Two by two: tracking personal identities in Montreal, 1880-1901

Abstract

For Montreal, a fast-growing industrial metropolis (180 000 in 1881, 325 000 in 1901), an initial suite of record-matching applications confirmed key social dimensions of identity and evaluated the power and limitations of local sources for control over personal identities. For three cohorts of newborns (1859, 1879, and 1899), records of birth and death were matched from parish registers; survivors or parents were identified in a census (1861, 1881, or1901); addresses and nextborns were captured over control periods of 33 to 56 months.

Grounded in that experience, we adopted for a second venture a strategy of reducing sample size, expanding the number of sources tapped, and tracking individuals over longer spans. We selected 12 surnames, compiled vital events and census records over 60 years, and employed that miniaturized city ‰ about 0.5 per cent ‰ to estimate decade rates of population turnover, appraise the relative contributions of arrivals and departures, births and deaths; and model the distinct demographic regimes of three communities of identity.

As a third strategy, we go now to the other extreme. Working with the entire census population of 1881 (150 000), we search for those who reappear in the Census of 1901, and ask some of the same questions. In the turnover, what were the relative contributions of deaths, departures, and unrecovered identities? To what extent were the identifiable survivors - about one quarter - representative of their communities? After 20 years, how many were still living in the same neighbourhood? in a neighborhood of comparable social status? with another member of the 1881 household? What do these witnesses tell us about urban social networks, personal trajectories, and the fast-growth urban system? The endeavour relies on full digital census data for 1881; for 1901 a digital index of all the names, addresses, ages, and relationships, and a complement of 35 000 local Catholic marriages during the intervening 20 years. To appraise bias, we employ a life table for 1881 to estimate expected survivors by age, sex, and ethnicity; and for selected groups we observe geographic pathways as indications of social mobility.

Two by two: tracking personal identities in Montreal, 1880-1901

To make reliable generalizations in social history or historical demography requires, directly or indirectly, tracking individuals, working with more than one source, and, as a consequence, facing the task of matching records. Do the two records refer to the same person? to the same couple? to the same household? If we are interested in vital events, can we find in the census the year's crop of newborns, newlyweds, or the newly widowed? As the span of observation lengthens from days or months to years, the challenge is greater, but so, too, are the documentary resources we can tap for control and comparison.   If we make a leap of twenty years, do the parameters of identities have the same meaning? What proportion of a sample will we recover? Are those we re-capture representative of their communities of 20 years earlier %   rich or poor, Catholic or Protestant, English- or French-speaking? And if we are interested in their movements through the city, how reliably and how precisely can we put their households on the map? Among Montrealers born in the nineteenth century, perhaps half survived 20 years, only 60 per cent of the 1881 couples survived intact; at least one in five unmarried women changed her name in the interval, and five out of six people moved to a new neighbourhood. Any attempt to track the survivors therefore   calls for ways to estimate bias of identifications.

The first section of the paper recalls a suite of matching exercises, pursued in collaboration with Patricia Thornton and Danielle Gauvreau, to acknowledge the social dimensions of identity in Montreal and the array of late-nineteenth-century sources available. Carried out over 25 years, those exercises provide the toolbox for the challenge we address in the second section of the paper, to identify the people who appear as residents of Montreal in both the Census of 1881 and the Census of 1901. Who is missing in 1901, and why? Of those we find, who are they? and where do we find them? in what circumstances? and why would you want to do anything so foolish?

The prime sources are the full digital set of 1881 census records for Montreal and its suburbs and, for the census of 1901, a digital index that for the entire population lists names, ages, birthdates, marital status, and relation to head[1]. To anticipate the numbers we might expect to survive to 1901, we take advantage of our earlier estimates of mortality, family formation, and household moves over a year, five years, or a decade.

In the matching operation I have privileged two strategies. The first is a *dyadic strategy* - a search for people two by two. The pairs we can identify in 1881, some of whom turn up in a 1901 household as well, would include the 25 000 married couples, of course, and dyads such as mother and daughter (37 000 dyads), the 600 boys under 15 living with their widowed mothers, 170 cases of a male head of household and his mother-in-law, and all the imaginable pairings of siblings - of the order of one million pairs among 70 000 offspring of 25 000 mothers.

Confirmation of identities for a dyad is nearly always reliable if we have the surname, first name, sex and age of the two persons, with considerable tolerance for age. In fact, we observe scores of dyads whose relationship was unsuspected and remains unspecified, although they shared a dwelling at both dates.   My second strategy is a high priority for retrieving and verifying locations, so that I can put that household on the map in both 1881 and 1901. In a city whose area has doubled, and whose population has increased 80 per cent, how far have people moved? How are they re-positioned in terms of social status?

Discussion in that central section of the paper is directed primarily to methods. Can we estimate to what extent rates of recovery are affected by relative survival rates, name changes, or selectivity in the sources? In the matching process itself, excessive rigour will reduce the recovery rate; over-zealous matching will add noise. At either extreme there is the risk of worrying bias. Having recovered close to one quarter of the 1881 population (38 000 in the urbanized area, or 30 000 inside the city limits), dare we treat them as credible samples of social pathways over 20 years?

The third section of the paper offers a preview of the (modest) returns to such an experiment. We display some evidence of family formation and dissolution, some paths through the urban space and the urban pecking order. The findings are not very surprising, but they underscore some critical gaps in our empirical knowledge of household formation at the time, and they offer glimpses of an array of connections as intricate % and as orderly % as the wiring that in those 20 years crept over the housetops and draped the streets to activate the hundreds of new electric streetcars, street lamps, and fire alarm boxes, the 9000 telephones, and the lightbulbs - still a luxury - in 5 000 homes. Over the years 1880-1900, as the city was plumbed and wired, a new mastery was achieved over system properties - connectivity, voltage and amperage, pressures and flows. Those material changes suggest the need to apply system thinking to the city's social networks.

1. Shrinking the city to a manageable size

The Montreal laboratory

For consideration of both identities and population turnover in a fast-growth industrial metropolis of the late nineteenth century, Montreal offers a convenient laboratory, first, because its wealth of sources, unique in North America and comparable to options in parts of Europe, allows us to address questions that, in the absence of individual data, have been hard to treat in the US and Rest of Canada: marital fertility, child mortality, and social mobility. Second, frontiers of cultural identity cut through the history of Montreal, with interferences of religion,

language, and national origin - dimensions that affect the comparability of sources as well as the relative probabilities of people at various ages marrying, conceiving, making a move, or dying. Acknowledged cultural boundaries delineated three core groups: Catholics of French origins (54 per cent in 1881), Anglo-Protestants (28 per cent), and Catholics of Irish origins (18 per cent). As late as 1901, they covered 96 per cent of the population.

A starting point in the study of infant mortality centred our attention on the mother-and-child dyad (3500 births of 1859) with 12 months control. To consider birth intervals and fertility rates, we extended the span of observation to three years, and the more complex objective invited confirmation of identities of four persons (father, mother, the 1859 child, and the next), with greater temporal control over addresses. Having acquired confidence in the records, we could reduce sampling depth for later birth cohorts (1879 and 1899), important since the urban population was growing so fast. For the 1899 cohort we adopted the strategy J.-P. Bardet used for sampling sixteenth-century Rouen, and Alfred Perrenoud for eighteenth-century Geneva, selecting surnames beginning with the letter B. With a modest adjustment, this strategy drew comparable proportions, ca 11 or 12 per cent, from the three major identity groups, and in 1901 from the Jewish immigrant population as well[2]. The alphabetical device allowed us to take advantage of the quasi-alphabetical indexes used by clerics and notaries, and the resulting economy of effort allowed us to extend the time-frame of supervision to five years, to recover the birthdate of a next child.

That is how we arrived at *Rule of Thumb Number 1: Smaller samples, more sources* (**Table 1**). Since we wanted to build up a fuller model of the demographic regime, we pressed the notion to the extreme by selecting a subset of twelve surnames to generate a miniature of the urban population. We plucked records with these names from parish registers, taxrolls, the censuses (none yet digital), repertories of local notaries, and, of particular value, the *Tutelles[3]*. The notarial sources like wills and marriage contracts make explicit both the short-term contingency planning practiced in conditions of high mortality, and the long-range planning horizon implied by lifetime commitment at marriage and a long period of fecundity. Despite the risks of death and recurrent births, families framed ambitions of upward mobility, and for assets yet to be acquired organized transmission to the fourth generation - great-grand-children "born or to be born"[4].

The 12-surname sample amounted to one half of one per cent of the urban population, running with it for 60 years, and we applied more rigorous principles of event history analysis to subsets of vital events for the 1860s and 1890s decades, a generation apart. In-migration periodically surged, but departures from the city were very low, of the order of ten per cent in a decade. The running sample generated some comparative rates and a rich array of hypotheses for a subsequent round of sampling. In the quest to generate reliable lifetables, its shortcomings

compelled us to expand the birth cohort of 1879 (to 7516 births) and to select a cohort of 5909 deaths (all ages) of the year 1881.

In successive experiments we had therefore employed three cohorts of baptisms, a cohort of burials, and a 60-year suite of vital events (the 12 surnames), all grounded in matches to census, taxrolls, and city directories.   From each source, records were independently collected, so that each file -   births, marriages, deaths, census families, lot owners of 1880, occupants - constitutes a free-standing table, each table with its unique id number for each record, each person, and each couple. When a match was confirmed, an id number was entered or modified to secure the link. All of those samples suffered some shrinkage as a consequence of matching problems[5], and the chief worry was never mismatches: In a database of thousands, we can tolerate % in small numbers – the kind of mismatch that would flaw a historical novel, undermine the credibility of the Dictionary of Canadian Biography, or, in the eyes of a jury, save a man from hanging. The problem is the no-match, and the way missing persons, missing vital events, and incomplete information are concentrated in marginal populations: the lowest-income, the most recently arrived, the unemployed or illegitimate, members of small minorities, persons living alone or in institutions. Since these groups tend to overlap, systematic matching of sources calls for systematic strategies to counteract bias.

Making the link to the map

The record-matching objective sets a premium on standardization of all variables that can be brought into play for confirming identities, and reconciling spellings and formats in the various tables[6], raising, of course, difficult issues of transmutations, as records compiled a century ago and subjected to erratic or remote contemporary supervision, are   sampled, re-transcribed, re-coded, and re-compiled, passing through many hands. The Census of 1881 contains neither an address nor an explicit specification of the individual's relationship to others in the household. Indeed there are some problems in recognizing where a household begins or ends. Household contours may be genuinely ambiguous in the duplex and triplex housing typical of Montreal, in dwellings where a family rents a room to in-laws or a lodger couple, and in elaborately compartmentalized institutions[7].   Census takers varied in the way they handled such situations; and in transcribing selected households or pages of data, we have not all made the same interpretations.

Since those problems are familiar to this audience, I will comment only on the handling of the map link, essential to my attempt to assign social status and uncover social pathways. To locate residences in 1881, we gave precedence to the taxroll which specifies the run of addresses on each property, and associates with it a formal cadastral lot number and the array of occupants[8]. By situating resident owners, we re-created the undocumented boundaries of the original census

divisions. We could then search for other census families within a smaller subset (reducing the number of homonyms), matching them to names of tenants living in the same census division. Assignment of a census household to a lot is entered as a numeric "map link" variable associated with a point on the map, its latitude and longitude[9].

