Granny's Legacy: Did Evolution Select for Grandmothers Over an Extended Fertility Window?

By
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Abstract

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Why are humans among the very few species in which females have an extended post-reproductive lifespan? This question was first posed in 1957 by evolutionary biologist and original theorist of the Grandmother Hypothesis G.C. Williams, based on the widely accepted belief that menopause was uniquely human (Williams., 1957; Kim et al., 2018). Menopause occurs in human females well before the end of their anticipated life span and is classified as the permanent discontinuation of ovulation (Thouzeau & Raymond, 2017). Following the postulates of Darwin, any decrease in reproduction is counteractive to fitness, meaning that menopause essentially has no benefits to survival (Croft et al.,2015). The Grandmother Hypothesis asserts that grandmothers' benefits of caring for and aiding children and grandchildren counterbalance the price of lost reproduction (Cohen 2007). This hypothesis suggests that natural selection favours a prolonged post-reproductive lifespan if it allows individuals to enhance their fitness by aiding their offspring in successful reproduction. This research evaluates the utility of the Grandmother Hypothesis for understanding PRLS in *Homo sapiens* using historical (1790-1918) parish data from Nova Scotia. Using this data, I will identify whether fecundity and infant mortality rates follow the trends outlined by the Grandmother Hypothesis. Specifically, I will analyze whether there are shorter birth intervals in the mothers where their mother lives in close geographic proximity and if the child survives to reproductive age when their maternal grandmother is present. Although the results did not achieve statistical significance, the trends apparent in the data do follow the proposed trends of the Grandmother Hypothesis.

Table of Contents

Introduction

Why are humans among the few species in which females have an extended post-reproductive lifespan? This question was first posed in 1957 by evolutionary biologist and original theorist of the Grandmother Hypothesis, G.C. Williams, based on the widely accepted belief that menopause was uniquely human (Williams 1957; Kim et al. 2018). While only one of five known mammalian species to experience menopause, the only other terrestrial population being a specific demographic of Chimpanzees (Dalton et al.; Wood et al. 2023), the actual evolutionary reasons for *Homo*'s post-reproductive lifespan are still unknown. The permanent discontinuation of ovulation characterizes menopause and occurs in human females well before the end of their anticipated life span (Thouzeau & Raymond 2017). Menopause is directly unfavourable by natural selection, and the emergence of the post-reproductive lifespan in human history poses an ongoing evolutionary puzzle. Why are humans unable to reproduce later in life? Nearly every other mammal shares the capability to reproduce until death (Wood 2023; Dalton et al.; Hawkes et al. 2018), but humans are exempt from this trait, leaving the assumption that there are some evolutionary advantages from experiencing menopause.

The Grandmother Hypothesis asserts that grandmothers' benefits of caring for and aiding children and grandchildren counterbalance the price of lost reproduction (Cohen 2007). This hypothesis suggests that natural selection favours a prolonged post-reproductive lifespan if it allows individuals to enhance their fitness by aiding their offspring in successful reproduction. This hypothesis implies that menopause evolved, at least in part, due to age-specific increases in opportunities for intergenerational cooperation and reproductive competition under conditions of ecological scarcity (Lahdenperä 2012).

This research evaluates the utility of the Grandmother Hypothesis for understanding the Post Reproductive Life Span (PRLS) in *Homo sapiens* using historical data (~1750-1860) from Nova Scotia. Using historical data will allow for analyzing a population on the cusp of industrialization, specifically before major monumental leaps in medicine, technology, and agriculture. The specific objectives of this research include assessing the population for the trends alleged to be the benefits of the Grandmother Hypothesis and utilizing geographic distance. The trends that are expected to be reflected in the data include: 1) Assessing the overall number of offspring that survived increases as distance from the Grandmother decreases, 2) examining if the age of first reproduction occurs at a later age of life than those who live at a greater distance from the Grandmother, 3) examining if the age of the last reproduction also occurs at a later age of life, and that the age of final reproduction decreases over distance. These three assessments were additionally examined by comparing the means of two groups, those with grandmothers present and those without grandmothers present, to see the effect distance had on the two groups.

The results of this research will provide important information to not only evaluate the Grandmother Hypothesis but to also understand the unique life history pattern of human females. Similar to what has been observed in modern hunter-gatherer societies, grandmothers in historical agricultural communities also acted to purvey resources to their grandchildren, thereby contributing to the continuation of their genes without reproducing themselves. The data gathered and analyzed provides a unique understanding of the evolutionary contribution of grandmothers and their prospective benefits for offspring in historical Nova Scotia. Grandmothers are a crucial and influential aspect in the fitness of their offspring that should not be disregarded when considering the evolutionary role of women in human life history.

1. Menopause and PRLS

While this extended post-reproductive life span is assumed to be a recent phenomenon, there is evidence of earlier hominins living past fertility and into menopause (Chan et al. 2016). The primary reason life expectancy in *Homo sapiens* has been extremely low over the past few hundred years is due to high death rates in children, not earlier deaths due to aging. Over the past two centuries, there has been a significant increase in human life expectancy at birth in Western societies. For instance, the record female life expectancy rose from 45 years in 1840 to 85 years in 2015 (Oeppen & Vaupel 2002). By around 1950, even the oldest old (aged 85 or older) began to exhibit a trend of extended life expectancy, and they are currently the fastest-growing segment of older populations (Oeppen & Vaupel 2002). This trend indicates that populations today live longer than in the past and experience lower mortality rates during their younger and middle years (Watcher & Finch 1997; Van der Berg et al. 2017). The age of senescence, known as deterioration with age, has not changed for humans in recent evolutionary history (Watkins et al. 2021). Generally, evolutionary biologists have considered two main types of explanations of menopause: adaptive hypotheses, stating that menopause itself has been positively selected for, and non-adaptive hypotheses, assuming that menopause is an epiphenomenon that has not been directly selected for (Huber & Fielder 2022).

The non-adaptive hypotheses suggest that menopause is either a by-product of increased life expectancy or a result of evolution favouring efficient reproduction early in life at the cost of reproductive ability later. These hypotheses assume that evolution is limited by genetics, development, and phylogeny (the evolutionary history and relationships among species or groups of organisms). For example, antagonistic pleiotropy is a genetic phenomenon in which a gene provides benefits early in life but becomes harmful later. This early benefit may result in increased fertility. Another factor limiting longevity could be physiological, preventing an extension of the fertility period. According to some researchers, a critical physiological constraint in female mammals is the depletion of viable egg supply, leading to reproductive senescence. However, others consider this view oversimplified, arguing that other factors may also contribute to reproductive senescence in mammals.

Dalton et al. (2022) suggests three primary factors a mammalian species must fulfill for a female to experience menopause. First, the species must be relatively long-lived; the average female lifespan must be forty years or more. Second, the animal must reside in a social group, which is true not only for modern humans but also for many living primates and our hominin ancestors. These authors argue that menopause is a phenomenon that conveys indirect fitness benefits, as post-menopausal females assist their daughters and grandchildren, thereby contributing to the continuation of their genes without reproducing (Dalton et al. 2022).

Coinciding with the second factor proposed by Dalton et al., (2022), the Grandmother Hypothesis links increased post-menopausal longevity in our lineage with the role of grandmothers as resource providers for their weaned juvenile grandchildren who could not acquire food for themselves (Chan et al. 2006). Critical to this argument is the observation that the extended childhood and adolescence phases that characterize human life history require many calories to be provisioned. The average human child requires nearly fourteen million calories from others before becoming nutritionally self-sufficient. In comparison, the other great apes are nearly self-sufficient when they are weaned (Watkins et al. 2021). As grandmothers with slightly longer lifespans were able to provide more support, they likely left behind more descendants, which contributed to increased longevity in subsequent generations. This productivity of older females, who could support their still-dependent grandchildren, enabled mothers in their childbearing years to care for multiple dependents simultaneously rather than one at a time (Blurton et al. 1978; Robson et al. 2006).

Dalton's third and most significant qualifying factor is that the average female lifespan of a menopausal species must be at least 30% greater than that of a male of the same species. These authors suggest menopause has been a part of our lineage as far back as *Homo ergaster* (~1.7 million years ago). At this time, hominins transitioned to living in larger family-based groups where cooperative resource acquisition became critical (Dalton et al. 2022). Following this trend through time, our genus *Homo* experienced monumental changes, including bigger brains, increased lifespans for both sexes, greater cooperation, and, coincidentally fitting with the menopause criteria, the development of a more significant difference in the lifespan of males and females (Dalton et al. 2022). When females began living past thirty, two things are thought to have happened: 1) there were fewer males above thirty for those females to mate with (due to the males engaging in mortality-enhancing activities), and 2) not only did the fertility rate decrease with age but the risks associated with pregnancy also increased at a significant rate. Based on these two factors, it is argued that the reproductive cessation mechanism slowly arose among older hominin females and, over time, spread throughout our ancestors into what is now known as menopause (Dalton et al. 2022).

Research on modern human hunter-gatherers has shown that women stop reproducing by their early forties despite the potential to live into their seventies (Cohen 2003). The assistance of older women with still-dependent children is argued to allow their daughters to have additional offspring while still supporting and caring for the previous child. While the Grandmother

Hypothesis is a leading contender for explaining menopause and the PRLS observed in our species, there are still numerous questions surrounding the validity of this theory.

2. Previous Research on PRLS

When G.C. Williams first began theorizing about the post-reproductive lifespan in 1957, humans were believed to be the only mammals to experience menopause. This belief is based on observing a PRLS in humans rather than other mammals. While it has been shown that other mammals experience menopause (Cohen 2007), there are still questions to be answered, such as why did human life span evolve beyond the age of female maturity? *Homo sapiens,* as of October 2023, were the only terrestrial mammal known to experience menopause; the only other known mammals to undergo the menopausal phase include short-finned pilot whales, orcas, belugas, and narwhals (Dalton et al. 2021). In one pod of short-finned pilot whales, 245 females were examined, with a total of 24% proving to be post-reproductive; while their PRLS is not nearing that of *Homo sapiens*, these whales have been recorded to live an average of fourteen years past their last birth (Kasuya & Marsh 1984; Cohen 2007). As of late October 2023, an article was published by Wood et al. (2023) in which the authors provided demographic and hormonal evidence for menopause in wild chimpanzees. Wood et al. (2023) report that in various chimpanzee populations and humans, fertility declined after age 30, and no births were observed after age 50. This finding could be relative to this specific chimpanzee population, as it is not unusual for the Ngogo chimpanzee population to live past 50 despite reaching adulthood around fourteen years of age. The results of this study showed that a Ngogo female chimpanzee is post-reproductive for approximately one-fifth of her adult life, which is about half of human hunter-gatherers who would be infertile for around one-third of their lives (Wood et al. 2023; Thouzeau & Raymond 2017).

Interestingly, Wood et al. also note that the Grandmother Hypothesis is an unlikely explanation for the post-reproductive lifespan in chimpanzees due to adult females generally living apart from their daughters, as daughters will leave their natal groups in adulthood. In sum, although the evolutionary origins of menopause and a prolonged post-reproductive phase are not fully understood, the findings of this study demonstrate that these characteristics can manifest in a chimpanzee population with minimal human influence. The extended post-reproductive lifespan seen in modern humans may not represent an entirely novel development in our hominin ancestors instead, it could have developed based on pre-existing genetic diversity present in the common ancestors shared with chimpanzees (Wood et al. 2023).

Not only does menopause directly counteract Darwin's postulates, but it also begs a similar question: why is there early discontinuation of reproduction in *Homo sapiens*? While humans are remarkably long-lived, other mammals with long lifespans have female fertility extended beyond those reached in our lineage (Kim et al. 2019). Elephants have been recorded giving birth into their sixties, and there are cases of fin whales being discovered pregnant into their eighties. As noted by Hawkes (2003), this more significant variation between species can suggest that it is not mammalian physiology that constrains female fertility to end at approximately 45; instead, it suggests an evolutionary trade-off (Hawkes 2003).

One potential benefit of menopause is the ability to aid in the survival of grandchildren to reproductive age. Engelhardt et al. (2019) tested theories around the Grandmother Hypothesis using historical data from 17th and 18th-century French settlers in the St. Lawrence Valley. These authors hypothesized that the geographic distance between grandmothers and their offspring may be related to their ability to help and improve their descendants' fitness. The results showed that grandmothers who were present enabled their daughters to increase the number of offspring produced by 2.1 and increase offspring survival by 1.1 years. As geographic distance increased, the number of offspring produced, and lifetime reproductive success diminished. This study suggests geographic proximity impacts inclusive fitness, which supports the Grandmother Hypothesis and contributes to understanding the evolution of the PRLS.

