thirty per thousand population died annually. "By comparing the number of annual deaths in Philadelphia with the number of Inhabitants, we shall find that there is not more than one in 40 dies annually; and if we do not include strangers in the account of the funerals, it will be found that there is not more than one in 50 that dies here."¹⁰⁹ These proportions dying, converted to death rates hint that twenty to twenty-five Philadelphians per thousand population died annually.

Other evidence, however, during forty-two years for which data are available between 1722 and 1775, demonstrated that there were only three years in which rates dipped to these estimated low ranges. In 1740, 1755, and 1768, the annual crude death rate per thousand, registered 26.7, 28.3, and 29.7, respectively. In thirty-nine other years between 1722 and 1775, the rate was thirty and upward to fifty deaths per thousand population, and in severe epidemic years, such as 1759, 71.3 Philadelphians per thousand population died annually.¹¹⁰ Perhaps by the 1780s and 1790s the death rate dropped to lower rates of twenty to twenty-five per thousand, since a pattern of lower rates appeared after 1766 which had not been observed before that date.¹¹¹

The Lancaster Reformed Church death rates for 1751, 1758, and 1771 of twenty-three, thirty-seven and seventeen deaths per thousand population respectively, may seem to underestimate the eighteenth century mortality experience. In light of Philadelphia's rates, which were 58.8, 39.8 and 33.7

deaths per thousand population¹¹² for the same years, the Lancaster estimates appear quite low. But "Philadelphia was . . . an extremely hazardous place in which to live, and even though conditions were improving in the late years of the colonial era, Philadelphia was considerably more unhealthy than either the colonial rural areas or even European cities."¹¹³ Perhaps it was because of repetitive smallpox epidemics in the city, and Philadelphia's position as a reception center for immigrants that more people "die annually in the city than in the country."¹¹⁴

Other evidence suggested that the Lancaster Reformed death rates may be too low. For example, as late as 1900 the combined total death rate for both sexes in the United States was 17.2 deaths per thousand population.¹¹⁵ One would expect much higher rates in 1800 and anticipate declining mortality rates during the course of the nineteenth century. However, the most important influence on demographic development in the eighteenth century "was improvement of health due to better nutrition." Other than that, "medicine made little or no contribution to lowering mortality," nor did it "significant(ly) contribut(e) to life expectations until long after" 1860.¹¹⁶ So that in historical perspective the relatively low Lancaster rates in the eighteenth century dropped during the nineteenth century and fitted with the United States pattern at the beginning of the twentieth century.

Endnotes

1. Jerome H. Wood, Jr., *Conestoga Crossroads: Lancaster, Pennsylvania, 1730-1790* (Harrisburg, PHMC, 1979), 13.

2. William J. Hinke, "Transcripts of the Church Records of the First Reformed Church, Lancaster, Pennsylvania, 1736-1806," Church of Jesus Christ of Latter Day Saints, Genealogy Society Microfilm #20349, 2.

3. Wood, *Conestoga Crossroads*, 13.

4. Franklin Ellis and Samuel Evans, *History of Lancaster County, Pennsylvania, With Biographical Sketches of Many of its Pioneers and Prominent Men* (Philadelphia, Everts and Peck, 1883), 453.

5. Hinke, "Transcripts of the Church Records of the First Reformed Church," 3.

6. *Ibid.*, 28.

7. "Report of Mr. Boehm to the Classis of Amsterdam, January 14, 1739," in William J. Hinke, *Life and Letters of Rev. John Philip Boehm* (Phila., 1916), 272-284, especially 274-276, 275, note 151.

8. Ellis and Evans, *History of Lancaster County*, 453; Wood, *Conestoga Crossroads*, 181.

9. James T. Lemon, "A Rural Geography of Southeastern Pennsylvania: The Contributions of Cultural Inheritance, Social Structure, Economic Conditions and Physical Resources." (Ph.D., dissertation, University of Wisconsin, 1964), 449; Wood, *Conestoga Crossroads*, 181.

10. Lemon, "Rural Geography," 449.

11. Wood, *Conestoga Crossroads*, 181.

12. *Ibid.*, 181, 13.

13. Ellis and Evans, *History of Lancaster County*, 450.

14. Hinke, "Transcripts of the Church Records of the First Reformed Church," 1.

15. *Ibid.*, 1, *passim*.

16. Benjamin Franklin, *Observations Concerning the Increase of Mankind, Peopling of Countries, &c* (Boston, S. Kneeland, 1755), 3, 4, 8; Israel Acrelius, *A History of New Sweden: or, the Settlements on the River Delaware, 1759* (trans. by William M. Reynolds, Phila., Historical Society of Pa., 1874), 356-357; Gottlieb Mittelberger, *Journey to Pennsylvania in the Year 1750 and Return to Germany in the Year 1754* (trans. and ed. by Oscar Handlin and John Clive, Cambridge, Mass., Belknap Press of Harvard U. Press, 1960), 42, 69-70, 74, 81; Peter Kalm, *Travels in North America* (2 vols., edited and rev. by Adolph B. Benson, N.Y., Dover Publications, 1966), I, 211, 223; Thomas Malthus, *As Essay on the Principle of Population, As it Affects the Future Improvement of Society* (London, 1798, Royal Economic Society Reprint, London, Macmillan & Co., 1926), 102-104.