Precision of assignment to the 10 000 lots of 1880 allows us, using GIS (geographic information systems), to re-aggregate data at any desired scale % by census division, city block, block face, or parish - to the level required for a meaningful statistic[10]. The precision allows us to evaluate features of the urban habitat and social space - to appraise lot coverage of buildings, urban population density, residential segregation at crude or fine-grained scale, and to estimate the journey to work. Women stall-holders in the city markets, for example, lived closer to the market than the men, probably for the same reasons that women today tend to live closer than men to their places of work.

Because the search for an address required consultation of additional sources, it demonstrated the paradox of improving linkage between two   sources - say a baptism and a census record - by extending the effort to a third or fourth - the taxroll or directory. The advance was often from 50 per cent linked to 70 per cent linked, at which point we run into trouble. For the several cohorts of birth or death, efforts to link households to the taxroll and place them on the map repeatedly reached a ceiling of diminishing returns at about 68 to 70 per cent[11]. The matching of census and taxroll, achieved for 70 per cent of census households within the city limits, is especially useful because the assessed rental value of a dwelling is an excellent indicator of household purchasing power[12], and this allows us to evaluate the income-selectivity of a set of data: Have we captured as high a proportion of low-rent households as high-rent households? Although the taxroll of a given year shows eight per cent of addresses as "vacant" (or not yet canvassed), it has consistently proved a less biased source than census or directory with respect to low-rent households[13].

For household heads of a particular occupation or profession, the median of their rents   is a convenient yardstick of occupational status, and neighbourhoods, too, can be classed by the median of rents. The neighbourhood median is more comprehensive than occupational status, since it can be applied to households headed by women or the elderly[14], and in this paper I employ the median rent of the several hundred small aggregates we call "street segments". The segment consists of the facing properties on both sides of the street, clipped at major intersections. As a further simplification, we class the segments in five intervals of median rent, and assign the category as an indicator of socioeconomic status of a person or a household. We can thus characterize populations by the weighted mean (weighted from 1 for the lowest to 5 for the highest rents). The sensitivity of these categories can be seen in Figure 1 for a selection of occupations, and for the three large cultural communities. Residential concentration of wealth and

poverty was so strong that even at the scale of the census division the weighted mean level ranged from 1.1 to 4.8. (This is based on households matched to the taxroll in the 67 divisions in the city.)

The question has been asked, Why do we do so much matching by hand and by eye, when Ruggles and Schürer and Ferrier seem to have it automated? Why can't the computer do the work? Smaller databases require high precision, and the bilingual nature of the city and its documents favours hand work. The diversity of handwritten sources and suites of transcriptions have introduced families of anomalies that are hard to program but readily transmitted through experience. Each new attack on a pair of sources introduced new anomalies, re-set priorities, and called for rebuilding search algorithms. The computer in fact does an enormous share: miracles are performed with appropriate software, care to set up screen displays that trigger visual pattern recognition, strategies of indexing and re-indexing on alternative variables, and multiplication of cross-cutting queries - age-specific, sex-specific, specific to widows or servants... Computer queries test for incongruities of age that arise from confusion of father and son or mother and daughter with the same name.

Despite the rewards of matching records from multiple sources, I should at this point intone several *Mea culpa*. One hazard is circularity. We have matched in all directions, and, as the options increased, we began stumbling over the failure to keep track of the source of a particular datum. In the case of maiden names, we now enter to the census record a code for the source from which the maiden name has been extracted or inferred[15]. In the matching process we apply temporary flags to suspect links, but we have not succeeded in several attempts to code quality of match. The operation does not meet the standards of the larger and more automated projects where rules were imposed at the outset[16].

To the fastidious demands of record-matching, impatience is a perennial threat (see *Rule No. 4*). Of assignments of addresses to the 10,000 lots, the first 500 were very difficult, as we groped for an efficient strategy; the next 30 000 were a cinch, and the last 500 were so muddled that I had to turn the job over to another colleague with a fresh burst of zeal. To avoid proliferation of missing data and errors into all other databases, the map-link had to be carried to exhaustion and to perfection.

Experience in grooming the databases has given us considerable confidence in the ability of the old bureaucracies that licensed, taxed, and tallied the souls to which they laid claim. One can sample a big city in a great variety of ways. The suite of experiments reinforced the necessity of confirming identity markers and the value of expanding the sources tapped, multiplying small samples, and re-sampling subsets (Table 1). Construction of each database was an experiment in research design and, as it turned out, a rehearsal for the massive project to which we now turn.

2. The city writ large

From experience with those two censuses for the birth cohorts, we were excited at the prospect of researching households at an interval of 20 years. Why in the world would you want to do this? At the scale of the continent, Ruggles has used intercensal links to track migration patterns and establish long-run trends in geographic mobility and household composition over 130 years, to reappraise the meaning of the agricultural frontier and racial migrations in the US, and Kasakoff, from genealogical sources, to appraise mobility in terms of "access to kin" and regional concentrations of wealth[17]. We are working at a different scale of resolution, but here, too, in a single metropolitan area and a span of 20 years, successive places of residence provide cues to assets and social networks, and the human dyads, their regrouping in households, and their removals to new locations may offer cues to lifetime social trajectories[18]. In this section of the paper, after a brief account of adjustments to ensure compatibility of the two sets of data, I focus on the magnitude of the "missing persons" problem.

Making the data compatible

The 1901 index we transformed into two tables: a table of households and a table of their members, the members linked by a household id number in the same way as the 1881 tables[19]. For analytic purposes, we use the variables of personal identity available in 1881, to distinguish five-year age groups, male and female, in the three cultural communities. We derived some additional variables to categorize households by number of persons, number of servants, presence of boarders, and other features of household composition. I gave close attention to distinguishing and re-aligning maiden and married names of women, and to creating id variables that would retain the order and logic, as well as the geography of the original census document.

Precision in reporting of ages differs between the two censuses. Age heaping is much reduced in 1901, but its severity in the 1881 data forces us to tolerate age differences as great as 5 years for matching individuals between the two dates[20]. In the creation of life tables, we made further adjustments, in particular a re-classification of census "one-year-olds" on the basis of ages known from baptismal registers[21].

The 1901 entry column "Relation to head" provides clues we do not have in 1881 for recognition of family relationships and household types. Nine households out of ten can be classed as "simple families" (parents and their children, the couple without children, or a surviving parent with children), and in such households the rubric "Relation to head" clarifies the relationships among all the members. For 1881, Danielle Gauvreau applied an algorithm based on age, sex, marital status, order of appearance, and shared surname; which was effective[22] in

identifying 85 percent of households as superficially "nuclear" or "simple"; in these households all the dyads are first-degree kin, and we can infer the probable relationships[23].

Although the 1901 index offers only a small number of variables, tests for representativity can be carried out using a 15 per cent sample of the urban population with a much larger array[24]. From these tests, we note some differences between the 1881 and 1901 populations: in 1901 a somewhat larger share of French Canadians, fewer married people under age 21, fewer children under age five, in the reported work force a smaller share of labourers and more young women, and among waged women a smaller proportion of domestic servants. There was little change in distribution of sizes of domestic households, the percentage headed by women, or the very large share of "simple" households. Commercial boardinghouses (three or more boarders) increased in size to house half of all boarders; and institutions expanded, several to over a thousand inmates: they housed one per cent of the population in 1881, three per cent in 1901[25]. Except for the increased numbers in institutions and large boardinghouses, none of these differences should affect the prospects for recognizing the 1881 individuals.

The geographic boundaries of the census divisions of 1881 and 1901 are hopelessly incongruent. To obtain precision and comparability of location, I   employ the fine-grained street segment, as described earlier for 1881[26]. The Census of 1901 reported a street address, but on a separate schedule, cross-referenced by page and line number. From the Property Schedule our team collected addresses for the entire index, reintegrated them and coded them by street segment[27]. The segments are of sizes comparable to 1881 (mean 100 households), more numerous in 1901 (772 instead of 444).   In view of a generalized trend to slightly larger dwellings and corresponding higher rents, we re-calibrated the categories of status to obtain the same proportional distribution (Figure 2). At either date the mid-range is comprised of streets of exceptional diversity (Figure 3), most of them shopfront streets with a greater variety of sizes of dwellings, sizes of households, occupations, and cultural affiliations[28].

Missing persons

Across the 20-year gap, what would be realistic expectations of match rates? We need to take into account not only the problems inherent in the record matching process, but exits, deaths, and name changes. We have seen that even in records of the same date or 12 months apart, we are not likely to achieve matches for more than two thirds, as a result of illegible microfilm, mistaken handwriting, insane spellings of surnames, variants of designated household head, and homonymy - more than one John Smith, Joseph Archambault, or Mary Ryan. Exit rates observed in the little surname samples amounted to 10 per cent over the 1890s decade, with some concentration at ages 15-29, and losses higher for the English- than the French-speaking. If we

extrapolate to the 20-year span, losing one third to "confusion" and 19 per cent to out-migration, we might realistically hope to find in each age group about half the number of presumed survivors. And how many would that be? Studies of the 1950s and even 1970s inferred enormous rates of departure from North American cities, in large part because they did not account for deaths[29]. The high death rates and their variations with respect to age, sex, and ethnicity, are such that we need to appraise those losses in order to know whether we have achieved a satisfactory level of matching across the 20-year gap, or comparable match levels for several social groups. Patricia Thornton, from her local life tables for 1881, generated 20-year survival rates. As shown in Figure 4, mortality rates among infants are based on the local cohort of 7516 births (1 April 1879 to 31 March 1880), mortality rates at ages over 12 months, on 5909 deaths of the calendar year 1881, all of them matched to census families of April 1881[30]. Examined by age and sex, survival rates differed among the three cultural communities (Table 3), especially poor among French Canadian children under five. Survival prospects for Irish Catholic women were better than Irish Catholic men at all ages (with the implication of more widows), among Protestants better for women at ages over 35, among French Canadians worse than men to age 30 (Figure 5).

We need also to make an attempt to reduce losses that would result from unrecognized name changes of women who marry or remarry in the interval. The digital source made available by Projet Balsac exhaustively covers the Catholic registers[31]. From 39 052 marriages celebrated in Catholic parishes of Montreal, 1881-1901 inclusive, I matched 12 000 first-married brides to their families of origin in the 1881 census (31 per cent), 10 000 first-married grooms to their families of origin in 1881 (26 per cent), and 16 000 of the newly married couples (half) to couples or widowed parties named in the 1901 census index. Using the linkages to the marriage record, I could then (automatically) link a set of people who were single in 1881 (many of them children) to the census record of 1901. The initial plan was simply to capture the maiden names, so that our "finds" would not be so heavily sex-biased or limited to women who had not married. Somewhat to our surprise, we found the payoff from marriage records just as valuable for men because of the potential for distinguishing among homonyms, detecting the re-married (more frequent among men), observing attrition in the later-married cohorts, and confirming the origins of stepchildren.

The tedious detour of linking 38 000 census records to a marriage record initially produced only 4000 "automatic" matches of an individual between the two censuses. Not a large number! I then selected 8500 cases I had set aside of a second (or third) marriage between 1881 and 1901 (2500 women and 6000 men). Tracking these people retrieved 750 more women and 2000 more men who in 1881 were living with the earlier spouse or widowed but not yet remarried. At present, of the 1881 population linked to a marriage record in the interval, I have

identified just over half in the Census of 1901, 53 per cent of the men, and 48 per cent of the women.   We uncovered 1419 people whose status changed twice, 400 three times, and these are understated since each change of status adds to the risk of no-match.