A second study crucial to the methods proposed here is that of Chapman et al. (2019), who used an extensively detailed dataset of preindustrial humans from Finland to investigate the influence of a grandmother's age on the fitness benefits conveyed to their children and grandchildren. While the study acknowledges the fitness benefits of helping raise grandchildren, the researchers wondered if grand mothering benefits decrease with the advancement of a grandmother's age. Effectively, these authors asked whether female lifespans are selected to extend past fertility until they become an additional burden to their families. Chapman et al. found that opportunities and abilities to help with grandchildren declined with age, while the fitness advantages for grandchildren increased with younger grandmothers (50-75). These results support that grand mothering can only be selected for post-reproductive longevity until a certain point.

The findings of Chapman et al. agree with the Active Grandparent Hypothesis (Liberman et al. 2021), which asserts that human (female and male) lifespans are both a cause and effect of habitual physical activity (PA), explaining why both grandparents with lifelong physical activity, can decrease the risk of disease and encourage a longer lifespan. Lieberman et al. argue that PA promotes health by distributing energy away from investments in fat stores and reproductive tissues and placing that energy towards repair and maintenance processes. The Active Grandparent Hypothesis asserts that *Homo sapiens* were selected not only for an extended PRLS but also to be physically active throughout those post-reproductive years. Selection for lifelong physical activity, including post-reproductive years, also promotes selection for both energy allocation pathways to interactively slow deterioration and reduce susceptibility to numerous forms of chronic disease (Liberman et al. 2021).

3. Methods

3.1 Data Collection

The data set for this research was accessed through cbgen.org, a website run by the Cape Breton Genealogy and Historical Association, a Nova Scotia-registered not-for-profit society in Sydney, Cape Breton. The database contains more than 330,000 pages of material transcribed from original documents, proclaiming to have the most extensive collection of Cape Breton genealogy information available anywhere. The records in the database include cemeteries, land maps, military, parish, schools, civil, census, and family records, as well as additional information. For the analysis, it was crucial to have records containing both mother and daughter information, so an investigation into the family records was conducted. Records that met the specific requirements to be considered in the data collection were input into an Excel spreadsheet (See Appendix A). For a family record to be selected, it must first have a grandmother born between 1700-1850, as anything past this time is converging on the brink of modern times, meaning they would have access to medical advancements. The records also had to contain the number of offspring the chosen grandmother had, how many survived, her location of death and age of first and last reproduction.

Additionally, the records had to contain the number of offspring the daughters had, their age of first and last reproduction, how many offspring survived, and if the location of her death was present. Finally, the area of birth and death had to be connected to Nova Scotia, particularly within Cape Breton or Lunenburg, where most families appeared to be. If records had missing information, for example, if occasionally daughters did not reproduce, they were still included; also, if the age of death for the grandmothers was missing, the family was still included in the spreadsheet.

The spreadsheet (See Appendix A) consisted of fifteen columns, with 343 data entries, equaling 63 grandmothers and 279 daughters. The columns were organized in a fashion that would contain all the critical information and were labelled as follows: Number of women, first and last name, total number of offspring, offspring survived to the age of 15, offspring dead before 15, number of daughters, total number of grandkids born, grandkids survived to 15, location born, location died, daughter of, age of death and status. Each column was necessary for organizing and providing easy filtering options once the analysis began. When labelling status, it is labelling who is a grandmother (GMA) or daughter (D), which was beneficial to the organization and collection of the data. The location of death for both mother and daughter were required as this would give insight into whether the daughters remained within a reasonable geographic distance of their mother. 'Daughter of' was a column added to the spreadsheet to keep the families intact and separated within the dataset.

Further, the age of 15 was selected as the presumed age of reproductive maturity, in accordance with Engelhardt et al., (2019), who also selected the age of 15 as the cut-off for adolescence. This criterion dictated that only offspring up to the age of 15 would qualify for inclusion in the 'offspring deceased' column. Once a child reached 15, signifying reproductive maturity, they would be added to the spreadsheet. Only children who passed away before reaching 15 were recorded as child fatalities.

3.2 Data analysis

The overall sample (see Appendix A), including grandmothers and daughters, was 343, with the total sample size of grandmothers being 72 and daughters being 271 (see Appendix A). The mean age of the grandmother's death was 75 (Min= 30, max= 99); the mean age of the daughter's death was not calculated as most of the daughters did not have a recorded age of death. However, the minimum age of daughter death was 5, with the maximum age of death being 99. For all 343 women, only 20 women did not have any known offspring. Using only the women who had offspring (N= 323), the average number of offspring per woman (Mean= 5), as well as the mean age of first (mean= 25, Min= 15, Max = 45) and last reproduction (Mean= 38.60, Min= 17, Max= 50) was calculated.

Linear regression was used to evaluate the relationship between distance and offspring survival and to test the assumption that the number of offspring survival would decrease as the distance between daughters and their mothers (the grandmothers) increases. Additionally, linear regression was used to evaluate the relationship between distance and age of first and last reproduction, to assess whether the prediction of the age of first reproduction is at a later age when closer to their mothers and later age of final reproduction, thereby elongating their reproductive window. The distance between grandmothers and daughters was first calculated by retrieving the latitude and longitude between each daughter and grandmother's location of death (Table 2) and then converting the results to a distance measured in kilometres. Additionally, the distance data was log-transformed to improve the fit of the linear model.

To investigate the relationship between the average age of offspring survived with and without a grandmother present; and additionally, the relationships between the average age of first and last reproduction with and without a grandmother present, a normality test was performed to assess the data distribution. Shapiro-Wilk normality test was conducted on both groups, with grandmother's present (W= 0.966, p =0.002) and without grandmother's present (W= 0.907, p= 0.003) to ensure they met the assumptions of the subsequent statistical tests; in this specific case, they were to determine that parametric tests ultimately could not be used.

Subsequently, a non-parametric Mann-Whitney test was employed to compare the average age of offspring who survived between groups with and without a grandmother present. The Mann-Whitney test is a non-parametric test used to compare the distributions of the two independent groups (with or without a grandmother present). To select which daughters were placed in which group, the maximum distance between grandmother and daughter was chosen at 15 kilometres, who were then labelled "with." Fifteen kilometres was selected as the maximum distance for the group with the assumed grandmother present due to considering the historical and environmental factors. Most of the data originates in Cape Breton; given the time the data contains (~1750-1860), the primary mode of transportation is assumed to have been via horse and buggy or on foot. To be considered regularly present in their offspring's lives, visiting daily or multiple times per week can be assumed, and greater distances (< 15km) would have made regular visits more challenging. Prior studies have examined the influence of a grandmother's proximity, defined as residing in the same village, on various outcomes. These studies specifically investigated the effects of grandmothers; their findings revealed that when maternal grandmothers lived locally, there were notable impacts on their offspring's reproductive success. The effects included producing more offspring, reproducing at a younger age, a higher likelihood of having more grandchildren, and improved survival rates for grandchildren compared to cases where grandmothers were non-local or deceased (Engelhardt et al. 2019; Lahdenperg & Lummaa 2004; Voland & Beise 2002). Additionally, due to the harsh winters experienced in Cape Breton, greater distances travelled during the winter months would have been especially difficult, if not treacherous, depending on the locations.

Following the Mann-Whitney test, standard error (SE) and standard deviation (SD) were then calculated to assess the variability and precision of the average age of offspring that survived within each group and were also calculated for the average age of first and last reproduction within the two groups. Standard error measures how spread out the sample means are around the true mean, while standard deviation measures the dispersion of data points around the mean. All analyses were conducted in R 4.3.0 with significance set at $\alpha = 0.05$.

4. Results

Distance and Total Number of Offspring Survived

Although not statistically significant, the results align with the trends proposed by the Grandmother Hypothesis. The distance between the grandmother and the number of offspring that survived until reproductive maturity, showed a slight tendency to decrease over distance (R2 = 0.001, p = 0.63). These findings, while not reaching statistical significance, display a pattern consistent with the principles of the Grandmother Hypothesis.

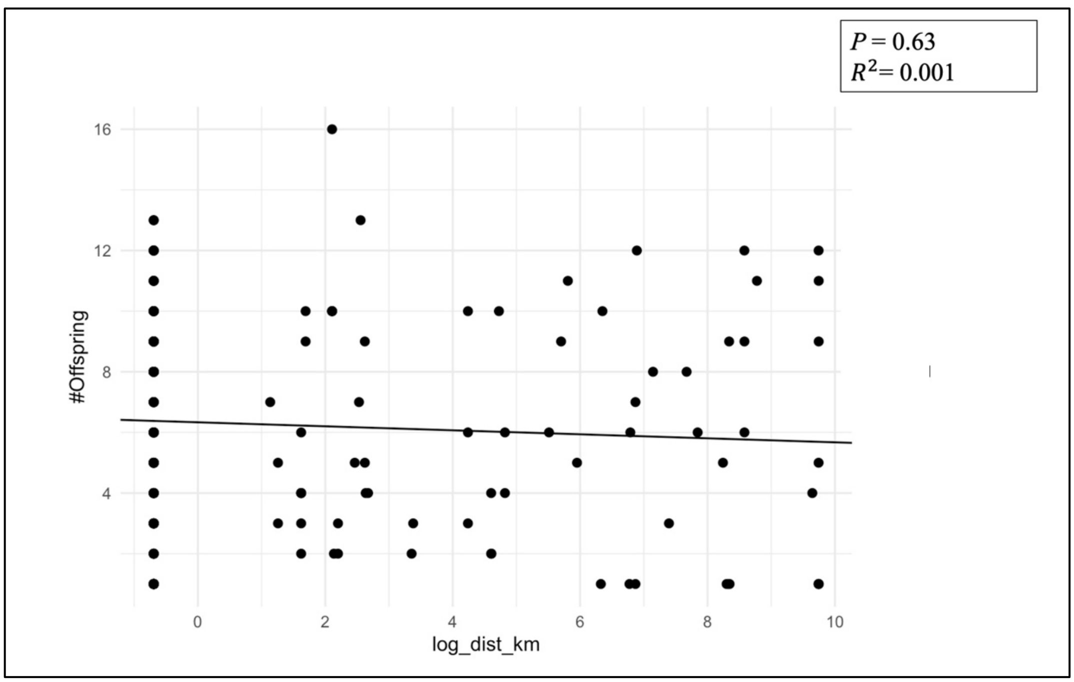

Figure 1. Number of Offspring and Distance

Distance and Age of 1st Reproduction

While the results did not achieve statistical significance, they are consistent with the Grandmother Hypothesis. The relationship between the distance from grandmother to daughter and the daughter's age of first reproduction showed a slight tendency to increase over distance.

However, this was not statistically significant (R2 = 0.002, p = 0.59). The observed increase was minimal. The data indicates that individuals further away from their mothers tended to have their first reproduction at or before the age of 25.

In contrast, those closer to their mothers, but not exceptionally so, displayed a wider range of reproductive ages, with the most common age range for first reproduction being between 25 and 30 years. Contrary to the prediction, there is no strong correlation, but the results align with the proposed trends of the Grandmother Hypothesis despite lacking statistical significance (Fig. 2).