17. Ralph B. Strassburger and William John Hinke, eds., *Pennsylvania German Pioneers: A Publication of the Original Lists of Arrivals in the Port of Philadelphia from 1727 to 1808* (Baltimore, 1966), *passim*, but especially xxix-xxxi; "Persons Naturalized in Pennsylvania, 1740-1773," in *Pennsylvania Archives* (Second Series, 19 vols., Harrisburg, 1879-1890), II, 295-415; Rodger C. Henderson, "Community Development and the Revolutionary Transition in Eighteenth-Century Lancaster County, Pennsylvania (Ph.D. dissertation, SUNY-Binghamton, 1983), 19-22.

18. For example, the Lutheran marriages for 1776, 1777, 1778, and 1779 are not to be found. There were 62 marriages recorded in 1780 and so this figure has been used to stand as an "average" for the five-year period, 1776-1780. See Figure 3.

19. James T. Lemon, *The Best Poor Man's Country: A Geographical Study of Early Southeastern Pennsylvania* (Baltimore, Johns Hopkins Press, 1972), 75 observed that "the rate [of] movement seems to have been strongest in the 1740s, 1758 to 1763, the middle 1780s, and the early 1790s"; "Minutes of the Provincial Council," August, 1755, *Pennsylvania Colonial Records* (16 vols., Harrisburg and Philadelphia, Joseph Severns Co., 1838-1853), VI, 574; Robert W. Ramsey, *Carolina Cradle: Settlement of the Northwest Carolina Frontier, 1747-1762* (Chapel Hill, N.C., 1964), 17-22, 150, 216.

20. Yasukichi Yasuba, *Birth Rates of the White Population in the United States, 1800-1860: An Economic Study* (Baltimore, Johns Hopkins Press, 1962), 27, 38.

21. See Note 16 above, and William Barton, "Observations on the Probabilities of the Duration of Human Life, and the Progress of Population, in the United States of America," *American Philosophical Society Transactions*, 3(Phila., 1793), 36-38.

22. J. Potter, "The Growth of Population in America, 1700-1860," in D. V. Glass and D.E.C. Eversley, eds., *Population in History: Essays in Historical Demography* (Chicago, Aldine Publishing Co., 1965), 646, figured that a crude annual death rate of 21 deaths per 1,000 population would be close to the mark.

23. Lemon, *Best Poor Man's Country*, 23-24, shows high mean annual rates of increase to 1770, but diminishing rates thereafter to 1800; Potter, "Growth of Population in America," Glass and Eversley, eds., *Population in History*, 638, computed an average percentage decennial increase of 43 percent from 1700 to 1790 in Pennsylvania, which is much larger than other colonial areas.

24. For example, in Andover, Massachusetts, deaths exceeded births on the occasion of the throat distemper epidemic in 1738. Philip J. Greven, Jr., *Four Generations: Population, Land, and Family, in Colonial Andover, Massachusetts* (Ithaca, N.Y., Cornell U. Press, 1970), 182, 187.

25. Hinke, "Transcripts of the Reformed Church Records;" Ellis and Evans, *History of Lancaster County*, 452.

26. Hinke, "Transcripts of the Reformed Church Records," 1, points out that in the Book of Baptisms and Marriages "some names of some members from neighboring Reformed Congregations are found." Among the persons married in the Trinity Lutheran Church, a number of members of other churches and different denominations appeared in the Marriage

Registers, including some Mennonites. See "Trinity Lutheran Church . . . Early Marriage Records: 1731-1850" (Lancaster, 1950), foreward, *passim*.

27. E. A. Wrigley, ed., *An Introduction to English Historical Demography from the Sixteenth to the Nineteenth Century* (N.Y., Basic Books, 1966), 54-55. For a discussion of the merits of aggregative analysis and its more detailed complementary technique of Family Reconstitution, see Philip J. Greven, Jr., "Historical Demography and Colonial America," *WMQ*, 24(1967), 438-454, but especially 440-441.

28. Wrigley, ed., *Introduction to English Historical Demography*, 49.

29. Mittelberger, *Journey to Pennsylvania*, 22, 52.

30. Jonathan Oswald, trans., *Halliche Nachrichten: Reports of the United German Evangelical Lutheran Congregations in North America, Especially in Pennsylvania* (2 vol., Halle, 1750) (Phila., 1880), I, 44-46.