Lower rates of recovery in the Protestant population, especially for women, are evidence of the usefulness of the Catholic marriage records (Table 4, Figure 7). I did not come to grips with all available Protestant marriage records. Because the local Protestant registers rarely report the full names of parents of bride and groom, they leave many ambiguities and inspire too much guesswork[32]. In the matched set, in addition to underrepresentation at ages of intense nuptiality, and the more severe underrepresentation of Protestants at those ages, we can anticipate some underrepresentation of the very poor due to underregistration in the Census of 1881, ambiguities surrounding boarders and single-room occupancies (never identified in the taxroll), and poor address coding in Point Saint-Charles and Hochelaga, low-rent areas under rapid development in the early 1880s[33].

Tolerances

The estimates of survival and exit rates, together with experience of "matchabilities" suggests setting targets of acceptable match levels at about 50 per cent of estimated survival, as shown in Figure 6. We can then compare the numbers of "Founds" with numbers of "Should-be-founds", and consider the shortfalls[34]. As we would expect, the excess of missing persons is rooted in the category of "unrelated individuals".   Ruggles defines them as individuals who from their surnames, occupations, and origins, seem not to be related to any other person in the household. Unrelatedness compromises matching: these are people who fall outside the reach of our dyadic strategy.   Because the safest and surest confirmation of an identity is from data for *two* people, we are losing a large share of the people who in 1881 were domestic servants (4000), living as "unrelated" boarders (8500), or living alone (1900). These groups amount to at least 18 per cent of the population[35].

Because living "unrelated" was most common at ages 15-29 (and to a lesser degree among the elderly), we will have trouble matching people who fall into that age group in 1881 and also people younger, who in 1901 have moved into the ages of maximum "unrelatedness"[36]. We see in Figure 8, for the relatively well-recorded French Canadian population, that the hard-to-identify set of young women 15-24   looms large in the overall population structure. Their rates of survival and retention in the city should be high, but the percentage I can identify is low. In most age groups, find rates approach 35-38 per cent, for women 15-24 (in 1881), only 30 per cent. For males, find rates are higher, but the deficits relative to other age groups are relatively more severe, at ages 15-29. Table 5 compares the troublesome age group 15-29 with the remaining population of 1881.

11

The low match rate in these age sets suggests the likelihood of bias, aggravated by the heterogeneity of the set. For servants (95 per cent women), inability to identify a family of origin reduces the chances of making a firm link to a marriage record. Since we cannot use the neighbourhood of the employer to evaluate the servant's social status, low retrieval of servants aggravates the underrepresentation of low-rent families. We know also that between 1880 and 1900 the ethnic distribution of servants shifted, city-born girls were avoiding these jobs, and leaving them to new streams of in-migrants[37]. In the case of religious vocations, two thirds women, observations of specific orders suggest important effects of aging of personnel and deployment of recruits from rural origins[38].   Among both boarders and servants, high turnover of makes it likely that the census taker has missed some of them, and may have obtained less accurate information[39]. Lovell's directory does not improve recovery of lodgers: in 1881 735 male boarders were listed, only 26 female boarders[40].

The "unrelated individuals" are - obviously - associated with particular types of households - to one-person households (only one per cent of all households), to families with a servant (11 per cent of households), or to "complex households". It is those households of greater complexity - the 15 per cent - that are harbouring the "unrelated" as well as an array of their own miscellaneous relatives. To be sure, not all are truly "unrelated". Even in the Census of 1901, many people reported as "lodgers" were "in-laws" with a first-degree relationship to someone in the household. They can be detected once we have realigned the names of married women, and more are apparent where we recover maiden names from marriage records.

Let us sum up the situation so far. Over the 20-year span, the problem lies not in the wrong-match realm, but in the no-match realm. Where we encounter diminishing returns to the matching effort[41], we fix a target rate (half), and where we fall short of it, in the age groups 15-29, we dare not assume representativity[42]. But for other   age groups we might! This gives us a sample of one quarter of the people present in 1881, and approaches half of the people we can suppose survived to 1901.

3. A preview of the payoffs: pathways through the city

If, aside from the segment 15-29, we treat the "Founds" as valid samples of the 1881 population, can we learn something of social pathways? In view of the uncertainties about the validity of the "samples", let's think of them as hypotheses rather than findings. We can explore some life transitions, geographic moves, and paths through the hierarchy of social status. We reduce the biases by controlling for ages and the fit with household structure. Where differences emerge, we will have to test further for variations of ethnicity and diversity of starting points.

One might ideally attempt regression modeling of the chances of recovery[43], but here I have tried only a simpler first step which amounts to a "re-sampling" with stratification, and it is not very illuminating.

Transitions

If we call those identified in 1901 as having made certain life transitions in the interval since 1881 -   moving into and out of marriages - we may be able to make some observations about the ages of such transitions, the extent to which they undermine matching, and how they may affect geographic or social mobility.

Of people who were single in 1881 and still single 20 years later, most were small children in 1881, living with their parents, and are still living with a parent or parents in 1901. They are therefore more easily found, with a higher proportion of males who are likely to marry a little older. Couples already married in 1881, and who survive *as couples* in 1901, are also readily found. The widows and widowers of 1881 are an older group; smaller numbers are retrieved, but more than anticipated, and more women than men. Men and women who embarked on a first marriage between 1881 and 1901, are a youthful distribution (dominant are ages 5 to 19 in 1881), and we already know, from analyses in both 1881 and 1901 samples, how age at first marriage varied with social status and cultural community - decidedly more youthful among French Canadians.

What about those whose trajectories are more complex? Persons married since 1881 and widowed before 1901 (two transitions), draw from the same age groups; and of those, the ones who have remarried by 1901 (a third transition) are a little older, more of them men (peak 15-24 in 1881).

Men and women already married in 1881 and widowed before 1901, are an older distribution, and the match rates are reduced by a high probability of death of both parties. Among "the widowed", the female set peaks 40-55, the male set   40-49. Far fewer women remarry, and they constitute a much younger distribution (peak at 25-34 in 1881) relative to the men (peak at 30-44). Of those who have remarried, some have enter into recomposition of complex households, while others have exited as re-simplified households (the new couple alone).

Deaths I could confirm from the data are consistent with a classic J-curve that reflects two sources of information: the 1881 cohort of deaths from which we created the survival estimates, and a set of deaths I infer from the record of a spouse widowed or remarried. This second mechanism confirms more deaths of women at ages 25-35, of men 35-45. Identification of men is as difficult as of women, since the Catholic record of death of an adult male rarely specifies the spouse.

The problem of the unrelated is produced at critical points in the life course. Conceptualized as life course transitions into and out of marriage, these have implications for household arrangements by age (Figure 8) as well as the shortfalls of traceability (Figure 7). The difference of ages for men and women arises from the differences of age at marriage and the premium on male salaries for support of widowed mothers. Household composition is culturally managed in relation to decisions about marriage itself. Over 500 households are made up exclusively of co-resident siblings, without parents. These households were supporting three women for every two men They are concentrated (half) in the mobile age groups, and recovery rates are very low, about 10 per cent, since so many promptly marry, but absence of information about parents hampers confirmation of the link to a marriage record. While most of these sibling sets are orphaned, several sets have moved into the city without their parents, and the 1901 information shows that a parent has followed.

Although the transitional roles and lodging situations cover only a modest share of the population at a given moment (15 to 20 per cent), they affected a very large share of lives. In the late nineteenth century, at least half of the people who survived to age 15 would subsequently experience a brief critical period of solitude, dependency, or recourse to a temporary or ephemeral "home". To shelter or sustain them, many others were engaged in a trying compromise, financial sacrifice, or harsh adjustment. Given the risks associated with entry or exit from a marriage, most adults functioned over many years against a backdrop of anxiety and contingency planning.

Of dyads co-resident in 1881, most were slivers of "family", and the numbers of transitions into and out of married life show how large a share of those initial dyads were split into separate households, either as newly formed couples or as remnants or reconstructions from parent couples broken by death.

Geographic pathways

In terms of geographic pathways, moves I succeeded in tracking indicate a centrifugal tendency understandable as a response to the attraction of newer housing at the rim of the city. Only in a small central business district (already thought of in 1901 as "Old Montreal") and to some degree in Griffintown, did pressures of commercial and industrial expansion produce net losses of population[44]. In all other neighbourhoods population density increased substantially over the 20 years. Where we observe net loss of 1881 individuals, it is because newcomers have replaced them, occupying older, more crowded parts of town.

In terms of ethnicity, the geographic moves are consistent with the persistence of high levels of residential segregation[45].   We know that levels of residential segregation were virtually unchanged between 1881 and 1901, with respect to rich and poor, French- and English--speaking,

Catholic and Protestant[46].

In 4400 families of 1881, I have tracked two or more members, and we observe the split into two or more households. In most cases children have married, moved out and set up households of their own. Few of the 4400 are still living in the same neighbourhood. This amounts in 1901 to 14 000 households with a first-degree kinship link to at least one other household, and such relationships - beyond the census family - affect nearly one third of the population retrieved. Mapping the related households uncovers a high frequency of very short distances - scores who lived next door or in another dwelling on the same lot, hundreds who lived in the same 1901 census division (much smaller than the 1881 divisions)[47].

Social status

In terms of social mobility, we observed (as reported in an earlier paper) evidence of net upward social mobility from one generation to the next, as measured in terms of both occupational status and residential status. Occupational mobility was a little greater for Irish Catholic sons relative to their fathers, and for Irish Catholic sons-in-law relative to their fathers-in-law (some of whom had died)[48]. The present larger set of matched records also shows upward mobility of the individuals who survived and traced 20 years later. A large share are, in 1901, living in a higher-rated neighbourhood than in 1881: 37 per cent of French Canadians, 38 per cent of Irish Catholics, 45 per cent of Protestants. I cannot discern any change as a function of age, of how long ago the individual married, or the number of transitions into and out of marriage. All of these factors point to the greater importance of intergenerational mobility relative to achievement within the span of a working life. Schooling seems to play a role. In 1881 most of the children of Montreal are reported "in school" at ages 10 to 13 years inclusive (85 per cent of boys and 82 per cent of girls). Of those retrieved, the "schooled" were living in better streets in 1901 (mean level 2.5 as compared with 2.0 for the "unschooled"), but the interpretation of differential success is uncertain since we retrieve fewer of those who were not in school that year (20 per cent rather than 28 per cent).

I selected for experiment several small sets of dyads of specific types: as recognized in 1881, sons of widowed mothers, men whose mothers-in-law lived in the same household. These households, relatively simple in 1881, are characterized in 1901 by a great variety of relationships. As Ruggles has repeatedly pointed out, the elderly were at risk of a shrinking web of kin. It was sometimes stretched by adoptive arrangements, inclusion of second and third degree kin, in-laws of in-laws, or "fictitious kin".

The shortfalls in our understanding of the "unrelated" suggest priorities for the research agenda. In the remarkable expansion of historical demography of Quebec over the past 40 years, points of fragility include empirical estimates of rates of entry to the city, rates of departure,

length of widowhood, time lapse before remarriage, and the processes of household formation as distinct from family formation. More specific questions need to be addressed by both demographers and social historians: the fecundity of second marriages, ages of children at deaths of their parents, turnover in institutions, entry to religious life and an early mortality transition in that population. Worthwhile research targets might include specific occupations such as servants and labourers, specific types of households such as boardinghouses and rear dwellings, and the smaller cultural subgroups such as the various Protestant denominations and Catholics of Scottish and English origins[49].