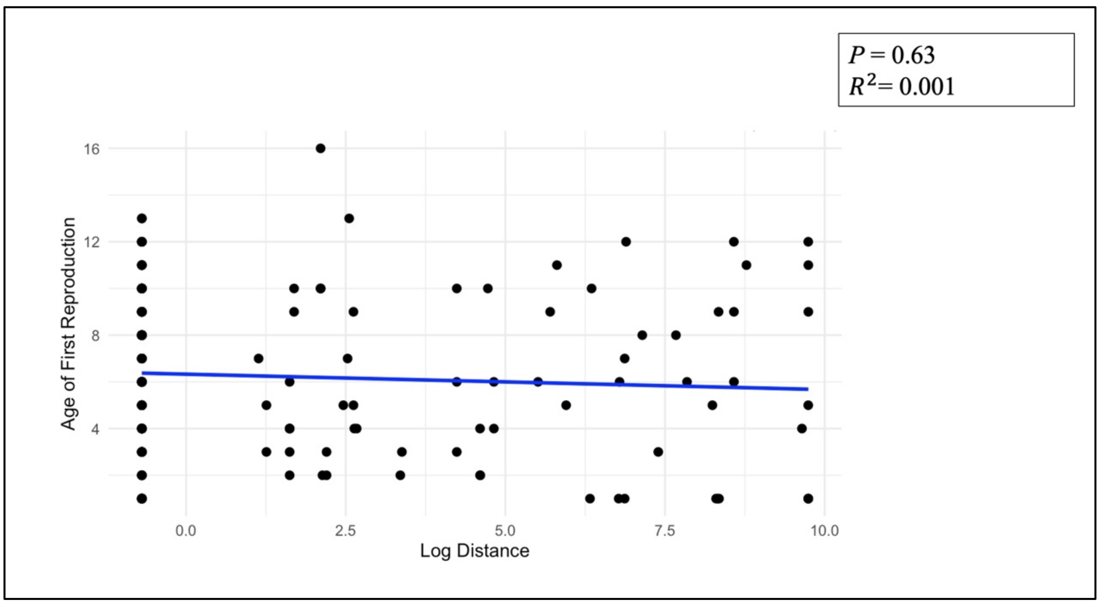

Figure 2. Age of First Reproduction and Distance

Distance and Age of Last Reproduction

Like the relationship observed in the plot of distance and total offspring survival (Figure 2), a subtle trend emerges suggesting that the age of last reproduction may slightly decrease as the distance from maternal grandmothers increases (Fig. 3). Although this trend is not statistically significant, (R2= 0.014, p = 0.13), the overall pattern supports the principles of the Grandmother Hypothesis. Additionally, daughters residing within 0.5 kilometres of their mothers exhibit wide variability in the age at which they have their last reproduction, ranging from 16 to 48 years (Fig. 3), further highlighting the complexity of the relationship between distance from grandmothers and reproductive patterns.

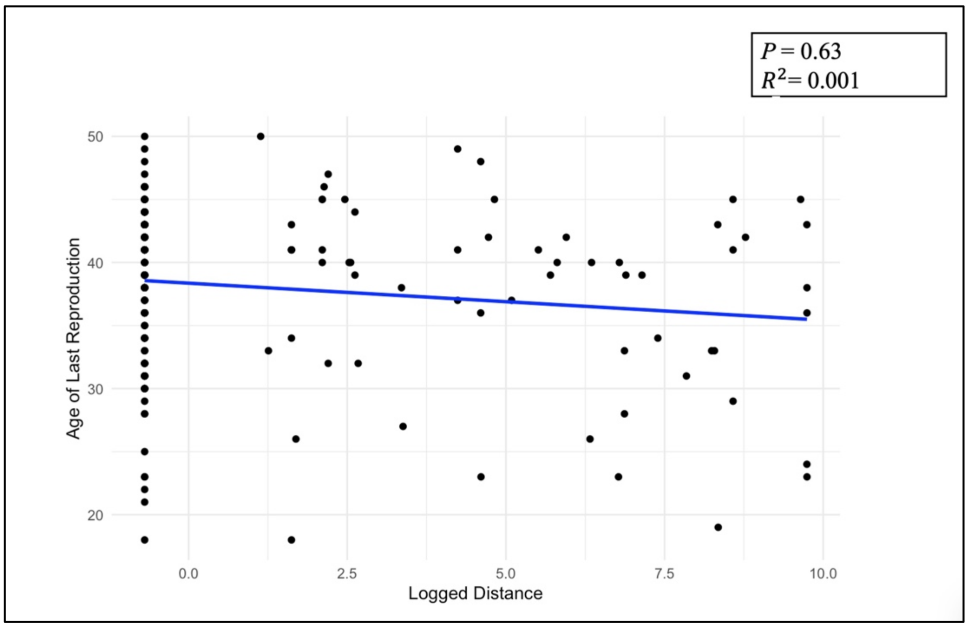

Figure 3. Age of Last Reproduction and Distance

Influence of Grandmother on Mean Number of Offspring

There was a variation between the two groups with and without a grandmother present, and the mean number of offspring survived (Fig. 4). Despite not being statistically significant, the difference in the distribution of ages of offspring survived between the two groups was not negligible (W = 2951.5, p = 0.30). The mean number of offspring between the two groups was slightly different, with a mean of 6.43 for those with grandmothers present and 5.75 for those without. The sample size was 171, with 132 in the group with grandmothers and 39 without. The standard error was 0.30 for the group with grandmothers present and 0.58 for those without. Additionally, the standard deviation was 3.36 for the group with grandmothers present and 3.74 for the group without (Fig. 4). Contrary to the prediction that there would be a statistically significant difference between the two groups and that daughters closer to home would have a higher number of offspring survived; these results do still align with the proposed trends of the grandmother hypothesis. However, there is no drastic effect.

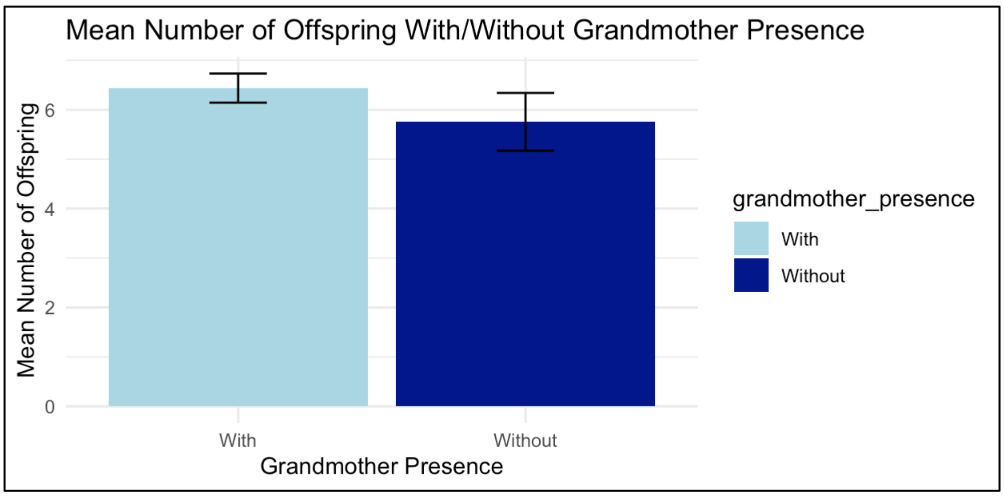

Figure 4. Mean Number of Offspring Survived With/Without Grandmother Present

Mean Age of First Reproduction With/Without Grandmother Present

There was minimal difference in the mean age of first reproduction between the two groups, with and without a grandmother present (Fig. 5); however, it was not statistically significant, and the results aligned with the trends of the Grandmother Hypothesis. Similarly, there was no statistically significant difference between the distribution of first reproduction age between the two groups (W = 2120, p = 0.97). The mean age of first reproduction between the two groups was slightly different, with a mean of 24.90 for those with grandmothers present and 25.60 for those without. The sample size was 171, with 132 in the group with grandmothers and

39 without. The standard error was 0.46 for the group with grandmothers present and 1.06 for those without. Additionally, the standard deviation was 5.28 for the group with grandmothers present and 6.77 for the group without (Fig. 5). The results were not by the prediction that there would be a statistically significant difference between the two groups. However, despite not achieving statistical significance, it does support that daughters closer to their mothers would have a first reproduction earlier in life than daughters further than 15km from their mothers, coinciding with the Grandmother Hypothesis.

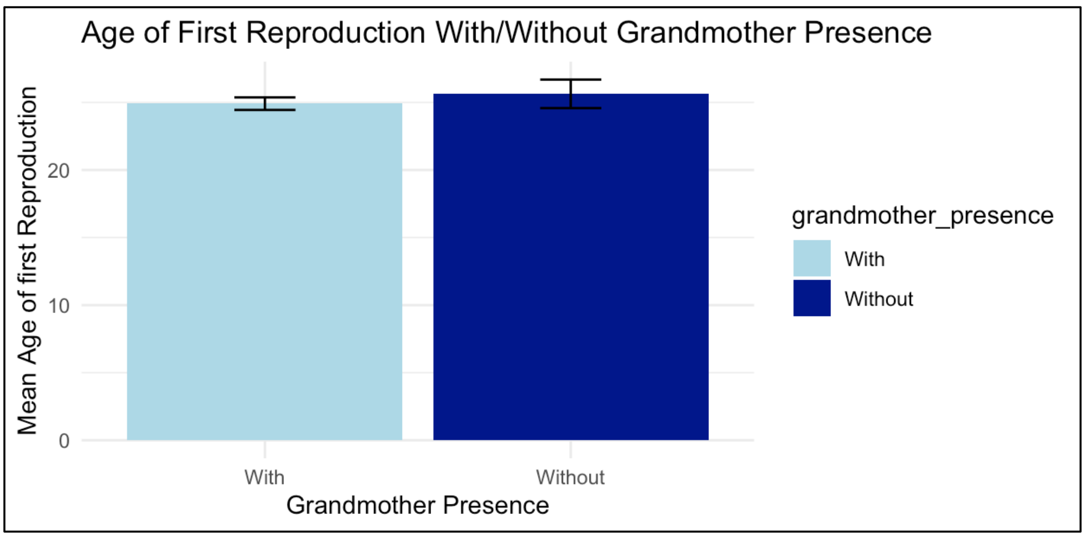

Figure 5: Mean Age of First Reproduction With/Without Grandmother Present

Mean Age of Last Reproduction With/Without Grandmother Present

Once again, there was no statistically significant difference in the mean age of last reproduction between the two groups, with and without a grandmother present (Fig. 6). Similarly, there was variance in the distribution of ages of last reproduction between the two groups (W = 2951.5, p = 0.29). The mean number of offspring between the two groups was slightly different, with a mean of 38.4 for those with grandmothers present and 35.80 for those without. The sample size was 153, with 114 in the group with grandmothers and 39 without. The standard error was 0.63 for the group with grandmothers present and 1.29 for those without. Additionally, the standard deviation was 6.65 for the group with grandmothers present and 7.94 for the group without (Fig. 6). While the results do not have statistical significance, the trend in the data does follow the proposed trends of the Grandmother Hypothesis.

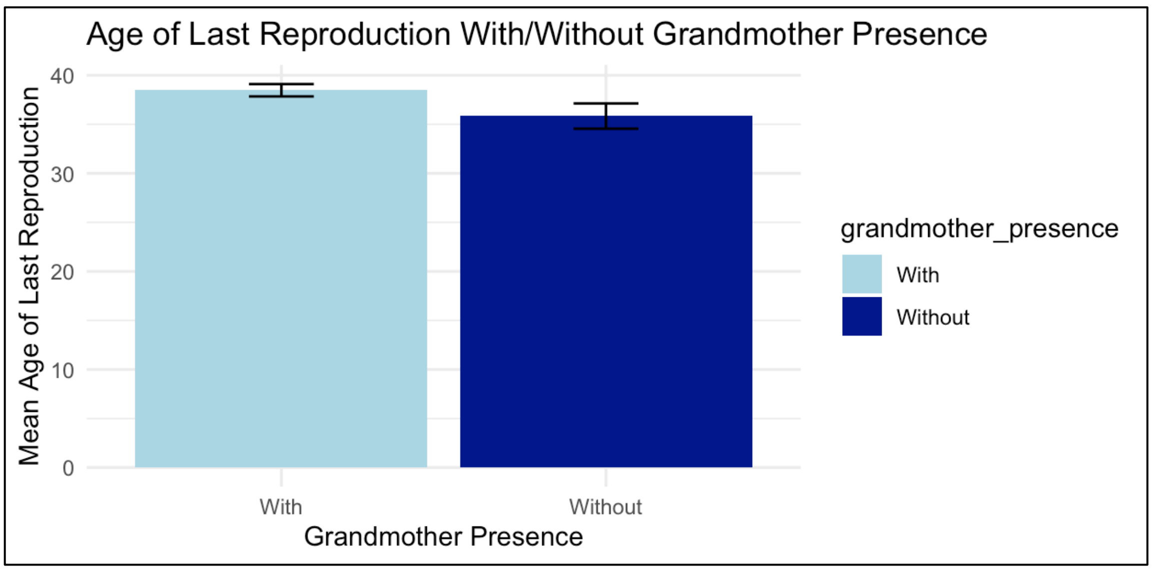

Figure 6: Mean Age of Last Reproduction With/Without Grandmother Present

6. Discussion

The Grandmother Hypothesis asserts that grandmothers' benefits of caring for and aiding children and grandchildren counterbalance the price of lost reproduction (Cohen 2007). Following Darwin's postulates, any decrease in reproduction is counteractive to fitness, meaning menopause essentially has no benefits to survival (Croft et al. 2015). If menopause is an evolutionary adaptation instead of an evolutionary byproduct, it would be assumed that the fitness advantage selected would offset the disadvantage of early reproductive termination (Thouzeau & Raymond 2017) Why are humans among the few species in which females have an extended post-reproductive lifespan? This question was first posed in 1957 by evolutionary biologist and original theorist of the Grandmother Hypothesis, G.C. Williams, based on the widely accepted belief that menopause was uniquely human (Williams. 1957; Kim et al. 2018). Menopause occurs in human females well before the end of their anticipated life span and is classified as the permanent discontinuation of ovulation (Thouzeau & Raymond 2017). However, most human females remain infertile for approximately a third of their lives, necessitating an examination of the evolutionary factors influencing selection for an extended post-reproductive life span (PRLS).