31. Henry Melchior Muhlenberg, *The Journals of Henry Melchior Muhlenberg in Three Volumes*. Trans. by Theodore G. Tappert and John W. Doberstein (Phila., Muhlenberg Press, 1942-1958), II, 342-343. For the importance of a well-kept baptismal register and for aberrations from these standards, see I, 88; I, 212; I, 355; I, 610; II, 343-344; II, 347.

32. *Ibid.*, I, 501-502, 524, 545; III, 65-66.

33. Mittelberger, *Journey to Pennsylvania*, 43-44.

34. Hinke, *Life and Letters of Boehm*, 89, quoting the Reverend A. G. Spangenberg.

35. *Muhl. Jour.*, I, 212, comparing Pennsylvanians' attitudes and practices with the Book of Judges 17:6.

36. On the contrary, young men who moved away and remained bachelors for life would add to the proportions of never married shown in Table 2. J. Hajnal, "European Marriage Patterns in Perspective," Glass and Eversley, eds., *Population in History*, 101, 102, demonstrated that a European marriage pattern started before 1700 and included a high mean age at marriage for men in the range of twenty-six to twenty-nine years. According to this pattern thirteen to sixteen percent of men of marriageable age never married. Very few men married at less than twenty years of age.

37. According to the European marriage pattern, the mean age at first marriage for women falls in the ages above twenty-three to twenty-four. Most frequently, seventeen to nineteen percent of women of marriageable age remain single for life. The uniqueness of the pattern is a high age at marriage for women, a large proportion who never marry, and a small difference between the ages of husbands and wives, rather than a high age at marriage for men. Hajnal, "European Marriage Patterns in Perspective," Glass and Eversley, eds., *Population in History*, 101, 102, 134; Wrigley, *Population and History*, 90.

38. William Penn, "Some Account of the Province of Pennsylvania, 1681," in Albert Cook Myers, ed., *Narratives of Early Pennsylvania, West Jersey and Delaware, 1630-1707* (New York, 1912), 203.

39. Samuel Thornely, ed., *The Journal of Nicholas Cresswell, 1774-1777* (New York, 1924), 271.

40. Malthus, *An Essay on the Principle of Population*, 58, 104.

41. Wolf, *Urban Village*, 254-255.

42. Wells, "Quaker Marriage Patterns," *WMQ*, 29(1972), 427-428.

43. William Currie, *An Historical Account of the Climates and Diseases of the United States of America* (Philadelphia, 1792), 112-113. See also Smith, "Death and Life in a Colonial Immigrant City," *JEH*, 37 (1977), 879, for a recent calculation of infant and child mortality rates based on church records. Another study based upon reconstituted Philadelphia families of the eighteenth century computed infant mortality rates of 253, 210, and 187 per 1,000. Susan E. Klepp, "Social Class and Infant Mortality in Philadelphia, 1720-1830," Seminar Paper, Philadelphia Center for Early American Studies, November 6, 1981, Table 5, 18.

44. William Barton, "Observations on the Probabilities of the Duration of Human Life, and the Progress of Population, in the United States of America," *American Philosophical*

Society Transactions, 3(Philadelphia, 1793), 56. In the years 1807 and 1808, 1,769 children under five years old died in Philadelphia when there were a reported 3,982 deaths; thus, 44.4 percent of total deaths were those of children under five. See "Statement of Deaths, with the diseases and ages, in the City and Liberties of Philadelphia, from the 2d of January 1807, to the 1st of January 1809. Communicated by the Board of Health," *American Philosophical Society Transactions*, 6(Phila., 1809), 403-407.

45. Barton, "Observations on the Probabilities of the Duration of Human Life," *Amer. Philos. Soc. Trans.*, 3(1793), 56.

46. *Ibid.*, 56.

47. Currie, *An Historical Account of the Climates and Diseases*, 100.

48. Smith, "Death and Life in a Colonial Immigrant City," *JEH*, 37(1977), 871.

49. Barton, "Observations on the Probabilities of the Duration of Human Life," *Amer. Philos. Soc. Trans.*, 3(1793), 56.

50. *Ibid.*, 35-36

51. To illustrate the point: if infants under one year of age die at rates of 145 per 1,000 cohort members then life expectancy for females would be about 45 years of life at birth. If rates increased to 161 deaths per 1,000 cohort members then life expectancy at birth would be 43 years. In general, higher infant mortality rates reduce the prospects of longer life. See Ansley J. Coale and Paul Demeny, *Regional Model Life Tables and Stable Populations* (Princeton, N.J., 1966), Model West, Level 11, Females, p. 12, and Model West, Level 10, Females, p. 11.

52. Barton, "Observations on the Probabilities of the Duration of Human Life," *Amer. Philos. Soc. Trans.*, 3(1793), 40.

53. Mittelberger, *Journey to Pennsylvania*, 81.

54. Kalm, *Travels in North America*, I, 56.

55. See Table 2, above.

56. Tritnity Lutheran Church, Burial Records, LDS Genealogy Society Microfilm #49173.

57. "Statement of Deaths, With the Diseases and Ages," *Amer. Philos. Soc. Trans.*, 6(1809), 403-407.