Conclusion

The proof of the pudding is always in the eating. The 1881 databases have already been groomed over a decade, exploited for a variety of purposes, and are accessible to everyone. Of the 1901 samples, the Canadian Families Project (5 per cent) has been heavily used, the others less so. Their amalgamation and geocoding are promising, but lengthen the chain of collective authorship and pose additional problems, demanding a more systematic and sharable documentation - another zone in which I am remiss[50].

Was the 20-year matching exercise worthwhile?[51] I could have been doing something else for six months! As I look back on it, addressing and geocoding the 1901 census index was worthwhile and should be shared. The objective of putting census households on the map makes it possible to ground earlier samples in the urban space and dwelling stock, to exercise greater control over geographic coverage of a sample, and to offer new opportunities for sampling the social space. The existence of the 1901 index, created and initially used by people seeking an individual or personal family history, in fact offers an extraordinary tool for exploration by historians, and for construction of future samples by demographers and geographers who are rarely satisfied with 5 per cent!

Capturing maiden names is also proving useful for analysis of household structure, and the estimation of survival rates is of interest for the dynamics of family dissolution. Finding rates I could probably have established from a sample, perhaps the B subset. (Why didn't I follow Rule No. 2?) Beyond the first round of linking the 20 years of marriage records, the refinements I attempted do not go much beyond what we published two years ago[52]. Initial application of the household typology revealed the increase of large boardinghouses, the fragility of two-person households, and the rarity of households that did not include both a man and a woman over 15[53]. There may be further possibilities if we explore more of the dyads of co-residence, to penetrate the dynamics of the high-mobility age group and the 15 per cent of households that not "standard" families.

There is no doubt that the basis for organization of most households was first-degree

kinship. Kinship extending beyond the co-resident household has tended to disappear from the literature of the industrializing city, largely because of our dependence on the census as a source and the "census household" as an organizing principle[54]. The evidence from Montreal reminds us that kinship remained the foundation for cultural transmission (language, religion, godparenting), for transmission of craft, domestic, and entrepreneurial skills, organization of apprenticeship and entreprise. Extended family contributed to investment in education; and inheritance within family networks was the prime vehicle for transmission and redistribution of property, both movable and immovable. The wish to enjoy, maintain, exploit, extend, reciprocate, and groom these relationships exerted a powerful constraint on decisions to move, and tended to conserve cultural patterns of residential segregation. In other words, kinship was a strategic component of the social organization of the city.

Those three processes - kinship, culture, and property -   help to explain how, in a fast-growth system, so many features remained stable or were self-reproducing. Understandable interest in technological and industrial advances has accustomed us to search the past for emergence of novelty; but research on nineteenth-century Montreal suggests some impressive elements of stability. Cultural loyalties persisted strong over at least three generations, most youth married within their community (92.5 per cent), residential segregation persisted at the same high level. Household structure changed little despite the continual turnover in membership of a household, and social inequality persisted at the same high level, despite the large share of individuals whose relative position improved. These characteristics added to the rigour and risks of city living, but they were essential also to making the city livable, and making it possible for all those egos to exchange, to collaborate, to innovate, to endure, and to endure one another.

List of Figures

List of Tables

Table 1   Ten rules of thumb
1. Smaller samples, more sources
2. Pre-test small pilot datasets
3. Error control: estimate error, test and re-set tolerances, target match rates
4. Grooming: keep the orignal datum; standardize and correct into new variables
5. Archive each version; file names, date stamps, back-ups
6. When your patience wears thin, take a break!
7. Exploratory data analysis (EDA) *and* hypothesis-testing at every step
8. Subsets as testbeds for bias, calibration and re-sampling
9. Analytic categories: multiple facets of identity, multiple scales of analysis
10 Document: participants, dates, formats, tactics, errors, match rates

Table 2   Sources of bias
Bias inherent in the source
      rent level? age heaping?   marital status?
      excluded or missing: illegitimates, homeless
Bias arising in data collection and transcription
      ethnic names? language disjunct? religious vocations?
      sampling geography?
      taken-for-granted categories of occupation? social status? ethnicity?
Differential match rates resulting from losses
      time elapsed? name changes? homonymy?
      variable reporting of headship?
      disparity of variables available
      investment in grooming of the two datasets

References

Alter, George 1987. *Family and the Female Life Course. The Women of Verviers, Belgium, 1849-1880*. Madison: University of Wisconsin Press.

Alter, George 1999. Casting spells, database concepts for event history analysis, *Historical Methods* 32-4, 165-176.

Amorevieta-Gentil, Marilyn 2010. Les niveaux et les facteurs déterminants de la mortalité infantile en Nouvelle-France et au début du Régime Anglais (1621-1779). Ph.D. diss. (Démographie) Université de Montréal.

Bardet, Jean-Pierre 1983 *Rouen aux XVIIe et XVIIIe siècles, Les mutations d'un espace social*. Paris, SEDES.

Baskerville, Peter A. 2008. *A Silent Revolution?: Gender and Wealth in English Canada, 1860-1930*. Montreal: McGill-Queen's University Press.

Baskerville, P., and E.W. Sager 1998 *Unwilling Idlers,The urban unemployed and their families in late Victorian Canada*. Toronto: University of Toronto Press.

Bernard, Claude 1952 (1865) *Introduction à l'étude de la médecine expérimentale*. Paris: Flammarion

Bradbury, Bettina 1997. Wife to Widow: Class, Culture, Family and the Law in Nineteenth-Century Québec, 3 novembre. Montréal, Les Grandes Conférences Desjardins.

Bradbury, Bettina 2000., Single parenthood in the past, *Historical Methods* 33-4, 211-217.

Bradbury, Bettina 2004. Itineraries of marriage and widowhood in nineteenth-century Montreal, pp. 103-140 in *Mapping the Margins, The family and social discipline in Canada 1700-1975*, Nancy Christie and Michael Gauvreau, eds.

Canadian Families Project 2002. *The National Sample of the 1901 Census of Canada User's Guide*. Eric W. Sager, dir.,   University of Victoria.

Castro, Marcia, and Alice Bee Kasakoff 2007. Spatial concentration of wealth in the American North in 1860, paper presented at Social Science History Association ("Spatial Statistics in Demographic Research"), Chicago, 15 November.

Curtis, Bruce 2000. *The Politics of Population, State Formation, Statistics and the Census of Canada, 1840-1875*. Toronto, University of Toronto Press.

Danylewycz, Marta 1988. *Taking the Veil, An Alternative to Marriage, Motherhood and Spinsterhood in Quebec, 1840-1920*. Toronto, McClelland & Stewart.

Darroch, Gordon 2000. Constructing census families and classifying households: "Relationship to head of family or household" in the 1901 Census of Canada, *Historical Methods* 33-4, 206.

Darroch, Gordon 2002. Semi-automated record linkage with surname samples: a regional study of "case law" linkage, Ontario 1861–1871, *History and Computing* 14, 1, 153-183.

Darroch, Gordon, and Ornstein

Derosas, Renzo 2004. A family affair: marriage, mobility and living arrangements in nineteenth century Venice, 1850-1869, in *The Road to Independence: Leaving Home in Western and Eastern Societies, 16th – 20th centuries.* Frans Van Poppel, Michael Oris and James Lee eds. Bern, Peter Lang, 143-196.

Dillon, Lisa Y. 2000. International partners, local volunteers and lots of data: the 1881 Canadian census project. *History and Computing* 12-2: 163-176.

Dillon, Lisa Y. 2002. Challenges and opportunities for census record linkage in the French and English Canadian context. *History and Computing* 14: 185-212.

Dillon, Lisa Y. 2008. *The Shady Side of Fifty: Age and Old Age in Late Victorian Canada and the United States*. Montréal : McGill-Queen's University Press.

Dufaux, François, and Sherry Olson 2009

Fecteau, Jean-Marie

Ferrie, Joseph. 1996. A new sample of males linked from the Public-Use-Microdata-Sample of the 1850 US Federal Census of Population to the 1860 US Federal Census Manuscript Schedules. *Historical Methods* 29: 141-156.

Gauch, Hugh G. jr. 2006. Winning the accuracy game, three statistical strategies. *American Scientist* 94 (March-April): 133-141.

Gauvreau, Danielle, and Peter Gossage 2001. Canadian fertility transitions: Quebec and Ontario at the turn of the twentieth century, *Journal of Family History* 26-2, 162-188.

Gauvreau, Danielle, and Sherry Olson 2009. Household structures in 1901 industrializing Montrea;: An overview and critical assessment. Paper presented at the annual conference of the Canadian Population Society (Ottawa, May).

Gauvreau, Danielle, Patricia Thornton, and Sherry Olson 2008. The harsh welcome of an industrial city: immigrant women in Montreal, 1880-19002, *Social History - Histoire Sociale* 40, no. 80 (November), 345-380.

Gauvreau, Danielle, Patricia Thornton, and Sherry Olson   2008. Mobilité sociale dans une ville industrielle nord-américaine, Montréal 1881 à 1901, *Annales de démographie historique* (ADH) 2008-1: 89-114.

Gilliland, Jason 1998. Modeling residential mobility in Montreal, 1860-1900, *Historical Methods*, 31-1: 27-42.

Gilliland, Jason, and Sherry Olson 1998.   Claims on housing space in nineteenth-century Montreal, *Urban History Review* 262:3-16.

Gilliland, Jason, and Sherry Olson (submitted).

Gossage, Peter 2004. Marginal by definition? stepchildren in Quebec, 1866-1920, pp. 141-172 in *Mapping the Margins, The family and social discipline in Canada 1700-1975*, Nancy

Christie and Michael Gauvreau, eds.

Green, Alan, and Mary MacKinnon 2001. The slow assimilation of British immigrants in Canada: Evidence from Montreal and Toronto, 1901, *Explorations in Economic History* 38, 315-338   ((the other))

Guest, Avery. 1987. Notes from the National Panel Study: Linkage and migration in the late nineteenth century. *Historical Methods* 20: 63-77.

Hall, Patricia Kelly, and Steven Ruggles. 2004. 'Restless in the midst of their prosperity': new evidence of the internal migration patterns   of Americans, 1850-1990." *Journal of American History* 91: 829-846.

Hanna, David, and Sherry Olson, Social landscape of Montreal 1901, in *Historical Atlas of Canada* vol. III 1990) Plate 30, and vol. II (1993) Plate 49. Toronto, University of Toronto Press

Henry, Louis, et Alain Blum 1988 *Techniques d'analyse en démographie historique*. Paris, Éditions de l'Institut national d'études démographiques, 2nd ed.

Inwood, Kris and Richard Reid 2001. Gender and occupational identity in a Canadian census, *Historical Methods* 32, 2 (Spring), 57-70.

Kasakoff, Alice Bee 2007. The fabric of time is torn: migration in the US North and Europe in the 19th century, paper presented at Social Science History Association, Chicago, 17 November.

Laflamme, Valérie 2007. *Vivre en ville et prendre pension à Québec aux XIXe et XXe siècles*. Paris, L'Harmattan.

Laslett, Peter and Richard Wall eds. 1972. *Household and Family in Past Time: Comparative Studies in the Size and Structure of the Domestic Group over the Last Three Centuries*. Cambridge, Cambridge University Press

Lauzon, Gilles 1992. Cohabitation et déménagements en milieu ouvrier montréalais : essai de réinterprétation à partir du cas du village Saint-Augustin (1871-1881). *Revue d'histoire de l'Amérique française* 46-1 (été): 115-142.

