Health and Mortality During the Transition to Commercial Dairy Farming in 19th-Century Upstate NY

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Introduction

In this work, we examine the relationship between farm production/household wealth and mortality patterns during the late 19th century in Madison County, New York on multiple scales, from the household to townwide to comparing multiple towns. Our primary sources of data are household, agricultural, and mortality census records--both state and federal--from 1850-1880.

Studies of health and mortality in rural communities in the 19th century have been much less common than those for urban communities. Additionally, this is a critical time when many farms were moving from subsistence-surplus to commercial production.

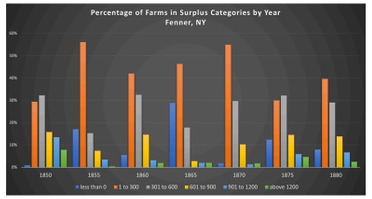
Context

Madison County is located in the geographic center of New York State (see map to the right). Euro-American settlement began in the 1790s, with most moving from New England and the Husdon Valley, buying land and establishing farms. African Americans, both those escaping enslavement in the South and those formerly enslaved in the North, also arrived in the 1790s. Immigrants, mainly from Ireland and Wales, began arriving in the 1820s. The latter two groups tended to make a living by laboring on farms and for local industries, like woollen mills.

We focus on the towns of Fenner and Cazenovia. Since settling, Fenner has been one of the most rural and relatively less economically propserous towns in the county, while Cazenovia has been one of the more affluent, with a village of 1500-2500 residents and more economic and occupational diversity.

Fenner and rural parts of Cazenovia continue to rely on family-run dairy farming today. The first author grew up on one of those farms in Fenner. This is a community-based project that came out of current residents' (and our own) interest in farmers' health in the past and how it was related to the changing profitability of family farming.

Previous Work



Jones et al. 2023 found that from 1850-1865, many (but not all) farmers in Fenner were moving toward commercial production by expanding existing ventures of growing oats, barley, and hay, and raising sheep. This allowed them to be flexible and deal with fluctuating markets. This can be seen in the changing proportions of farms with commercial production (≥300 bu of corn/$250) in the graph above.

This situation began to change in 1870 after cheese factories were established in the town. Farmers shifted toward dairy production and profits increased. However, profits were lower than those in Cazenovia, and the rural nature of the town produced a more community-oriented approach to farm economics.

Proportionate Causes of Death: All Towns Pooled

Year		Infectious	Non-communicable disease	External cause	Infant	Maternal	Total
1850	Count	284	152	20	48	2	506
	% within COD_Scat	23.0%	20.3%	21.5%	39.7%	11.8%	22.8%
1855	Count	251	149	28	34	5	467
	% within COD_Scat	20.3%	19.9%	30.1%	28.1%	29.4%	21.1%
1860	Count	259	154	12	14	3	442
	% within COD_Scat	20.9%	20.6%	12.9%	11.6%	17.6%	19.9%
1865	Count	209	139	17	13	1	379
	% within COD_Scat	16.9%	18.6%	18.3%	10.7%	5.9%	17.1%
1870	Count	234	154	16	12	6	422
	% within COD_Scat	18.9%	20.6%	17.2%	9.9%	35.3%	19.0%

DeWitte et al. (2024) conducted Kaplan-Meier survival analyses to evalutate trends in survivorship from 1850-1870 for each town and the county as a whole (table above). For towns with no village or a small village (like Fenner), there was no significant change in survivorship over time, though it did improve somewhat. In contrast, for towns with large villages (like Cazenovia), there were consistent, significant ($p < 0.001$), and substantial increases in survivorship.

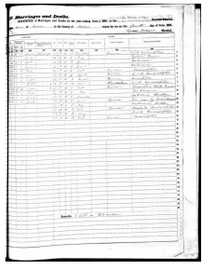
In addition, our examination of causes of death showed that the proportions of deaths from infectious diseases decreased, deaths during infancy declined, and deaths from non-communicable diseases and maternal causes increased.

Methods

This work combines the results of the previously described studies to examine the relationship between farm production, household wealth, and mortality. We used the mortality records (see an example at right) used in the DeWitte et al. study, located the household in which those individuals lived in the same year's census, and then linked each person's mortality data with the farm surplus data from the Jones et al. study. We did this for each state and Federal census from 1850-1800 for the town of Fenner (which had no village). We began the process for the neighboring town of Cazenovia (which had a large village), and we present those partial results.