58. *Muhl. Jour.*, III, 371.

59. "Benjamin Franklin to Mary Stevenson, October 28, 1768," as quoted in *Dr. Benjamin Franklin and the Ladies: Being Various Letters, Essays, Bagatelles, & Satires to & about the Fair Sex* (Mount Vernon, N.Y., 1939), 27.

60. Samuel Smith, *History of the Province of Pennsylvania* (Philadelphia, 1913), 17.

61. "Benjamin Franklin to Mary Stevenson, October 28, 1768," as quoted in *Dr. Benjamin Franklin and the Ladies*, 28.

62. George Hess, Will, April 28, 1770, *Lancaster County Wills*, Book C, 187-188; George Gerlach, Will, August 3, 1770, *LCW*, Book B, 665-666.

63. "William Becket to Bro. John on the death of Bro. James, Lewes, August 1, 1728," in C. H. B. Turner, comp., *Some Records of Sussex County, Delaware* (Philadelphia, 1909), 189-191.

64. "Aletta Clarke's Diary," in Turner, comp., *Some Records of Sussex County, Delaware*, 350-351.

65. Techniques for determining unrecorded infant deaths using birth interval data in reconstituted families disclosed that infants who died in their first year of life approached 45.1 percent of recorded infant deaths before 1741, while 37.6 percent of infant deaths went unrecorded between 1741 and 1770, and 47.3 percent of infant deaths were not registered between 1771 and 1800. See Henderson, "Community Development," 40-42.

66. Some infant deaths must be attributed to stillborn births, but in what proportions is

not evident in the Reformed Church Registers. Stillborn births amounted to 5.4 percent of deaths under age two in Philadelphia in 1746-1747, and to 19.4 percent of deaths under three years of age in Philadelphia in 1750-1751. "An Account of the Births and Burials in Christ Church Parish from December 24, 1746, to December 24, 1747," *Broadside*, (Phila., 1747); *Ibid.* (Phila., 1751). Again in Philadelphia, stillborn births accounted for 13.6 percent of burials for those who died under two years of age in 1807, and 14.5 percent of the deaths reported under age two in 1808. "Statement of Deaths, With the Diseases and Ages," *Amer. Philos. Soc. Trans.*, 6(Phila., 1809), 403-407.

67. William J. Hinke, "Transcripts of the Church Records," 405-406.

68. 169 recorded child burials plus 42 (25 percent estimate of underregistration) divided by 1,106 recorded births plus 42 unrecorded infants multiplied by 1,000 equaled 183.7

69. Edw. Kluge, "The Moravian Graveyards of Nazareth, Pennsylvania, 1744-1904," *Moravian Historical Society Transactions*, 7(1902-1906), 99; John Duffy, *Epidemics in Colonial America* (Baton Rouge, La., 1953).

70. Trinity Lutheran Church, Burial Records, LDS Genealogy Society Microfilm #49173.

71. *Ibid.* These data differ markedly from some evidence in neighboring New Jersey where a death rate in the range of ten per 1,000 "suggested an astonishingly low infant mortality rate." See Potter, "Growth of Population in America," Glass and Eversley, Eds., *Population in History*, 658, 663. The Lancaster data do not appear strikingly different from some European infant mortality rates. Infant-child rates in the range of 150 to 183 per thousand appear similar to those for Sweden, 1761-1770, of 216.1 per 1,000, or for Colyton, 1601-1650, of 138.0 per thousand, or for Lourmarin, 1696-1815, of 150 per 1,000, where no progress was made "in reducing infant and child mortality." See Thomas F. Sheppard, *Lourmarin in the Eighteenth Century: A Study of a French Village* (Balt., 1971), 43, 46.

72. *Muhl. Jour.*, I, 190, 355; II, 748; III, 3, 181, 183, 184, 277, 298, 347.

73. Brecht, ed., *The Genealogical Record of the Schwenkfelder Families, passim*.

74. Lancaster Moravian Congregation, Burial Records, LDS Genealogy Society Microfilm #49174. Infant mortality rates calculated from Family Reconstitution Forms registered 148 infant (0-1) deaths per 1,000 cohort members before 1741. Between 1741 and 1770, 176 infants (0-1) died per 1,000 cohort members, and 178 infants (0-1) per 1,000 died in the period 1771-1800. Children aged one to four died at rates of 52, 68, and 70 per thousand during the same time periods, respectively. See the discussion of infant mortality rates in Chapters 5, 8, and 11, in Henderson, "Community Development."