6.1 Impacts of Distance

While the analysis did not yield statistical significance, all variables investigated represented the Grandmother Hypothesis trends. When considering the analysis examining the impacts of distance on the entire data set of daughters, as the distance from the grandmothers increased or decreased, there was an effect on the survival rates or age of first and last reproduction. When examining the number of offspring that survived over distance (Fig. 1), there is not as stark of a difference as initially expected. However, a pattern is present in the data, the daughters closest to their mothers displayed significant variability in the total number of offspring that survived, ranging from 1 to 13, rather than demonstrating a consistent trend towards a higher number of offspring, as the hypothesis would propose. (Fig. 1). Engelhardt et al., (2019) noted that the presence of grandmothers improved the survival of grandchildren to the age of 15 compared to when the grandmothers were dead or, in the case of this research, not present. Unfortunately, the data did not include information on when the grandmothers had passed, leaving the analysis to be conducted on distance and grandmother presence, as opposed to living or dead. The lifespan of port-reproductive grandmothers was positively associated with the number of grandchildren born, with additional research claiming that grandmothers had an additional two grandchildren per additional decade of life on average (Engelhardt et al. 2019). The positive effect of grandmothers on the number of offspring born could also be due to the shortening of their daughter's inter-genetic birth intervals (Engelhardt et al. 2019; Sear & Coall 2011).

The comparison with Figure (1) detailing the total number of offspring that survived over distance reveals a notable range of ages at first reproduction for daughters living within 0.5 kilometres from their mothers, spanning from 16 to 44 years (Fig. 2). This considerable variability in age range may imply that daughters in extreme proximity to their mother's experience fewer fertility and time constraints. Their proximity may afford them a sense of security, knowing they have immediate support for childcare whenever they choose to reproduce. Furthermore, daughters living near their mothers who delay reproduction may do so due to caregiving responsibilities for their aging parents, which could delay their reproductive timeline. Additionally, the daughters themselves may have just made the personal choice to get married and reproduce earlier in life, or, potentially, they were already providing additional care to their sister's offspring and had no immediate need to reproduce themselves due to still enhancing their inclusive fitness by investing in the survival and success of their family.

This variability in the age of last reproduction over distance may be attributed to the potential that individuals closer to their mothers experience fewer fertility constraints. Proximity to maternal support may extend their fertility window, enabling later reproductions in life. Conversely, daughters who experience an earlier age of final reproduction may do so out of necessity, possibly due to the challenges of caring for numerous children alone at a young age. This limitation in their fertility window could result from the absence of extended maternal support, compelling them to conclude their reproductive activities earlier in life.

Interestingly, a study on Utah's historical population (Moorad & Walling 2017) found no evidence supporting the effects of genetic grandmothers on inclusive fitness. One possible explanation for this lack of evidence, proposed by Moorad and Walling (2017), suggests that the challenges and increased isolation resulting from migration may have reduced the positive impact of ancestral care. The results align with this proposed explanation, as there is a decrease in inclusive fitness benefits as the distance between grandmother-daughter pairs increases.

6.2 Grandmothering Effects

There were no statistically significant results when exploring the same variables related to reproduction (number of offspring survived, age of first and last reproduction) and specifically comparing the differences between groups with and without a grandmother present. However, the data exhibits trends consistent with the predictions of the Grandmother Hypothesis, particularly in the group where the grandmother was assumed to be present. The analysis of the mean number of offspring that survived with and without a grandmother present revealed an interesting pattern. On average, those who reproduced near their mothers had one more child than those at a greater distance. This finding supports the notion put forth by the Grandmother Hypothesis, suggesting that proximity to maternal support may have a positive impact on reproductive success.

Despite not meeting the threshold for statistical significance, the findings of mean age of first reproduction with or without a grandmother present hint at differences that could be significant in a larger sample size. While the results, interestingly, did not align with the specific prediction that daughters closer to their mothers would have a first reproduction later in life than daughters further away, they do suggest a complex interplay of factors that influence reproductive behaviour. Women who lived near their mothers may have had access to a more stable and supportive social network, which could have allowed them to reproduce earlier. Additional studies revealed that when maternal grandmothers are local, they enhance their offspring's fertility, lower the age at which offspring begin reproducing, increase the likelihood of additional grandchildren being born, and improve grandchildren's survival rates compared to grandmothers who are non-local or deceased (Lahdenpera et al. 2004; Voland & Beise 2002).

Examining the mean age of final reproduction with or without a grandmother's presence did align with the prediction that daughters closer to their mothers would have a later age of final reproduction, expanding their fertility window, and supporting a key principle of the Grandmother Hypothesis. Those in the ‘with’ grandmother present group had an average final age of reproduction of 38.5, while those without a grandmother present had an average final age of 36.8. While appearing to be quite slim, it is an average difference of two years between final reproduction within the two groups, displaying the largest variance between the two groups in any of the three variables. Despite the lack of statistical significance, these findings do contribute to the understanding between proximity and reproductive patterns, as the age does decrease as distance increases.

The negative effect on geographic distances on grandmother effects could also be associated with an increased distance from other members of the family, who could have provided help (Engelhardt et al. 2019). However, in the dataset used for this project, only major life-history events were available (baptism, marriage, death) and at times even those dates were missing from the records. This lack of dates prevents from knowing specifically the age of dispersal for all family members, especially when considering all children, since this data only contains information on mothers, who were known to become grandmothers and their daughter's records, no information involving sons was recorded in the dataset. It would be interesting to investigate the link between variation in dispersal patterns and some life-history strategies, as the influence of paternal grandmothers was not accounted for in this study.

While these differences were not statistically significant, the grandmother's presence influences reproductive outcomes, aligning with the Grandmother Hypothesis's overarching principles. Further research with larger sample sizes may provide additional insights into these trends. Together, the results suggest that geographic distance can be a proxy for the potential for help given by relatives.

6.3 Additional Considerations

These analyses did not consider the potential impact of genetic and environmental factors on fitness. For example, traits like longevity, known to have a genetic component in human populations, correlate with the age at which individuals last reproduce. This age directly affects the number of offspring produced (Engelhardt et al. 2019). Additionally, spatial autocorrelation in survival, stemming from shared environmental conditions among family members, may also contribute to indirect correlations in the number of offspring born. This coincides with an additional benefit of the Grandmother Hypothesis published in recent research, claiming that aiding in the survival of childrearing can benefit the mother's mental and physical health. Younger grandparents who are not employed, in good health, live close by and have stable relationships are more likely to support their adult children and grandchildren (Metsä-Simola et al. 2024). Recent demographic changes, including longer life expectancy, fewer children per family, shorter age gaps between siblings, and the trend of earlier childbearing, have led to a higher likelihood of young children having multiple living grandparents. Due to the younger age of reproduction throughout this time, the grandmothers were relatively young, unemployed and, for the most part, in reasonably good health; it is not outlandish to assume these findings are potential factors influencing the dataset used in this research as well (Metsä-Simola et al. 2024).

There is also the potential for Nova Scotians to experience a similar dilemma to the pre-industrial Finnish population used in a study by Chapman et al. (2019), where the dataset ranged from 1731 to 1895. The population experienced significant fluctuations in mortality and fertility rates, influenced by harsh climatic conditions, famines due to poor crop yields, farming techniques and disease outbreaks. Considering that most people in this dataset had recently immigrated to Nova Scotia from Europe, they might have experienced similar struggles upon their arrival. Struggles with fertility would explain why there were lower offspring survival rates in the analysis than expected (Fig 1), specifically when considering numerous daughters less than 15km from their mothers occasionally had only one to two children. However, similar to the data on Nova Scotians, adults had a life expectancy of over 60 years, and among women who survived to adulthood and had at least one child, more than half lived to age 50, entering a presumed post-reproductive stage themselves. Each of these women, most notably, had an average of 5.5 children, which is 0.3 higher than the mean number of offspring per woman in this research (5.2).

6.4 Effects of Sample Size

The sample sizes used for this research undeniably impacted the analysis conducted and the results seen; it was significantly smaller than that of other studies where the grandmother hypothesis was tested. In the study where the methods of this research are based (Engelhardt et al. 2019), the dataset included records from 149 parishes, from 1608-1799 and had a total of 3,382 grandmothers that had 34,660 offspring, from which 7,164 daughters married and produced 56,767 offspring, which is then referred to as the study's overall dataset. In an additional study by Chapman et al. 2019, the authors of this paper included individuals between 1731-1890, which is a similar date range to the Nova Scotia dataset, and this study mainly investigates grandchildren and grandmother survival. In total, Chapman et al. had 5815 children and 2037 grandmothers. The overall dataset for this research had 72 grandmothers and 271 daughters, which is quite a stark contrast compared to the broad assortment seen in the other studies.

A smaller sample size can have several impacts on the results of a study. Firstly, a smaller sample size reduces the sample's representativeness, making it less likely that the characteristics of the sample reflect those of the larger population. Additionally, a smaller sample size reduces the study's statistical power, making it less likely to detect actual effects if they exist. Overall, a smaller sample size can result in less reliable and less generalizable results, which could explain why there is evidence of the effects of Grandmothering, yet no significant correlation.

7.0 Conclusion

While none of the analyses proved statistically significant, the analysis yielded positive results in the data supporting the Grandmother Hypothesis. Although it cannot be definitively said that the Grandmother Hypothesis is the sole reason for the post-reproductive lifespan, there is sufficient evidence from previous literature, plus the additional trends observed in this research, that suggests that the Grandmother Hypothesis is a strong leading contender. While the statistical analysis resulted in weaker correlations than expected, the trends were still visible once analyzed with linear regression and a non-parametric Mann-Whitney test to examine the differences in means. The trends were visible and observed in the data despite not appearing as strong as the original prediction. It was seen that there was a decrease in several offspring that survived as the distance from the grandmother increased (Figure 1). Additionally, there was a pattern of the age of first and last reproduction (Figure 2, Figure 3), both later in life when closer to their mother than daughters who lived a greater distance away.

The means were compared to account for specific kilometre differences and investigate potential differences in those who were more unlikely to have a consistent presence of their grandmother than those who do. For this additional analysis, there was also a difference between all three variable means examined within the two groups, "with" grandmother present and "without." The difference between the means of the total number of offspring that survived with and without a grandmother was slight, equaling one child's difference, but it still leans in favour of those closer to their mother. The same is seen for the age of first and last reproduction with and without a grandmother; the mean age of first reproduction also had a difference of about one year. However, this is the only incident with no statistical significance and trend outlined.

However, previous studies suggest that earlier first reproduction is evidence for the Grandmother Hypothesis, contrasting the original assumption that those with a smaller distance would have a later age of reproduction. Finally, the age of the last reproduction with or without a grandmother present had the most notable difference, averaging about two years between the groups. Further, the group with a grandmother present did have a later age of last reproduction compared to those without a grandmother present, following the Grandmother Hypothesis. The reasoning for the later age of final reproduction, extending the reproductive window, can likely be attributed to stress and environmental factors; the less stress a mother experiences, the less stress will be placed upon her body.

Despite its lack of statistical significance, the research provides further insight into the Grandmother Hypothesis and its applicability to various populations. Should there have been a greater sample size, the significance of the statistical analysis might have revealed the strong correlation that was initially anticipated. However, this research investigates the leading hypothesis into the ongoing evolutionary mystery that is menopause and the actual reasoning behind *Homo* post-reproductive lifespan. However, the results of this research support the Grandmother Hypothesis remaining in its respected position. Regardless of why humans evolved to select for a PRLS, *Homo* are of the unique few species to experience a grandmother, let alone grandmothers who play a crucial and influential aspect in the fitness of their offspring, as well as an essential part of women in human life-history.