Lewis, Robert D. 2000. *Manufacturing Montreal, The Making of an Industrial Landscape, 1850 to 1930* . Baltimore, Johns Hopkins University Press, 337pp.

Lewis, Robert D., ed. 2004. *Manufacturing suburbs : building work and home on the metropolitan fringe*. Philadelphia: Temple University Press.

Linteau, Paul-André. 1981. *Maisonneuve ou Comment des promoteurs fabriquent une ville, 1883-1918* Montreal, Boréal Express.

Long, Jason 2005. Rural-urban migration and socioeconomic mobility in Victorian Britain, *Journal of Economic History* 65-1: 1-35.

Lovell's Montreal Directory of 1880-81... corrected to June 11th 1880. Montreal, J. Lovell.

MacKinnon, Mary 2000 Unilingues ou bilingues? Les Montréalais sur le marché du travail en 1901. *L'Actualité économique* 76, 1: 137-158

McCann, Larry, with Ian Buck, David Jordan, and Shaun Manella 2000. Reconstructing the geographical framework of the 1901 Census of Canada. *Historical Methods* 33: 199-205

Minns, Chris, and Marian Rizov 2005. The spirit of capitalism? Ethnicity, religion, and self-employment in early XXth century Canada, *Explorations in Economic History* 42: 259-281.

Morris, Robert J. 2005. *Men, Women, and Property in England, 1780-1870: A social and economic history of family strategies amongst the Leeds middle classes.* Cambridge, Cambridget University Press.

Myers, George C., and Cheryl Elman. 2000. Morbidity, disability and mortality in the United States in the late nineteenth century: Differentials and social implications. *Cahiers de la Société de démographie historique* 2: 93-109.

Nootens, Thierry 2005. "What a misfortune that poor child should have married such a being as Joe": les fils prodigues de la bourgeoisie montréalaise, 1850- 1900. *Canadian Historical Review* 86, 2 (juin), 225-256.

Olson, Sherry 2000. Feathering her nest in nineteenth-century Montreal, *Social History / Histoire sociale* 33 (May), 65 :1-35.

Olson, Sherry, and Patricia Thornton 2001. La croissance naturelle des Montréalais au XIXe siècle. *Cahiers québécois de démographie* 30, 2 (automne): 191-230.

Oris, Michel 1996. Fertility and migration in the heart of the industrial revolution, *The History of the Family* 1-2: 169-182.

Oris, Michel, Gilbert Ritschard, and Grazyna Ryczkowska 2006. Les solitudes urbaines, structures et parcours dans la Genève des années 1816-1843, Annales de démographie historique 1: 59-87.

Parkerson, Donald H. 1982. How mobile were nineteenth-century Americans? *Historical Methods* 15 (Summer): 99-110.

Perrenoud, Alfred 1979. *La population de Genève du seizième au début du dix-neuvième siècle: Étude démographique.* Genève, Jullien.

Rodger, Richard 2001. *The Transformation of Edinburgh, Land, Property and Trust in the Nineteenth Century.* Cambridge, Cambridge University Press.

Rosental, Paul-André 1999. *Les Sentiers invisibles, Espace, familles et migrations dans la France*

du 19ᵉ siècle. Paris, EHESS, 255pp.

Rousseau, Louis and Frank Remiggi, eds. 1998. *Atlas historique des pratiques religieuses: le sud-ouest du Québec au XIXᵉ siècle*. Ottawa, Presses du l'University d'Ottawa, 45-50.

Ruggles, Steven, 1988. The demography of the unrelated individual 1900-1950, *Demography* 25-4 (November): 521-536.

Ruggles, Steven. 1994. The transformation of American family structure. *American Historical Review* 99: 103-128.

Ruggles, Steven, 2003. Multigenerational families in nineteenth-century America. *Continuity and Change* 17-1: 139-165.

Ruggles, Steven, and Susan Brower. 2003. Measurement of household and family composition in the United States, 1880-2000. *Population and Devlopment Review* 29-1 :73-101 (ok)

Ruggles, Steven. 2007. The decline of intergenerational coresidence in the United States, 1850-2000, *American Sociological Review* 72: 962-989.

Ruggles, Steven 2006. Linking historical censuses: a new approach." *History and Computing* 14(1-2): 213-224.

Sager, Eric W. 2000, National data on working-class earnings: The 1901 Census of Canada. *Historical Methods* 33, 4: 235-242.

Sager, Eric W., and P. Baskerville eds. 2007 *Household Counts : Canadian Households and Families in 1901*. Toronto, University of Toronto Press

Sweeny, Robert C.H. 2007 Spatial and social dynamics of rentier capital in an industrializing own: The case of 19th century Montreal. Paper presented at Economic History Association, Austin, 6 September

Sweeny, Robert C.H., and Sherry Olson 2003 MAP: Montréal l'avenir du passé: sharing geodatabases yesterday, today and tomorrow. *Geomatica*, 57(2): 145-154

Thornton, Patricia A., and Danielle Gauvreau. 2002. Reconciling cross-sectional and longitudinal measures of fertility, Quebec 1890-1900, *History and Computing* 14(1&2): 129-152.

Thornton, Patricia, and Sherry Olson 2001. A deadly discrimination among Montreal infants 1860-1900. *Continuity and Change*, 16-1: 95-135.

Thornton, Patricia, and Sherry Olson 1997. Infant vulnerability in three cultural settings in Montreal 1880, pp. 216-241 in *Infant and Child Mortality in the Past*, A. Bideau, B. Desjardins et H. Perez-Brignoli eds. Oxford: Clarendon Press..

Thornton, Patricia and Sherry Olson 2006. The religious claim on babies in nineteenth-century Montreal, pp. 207-233 in *Religion and the Decline of Fertility in the Western World*, R.

Derosas and F. van Poppel eds. Dordrecht, Springer.

van Poppel, Frans, Jurjen de Jong, and Aart C. Liefbroer 1998. The effects of paternal mortality on sons' social mobility, *Historical Methods* 31-3 (Summer): 101-113.

Young, Brian 1986. *In Its Corporate Capacity: The Seminary of Montreal as a Business Institution, 1816-1876*. Montréal, McGill-Queen's University Press, 295pp.

Acknowledgments

Notes

[1] Data in both the Census of 1881 and the index to the Census of 1901 are well controlled with respect to order and geographic location, and the index is reliably linked to digital images of both the Population Schedule and the Property Schedule. For the 1881 data, see Dillon 2000 and http://www.genealogie.umontreal.ca. The 1901 index, transcribed by volunteer genealogists, is accessible at http://automatedgenealogy.com/, the images at www.collectionscanada.gc.ca/archivianet/. On the census variables see Sager and Baskerville 2007.

[2] Rouen in the 17th and 18th centuries of the order of 80,000 people on 12,000 lots (Bardet 1983), Montreal 1880 160 000 on 10 000 lots. On use of B surnames, see Perrenoud 1979; Oris 2006; Darroch 2002. To correct the sampling density for Irish Catholics, we added Irish names in

R % Ryan, Riley, Rafter, Roach...

[3] BAnQ, Fonds Cour supérieure, District judiciaire de Montréal, *Tutelles*, court approvals of guardianships, contain detailed identifications and ages of surviving children. They specify relationships and places of residence of those present at family councils convoked to advise the court, and usually refer to a death date, will, marriage contract, or inventory. See Gossage 2004.

[4] See, for example, Dufaux and Olson 2009; Nootens 2005.

[5] Ruggles 2002.

[6] We standardized street names to spellings of the Goad Atlas (1881). In creation of "Newfirst", "Newlast", and "Maiden" variables, we opted for lowercase without French accents. We removed punctuation such as the hyphen in Jean-Baptiste or the full-stops of J.J. Johnson. We standardized French Canadian surnames to their most common form (cf. PRDQ), and from 1840s registers of Paroisse Notre-Dame compiled a dictionary of the double-names common in the region, such as Bélair dit Plessis.   We corrected scores of inversions of last and first names, and standardized the most common *prénoms*, retaining French or English variants as they occurred, e.g. Jean-Baptiste to Jean Bap, Jno to John. Codes were added to standardize or regroup occupations in several alternative ways. On the greater frequency of homonymy among French Canadians, see Dillon 2002, 192.

[7]   Of great importance is the effort of Lauzon 1992 to track the route of the 1871 and 1881 census takers.

[8] Since most moves occurred 1 May on a one-year lease, the taxroll of occupants compiled in June 1880 corresponds best to the census of April 1880. Business and industrial occupants are distinguished from dwellings.

[9]   Points for independent households were scattered on the lot, one for each address in the taxroll. Among the 67 divisions in the City (83 in the urbanized area); outside Old Montreal the number of households ranged 104 to 890, median 105.

[10] Even in 1881, to model and map age-standardized mortality ratios, we had to re-group the city's 67 divisions to 27 amalgams.

[11] Since 1847,   an address is recorded in the registers of *Nécrologie* at Paroisse Notre Dame de Montréal; in registers of the Catholic cemetery itself (Notre Dame des Neiges); and in registers of the Mount Royal Cemetery (Protestant) since its opening in 1846. Lovell's directory, since 1864,

classes entries by street address as well as alphabetical order, accessible at http://bibnum2.banq.qc.ca/bna/lovell/index.html.

[12] We have compared the rental assessment (*taxe locative*) with number of rooms in the dwelling, first reported in 1901, and at earlier dates with leases (Gilliland and Olson 1998). The assessor hewed close to floor area of the dwelling (r^2 .99 for a measured sample). Re-expression as rent per person yields a good surrogate for room-crowding (Thornton and Olson forthcoming).

[13] Of households recorded on the rental taxroll of June 1860, ten per cent were missing from the city directory, and ten per cent from the census of April 1861, and the missing were disproportionately from the low-rent stratum (Thach 1987). Since they are not the same set, the problem is amplified in the match rates, hence the value of introducing the additional source, with smaller bias. Coverage had improved by 1881.

[14] See Gauvreau et al. 2009. The wide range of rents makes it convenient to work with them in log transformation (base 10), where they assume a normal distribution; to employ the median and interquartile range to assess central tendency and dispersion respectively.

[15] Addresses differ in sources compiled a few months apart: the cemetery record may not match census or taxroll address of a few months earlier.

[16] In the urban arena, we do not have the financial resources that creation of a national or international database commands, nor are we under the same pressure to automate operations, to encompass rural lifestyles or devise universally applicable categories of identity.

[17] Ruggles 2002; Castro and Kasakoff 2007; Kasakoff 2007.

[18] Gilliland 1998.

[19] The five digital databases were compiled between 1990 and 1998, prior to Statistics Canada release of the microfilms for public use; they can be obtained from the several authors or MAP. The same household id, built from codes for ward, census subdistrict and division, identifies household members in the index and in the more elaborate sample.

[20] To reduce impact of 1881 age heaping on comparisons 1881-1901, Thornton adopted unusual intervals for calculation of age-adjusted fertility: Instead of the conventional 20-24 and 25-29, she used 18-22 and 23-28...; and for estimating life transitions by year of age (proportion in school, having left home by age 15, 16, or married by age 20...) she applied a five-year moving average. I have not applied these refinements here.