75. Wells, "Quaker Marriage Patterns," *WMQ*, 29(1972), 422-423.

76. Wolf, *Urban Village*, 283, 273-275.

77. *Muhl. Jour.*, II, 417; Abraham Reinke Beck, "The Moravian Graveyards of Lititz, Pennsylvania, 1744-1905," *Moravian Historical Society Transactions*, 7(1902-1906), 237; Kluge, "The Moravian Graveyards of Nazareth, Pennsylvania, 1744-1904," *Mor. Hist. Soc. Trans.*, 7(1902-1906), 98; "J. Krill to Jonathan Dickinson, Philadelphia, 16th April, 1703," in *Historical Society of Pennsylvania Memoirs*, IX, 185; Mittelberger, *Journey to Pennsylvania*, 14; Cecil K. Drinker, *Not So Long Ago: A Chronicle of Medicine and Doctors in Colonial Philadelphia* (N.Y., 1937), 48; "Early Letters from Pennsylvania, 1699-1722," *PMHB*, 37(1913), 331; Barbara Cunningham, "An Eighteenth-Century View of Femininity as Seen Through the Journals of Henry Melchior Muhlenberg," *Pa. Hist.* 43(1976), 201, 208; Catharine M. Scholten, "On the Importance of the Obstetric Art: Changing Customs of Childbirth in America, 1760 to 1825," *WMQ*, 34(1977), 426-445.

78. Peter De Sales La Terriere, *A Dissertation on the Puerperal Fever*, (Boston, 1789), 7, 14; *Muhl. Jour.*, II, 748; III, 347-348; John Griffith, *A Journal of the Life, Travels and Labours in the Work of the Ministry* (London, 1779), 56; "Aletta Clark Diary," in Turner, *Some Records of Sussex County, Delaware*, 350-351. "Frequent childbearing, combined with poor obstetrics, accounted for much of the ill-health and mortality among mothers." Richard Harrison Shryock, *Medicine and Society in America, 1660-1860* (N.Y., 1960), 92.

79. A spot check of the Lutheran Church burials for 1748-1750, 1772-1775, and

1796-1799 brought to light evidence that sixteen women died in childbirth during 1,266 confinements which computed to a maternal mortality rate of 12.6 per 1,000. The average age at death of twenty-nine Lutheran women who died in childbirth, 1771-1820, was 29.0. Of these, 79.3 percent died before reaching their thirty-fifth birthday. Trinity Lutheran Church, Burial Records, LDS Genealogy Society Microfilm #49173. Other evidence showed that thirty-five women died giving birth to 1,981 children, producing a maternal mortality rate of 17.6 maternal deaths per 1,000 confinements. See "An Account of the Births and Burials in Christ Church Parish," Phila., 1747 *Broadside*; *Ibid.*, Phila., 1751; *Ibid.*, Phila., 1767; *Ibid.*, Phila. 1768; *Ibid.*, Phila., 1769; *Ibid.*, Phila., 1770; *Ibid.*, Phila., 1772; *Ibid.*, Phila., 1774; "An Account of the Births and Burials in St. Paul's Church," Phila., 1774, *Broadside*. In 1807 in Philadelphia seven women died of puerperal fever and twelve died in parturition. The data suggest that 6.9 percent of the approximate 175 women who died between ages twenty and fifty did so in childbearing. See "Statement of Deaths, with the Diseases and Ages," *Amer. Philos. Soc. Trans.*, 6(1809), 403-407.

80. The figure of 11.4 percent is based on 21 maternal deaths out of a total of 185 married women. The 30.8 percent figure is based on 57 deaths of a total of 185 married women. For a modern estimate of maternal mortality on the order of five deaths per 1,000 pregnancies, see Carole Spearin McCauley, *Pregnancy after 35* (N.Y., 1976), 187. Until the development of antibiotics and improved postnatal and antenatal care "maternal mortality remained for several decades in the region of five deaths due to or associated with child-bearing per 1,000 confinements." Peter R. Cox, *Demography* (N.Y., 1976), 129-130. Maternal deaths in populations having low levels of economic development "are on the order of 2 per 100 deliveries." Louis Henry, *Population: Analysis and Models* (N.Y., 1976), 156. Maternal deaths in 1916 in New York, Boston, and Philadelphia were 4.6, 6.5, and 7.0 per 1,000 births, respectively. Julius Levy, "The Maternal and Infant Mortality in Midwifery Practice in Newark, New Jersey," *American Journal of Obstetrics and Diseases of Women and Children*, 77(1918), 43. When life expectancy at birth for females is less than forty years the average percentage of maternal deaths is presented as 1.62 of newborns who would ultimately die in childbirth as mothers in this range of life expectancy. Samuel H. Preston, et. al., *Causes of Death: Life Tables for National Populations* (N.Y., 1972), 3.

81. Currie, *An Historical Account of the Climates and Diseases of the United States*, 123-124.

82. Benjamin Rush, "An Inquiry into the Cause and Cure of the Pulmonary Consumption," in *Medical Inquiries and Observations* (2 Vol., Philadelphia, 1815), II, 50. Some twentieth century statistics show more precisely the age-specific nature of tuberculosis. In 1900 when consumption infection was "well-nigh universal," the rates at ages 15, 25, 35, 45, and 55 were 40, 210, 290, 250, 210, respectively. See Rene and Jean Dubos, *The White Plague: Tuberculosis, Man and Society* (Boston, 1952), 237.