Of course, not everyone in Fenner or Cazenovia was a farmer. This is a common misconception for rural communities, both then and now, and one that even archaeologists have tended to perpetuate (see Wurst 1999 for a critique). To account for this, we did analyses for farm production to compare farm households, and household property value to compare everyone.

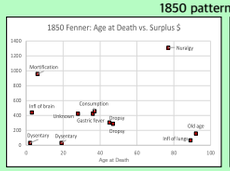
For this preliminary analysis, we produced graphs of age at death (with cause of death displayed) and farm production, and also for property value. We then used these data to interpret potential relationships between farm production, household wealth, cause of death, and age at death.

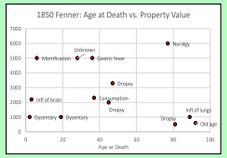


Results

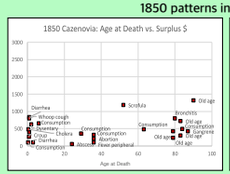
All graphs are shown with the maximum and minimum surplus and property values for the entire town in the y-axis. We present surplus and property values for 1850 because Cazenovia had many more non-farmers. For the remaining years, in which we have only completed analyses for Fenner, we present only farm surplus because most people in Fenner were farmers and the surplus and farm value graphs were very similar. Everyone in our analyses so far were recorded as white.

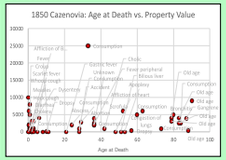
1850 patterns in Fenner





1850 patterns in Cazenovia

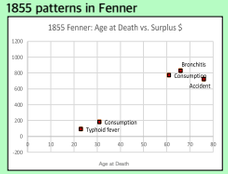




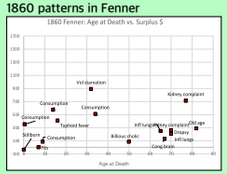
In 1850, there was not a clear relationship between farm surplus/property values and health outcomes in Fenner. In Cazenovia, the highest producing farms and wealthiest households were not represented. Consumption was a common killer among all ages in Cazenovia (15/67 or 22% of deaths), but not in Fenner (1/24 deaths).

In 1855 in Fenner, we see a positive correlation between farm surplus and age at death. The 1860 Fenner pattern mirrored the 1850 Cazenovia pattern, where the wealthiest were not represented and consumption was more common.

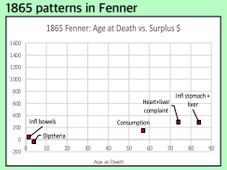
1855 patterns in Fenner



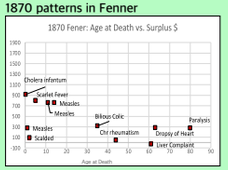
1860 patterns in Fenner



1865 patterns in Fenner

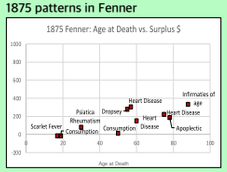


1870 patterns in Fenner



In 1865, the positive correlation seen in 1855 returned. Similarly, there were also few cases of infant mortality recorded. Conversely, there was a negative correlation between surplus and age at death in 1870. There were several children under the age of 10 that died from across farms in the bottom half of surplus production. Community members dying at age 60 or older were concentrated on farms with $300 or less of surplus, which was at the bottom end and below for commercial production levels.

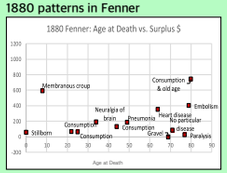
1875 patterns in Fenner



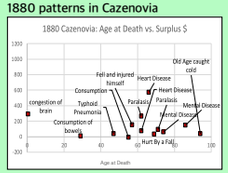
For 1875, there was a general positive correlation between farm surplus and age at death, but again, only people from the bottom half of the surplus range were represented. There were no children, either.

For 1880, we have a 60% sample of the Cazenovia mortality record, and it was similar to Fenner: few children and deaths only among the bottom half of the surplus range.

1880 patterns in Fenner



1880 patterns in Cazenovia



Discussion

Wealth = living longer. In Fenner, we see people from higher income households in the mortality records only in 1850 and 1855. Afterwards, only low- to middle-income households were represented. In Cazenovia, this pattern was established by 1850. This suggests protective effects of wealth, countering arguments by some (see Marmot 2004) that wealthier individuals have always fared better. Antonovsky (1967) argued that industrialization was a major factor in the emergence of modern health gradients by wealth because of differential access to medical care, adequate nutrition, etc. In both towns here, it may have been as simple as: **some could afford healthcare, some could not.** Additionally, **wealthier farmers could afford hired labor**, freeing up their time and allowing for rest during illnesses.