[21] The baptismal register is a more reliable source than the census for ages. The apparent precision of a full birthdate in the Census of 1901 is somewhat illusory. While month and day of birth offer attractive clues for confirming an identification, the census year of birth appears to be often a census-taker's calculation from the age reported to him. We adopted a flag devised by Projet Balsac for specifying a missing month, day, or year from a date of birth; but this does not identify the cases where the censustaker may have done the arithmetic. On all these points, as well as the ages reported for the elderly, see Dillon 2009, chapter 1.

[22] Gauvreau conceived a procedure for classifying households, and another for classifying the individual's situation in a household. These were modeled on categories used in the Canadian Families Project, and centred on the number of "parenting relationships", from variables of age, sex, and identities of surname. It is consistent with Laslett's approach and ignores presence of a servant. To improve the classification for 1881, she applied the algorithm to the 1901 data and compared the results with the information available from reported "Relation to head". Even in the 1901 data, Relation-to-head had to be "cleaned", translated, and standardized as a new variable. Of thousands of "wrong" tags, many reflect alternative logics of a censustaker.

[23] 6.6 per cent of individuals were wrongly identified as resident employees (type 1 error), and 6.7 per cent were resident employees not recognized (type 2 error). At the second step, one-family households were reliably distinguished from multi-family households (93% concordance) and institutions (98%). For those living in nuclear families, the relation assigned from age-sex-name algorithm was 80% concordant, but much less satisfactory for more complex households. Even in these households, the little surname samples warn us of high turnover in membership. In what looked like "simple" or "nuclear" families in both 1891 and 1901, a full ten-year series of vital events showed that at least one third were re-structured in the course of a decade, often with a second marriage and a second set of children.

[24]. From a crude sketch map, McCann et al. 2000 painstakingly outlined for the Canadian Families Project, the 1901 census divisions, too small for cross-tabulations of a five per cent sample. Prior to the Canadian Century Infrastructure, "user samples" were conceived with little attention to issues of spatial distribution, forcing users to assume that the undocumented urban "divisions" were well-designed, of comparable size and meaningful boundaries.

[25] It is very difficult to match people in the institutions. Most inmates were "unrelated individuals", religious appear under new names, transcriptions of their roles are poor, with ambiguities among staff, servants, and the "sheltered" or *protégés*. Data entry to both the index and the samples needs grooming by people familiar with French language and Catholic vocations.

[26] The schedule contains an address for 92 per cent of families. Since many of the remainder are cases of two families living in the same house, the street segment can be interpolated, with verifications possible in Lovell's directory. Segments are not strictly identical at the two dates; for 1901 we split some streets of increased density. The original assignments were made by David Hanna and Robert Lewis, with the objectives of obtaining homogeneous neighborhoods and a minimum size (30 households) for statistical reliability.

[27] From the Property Schedule we collected also the number of families in the house and rooms in the dwelling. As we work toward placing the address on a specific lot, the strategy, as for 1881, is to match the census address to an address in the taxroll, where each lot is associated with an owner, a cadastral lot number, and the run of addresses on the lot. We are using the taxroll of property owners of June 1903.

[28] For matching work, we included all available data from the suburbs (index), but analyses calling for variables of ethnicity and occupation, limited to the more elaborate samples, are confined to the city limits. Since the residents of the excluded suburbs were 95 per cent French Canadian and low-rent (the largest groups), their exclusion has limited impact on the stratified analyses.

[29] For compilation and review of that literature see Hall and Ruggles 2004. Parkerson 1982 was among the first to point out the magnitude of the mortality effect on the estimates of mobility.

[30] References and cautionary details in Thornton and Olson (forthcoming), *Population Studies*.

[31] Projet Balsac, Université du Québec à Chicoutimi, provided us their registry of Catholic marriages for the entire region upstream of Lac Saint-Pierre (www.http://www.uqac.ca/balsac/). For first marriages, these records contain full names of parents of both bride and groom (even if deceased); they are well-groomed, and second marriages usually contain names of deceased spouse and link to the previous marriage record.

[32] The Quebec Family History Society provided a compilation of Protestant marriages (http://www.qfhs.ca/), as well as a carefully verified digital version of the marriage register from Christ Church, the Anglican cathedral.

[33] We do not have a complete taxroll for 1880 for St Gabriel and Hochelaga, independent municipalities in 1881, that were annexed to Montreal in 1886. The large cotton mills in Hochelaga had substantial turnover of employment (closures, suspended production, strikes, lockouts), and a large share of female hands were boarders.

[34] In a more elaborate simulation, we might adjust death rates to take into account the toll of children in the smallpox epidemic of 1885, and decline of smallpox and improvement of child mortality late in the century;   this would have a small effect on age structure of the presumed survivor population. Application of more realistic exit rates might moderate the underrepresentation of males 15-34. but those improvements will not solve the problem of "the unrelated". Data available in annual reports of the city's Health Department are limited by weak statistical instruments and straight-line interpolation from decennial census despite a surging in-migration (a peak 1886, a trough 1894). Departures varied from year to year, in response to severe depression, runs   of bankruptcies (1864, 1873, and 1894), and labour disputes and   work stoppages in the cotton mills.

[35] Gauvreau and Olson 2009. Percentages are calculated on the basis of domestic households, fewer than 30 persons. In institutions were both inmates and personnel, including 1300 religious, of whom two thirds were women.

[36] One-person households were rare, and for each person the census described as explicitly living alone in 1901, there were eight more individuals who, from their surname and Relation to Head entry, appear to be "unrelated" to any other member of the household.

[37] On servants, see Gauvreau et al. 2008.

[38] Danylewicz 1988; Rousseau and Remiggi eds. 1988.

[39] In a number of cases of double counting in the census, a girl's age is reported as younger in her family than in the household of her employer. Information was presumably provided in the one case by a parent, in the other by the employer.

[40] The male boarders listed in Lovell's are primarily from white collar and professional occupations or partners in downtown firms; about one in seven was living in one of the town's premier residential hotels.

[41] We had spent several years grooming the small surname samples before we undertook event history analysis for two decades,   then worked six months more on the decades under observation to maximize control and avoid censoring. In contrast, for the mobility study (Gauvreau and Olson 2008), we worked from databases heterogeneous in quality: good spellings and excellent data entry in the Balsac marriage file (39 052), already-groomed 1881 census data (35 000), and still-raw 1901 census data (160 000) where preparation was limited to removal of duplicates and correction of inverted first and last names.

[42] On the effort to obtain representativity in linked samples, see Dillon 2002. Despite the 20-year gap, our match rates for married persons are comparable to that reported there for a search for an 1871 sample population in 1881.

[43] See, for example, Van Poppel et al. 1998; Thornton and Gauvreau 2002. It should be possible to model likelihood of retrieval in 1901 as a function of the individual's 1881 situation with respect to age group, gender, marital status, ethnicity (3 groups), low-rent street, household type, and situation as an "unrelated individual" (servant, loner, living in an institution, or presumed lodger whose surname differs from others in household). I would recode ages as five groups: <15, 15-29, 30-44, 45-59, 60+, and explore the effects of adding two other variables - a Balsac link for a woman, knowledge of her maiden name; for a man, knowledge of a maiden name or previous marriage of any other person in the household.

[44] On the expansion of working-class industrial suburbs in this era, see Lewis 2000; Lewis ed. 2004; Linteau 1981.

[45] Protestants were moving to areas of earlier Protestant concentration, French Canadians to areas of French Canadian concentration, and Irish Catholics to areas of Irish identity and also to newer and better-off areas of Protestant occupance.

[46] Gilliland and Olson 2010; Gilliland and Olson (submitted).

[47] Ruggles 2003 comments on adjacency of elderly couples and households of their offspring in US samples of 1850. In our case, recovery is doubtless biassed toward identification of close neighbours, but we have also recovered kin in farming settlements on the Island (not mapped).

[48] For details, see Gauvreau and Olson 2008.

[49] Among ongoing contributions to these areas of research locally are Dillon 2008; Bradbury on widowhood (forthcoming), Laflamme 2007 on boarders; Baskerville 2008 on women's property; Fecteau and Harvey et al.; paper on the number of religious in Canada, living spaces and institutions.

[50] This exercise also demonstrated the substitutability of occupational data from either marriage register or census (Gauvreau et al. 2009).

[51]See Dillon 2002 on links 1871-1881. Ten-year intercensal links can also be envisioned 1881 and 1901 to Kris Inwood's 1891 sample (10 per cent); and 1901 to 1911 (www.collectionscanada.gc.ca/databases/census-1911/index-e.html, and

http://automatedgenealogy.com/census11/); and comparisons can be made with the remarkable suite of decennial data for Quebec City (St-Hilaire and Marcoux, http://www.phsvq.cieq.ulaval.ca/).

[52] Gauvreau et al. 2008.

[53] Gauvreau and Olson 2009.

[54] Elegant exceptions, employing entirely different sources, are Morris 2005 and Kasakoff 2007.

From parish registers, generate death rates ...
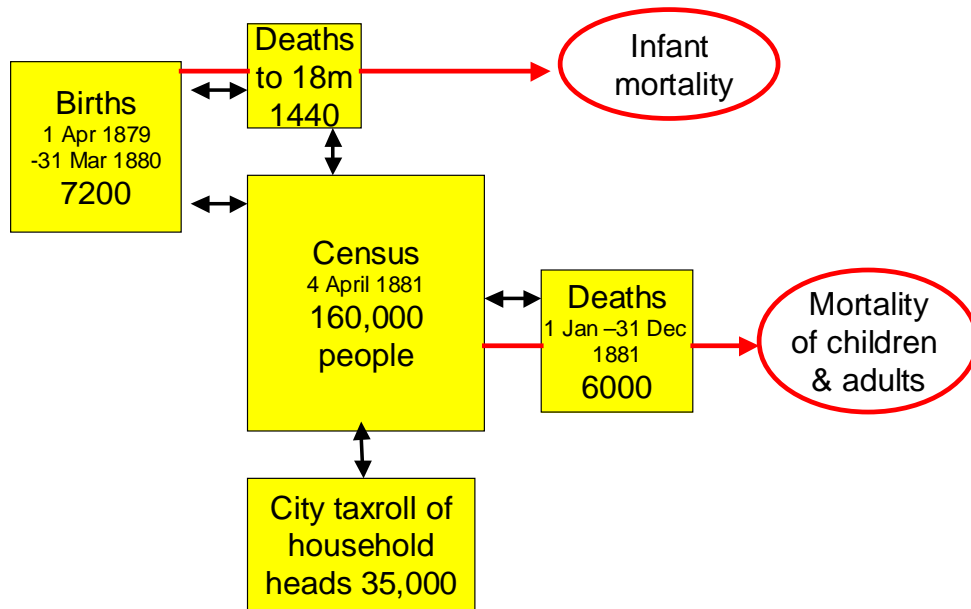
... and estimate survivors
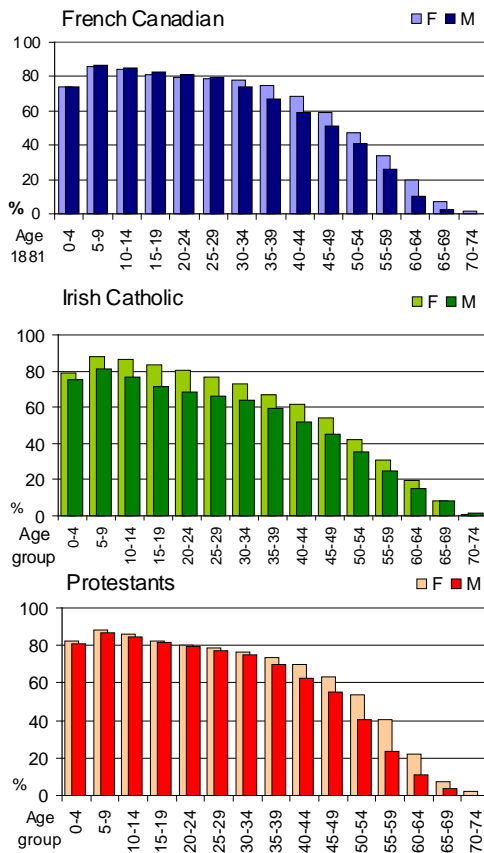
Survival rates by sex
and cultural community