83. Benjamin Rush, "Thoughts upon the Cause and Cure of the Pulmonary Consumption," in *Medical Inquiries and Observations* (2 Vol., Philadelphia, 1815), II, 38.

84. Currie, *An Historical Account of the Climates and Disease of the United States*, 123-124. Some data on tuberculosis in the U.S. in 1900 portrayed the death rate for men as 203 per 100,000, but for women it was 172 per 100,000 population. The greatest proportion of deaths among men occurred between ages twenty-five and thirty-four, but for women the most dangerous period of life was age fifteen to twenty-four. About one-third of all tuberculosis deaths for both sexes occurred between ages fifteen and forty-four. See Richard Harrison Shryock, *National Tuberculosis Association, 1904-1954: A Study of the Voluntary Health Movement in the United States* (N.Y., 1977), 63. Age-specific tuberculosis death rates for males and females in the U.S. in 1914 formed the following configuration according to Anthony M. Lowell, et. al., *Tuberculosis* (Cambridge, Mass., 1969), 69.

Age	Male	Female
5-14	19.6	26.7
15-24	119.5	134.7
25-34	196.8	169.9
35-44	230.0	144.1
45-54	218.5	111.6

85. Lowell, *Tuberculosis*, xxi, 6-7. A sample of Philadelphia's bills of mortality from 1746 to 1774 demonstrated that 24.7 percent of all recorded deaths resulted from "consumption" and "decay." See "Account of the Births and Burials in Christ Church Parish," Philadelphia, 1747, *Broadside*; *Ibid.*, Phila., 1751; *Ibid.*, 1767; *Ibid.*, 1768; *Ibid.*, 1769; *Ibid.*, 1770; *Ibid.*, 1772; *Ibid.*, 1774; "An Account of the Births and Burials in St. Paul's Church," Philadelphia, 1774 *Broadside*; "An Account of the Burials and Baptized in the Baptist Church," Phila. 1767 *Broadside*; "An Account of the Burials of the Second Presbyterian Church," Phila., 1767, *Broadside*; *Ibid.*, 1768.

86. Lancaster Moravian Congregation, Burial Records, LDS Genealogy Society Microfilm #49174; Trinity Lutheran Church, Burial Records, LDS Genealogy Society Microfilm #49173; Lititz Moravian Congregation, Burial Records, LDS Genealogy Society Microfilm #20371.

87. For a discussion of tuberculosis and pregnancy, see Douglas M. Haynes, *Medical Complications During Pregnancy* (N.Y., 1969), 197-209, where "the considerable mortality of the disease in individuals in the childbearing age" is evaluated. The average percentage of newborns who would ultimately die of respiratory tuberculosis when life expectancy at birth for females was less than forty years is listed at 7.43, in Preston, *Causes of Deaths; Life Tables for National Populations*, 3, suggesting that "consumption" mortality may have been four to five times more deadly for women than giving birth in eighteenth century Lancaster, Pennsylvania.

88. Construction of the population growth curve in Figure 5 proceeded on the foundation that ". . . it is not in fact necessary to know to a high degree of accuracy what the population was in a given year, but to establish marker or reference points which can be used to fix the approximate line of a population growth curve, to which the vital statistics may be referred to establish rates." Wrigley, ed., *Introduction to English Historical Demography*, 76. The purpose was to "find several fixed reference points" using "data about the size of population . . . independent of the annual" birth, death, and marriage records. *Ibid.*, 76. Underlying the estimates of population was the opinion "that a difference either way in the reference figure will not affect . . . vital statistics very much . . . Errors about the base population on the order of ten to fifteen percent cannot affect the direction of the movement of rates to a significant extent." *Ibid.*, 78-79. Each reference point on the graph is an average of six to eight population estimates based on the numbers of taxables and houses in Lancaster, and travelers', diarists', and journalists' accounts for each year selected. Multipliers used to convert house estimates to population ranged from four to six; for taxables, five to six; for families, five to six. Before 1790, three series of data proved helpful. F. R. Diffenderffer, "The Early Settlement and Population of Lancaster County and City," *Journal of the Lancaster County Historical Society*, 9(1904-05), 151-171, estimated inhabitants on the basis of four people to a house, between 1730 and 1800; Lemon, "A Rural Geography," (Ph.D. dissertation, U. of Wisconsin, 1964), 84, estimated the population of Lancaster on the basis of taxables times a multiplier of 5.5 from 1730 to 1790; Wood, "Conestoga Crossroads," (Ph.D. dissertation, Brown University, 1969), 52, 274, estimated the Borough's population at thirteen dates from 1746 to 1790, using a multiplier of six times the number of taxables, assuming that taxables were equivalent to "heads of families." Other useful sources included *Heads of Families at the First Census of the United States Taken in the Year 1790, Pennsylvania* (Washington, 1908), Tax Lists for 1771-1773, 1779, and 1782 in *Pennsylvania Archives*, 3rd Series, Vol. 17; Thomas Gordon, *Gazetteer*, 232; Lemon, "Urbanization and the Development of Eighteenth Century Southeastern Pennsylvania," *WMQ*, 24(1967), 501-542; Proud, *The History of Pennsylvania*; and Sutherland, *Population Distribution in Colonial America*. Also, see note 96 below.