8. Resources

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Appendix A

Table A-1

Overall Statistics for the Total Dataset

Overall Statistics

Statistic	Value
Total Sample Size	343.00
Sample Size Grandmother	72.00
Sample Size Daughter	271.00
Minimum Age of Daughter Death	5.00
Maximum Age of Daughter Death	99.00
Minimum Age of Grandmother Death	30.00
Maximum Age of Grandmother Death	99.00
Average Age of Grandmother Death	75.18
Average Number of Offspring Per Woman	5.20
Average Age of First Reproduction	24.93
Average Age of Last Reproduction	38.60
Minimum Age of First Reproduction	15.00
Maximum Age of First Reproduction	45.00
Minimum Age of Last Reproduction	17.00
Maximum Age of Last Reproduction	50.00

Table A-2

Summary Statistics for Each Figure (1-6)

Summary Statistics

Variable	Total_Sample_Size	Sample_Size_With	Sample_Size_Without	Minimum	Maximum	Average	Average_With	Average_Without	P_Value	R2	W	SE_With	SE_Without	SD_With	SD_Without
Figure 1	177	NA	NA	1	16	6.30	NA	NA	0.63	0.001	NA	NA	NA	NA	NA
Figure 2	171	NA	NA	16	45	25.08	NA	NA	0.59	0.002	NA	NA	NA	NA	NA
Figure 3	168	NA	NA	18	50	36.62	NA	NA	0.13	0.014	NA	NA	NA	NA	NA
Figure 4	171	132	39	NA	NA	NA	6.43	5.75	0.30	NA	2951.5	0.30	0.58	3.36	3.74
Figure 5	171	132	39	NA	NA	NA	24.90	25.60	0.97	NA	2120.0	0.46	1.06	5.28	6.77
Figure 6	153	114	39	NA	NA	NA	38.40	35.80	0.29	NA	2951.5	0.63	1.29	6.65	7.94

Table A-3

Location of Grandmothers Born and Location of Grandmothers Died

Grandmothers Born and Died

Grandmother.Born	Grandmother.Died
St. Margarets Bay	Lingan
Edinburgh	Barney's River
Sydney	Low Point
Judique	Little Judique Ponds
Port Caledonia	Glace bay
Glace Bay	Port Caledonia
Sydney Cb	Glace Bay
Dublin	Hancock
Lingan	Mahone bay
Hamburg	Lunenburg
Lunenburg	Guysborough
Boston	Mayhone Bay
Lununburg	Louisbourg
Louisbourg	River Inhabitants
Halifax	Coxheath
Coxheath	Sydney Mines
Charlottetown	Port Morien
Little Bras d'or	Sydney
Port Morien	Mabou
Mabou	Groves Point
n/a	bras d'or
Sydney Mines	Toronto
Margaree	Sheet Harbour
Ireland	Broad Cove
Scotland	Margaree
Little Tracadie	Inverness
trinity Bay	Conception Bay
Conception Bay	Main A Dieu
Main A Dieu	Guysborugh
Guysborough	Hants County
Paris	Arichat
St. Ann's	St. Ann's
Parrsboro	North Shore

Table A-4

Full Data Information Used for this Research

Note. This table is a copy of the original spreadsheet used to conduct all analyses, including all 343 entries, and the corresponding information in the 15 columns.

woman	W_FNLN	offspring	offspringLive	Offspringdead	daughters	age1rep	agelastrep	grandkids	grandkidslive	locBorn	locDied	daughterOF	AOD	status
1	Hanna Elizabeth Boutiller	16	16	0	4	20	44	50	50	St. Margarets Bay	Lingan CB	n/a	84	gma
2	Mary Catherine Boutiller (howie)	12	12	0	4	16	44	n/a	n/a	St, Margaret' Bay		Hanna Elizabeth Boutiller	57	d
3	Hanna Lucy Boutillier (Howie)	10	10	0	7	27	45	n/a	n/a	Coxheath	Glace Bay	Hanna Elizabeth Boutiller	80	d
4	Susan Elizaveth Boutilier (Petrie)	16	16	0	8	20	45	n/a	n/a	Lingan	Glace Bay	Hanna Elizabeth Boutiller	97	d
5	Mary Ann Boutilier (Mitchell)	12	12	0	5	18	45	n/a	n/a	Lingan	Lingan CB	Hanna Elizabeth	u/k	d

												Boutiller		
6	Anne Cameron	11	10	2	4	23	43	9	9	Scotland	Barney' River	n/a	69	gma
7	Catherine Cameron	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Scotland		Anne McLean	n/a	d
8	Janet Cameron	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Scotland	Barney's River	Anne McLean	n/a	d
9	Mary Cameron (McLennan)	9	9	0	4	22	43	n/a	n/a	Scotland	Scotland	Anne McLean	85	d
10	Margaret McPhee	9	9	0	5	21	44		23	NS	Low Point	n/a	90	gma
11	mary mcphee	2	3	0	1	21	23	n/a	n/a	Grand Mira	Coxheath	Margaret McPhee	85	d
12	theresa mcphee	10	10	0	5	28	42	n/a	n/a	Grand Mira	New Victoria	Margaret McPhee	67	d
13	Margaret McPhee	4	4	0	2	32	n/a	n/a	n/a	Grand Mira	Glace bay	Margaret McPhee	66	d
14	catherine mcphee	6	6	0	5	19	45	n/a	n/a	Grand Mira	Glace Bay	Margaret Mc	77	d

												Phee		
15	sarah margaret mcphee	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Grand Mira	n/a	Margaret McPhee	n/a	d
16	Catherine MacNeil	9	9	0	4	20	44	n/a	n/a	Judique	Little Judique Ponds	n/a	88	gma
17	Catherine MacNeil	6	6	0	3	36	44	n/a	n/a	Llittle Judique Ponds	Little Judique Ponds	Catherine MacNeil	n/a	d
18	Christina MacNeil	1	1	0	1	20	n/a	n/a	n/a	Little Judique Ponds	n/a	Catherine MacNeil	n/a	d
19	Mary Catherine Howie	12	12	0	4	16	44	4	4	St, Margaret' Bay	Glace bay	Hanna Elizabeth Boutiller	57	gma
20	Susan Margaret Howie (Murrant)	40	4	4	1	36	45`	n/a	n/a	Scotland	Glace Bay	Mary Catherine Howie		d
21	Mary Anne Howie	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Scotland	Glace Bay	Mary Cat		d

												herine Howie		
22	Hannah Elizabeth Howie (Phalen)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Glace Bay	Mary Catherine Howie		d
23	Ellen Howie (Brown)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace bay	glace bay	Mary Catherine Howie		d
24	Annabella "Annie" Christie Boutilier	9	7	2	6 (5)	29	43	5	5	Port Caledonia	Port Caledonia	n/a	63	gma
25	Margaret Elle Boutilier (Liscombe)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Big Glace Bay	Big Glace Bay	Annabella "Annie" Christie Boutilier		d
26	Anna Belle boutilier (MacLeod)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Port caledonia	Port Caledonia	Annabella "Annie" Christie Boutilier	79	d

27	Mary Elizabeth Boutilier (McLeod)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Port caledonia	Port caledonia	Annabella "Annie" Christie Boutilier		d
28	Priscilla Florence Boutilier (Nutter)	2	2	0	0	17	18	n/a	n/a	Glace bay	Glace bay	Annabella "Annie" Christie Boutilier	57	d
29	Robina B. Boutilier (MacLeod)	3	3		0	29	34	n/a	n/a	Port Caledonia	Glace Bay	Annabella "Annie" Christie Boutilier	86	d
30	Margaret Boutilier 7	8	8	0	7	20	40	24	24	Port Caledonia	Port Caledonia	n/a	79	gma
31	Margaret Elizabeth Boutilier (McLeod)	6	6	0	2	29	44	n/a	n/a	Port Caledonia	Port Caledonia	Margaret Boutilier	50	d
32	Mary Ellen Boutilier	na	na	na	na	na	na	n/a	n/a	Port Caledonia	Port Caledonia	Margaret Bou		d

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33	Mary Ann Boutilier (Wadden)	4	4	0	2	23	41	n/a	n/a	Port Caledonia	Glace Bay	Margaret Boutilier		d
34	Sarah Lucy Boutlier	6	6	0	4	35	41	n/a	n/a	Port Caledonia	Glace bay	Margaret Boutilier		d
35	Susan Matilda Boutilier (Robertson)	4	4	0	2	23	41	n/a	n/a	Port Caledonia	Glace Bay	Margaret Boutilier		d
36	Rosina Henrietta Boutilier (Howie)	4	4	0	2	35	43	n/a	n/a	Port Caledonia	Glace Bay	Margaret Boutilier		d
37	Christina Ellen Jane Boutilier	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Port Caledonia	Glace Bay	Margaret Boutilier		d
38	Isabella Petrie	9	9	0	2	31	48	11	10	Glace Bay	Glace Bay	Susan Elizabeth Petrie	74	gma
39	Minnie Jane Boutilier(	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Glace Bay	Isabella Petrie		d

	Routledge)													
40	Margaret Elizabeth Boutilier (Whitney)	11	10	1	2	20	37	n/a	n/a	Glace Bay	Glace Bay	Isabella Petrie		d
41	Mary Susannah Brown	11	11	0	5	20	43	28	27	Sydney Cb	Hancock, Iowa, USA	n/a	81	gma
42	Florence Eliza Ellen Boutiller (Ward)	10	9	1	4	25	44	n/a	n/a	Glace Bay	Hancock, Iowa, USA	Mary Susannah Brown	87	d
43	Delia Sybella Boutilier (Manuel)	11	11	11	5	20	43	n/a	n/a	Glace Bay	Hancock, Iowa, USA	Mary Susannah Brown	90	d
44	Elizabeth Lucy Boutilier (Clements)	3	3	0	0	23	28	n/a	n/a	Glace Bay	Hancock, Iowa, USA	Mary Susannah Brown	32	d
45	Anne Matilda Boutilier (Geddes)	4	4	0	1	26	38	n/a	n/a	Glace Bay	Hancock, Iowa, USA	Mary Susannah Brown	73	d

46	Maria Susanna Boutilier	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Hancock, Iowa, USA	Mary Susannah Brown	31	d
47	Hester Boutilier	10	10	0	4	22	47	35	35	Ireland	Lingan CB	n/a	n/a	gma
48	Mary Ann Boutilier (Neville/Cummings/ockett)	7	7	0	2	22	50	n/a	n/a	Glace Bay	Dominion	Hester Boutilier	68	d
49	Sarah O Boutilier (O'Brien)	10	10	1849	2	22	40	n/a	n/a	Glace Bay	Glace Bay	Hester Boutilier	56	d
50	Helen Boutilier (Routledge)	10	10	0	3	23	41	n/a	n/a	Glace bay	Glace Bay	Hester Boutilier	n/a	d
51	Alice Boutilier (graham)	5	5	0	2	n/a	n/a	n/a	n/a	Glace Bay	n/a	Hester Boutilier	n/a	d
52	Hester Boutilier (Boutilier/Marsh/Mason)	3	3	0	0	24	33	n/a	n/a	Glace Bay	n/a	Hester Boutilier	n/a	d
53	susan elizabeth boutilier (Petrie)	16	16	0	8	20	45	35	35	Lingan	Glace Bay	Hanna Elizabeth Bou	97	gma

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54	Elizabeth Petrie ((Campbell)	12	12	0	5	20	43	n/a	n/a	Lingan	Glace Bay	susan elizabeth boutilier (Petrie)	62	d
55	Isabella Petrie (Boutilier)	9	9	0	2	31	48	n/a	n/a	Glace Bay	Glace Bay	Susan Elizabeth Petrie	74	d
56	mary Ann Petrie (Copp)	1	1	0	1	n/a	n/a	n/a	n/a	Glace Bay	n/a	susan elizabeth boutilier (Petrie)	n/a	d
57	Margaret Ann Petrie (Boutilier)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Glace Bay	susan elizabeth boutilier (Petrie)	n/a	d

58	Ellen Jane Petrie (McNeil)	8	8	0	3	22	43	n/a	n/a	Glace Bay	Glace Bay	susan elizabeth boutilier (Petrie)	n/a	d
59	Sarah Petrie	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Glace Bay	susan elizabeth boutilier (Petrie)	n/a	d
60	Ellen Petrie	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Glace Bay	susan elizabeth boutilier (Petrie)	n/a	d
61	Mary Belle Petrie (Phalen)	5	5	0	1	23	33	n/a	n/a	Glace bay	Glace Bay	susan elizabeth boutilier (Petrie)	66	d