Female excess >30

Male excess
at all ages

Female excess >40

Based on 1881 life table

Figure 6. Percentages identified in 1901 of French Canadians by sex and five-year age-groups, of the numbers expected to survive and remain to 1901 (above, yellow, target line 50%), and of the original population in 1881 (below, red, target line 25%)
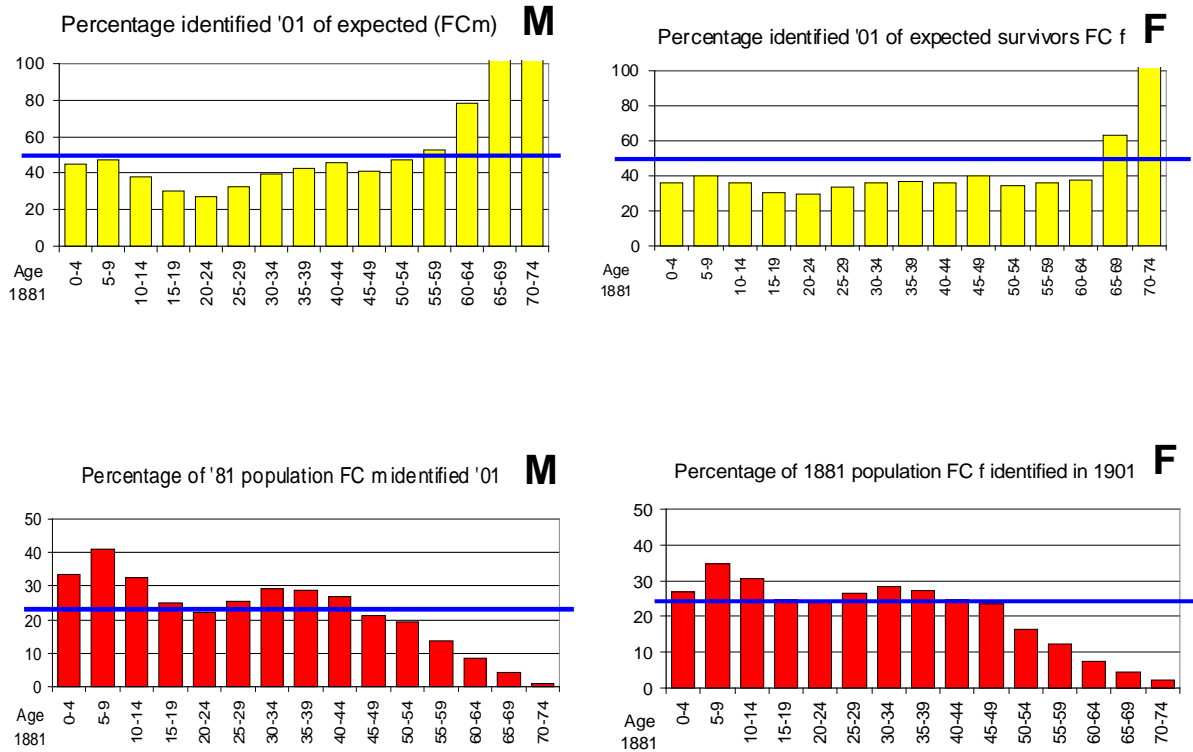
Survivors identified 1901, % of 1881 population, by ethnicity, gender, and age group
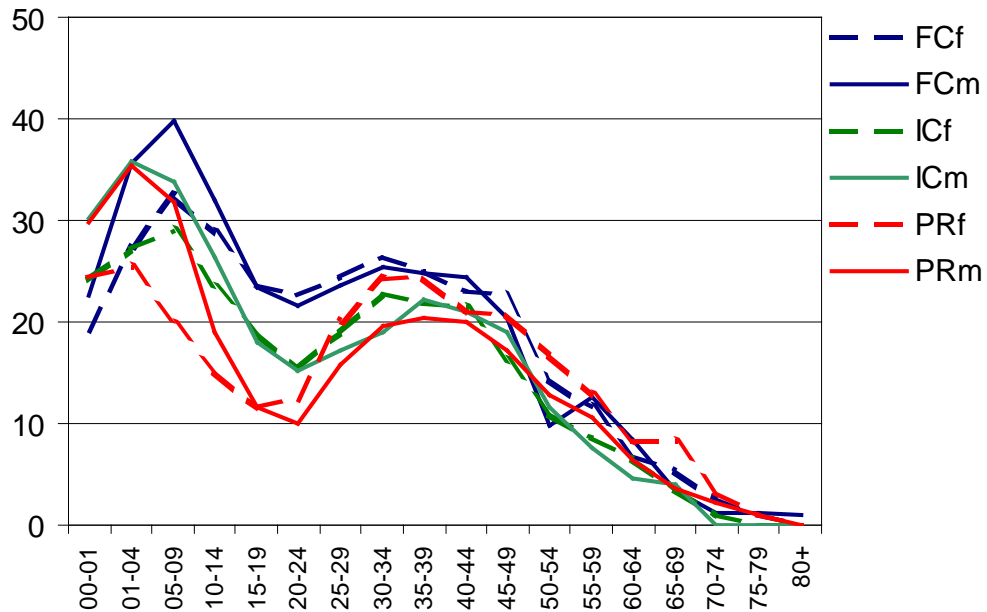
Shortfalls at ages 10-34, Irish Catholics more so, among Protestants, gendered and more extreme

Role in household by age, Montréal,1881

15-30 life transitions
20 years to census
29 years = generation
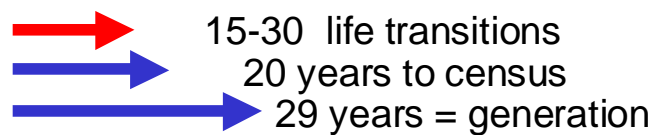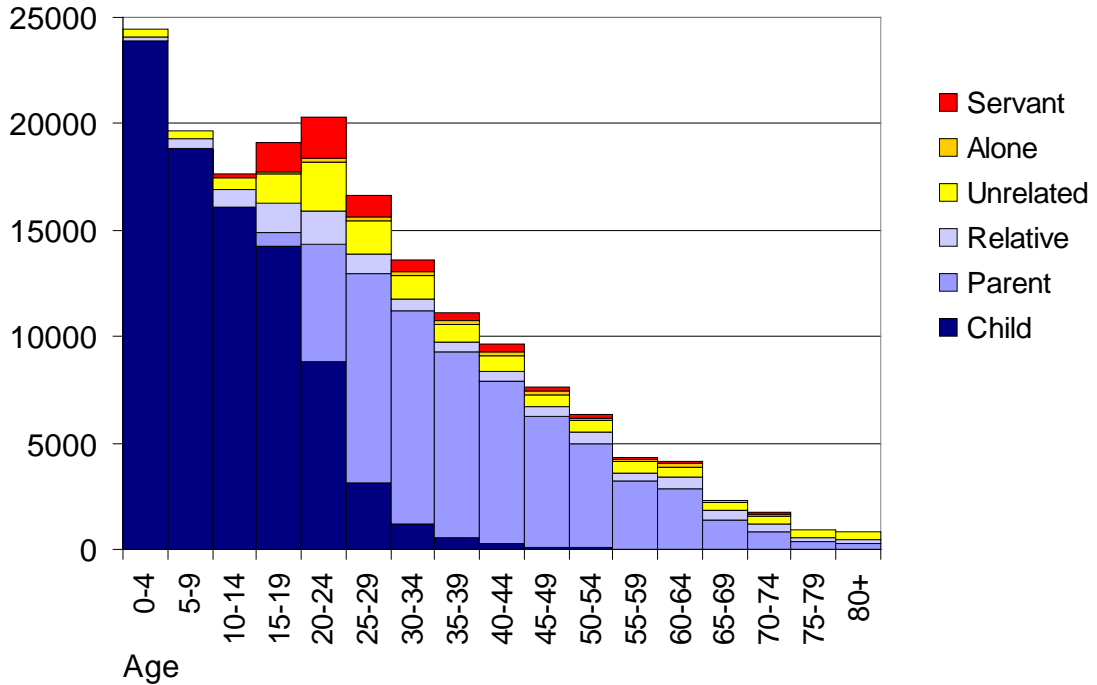
Status indicators for household heads
of selected occupations 1881 and 1901

	Median rent $/yr in occupation		Mean rent level in street of residence	
	1881	1901	1881	1901
Merchants	220	300	3,2	3,2
Accountants	200	160	3,6	3,1
Bookkeepers	120	140	2,8	3,3
Printers	60	90	2,3	2,2
Machinists	60	80	2,0	1,9
Moulders	50	70	1,7	1,7
Carpenters	50	80	1,8	1,8
Carters	50	70	1,5	1,6
Labourers	40	60	1,6	1,6

Rent level in street
by cultural community 1881

| 5 High |
| 4 |
| 3 |
| 2 |
| 1 Low |

FC	IC	PR
1.8	2.1	3.1	Group median
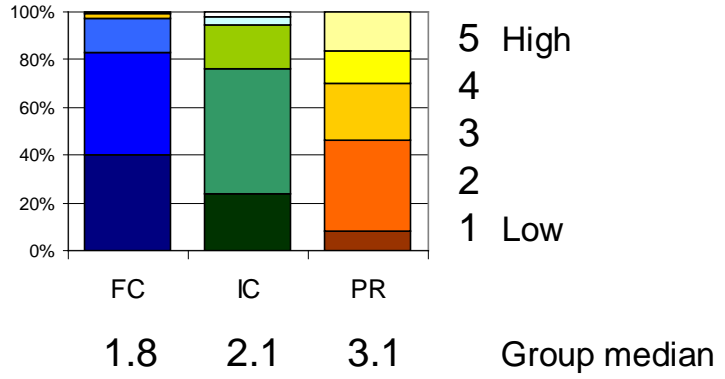
Median rent ($/year) 1880
in census division or street