89. Lemon, "A Rural Geography," 449; William J. Hinke, ed., *Minutes and Letters of the Coetus of the German Reformed Congregations in Pennsylvania, 1747-1792* (Philadelphia, 1903), 320, 386. Comparison of Figure 1, 5-year average of Births, Deaths, and Marriages, Lancaster Reformed Church, 1736-1810, support the estimate of one-third of the population being Reformed Church members, at least, to the end of the eighteenth century.

90. William J. Hinke, ed., "Diary of the Rev. Michael Schlatter: June 1 - December 15, 1746," *Journal of the Presbyterian Historical Society*, 3(1905), 163, notes that baptized

members "were at least three times as numerous as" communicant members.

91. Henry Harbaugh, *The Life of Rev. Michael Schlatter: With a Full Account of His Travels and Labors Among the Germans in Pennsylvania* (Philadelphia, 1857), 178.

92. Hinke, "Transcript of the Church Records," 27, 28.

93. *Ibid.*, 378-381. 181 male catechumens from 1795 to 1806 averaged 17.13 years of age. 206 females averaged 16.16 years of age. *Ibid.*, 387-392.

94. Potter, "The Growth of Population in America," Glass and Eversley, eds., *Population in History*, 653, shows the ratio of males to females as 51.3 to 48.7 in 1790 and males over 16 as 26.1 percent compared to males under 16 as 25.2. William Barton, "Observations on the Probabilities of the Duration of Human Life," *Amer. Philos. Soc. Trans.*, 3(1793), 35, notes one-half of those under 16 out of the total number of inhabitants. According to *A Century of Population Growth, From the First Census of the United States to the Twelfth, 1790-1900* (Washington, 1909), Table 106, 208-09, females composed 49.7 percent of the white population in 1790 and males the remainder of 50.3 percent.

95. Ellis and Evans, *History of Lancaster County*, 453; Wood, *Conestoga Crossroads*, 181; Lemon, "A Rural Geography," 449.

96. Evarts V. Greene and Virginia D. Harrington, *American Population Before the Federal Census of 1790* (New York, 1932), xiii, 113-117 recommend the following multipliers for calculating population: Militia: 5 x 1; Polls, taxables, tax lists: 4 x 1; Houses: 7 x 1; Families: 5.7 or 6.1. Friis, *A Series of Population Maps of the Colonies and the United States* 6-7, recommends 4 x 1 for militia but follows Greene and Harrington in using as a multiplier for families 5.7 x 1 or 6 x 1. Wood, *Conestoga Crossroads*, 47-48, took taxables as "heads of families," and used a multiplier of 6 x 1 to estimate population. Lemon, *Best Poor Man's Country*, 239, Note 71, used a multiplier of 5.5 to convert taxables to population. The average size of Pennsylvania families in 1790 was 5.7. See *A Century of Population Growth*, Table 26, 96.

97. In the Moravian community at Bethlehem, Pennsylvania marriage rates approached 29 per 1,000 population in the 1740s but declined steadily so that by the 1790s marriage rates for that decade registered only 7 per 1,000. Gollin, *Moravians in Two Worlds*, 121.

98. Barton, "Observations on the Probabilities of the Duration of Human Life," *Amer. Philos. Soc. Trans.*, 3(1793), 28. Barton inferred that the rapidity of population increase in the United States exceeded that in other countries on the basis "that the births exceed the deaths, in number, in a superior degree, among us" in the proportion of 100 births to 50 deaths. *Ibid.*, 36-38.

99. *Ibid.*, 31.

100. "Persons Naturalized in Pennsylvania," *Pa. Arch.*, 2nd Series, II, 295-415.

101. *Historical Statistics of the U.S.: Colonial Times to 1970* (Washington, 1975), 49. Some fragmentary data from New Jersey in the eighteenth century produced a birth rate of thirty per thousand population, "but that is almost certainly too low." Potter, "Growth of Population in America," Glass and Eversley, eds., *Population in History*, 663, 658. "Except where the age structure of the population is very unusual the maximum rate of inflow is about 50 per 1,000 per annum. Birth rates above this level are very exceptional and rates above 45 are uncommon." Wrigley, *Population and History*, 62. But, Pennsylvania was exceptional as a reception center for immigrants, as a distributing center for population, and as a reproductive center experiencing maximum growth rates through natural increase, with an average percentage decennial increase of 43.0 percent. Potter, "Growth of Population in America," Glass and Eversley, eds., *Population in History*, 638, 643, 644.