Location Matters? Transportation and travel distance were and still are key factors in rural areas. Fenner is completely rural and Cazenovia is a large town oriented north-south with the village in the middle and rural areas on the extremes. Access to doctors and general stores, where medicines could be purchased, required traveling as much as 7 miles by foot or horse/carriage for those in more remote locations. This may have been difficult for some, but made more feasible for households with more money and better means of transportation.

Wealth = healthier children. Huateniemi et al. (1999) found that wealth did not improve mortality patterns for adults but did for children in industrialized Massachusetts mill towns. **We see it improving for both**, suggesting differences in rural and urban contexts.

Lower population density = living longer. In Hautaniemi et al.'s (1999) study, mortality patterns were poor until 1900, resulting from high population densities and crowding. Our results provide further support that **crowding (or lackthereof) may have been a major factor in community mortality patterns**. Vinovskis (1972) found an increase in mortality in rural Massachusetts as town size exceeded 1000 people. Our results suggest a different pattern in upstate New York. The Village of Cazenovia had a population of 1718 in 1870 and the town appears to have had similar or better health outcomes compared to Fenner. Perhaps the wealth concentrated there offset the larger population?

Health and Household Economics. The years with the most farms producing at commercial levels in Fenner were 1850 and 1875. The mortality records for these years look quite different from one another, with the latter year having deaths concentrated in the lower half of the farm surplus spectrum and zero recorded childhood deaths. Conversely, 1855 and 1870 had the fewest farms at commercial production, and they also look quite different from one another. It appears as though **townwide economic trends do not predict individual health outcomes**. This suggests that the relationship between economic production and mortality occured at the household level. While labor and equipment may have been shared between cooperative farms to level economic differences, what was purchased with that household money, and how it related to health, appears to have varied.

Conclusions and Future Directions

We found both similarities (improved childhood mortality with more wealth) and differences (improved adult mortality with more wealth) between this rural community and previously studied urban communities. This counters some assumptions that health differences in the U.S. in the 19th century were primarily rural vs. urban rather than wealthy vs. poor. **Mortality patterns may have been more community specific.** In our case, the lack of crowding may have helped with communicable diseases; however, being spread out may have hurt poorer families.

Urban vs. Rural in Central New York. We have already begun collecting data from neighboring Onondaga County, where the city of Syracuse became an important late 19th-early 20th-century industrial center in the region. We will compare regional rural and urban mortality patterns.

Landscapes of Healthcare. Analyses of farm/household locations relative to villages and doctors will help us better understand the spatial relationships between healthcare, residential patterns, household economics, and mortality.

Household Consumption Patterns. Examining household material culture could be helpful to determine if more household income led families to purchase more medicines. We have artifact collections from two farmsteads and community interest in collecting from more.

Immigration. Studies show a "healthy migrant effect": better migrant health compared to both their sending and receiving populations (Feliciano 2020). Conversely, immigrants may be vulnerable to poor working and living conditions and to diseases endemic in those areas, but new to them. We plan to explore temporal trends in age-at-death and cause-of-death for migrants.

Sex and Gender. DeWitte et al. 2024 examined differences related to sex, but we still need to expand the economic work to this area as well.

Acknowledgments

Funding for this work was provided by colleges of Arts & Sciences at both CU-Boulder and USC in the form of start-up funding that paid undergraduate researchers. Unfortunately, this poster abstract was submitted prior to several students joining the research team, so they were not able to be co-authors despite collecting large amounts of data. So, we recognize them here: thank you to Eleanor Downing, Elena Miller, Emily Reardon, Elise Suckling, and Atticus Christiansen.

References

DeWitte et al. 2024, Health and Mortality in the 19th-Century Rural U.S.: The 2nd Epidemiological Transition in Madison County, NY. Poster presented at the Society for Historical Archaeology Meetings, Oakland, CA.
Feliciano 2020, Immigrant Selectivity Effects on Health, Labor Market, and Educational Outcomes. **Annual Review of Sociology**
Huateniemi et al. 1999, Mill Town Mortality: Consequences of Industrial Growth in Two 19th-Century New England Towns. **Social Science History**
Jones et al. 2023, The Settlement Ecology of Emerging Commercial Dairy Farming in the 19th-Century Northeast. **Historical Archaeology**
Marmot 2005, Social Determinants of Health Inequalities. **The Lancet**
Vinovskis 1972, Mortality Rates and Trends in Massachusetts before 1860. **Journal of Economic History**
Wurst 1999, Internalizing Class in Historical Archaeology. **Historical Archaeology**

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