- 1   20 - 49
- 2   50 - 79
- 3   80 - 169
- 4   170- 299
- 5   300 - 710

Hochelaga

Mile
End

Mont
Royal

Westmount

St-Henri

Point

N

0   1   2 km
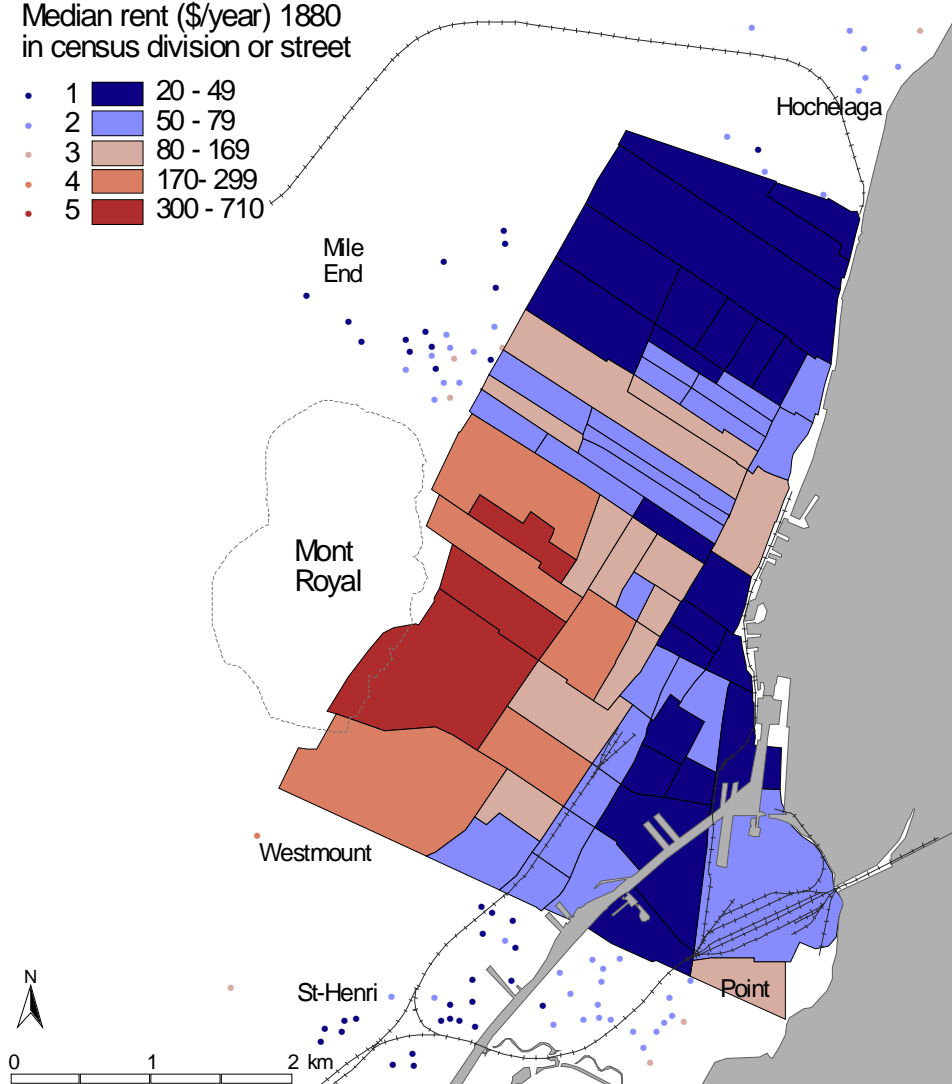
Cohort projections of survivors between 1881 and 1901

French Canadians

Age group 1881	Males 1881	20-year survival rates	Age group 1901	Males 1901	Age group 1881	Females 1881	20-year survival rates	Age group 1901	Females 1901
column	(1)	(2)		(1) * (2)		(3)	(4)		(3) * (4)
0-4	4558	,74316	20-24	3387,3	0-4	4756	,73672	20-24	3503,9
5-9	3459	,86534	25-29	2993,2	5-9	3480	,86008	25-29	2993,1
10-14	3046	,85099	30-34	2592,1	10-14	3008	,84090	30-34	2529,4
15-19	2954	,82877	35-39	2448,2	15-19	3548	,81258	35-39	2883,0
20-24	2779	,81490	40-44	2264,6	20-24	3755	,79587	40-44	2988,5
25-29	2498	,79229	45-49	1979,1	25-29	3031	,78677	45-49	2384,7
30-34	2240	,74241	50-54	1663,0	30-34	2498	,77774	50-54	1942,8
35-39	1815	,67075	55-59	1217,4	35-39	2044	,74522	55-59	1523,2
40-44	1449	,59028	60-64	855,3	40-44	1638	,68375	60-64	1120,0
45-49	1205	,51381	65-69	619,1	45-49	1264	,59123	65-69	747,3
50-54	886	,41035	70-74	363,6	50-54	1018	,47262	70-74	481,1
55-59	715	,25619	75-79	183,2	55-59	788	,34193	75-79	269,4
60-64	579	,10597	80-84	61,4	60-64	613	,19733	80-84	121,0
65-69	363	,02039	85-89	7,4	65-69	438	,07200	85-89	31,5
70-74	247	,00149	90-94	0,4	70-74	284	,01734	90-94	4,9
	116					167			

Irish Catholics

Age group 1881	Males 1881	20-year survival rates	Age group 1901	Males 1901	Age group 1881	Females 1881	20-year survival rates	Age group 1901	Females 1901
0-4	1354	,75540	20-24	1022,8	0-4	1335	,78919	20-24	1053,6
5-9	1200	,80916	25-29	971,0	5-9	1134	,87863	25-29	996,4
10-14	1118	,76716	30-34	857,7	10-14	1118	,86219	30-34	963,9
15-19	1076	,71563	35-39	770,0	15-19	1416	,83269	35-39	1179,1
20-24	993	,68611	40-44	681,3	20-24	1547	,80335	40-44	1242,8
25-29	757	,65826	45-49	498,3	25-29	1107	,76617	45-49	848,2
30-34	620	,63821	50-54	395,7	30-34	821	,72605	50-54	596,1
35-39	507	,59338	55-59	300,8	35-39	749	,66590	55-59	498,8
40-44	573	,52054	60-64	298,3	40-44	748	,61285	60-64	458,4
45-49	470	,45107	65-69	212,0	45-49	498	,54225	65-69	270,0
50-54	409	,35161	70-74	143,8	50-54	487	,42240	70-74	205,7
55-59	200	,24891	75-79	49,8	55-59	254	,30492	75-79	77,4
60-64	320	,15130	80-84	48,4	60-64	366	,19221	80-84	70,3
65-69	132	,08192	85-89	10,8	65-69	111	,08516	85-89	9,5
70-74	99	,01780	90-94	1,8	70-74	131	,01092	90-94	1,4
	41					52			

Anglo Protestants

Age group 1881	Males 1881	20-year survival rates	Age group 1901	Males 1901	Age group 1881	Females 1881	20-year survival rates	Age group 1901	Females 1901
0-4	1889	,80684	20-24	1524,1	0-4	1893	,82396	20-24	1559,8
5-9	1718	,86950	25-29	1493,8	5-9	1679	,87977	25-29	1477,1
10-14	1555	,84824	30-34	1319,0	10-14	1509	,85916	30-34	1296,5
15-19	1395	,81440	35-39	1136,1	15-19	1742	,82514	35-39	1437,4
20-24	1381	,79595	40-44	1099,2	20-24	2047	,80236	40-44	1642,4
25-29	1263	,77155	45-49	974,5	25-29	1585	,78513	45-49	1244,4
30-34	1200	,74704	50-54	896,4	30-34	1258	,76698	50-54	964,9
35-39	1005	,70028	55-59	703,8	35-39	1014	,73714	55-59	747,5
40-44	963	,62488	60-64	601,8	40-44	885	,69581	60-64	615,8
45-49	706	,55061	65-69	388,7	45-49	664	,63234	65-69	419,9
50-54	587	,40392	70-74	237,1	50-54	613	,53727	70-74	329,3
55-59	378	,23281	75-79	88,0	55-59	381	,40294	75-79	153,5
60-64	378	,11299	80-84	42,7	60-64	366	,21793	80-84	79,8
65-69	159	,03479	85-89	5,5	65-69	183	,07669	85-89	14,0
70-74	116	,00230	90-94	0,3	70-74	144	,01931	90-94	2,8

Retrieval rates from expected survivors and 1881 population

French Canadians

Age group 1881	Males retrieved of expected survivors		Females retrieved of expected survivors		Retrieved as % of entire population	
	n	%	n	%	Female	Male
	(5)	(5)/((1)*(2))	(6)	(6)/((3)*(4))	(6)/3	(5)/(1)
0-4	1520	44,9	1270	36,2	26,7	33,3
5-9	1422	47,5	1202	40,2	34,5	41,1
10-14	994	38,3	919	36,3	30,6	32,6
15-19	740	30,2	880	30,5	24,8	25,1
20-24	613	27,1	891	29,8	23,7	22,1
25-29	642	32,4	801	33,6	26,4	25,7
30-34	656	39,4	706	36,3	28,3	29,3
35-39	518	42,5	556	36,5	27,2	28,5
40-44	389	45,5	403	36,0	24,6	26,8
45-49	253	40,9	299	40,0	23,7	21,0
50-54	172	47,3	167	34,7	16,4	19,4
55-59	97	53,0	96	35,6	12,2	13,6
60-64	48	78,2	45	37,2	7,3	8,3
65-69	16	216,2	20	63,4	4,6	4,4
70-74	2	541,7	6	121,9	2,1	0,8

Irish Catholics

Age group 1881	Males retrieved of expected survivors		Females retrieved of expected survivors		Retrieved as % of entire population	
	Male n	%	Female n	%	Female	Male
0-4	497	48,6	386	36,6	28,9	36,7
5-9	444	45,7	361	36,2	31,8	37,0
10-14	312	36,4	291	30,2	26,0	27,9
15-19	204	26,5	275	23,3	19,4	19,0
20-24	166	24,4	243	19,6	15,7	16,7
25-29	144	28,9	212	25,0	19,2	19,0
30-34	144	36,4	204	34,2	24,8	23,2
35-39	119	39,6	181	36,3	24,2	23,5
40-44	141	47,3	173	37,7	23,1	24,6
45-49	91	42,9	88	32,6	17,7	19,4
50-54	55	38,2	56	27,2	11,5	13,4
55-59	16	32,1	26	33,6	10,2	8,0
60-64	16	33,0	22	31,3	6,0	5,0
65-69	6	55,5	5	52,9	4,5	4,5
70-74	0	0,0	2	139,9	1,5	0,0

Anglo Protestants

Age group 1881	Males retrieved of expected survivors		Females retrieved of expected survivors		Retrieved as % of entire population	
	Male n	%	Female n	%	Female	Male
0-4	691	45,3	509	32,6	26,9	36,6
5-9	577	38,6	349	23,6	20,8	33,6
10-14	314	23,8	241	18,6	16,0	20,2
15-19	173	15,2	218	15,2	12,5	12,4
20-24	148	13,5	258	15,7	12,6	10,7
25-29	224	23,0	342	27,5	21,6	17,7
30-34	248	27,7	328	34,0	26,1	20,7
35-39	223	31,7	262	35,1	25,8	22,2
40-44	200	33,2	200	32,5	22,6	20,8
45-49	133	34,2	149	35,5	22,4	18,8
50-54	82	34,6	112	34,0	18,3	14,0
55-59	43	48,9	49	31,9	12,9	11,4
60-64	26	60,9	34	42,6	9,3	6,9
65-69	4	72,3	17	121,1	9,3	2,5
70-74	3	1126,5	4	143,8	2,8	2,6

Household roles in two age groups, Montreal, 1881 and 1901

	Ages 15-29 (%)		Other ages (%)	
	1881	1901	1881	1901
Child	50,4	53,4	51,1	48,3
Parent	31,1	24,8	40,3	40,8
Other relative	3,3	4,7	2,7	4,6
Unrelated	8,5	11	3,6	4,5
Living alone	0,9	0,2	1,2	0,5
Servant	5,7	5,9	1,0	1,3
Other than parent or child	18,5	21,8	8,6	10,8
Total population *	50888	97708	115521	234084

* in households of fewer than 30 persons