62	Anna Regina Barbara Ernst	13	12	1	3	18	38			Germany	Mahone bay	n/a	65	gma
63	Anna Gertrude Ernst	7	7	0	4	24	43	n/a	n/a	Lunenburg	Mahone Bay	Anna Regina Barbara Ernst	76	d
64	Anna Magdalene Maria Ernst	5	5	0	2	30	42	n/a	n/a	Lunenburg	Lunenburg	Anna Regina Barbara Ernst	42	d
65	Anna Catherine Ernst	3	3	0	2	n/a	n/a	n/a	n/a	Lunenburg	Mahone bay	Anna Regina Barbara Ernst	63	d
66	Maria Magdalene Ernst	9	9	0	6	20	41	40	40	Lunenburg	Lunenburg	n/a	84	gma
67	Maria Magdalenea Ernst	12	9	3	2(1)	20	45	n/a	n/a	Lunenburg	Indian Point	Maria Magdalene Ernst	84	d

68	Regina Magdalena Ernst	2	2	0	1	27	45	n/a	n/a	Mahone Bay	Lunenburg	Maria Magdalene Ernst	95	d
69	Christina Margaret Ernst	6	6	0	5	22	41	n/a	n/a	Lunenburg	Mahone bay	Maria Magdalene Ernst	86	d
70	Catherine Margaretha Ernst	10	10	0	5	27	40	n/a	n/a	Lunenburg	Lunenburg	Maria Magdalene Ernst	78	d
71	Charlotte Ernst	9	9	0	5	30	43	n/a	n/a	Lunenburg	Lunenburg	Maria Magdalene Ernst	91	d
72	Maria Elizabeth Ernst	5	4	1	0	29	43	n/a	n/a	Lunenburg	Lunenburg	Maria Magdalene Ernst	80	d
73	Catherine Walsh	10	7	3	4	17	40	19	19	MA, USA	Guysborough	n/a	78	gma
74	Adeline Walsh	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Guysborough	n/a	Catherine Walsh	n/a	d

75	Catherine Walsh	10	9	1	4	27	49	n/a	n/a	Guysborough	Port Hood	Catherine Walsh	70	d
76	Gertrude Walsh	3	3	0	0	37	41	n/a	n/a	Guysborough	Port Hood	Catherine Walsh	86	d
77	Fannie Walsh	6	6	0	4	27	37	n/a	n/a	Guysborough	Port Hood	Catherine Walsh	66	d
78	Anna Maria Heison (Ernst)	9	9	0	3	28	50	10	9	Lunenburg	Mayhone Bay		61	gma
79	Anna Elizabeth Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	Lunenburg	Anna Maria Heison (Ernst)	20	d\
80	Regina Ernst	9	8	1	3(2)	22	29	n/a	n/a	Lunenburg	Lunenburg	Anna Maria Heison (Ernst)	73	d
81	Catherine Ernst	1	1	0	0	23	n/a	n/a	n/a	Lunenburg	Mahone Bay	Anna Maria Heison (Ernst)	33	d

82	Sarah Salome Conrad	9	9	0	4	19	43	3	3	Lunenburg	Lunenburg	n/a	63	gma
83	Sophia Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	Martin's River	Sarah Salome Conrad	74	d
84	Louisa Elizabet Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	Port Lorne, Annapolis	Sarah Salome Conrad	56	d
85	Sarah Catherine Ernst	3	3	0	1	22	34	n/a	n/a	Indian Point, NS	Lunenburg	Sarah Salome Conrad	75	d
86	Mary Ann Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	Lunenburg	Sarah Salome Conrad	40	d
87	Susanna Catherine Ernst	12	12	0	4	23	41	14	14	Lununburg	Lunenburg	n/a	88	gma
88	Catherina Ernst	8	8	0	0	24	41	n/a	n/a	Lunenburg	Lunenbirg	Susanna Catherine Ernst	86	d

89	Anna Elizabeth Ernst	n/a	n/a	n/a	m/a	n/a	n/a	n/a	n/a	Lunenburg	Lunenbrg	Susanna Catherine Ernst	95	d
90	Louisa Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	Lunenburg	Susanna Catherine Ernst	18	d
91	Regina Barbara Ernst	6	6	0	3	19	36	n/a	n/a	Lunenburg	Lundnburg	Susanna Catherine Ernst	94	d
92	Sophia Elizabeth Weinacht (Ernst)	10	10	0	6	21	40	25	21	Lunenburg	Lunenburg	n/a	71	gma
93	Sophia Elizabeth Ernst	11	9	2	8(6)	19	42	n/a	n/a	Lunenburg	Springfield, Annapolis	Sophia Elizabeth Weinacht (Ernst)	86	d
94	Mary Catherine Ernst	4	4	0	3	25	45	n/a	n/a	Lunenburg	Lunenburg	Sophia Elizabeth	24	d

												Weinacht (Ernst)		
95	Sarah Cassandra Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	MA., USA	Sophia Elizabeth Weinacht (Ernst)	81	d
96	Louisa Matilda Ernst	10	8	2	6	19	46	n/a	n/a	Lunenburg	Lunenburg	Sophia Elizabeth Weinacht (Ernst)	61	d
97	Martha Adah Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	Pennsylvania, USA	Sophia Elizabeth Weinacht (Ernst)	86	d
98	Alice Lucretia Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	India	Sophia Elizabeth Weinacht	n/a	d

												(Ernst)		
99	Mary Ann Cross (11)	5	5	0	3	23	31	22	20	Lunenburg	Lunenburg	n/a	34	gma
100	Sophia Ernst	7	5	2	5	21	34	n/a	n/a	Lunenburg	Lunenburg	Mary Ann Cross	94	d
101	Catherine Elizabeth Ernst	6	6	0	3	29	40	n/a	n/a	Lunenburg	Chester	Mary Ann Cross	72	d
102	Sarah Elizabeth Ernst	4	4	0	3	20	30	n/a	n/a	Lunenburg	Lunenburg	Mary Ann Cross	24	d
103	13 Anna maria Lantz (Ernst)	4	3	1	3	27	40	6	6	Lunenburg	Lunenburg	n/a	87	gma
104	catherine Barbara Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	Lunenburg	Anna maria Lantz (Ernst)	11	d
105	Anna Maria Ernst	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	Lunenburg	Anna maria Lantz (Ernst)	61	d

106	barbara Ernst	6	6	0	2	25	38	n/a	n/a	Lunenburg	Lunenburg	Anna maria Lantz (Ernst)	83	d
107	Elizabeth Price	8	8	0	3	27	40	9	9	Louisbourg	Louisbourg	n/a	99	gma
108	Henriette Price	4	4	0	1	23	28	n/a	n/a	Louisbourg	Louisbourg	Elizabeth Price	n/a	d
109	Alice Price	3	3	0	0	30	32	n/a	n/a	Louisbourg	Little Lorraine	Elizabeth Price	75	d
110	Catherine Price	2	2	0	1	20	47	n/a	n/a	Louisbourg		Elizabeth Price	n/a	d
111	Catherine Stewart	14	12	2	7	25	45	65 tot		Scotland	River Inhabitants	n/a	98	gma
112	Mary Stewart	5	5	0	3	23	33	n/a	n/a	Scotland	Kingsville	Catherine Stewart	n/a	d
113	Margaret Stewart	10	10	0	7	23	43	n/a	n/a	River Inhabitanta	River Inhabitants	Catherine Stewart	68	d

114	Marcella Stewart	5	5	0	3	22`	46	n/a	n/a	River Inhabitanta		Catherine Stewart	n/a	d
115	Anne Stewart	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	River Inhabitanta	n/a	Catherine Stewart	n/a	d
116	Christina Stewart	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	River Inhabitanta	Sydney	Catherine Stewart	n/a	d
117	Jane Stewart	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	River Inhabitanta		Catherine Stewart	n/a	d
118	Mary Stewart	4	4	0	3	n/a	n/a	n/a	n/a	River Inhabitanta	Port Hastings	Catherine Stewart	n/a	d
119	Ann Susan Boutilier	9	9	0	6	23	47	33	33	Cape Breton	Coxheath Cb	n/a	87	gma
120	Anne Elizabeth Boutilier (Murrant)	9	9	0	6	20	39	n/a	n/a	Sydney	Cow Bay CB	Ann Susan Boutilier	74	d

121	Susan Margaret Boutilier (Rudderham)	9	9	0	5	23	42	n/a	n/a	Coxheath	n/a	Ann Susan Boutilier	90	d
122	Mary Martha Boutilier (Currie)	9	9	0	3	26	44	n/a	n/a	Coxheath		Ann Susan Boutilier	96	d
123	Barbara Ellen Boutlier (Lewis)	5	5	0	2	27	39	n/a	n/a	Coxheath		Ann Susan Boutilier	62	d
124	Sarah Ann Boutlilier (Willows)	1	1	0	1	27	27?	n/a	n/a	Coxheath		Ann Susan Boutilier	n/a	d
125	Sarah Elizabeth Jane Boutilier	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Coxheath, Cb	Cows Bay CB	Ann Susan Boutilier	98	d
126	Elizabeth Wadden (Boutilier	10	10	0	4	19	49			Halifax	Coxheath Cb	n/a	41	gma
127	Marianne Boutilier	8	8	0	4	23	36	n/a	n/a	Coxheath		Elizabeth Wadden (Boutilier	85	d

128	Eliza jane Boutilier	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Coxheath		Elizabeth Wadden (Boutilier)		d
129	Sarah Ann Boiutilier	2	2	0	2	29	38	n/a	n/a	Coxheath	Port Morien	Elizabeth Wadden (Boutilier)		d
130	Matirlda Jane Boutilier	3	3	0	2	19	33	n/a	n/a	Coxheath		Elizabeth Wadden (Boutilier)	62	d
131	Louisa Ann Boutilier 16	9	9	0	4	24	42	16	16	Coxheath	Coxheath	n/a	n/a	gma
132	Emma Jane Boutilier	2	2	0	1	20	23	n/a	n/a	Minnnesota, USA	Coxheath	Louisa Ann Boutilier	89	d
133	Henrietta catherine Boutliler	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Minnesota, USA	Coxheath	Lousia Ann Boiutilier	56	d

134	Rose Boutilier	8	8	0	4	17	31	n/a	n/a	Minnestoa, SUA	Coxheath	Louisa Ann Bouitilier	83	d
135	Susan Elizabeth Bouitilier	6	6	0	4	16	31	n/a	n/a	Minnesota, USA,	n/a	Louisa Ann Boutilier	82	d
136	Margaret McGregor	3	3	0	2	25	31	1	1	PEI	Coxheath	n/a		gma
137	Sarah Ann Boutilier	1	1	0	0	24	24	n/a	n/a	Sydney Cb	Sydney	Margaret McGregor	43	d
138	Catherine Janet Boutilier	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney	Sydney	Margaret McGregor	74	d
139	Anna Margaret Boutilier	10	10	0	5	19	35	31	30	Little Bras d'r	Sydney Sydney Mines	n/a	n/a	gma
140	Annie Frances Boutilier	13	12	1	3	19	40	n/a	n/a	sydney mines	Gardiner Mines	Anna Margaret Boutilier	85	d
141	Ellen matidla Boutilier	6	6	0	2	21	32	n/a	n/a	Sydney Mines	sydney mines	Anna Margaret	84	d

												Boutilier		
142	Caroline Rosina Boutilier	12	12	0	4	21	n/a	n/a	n/a	Sydney	Sydney	Anna Margaret Boutilier	74	d
143	Mary Catherine Boutilier	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	New Waterford	Anna Margaret Boutilier	85	d
144	Mary Bridget Boutilier	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Little Bras d'or	n/a	Anna Margaret Boutilier	n/a	d
145	Charlotte Miles	10	9	1	4	21	43	25`	25	Port Morien	Port Morien	n/a	n/a	dgma
146	Laura Elizabeth Louisa Boiutilier	7	7	0	0	25	40	n/a	n/a	Port Morien	Reserve Mines	Charlotte Miles	88	d
147	Susan Matils Boutilier	4	4	0	3	26	32	n/a	n/a	Port Morien	Dominion	Charlotte Miles	61	d
148	Sarah Ann Boutilier	3	3	0	2	23`	27	n/a	n/a	Port Morien	Sydney	Charlotte	70	d