102. Smith, "Death and Life in a Colonial Immigrant City," *JEH*, 37(1977), 881, 887. A number of demographers have computed the American birth rate in the period 1790-1810 at fifty per thousand and slightly higher. Wells, "Family Size and Fertility Control in Eighteenth Century America: A Study of Quaker Families," *Population Studies*, 25(1971), 73. Annual birth rates ranged between 52 and 53 per thousand population between 1790 and 1800 among the white population. The crude birth rate of 1800 was 55.0 births per 1,000 population but dropped to 54.3 per 1,000 in 1810. Yasuba, *Birth Rates of the White Population in the United*

States, 1800-1860, 38, 27.

103. See above, Table 2, First Reformed Church, Burials, 1750-1806.

104. *Historical Statistics of the U.S.: Colonial Times to 1970* (Wash., 1975), 49.

105. *Ibid.*, 59. Fertility rates calculated for three cohorts of women between ages fifteen and forty-nine before 1741, 1741-1770, and after 1771 in Lancaster County disclosed that 371 births per 1,000 women of childbearing age prevailed before 1741 and that rates of 345 and 346 characterized fertility of women in the periods 1741-1770, and 1771-1800, respectively. These data refer to women whose fertility extended through the entire childbearing years, and suggest completed family sizes in the range of eight or nine births per marriage. Mean births per marriage before 1741 registered 9.6, the average births per marriage in completed families, 1741-1770 was 9.3, and the comparable figure for the period after 1771 was also 9.3. See Henderson, "Community Development," chapters four, seven, and ten for a discussion of cohort marriage and fertility patterns.

106. The records of births and baptisms of the Trinity Lutheran Church, Lancaster may be found on LDS Genealogy Society Microfilm #20371, while burials are filmed on GS #49173 and marriages on GS #896897. See Figures 1, 2, and 3.

107. Potter, "Growth of Population in America," Glass and Eversley, eds., *Population in History*, 663.

108. Barton, "Observations on the Probabilities of the Duration of Human Life," *Amer. Philos. Soc. Trans.*, 3(1793), 44.

109. Currie, *An Historical Account of the Climates and Diseases of the United States*, 197. Benjamin Franklin wrote in 1749 that "in a healthy country (as this is) political Arithmeticians compute, there dies yearly One in Thirty-Five." On a proportionate basis this suggests a death rate of about 29 per thousand population. Passage quoted in James H. Cassedy, *Demography in Early America, Beginnings of the Statistical Mind, 1600-1800* (Cambridge, Mass., 1969), 120, note.

110. Smith, "Death and Life in a Colonial Immigrant City," *JEH*, 37(1977), 871. Deaths per thousand population in Boston, 1701-1774 generally fell in the range of thirty to forty per year, with much higher rates in epidemic years such as 1702, 1721, 1730, and 1752, when they approached 65, 100, 75, 60 per thousand, respectively. Maris A. Vinovskis, "Angels Heads and Weeping Willows: Death in Early America," in Michael Gordon, ed., *The American Family in Social-Historical Perspective* (N.Y., 1978), 549.

110. Smith, "Death and Life in a Colonial Immigrant City," *JEH*, 37(1977), 871 and Table 9, 888. On the assumption that it was "rather unlikely that there was a noticeable decrease in mortality" in the 1790s, total years' deaths were estimated and held constant at a rate of 25 per 1,000. Yasuba, *Birth Rates of the White Population in the United States, 1800-1860*, 38.

112. Smith, "Death and Life in a Colonial Immigrant City," *JEH*, 37(1977), 871.

113. *Ibid.*, 888. Pre-industrial cities experienced heavier mortality and "life in large settlements was apt to be shorter . . . than in the countryside." Crowded cities created "conditions in which diseases of all types can flourish . . . some types of epidemic disease spread much more easily in towns and cities." Wrigley, *Population and History*, 95-96.

114. Currie, *An Historical Account of the Climates and Diseases of the United States*, 100; Barton, "Observations on the Probabilities of the Duration of Human Life," *Amer. Philos. Soc. Trans.*, 3(1793), 35-36.

115. *Historical Statistics of the U.S.: Colonial Times to 1970* (Wash., 1975), Series B181, 60.

116. Potter, "Growth of Population in America," Glass and Eversley, eds., *Population in History*, 679. "Abundant food, good clothing and warm dwellings can cause a vast improvement in mortality even when medical knowledge is slight." The poor, however, "are much more likely to fall victim to disease and, having done so, to succumb." Wrigley, *Population and History*, 129. An estimated life expectancy at birth of only thirty-five years for the later eighteenth century rose slightly to almost forty years by 1850 largely due to improved living standards rather than medicine and health measures. Life expectancy at birth in 1900 was almost fifty years. See Shryock, *Medicine in America: Historical Essays*, 12, 14, 25-26.