											Mines	Miles		
149	Mary Ellen Boutilier	11	11	0	6	20	39	n/a	n/a	Port Morien	Port Morien	Charlotte Miles	66	d
150	Sarah Margaretha Boutilier	9	9	0	4	23	43	3	3	Halifax	Sydney		93	gma
151	Catherine Elizabeth Andrews	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney	n/a	Sarah Margaretha Boutilier	n/a	d
152	Martha Ann Andrews	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney	n/a	Sarah Margaretha Boutilier	n/a	d
153	Susan Sarah Andrews	3	3	0	0	36	40	n/a	n/a	Sydney	n/a	Sarah Margaretha Boutilier	36	d
154	Marianne Andrews	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney	n/a	Sarah Margareth	25	d

												a Boutilier		
155	Janet Beaton	2	2	0	2	28	30	12	11	SW Mabou	SW Mabou	n/a	30	gma
156	Annie Cameron Beaton	1	1	0	1	23	23	n/a	n/a	G;engarry, Inverness	MA, USA	Janet Beaton	n/a	d
157	Mary Cameron beaton	11	10	1	5	24	42	n/a	n/a	Inverness	n/a	Janet Beaton	80	d
158	Jane Moncks	5	5	0	4	18	29	2	2	n/a	Groves Point	n/a	79	gma
159	mary Sophia Dunlap	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Groves POint	Sydney Mines	Jane Moncks (Dunlap)	n/a	d
160	Elizabeth Dunlap	2	2	0	0	44	46	n/a	n/a	Groves Point	Sydney Miines	Jane Moncks (Dunlap)	61	d
161	Ellen Dunlap	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Groves Point	Sydney Mines	Jane Moncks (Du	n/a	d

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162	Jane Dunlap	n/a	n/a	na/	n/a	n/a	n/a	n/a	n/a	Groves Point	Syndye Mines	Jane Moncks (Dunlap)	n/a	d
163	Jane Merick	7	7	0	4	17	33	4	4	Sydney	Sydney	n/a	78	gma
164	mary Sophia Dunlap	2	2	0	2	29	33	n/a	n/a	Little Bras d'or	Little Bras d;or	Jane Merick	75	d
165	Elizabeth Dunlap	2	2	0	0	44	46	n/a	n/a	Little Bras d'or	Little Bras d;or	Jane Merick	61	d
166	Ellen Dunlap	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Little bras d'or	Sydney Mines	Jane Merick	70	d
167	Jane Dunlap	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Little Bras d'or	Little Bras'dor	Jane Merick	76	d
168	Margaret Oram Dunlap	9	9	0	8	23	41			Sydney Mines	Sydney Mines	n/a	83	gma
169	Ann L. Dunlap	13	11	2	5	22	46	n/a	n/a	Sydney Mines	Sydney Mines	Margaret Oram Dunlap	75	d

170	Jane Dunlap	4	4	0	2	24	30	n/a	n/a	SYDNEY MINES	SYDNEY MINES	Margaret Oram Dunlap	92	d
171	Margaret Dunlap	9	9	0	4	26	40	n/a	n/a	SYDNEY MINES	Sydney Mines	Margaret Oram Dunlap	30	d
172	Ellen Dunlap	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	Sydney Mines	Margaret Oram Dunlap	n/a	d
173	Emily Dunlap	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	Sydney Mines	Margaret Oram Dunlap	33	d
174	Mary Ann Dunlap	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	Sydney Mines	Margaret Oram Dunlap	69	d
175	Isabella Dunlap	5	5	0	0	23	39	n/a	n/a	Sydney Mines	Sydney Mines	Margaret Oram Dunlap	n/a	d

176	Henrietta Dunlao	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	Sydney Mines	Margaret Oram Dunlap	62	d
177	Ann L. Dunlap	13	11	2	5	22	46	18	18	Sydney Mines	Sydney Mines	n/a	75	gma
178	Margaret Lockman	9	9	0	3	24	42	n/a	n/a	Sydney Mines	Sydney Mines	Ann L. Dunlap	88	d
179	Mary Lockman	4	4	0	1	26	39	n/a	n/a	Sydney Mines	Sydney Mines	Ann L. Dunlap	83	d
180	Emily Lockman	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	Sydney Mines	Ann L. Dunlap	24	d
181	Agnes Lockman	4	4	0	2	29	39	n/a	n/a	Sudney Mines	Sydney Mines	Ann L. Dunlap	88	d
182	Bernadetta Maria Lockman	1	1	0	0	38	38	n/a	n/a	Sydney Mines	Sydney Mines	Ann L. Dunlap	38	d
183	Ellen Coady (Dunlp)	5	5	0	3	32	40			Margaree	bras d'or		74	gma
184	Mary Ann Dunlap	8	6	2	3	19	36	n/a	n/a	Bras d'or	bras d'or	Ellen Coady (Dunlp)	36	d
185	Margaret Gertrude Dunlap	7	7	0	4	21	33	n/a	n/a	Groves Point	Ma, USA	Ellen Coady	85	d

											(Dunlp)		
186	Evelyn Frances Dunlapn	1	1	0	0	28	28	n/a	n/a	Sydney Mines	MA, USA	Ellen Coady (Dunlp)	71	d
187	Susane Rigoulea	10	9	1	3	31	44	8	8	Lunenburg	Coxheath	n/a	n/a	dgma
188	Catherine Lewis	8	8	0	1	22	42	n/a	n/a	Lunenburg	Coxheath	Susanne Rigouleau	76	d
189	Mary Catherine Rigouleau	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Lunenburg	n/a	Susanne Rigouleau	n/a	d
190	Susanna Rigouleau	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Luennburg	n/a	Susanne Rigouleau	n/a	d
191	Sarah Ivory Maloney	5	5	0	3	26	43	8	7	Ireland	Ontario	n/a	43	dgma
192	Rosina McIvory Maloney	8	7	1	4	21	32	n/a	n/a	Ireland	Ontario	Sarah Ivory Maloney	94	d
193	Sarah McIvory Maloney	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ireland	Ontario	Sarah Ivor	n/a	d

194	Mcivory Maloney Daughter 3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ontario	Ontario	y Maloney Sarah Ivory Maloney	24	d
195	Rosina McIvory Maloney	8	7	1	4	21	32			Ireland	Ontario	n/a	94	gma
196	Isabelle McIvory	8	8	0	0	27	39	n/a	n/a	Ontario	n/a	Rosina McIvory Maloney	69	d
197	Sarah McIovry	11	8	3	1	21	40	n/a	n/a	Ontario	Michigan	Rosina McIvory Maloney	78	d
198	Rosina McIvory Maloney	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ontario	n/a	Rosina McIvory Maloney	n/a	d
199	Ann McIvory Caldwell	9	5	4	5	29	46	n/a	n/a	Ontario.	Ontairio	Rosina McIvory Maloney	62	d

200	Bridget Farrell	5	4	1	3(2)	37	45			Glace Bay	Glace Bay	n/a	80	gma
201	Margaret Farrell	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Glace bay	Bridget Farrell	n/a	d
202	Catheine Farrell	3	3	0	2	26	n/a	n/a	n/a	Glace Bay	Glace Bay	Bridget Farrell	65	d
203	Mary Ann Farrell	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Glace Bay	Bridget Farrell	7	d
204	Marjarie Mackinnone (Fraser)	4	4	0	1	21	42	8	8	Scotland	Cape Mabou	n/a	42	gma
205	Annabelle Fraser	8	8	0	4	26	41	n/a	n/a	Cape Mabou	Glencoe	Marjarie Mackinnone (Fraser)	95	
206	Flora Alice MacGregor	9	9	0	5	32	44	1752	4	Scotland	Sheet Harbour	n/a	75	gma
207	Marjory Frser	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sheet Harbour	Little Harbour	Flora Alice MacGregor	93	d
208	catherine Fraser	13	13	0	6	20	37	13	13	Sheet Harbour	Sheet Harbour	Flora Alice	86	d

												MacGregor		
209	Alice Elizabeth Fraser	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sheet Harbour	Sheet harbour	Flora Alice MacGregor	76	d
210	Maria Fraser	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sheet harbour	Caribou, NS	Flora Alice MacGregor	76	d
211	Ann Fraser	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sheet Harbour	Nebraska, USA	Flora Alice MacGregor	79	d
212	Margaret Mackay	8	8	0	3	30	50			Scotland	Broad Cove	n/a	80	gma
213	Lucy Fraser	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Cape Mabou	Broad Cove	Margaret Mackay	n/a	d
214	Ann Fraser	8	8	0	3	25	42	n/a	n/a	Cape Mabou	Broad Cove	Margaret Mackay	n/a	d

215	Micy Fraser	n/a	na/	n/a	na/	n/a	n/a	n/a	n/a	Cape Mabou	Broad Cove	Margaret Mackay	40	d
216	Alexis Campbell	7	6	1	3(2)	33	46	7	7	Little Tracadie	Margaree NS	n/a	n/a	gma
217	Margaret Hannigan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Margaree	Margaree	Alexis Campbell	5	d
218	Catherine Anne Hannigan	1	1	0	0	34	34	n/a	n/a	Margaree	Margaree NS	Alexis Campbell	n/a	d
219	Margaret Hannigan	6	6	0	1	22	31	n/a	n/a	Margaree	Margaree	**Alexis Campbell**	n/a	d
220	Marie Anne Brown	11	11	0	6	20	49	11	11	Margaree	Inverness	n/a	95	gma
221	Lexie Hannigan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Inverness	Inverness	Marie Anne Brown	94	d
222	Jennie Hannigan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	margaree	n/a	Marie Anne Brown	n/a	d

223	Mary Ellen Hannigan	10	10	0	5	44	18	n/a	n/a	Margaree	n/a	Marie Anne Brown	82	d
224	Annie Ellen Hannigan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Margaree	n/a	Marie Anne Brown	n/a	d
225	Catherine Hannigan	1	1	0	1	33	33	n/a	n/a	Margaree	n/a	Marie Anne Brown	n/a	d
226	Maggie Hannigan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Margaree	n/a	Marie Anne Brown	n/a	d
227	Elizabeth Hogan	8	8	0	2	16	31	8	8	Ireland	Conception Bay, NL	n/a	58	gma
228	Eleanor Hogan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ireland	n/a	Elizabeth Hogan	n/a	
229	Mary Hogan	8	8	0	4	20	45	n/a	n/a	Ireland	Newfoundland	Elizabeth Hogan	n/a	

230	Elizabeth Hogan	8	8	0	5	29	48	27	27	trinity Bay, NL	Glace Bay	n/a	77	gma
231	Jean Hogan	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	n/a	Elizabeth Hogan	25	d
232	Alice hogan	9	9	0	4	26	43	n/a	n/a	Glace Bay		Elizabeth Hogan	79	d
233	Mary Hogan	5	5	0	2	30	38	n/a	n/a	Glace Bay		Elizabeth Hogan	n/a	d
234	Theresa Hogan	7	7	0	3	22	44	n/a	n/a	Glace Bay		Elizabeth Hogan	54	d
235	Ceceila Gogan	6	6	0	3	27	39	n/a	n/a	Glace Bay	Glace Bay	Elizabeth Hogan	n/a	d
236	Mary Tobin	8	8	0	5	25	44	33	33	Glace Bay	Glace Bay	n/a	76	gma
237	Mary Elizabeth Doyle	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Boston, MA, USA	Mary Tobin	25	d
238	Mary Ellen	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Glace Bay	Glace Bay	Mary Tobin	54	d
239	Ellen Doyle	12	9	3	5	23	37	n/a	n/a	Glace Bay	Glace Bay	Mary Tobin	70	d

240	Anna Doyle	12	2	10	1	24	43	n/a	n/a	Glace Bay	Glace Bay	Mary Tobin	n/a	d
241	Bridget Doyle	9	9	0	4	23	42	n/a	n/a	Glace Bay	Glace Bay	Mary Tobin	n/a	d
242	Elizabeth Crummey	11	11	0	5	21	46	31	31	Glace Bay	Glace Bay	n/a	n/a	dgma
243	Louisa Hogan	9	9	0	6	26	44	n/a	n/a	Glace Bay	Glace Bay	Elizabeth Crummey	47	d
244	Bridget Hogan	12	12	0	6	29	31	n/a	n/a	Glace Bay	Glace Bay	Elizabeth Crummey	89	d
245	Mary hogan	2	2	0	2	34	40	n/a	n/a	Glace Bay	Glace Bay	Elizabeth Crummey	n/a	d
246	Elizabeth Mary Hogan	6	6	0	2	25	34	n/a	n/a	Glace Bay		Elizabeth Crummey	n/a	d
247	Ellen Hogan	2	2	0	2	24	26	n/a	n/a	Glace Bay	St. John's	Elizabeth Crummey	91	d
248	Johanna hogan	7	7	0	3	26	39			Glace Bay	Concepti	n/a	77	dgma

											on Bay			
249	Elizabeth Mullaly Hogan	10	10	0	4	24	49	n/a	n/a	Glace Bay		Johanna hogan	n/a	d
250	Anne Millaly	3	3	0	3	29	32	n/a	n/a	Glace Bay		Johanna hogan	n/a	d
251	Sarah Mullaly	1	1	0	1	39	39	n/a	n/a	Conception Bay	Conception Bay	Johanna hogan	n/a	d
252	Cecelia Hogan	6	6	0	2	31	42	8	8	Conception bay NL	Conception Bay NL	n/a	64	gma
253	Ellen Fahey	1	1	0	0	26	26	n/a	n/a	Conception Bay, NL	Conception Bay, NL	Cecelia Hogan	n/a	d
254	Elizabeth Anne Fahey	7	7	0	4	20	43	n/a	n/a	Conception Bay	Conception Bay	Cecelia Hogan	n/a	d
255	Elenor Shaw	5	5	0	1	31	42	5	5	Main A Dieu	Main A Dieu	n/a	68	gma
256	Jane Lahey	5	5	0	2	22	29	n/a	n/a	Main A Dieu	Little Lorraine	Eleanor Shaw	30	d
257	Rachel Dillon Way	8	8	0	7	17	33			Main A Dieu	Sydney Mines	n/a	84	gma

258	Ann Way	9	9	0	2	18	46	n/a	n/a	Sydney Mines	Sydney Mines	Rachel Dillon Way	75	d
259	Mary Way	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	Sydney Mines	Rachel Dillon Way	n/a	d
260	Elizabeth Way	7	7	0	5	20	38	n/a	n/a	Sydney Mines	Sydney Mines	Rachel Dillon Way	73	d
261	Jane Way	6	6	0	2	21	21	n/a	n/a	Sydney Miens	Sydney Mines	Rachel Dillon Way	67	d
262	Maria Way	1	1	0	0	21	37	n/a	n/a	Sydney Mines	Sydney Mines	Rachel Dillon Way	61	d
263	Rachel Way	10	10	0	3	28	38	n/a	n/a	Sydney mines	Sydney Mines	Rachel Dillon Way	89	d
264	Alice Way	6	6	0	3	21	43	n/a	n/a	Sydney Mines	Sydney Mines	Rachel Dillon Way	73	d

265	Esther Maria Hart Walsh	11	11	0	6	23	45			Guysborough	Guysborugh	n/a	89	gma
266	Alice Walsh	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Boston	Esther Maria Hart Walsh	26	d
267	Frances Walsh	7	7	0	4	27	39	n/a	n/a	Guysborough	Inverness	Esther Maria Hart Walsh	66	d
268	Catherine Walsh	10	10	0	3	27	49	n/a	n/a	Guysborough	Inverness	Esther Maria Hart Walsh	70	d
269	Helen Walsh	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Guysborough	New jersey	Esther Maria Hart Walsh	47	d
270	Mary Walsh	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Guysborough	MA, USA	Esther Maria Hart Walsh	n/a	d

271	Elizabeth Walsh	3	3	0	0	37	41	n/a	n/a	Guysborough	Port Hood	Esther Maria Hart Walsh	86	d
272	Elizabeth Philips Townsend	11	11	0	6	30	48	44	44	MA, USA	Louisbourg	n/a	72	gma
273	Elizabeth Townsend	9	9	0	3	15	41	n/a	n/a	Louisbourg	Louisbourg	Elizabeth Philips Townsend	63	d
274	Susannah Townsend	9	9	0	5	17	38	n/a	n/a	Louisbourg	PEI	Elizabeth Philips Townsend	65	d
275	Lucy Townsend	10	10	0	4	22	44	n/a	n/a	Louisbourg	Sydney	Elizabeth Philips Townsend	74	d
276	Mary Townsend	6	6	0	3	16	23	n/a	n/a	Louisbourg	Louisbourg	Elizabeth Philips Townsend	71	d

277	Sarah Townsend	9	9	0	4	22	43	n/a	n/a	Louisbourg	Louisbourg	Elizabeth Philips Townsend	80	d
278	Nancy Townsend	1	1	0	0	22	22	n/a	n/a	Louisbourg	Sydney	Elizabeth Philips Townsend	86	d
279	Elizabeth Townsend	9	9	0	3	15	41	n/a	n/a	Louisbourg	Louisbourg	n/a	63	gma
280	Frances Townsend	11	11	0	4	29	50	n/a	n/a	Louisbourg	Louisbourg	Elizabeth Townsend	99	d
281	Mary Ann Townsend	8	8	0	4	18	38	n/a	n/a	Louisbourg	Louisbourg	Elizabeth Townsend	99	d
282	Nancy Townsend	8	8	0	4	24	36	n/a	n/a	Louisbourg	Louisbourg	Elizabeth Townsend	82	d
283	Sarah Currie Phalen	10	10	0	3	27	43	13	13	PEI	Port Morien	n/a	95	gma
284	Susan White	5	5	0	2	25	35	n/a	n/a	Port Morien	Sydney	Sarah Cur	41	d

												rie Phalen		
285	Sarah Ann Phalen (Greenough)	8	8	0	4	20	42	n/a	n/a	Port Morien	Hants County	Sarah Currie Phalen	89	d
286	Margaret Phalen	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Port Morien	n/a	Sarah Currie Phalen	n/a	d
287	Susan Phalen White	5	5	0	2	25	35	5	5	Port Morien	Sydney	n/a	41	gma
288	Margaret White	5	5	0	1	25	36	n/a	n/a	Sydney	Sydney	Susan Phalen White	74	d
289	Sarah White	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney	n/a	Susan Phalen White	n/a	d
290	Sarah Ann Greenough	8	8	0	4	20	42	8	8	Port Morien	Hants County	n/a	89	gma
291	Bessie Greenough	1	1	0	1	25	25	n/a	n/a	Hants County	n/a	Sarah Ann Greenough	64	d
292	Margaret Greenough	3	3	0	2	26	33	n/a	n/a	Hants	hants	Sarah Ann	33	d

										County	County	Greenough		
293	Sarah Greenough	2	2	0	1	25	30	n/a	n/a	Hants County	Hants County	Sarah Ann Greenough	30	d
294	Priscilla Greenough	2	2	0	1	33	35	n/a	n/a	Hants County	Hants County	Sarah Ann Greenough	89	d
295	Catherine MacLeod	8	8	0	5	26	36	25	25	Scotland	Sydney	n/a	78	dgma
296	Mary MacLeod	7	7	0	3	25	41	n/a	n/a	Sydney	Sydney	Catherine MacLeod	n/a	d
297	Effie MacLeod	10	10	0	4	32	41	n/a	n/a	Sydney	Sydney	Catherine MacLeod	60	d
298	Catherine MacLeod	8	8	0	1	25	43	n/a	n/a	Sydney	Sydney	Catherine MacLeod		d
299	Elizabeth MacLeod	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney	n/a	Catherine MacLeod	n/a	d

300	Mary Ann MacLeod	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney	n/a	Catherine MacLeod	n/a	d
301	Elenor Shaw	5	5	0	1	31	42	5	5	Main A Dieu	Main A Dieu	n/a	68	gma
302	Jane Shaw	5	5	0	2	21	29`	n/a	n/a	Main A Dieu	little lorraine	Elenor Shaw	30	d
303	Alice Way	11	11	0	6	20	42	18	18	Sydney Mines	Sydney Mines	n/a	73	gma
304	Mary Eliza Way	10	9	1	6	19	40	n/a	n/a	Sydney Mines	Dartmouth	Alice Way	83	d
305	Maria Way	6	5	1	4	24	30	n/a	n/a	Sydney Mines	Sydney Mines	Alice Way	30	d
306	Rachel Way	1	1	0	0	23	23	n/a	n/a	Sydney Mines	Sydney Mines	Alice Way	n/a	d
307	harriet Way	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	Sydney Mines	Alice Way	n/a	d
308	Alice Way	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Sydney Mines	Boston, MA, USA	Alice Way	58	d
309	Isabella Way	1	1	0	1	34	34	n/a	n/a	Sydney Mines	Sydney Mine	Alice Way	55	d

310	Victoire Babin Marmaud	7	7	0	4	22	41			France A	Arichat	n/a	88	gma
311	Marie Marmaud	2	2	0	1	28	36	n/a	n/a	Bras d'or	Richmond	Victoire Babin Marmaud	85	d
312	Marie Victoire Marmaud	8	8	0	4	29	48	n/a	n/a	Bras d'or	Bras d'or	Victoire Babin Marmaud	99	d
313	Francoise Marmoud	3	3	0	2	15	19	n/a	n/a	Bras d'or	Bras d'or	Victoire Babin Marmaud	43	d
314	Sophie Marmous	2	2	0	1	38	39	n/a	n/a	Bras d'or	Bras d'or	Victoire Babin Marmaud	n/a	d
315	Bell McRae MacLeod	4	4	0	1	41	46	4	4	St. Ann's	St. Ann's	n/a	89	gma
316	Catherine MacLeod	4	4	0	1	26	31	n/a	n/a	St Ann's	South bar	Bell McRae MacLeod	51	d
317	Annie MacLeod	7	7	0	5	26	43	11	22	Port Morien	Port Morien	n/a	71	gma

318	Christie MacLeod	1	1	0	1	45	45	n/a	n/a	Port Morien	Port Morien	Annie MacLeod	90	d
319	Jane MacLeod	5	5	0	3	31	45	n/a	n/a	Port Morien	North Shore	Annie MacLeod	48	d
320	Sarah Macleod	1	1	0	1	25	25	n/a	n/a	Port Morien	Port Morien	Annie MacLeod	71	d
321	Mary MacLeod	4	4	0	4	39	47	n/a	n/a	Port Morien	Port Morien	Annie MacLeod		d
322	Annie MacLeod	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Port Morien	Port Morien	Annie MacLeod	30	d
323	Jane MacDonald	5	5	0	3	31	45	16	16	Port Morien	North Shore	n/a	48	gma
324	Ann MacDonald	8	8	0	4	24	41	n/a	n/a	Port Morien	North Shore	Jane MacDonald	67	d
325	Sarah MacDonald	5	5	0	4	27	38	n/a	n/a	Port Morien	North Shore	Jane MacDonald	88	d
326	Maggie MacDonald	3	3	0	1	23	36	n/a	n/a	Port Morien	North	Jane Ma	86	d

											Shore	cDonald		
327	Sarah MacDonald	5	5	0	4	27	38	4	4	Port Morien	North Shore	n/a	88	gma
328	Janie MacDonald	2	2	0	0	21	44	n/a	n/a	North Shore	North Shore	Sarah Maczdonald	77	d
329	Johannah MacDonald	1	1	0	0	31	31	n/a	n/a	North Shore	North Shore	Sarah Maczdonald	86	d
330	Annie MacDonald	1	1	0	0	36	36	n/a	n/a	North Shore	North Shore	Sarah Maczdonald	85	d
331	Agnes MacDonald	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	North Shore	North Shore	Sarah Maczdonald	23	d
332	Mary MacLeod	2	2	0	1	16	17	8	8	Scotland	Sydney	n/a	n/a	gma
333	Catherine MacLeod	8	8	0	5	24	41	n/a	n/a	Scotland	Sydney	Mary MacLeod	78	d
334	Catherine MacLeod	8	7	1	5(4)	26	41	28	28	Scortland	Sydney	n/a	78	gma

335	Mary MacLeod	7	7	0	3	25	41	n/a	n/a	Sydney	Sydney	Catherine MacLeod	91	d
336	Effie MacLeod	10	10	0	5	22	41	n/a	n/a	Sydney	Sydney	Catherine MacLeod	80	d
337	Catherine MacLeod	8	8	0	1	26	43	n/a	n/a	Sydney	Sydney	Catherine MacLeod	68	d
338	Elizabeth MacLeod	3	3	0	3	25	32	n/a	n/a	Sydney	Sydney	Catherine MacLeod	80	d
339	Annie MacLeod MacLennon	10	10	0	3	21	44	21	21	Parrsboro, NS	Inverness	n/a	98	gma
340	Flora MacLeod MacLennon	5	5	0	3	36	45	n/a	n/a	Inverness	Inverness	Annie MacLeod MacLennon	95	d
341	Janet MacLeod MacLennon	8	8	0	3	20	32	n/a	n/a	Inverness	Inverness	Annie MacLeod MacLe	n/a	d

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342	Mary Ann MacLeod MacLennon	8	8	0	4	23	33	n/a	n/a	Inverness	Inverness	Annie MacLeod MacLennon	84	d
343	Julie Ann MacLeod	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	inverness	inverness	Annie MacLeod MacLennon	n/a	d