Jewish Chicago: Who We Are

A 2020 POPULATION STUDY | METHODOLOGY FROM THE TECHNICAL APPENDIX

Jewish United Fund
TOGETHER for GOOD

NORC at the University of Chicago

Brandeis
COHEN CENTER FOR MODERN JEWISH STUDIES
STEINHARDT SOCIAL RESEARCH INSTITUTE

The Cohen Center for Modern Jewish Studies (CMJS), founded in 1980, is dedicated to providing independent, high-quality research on issues related to contemporary Jewish life.

The Cohen Center is also the home of the Steinhardt Social Research Institute (SSRI). Established in 2005, SSRI uses innovative research methods to collect and analyze sociodemographic data on the Jewish community.

SECTION A. STUDY METHODOLOGY

Sampling Frame Construction

The sampling frame was designed to encompass the Jewish population across Cook, DuPage, Lake, Kane, McHenry, and Will counties in Illinois and was constructed from two main sets of data sources: (1) combined, de-duplicated membership lists from more than 40 Chicagoland-area Jewish organizations and (2) an extract from the U.S. Postal Service Computerized Delivery Sequence File (CDSF) to ensure broad coverage of the Jewish community in the Chicago metropolitan area.

Both sets of data sources were used for the main sample. To be eligible for the main sample, a household needed to have a valid mailing address available. Main sample households were eligible to be contacted by mail, phone, or email for recruitment for the survey. In addition, a supplemental sample contacted by email only was developed using only organization list records with email addresses available.

Organization List Frame

In addition to utilizing databases available from JUF, the study team contacted a wide variety of organizations in the community and asked them to share their membership lists for inclusion in the study. More than 40 additional organizations participated representing a broad cross-section of the community, including synagogues, day schools, early childhood centers, social service agencies, and youth organizations.

The study team used a probabilistic record linkage model to identify and remove households appearing on multiple lists. After removing likely business addressees using the USPS CDSF, names, mailing addresses, and contact information were cleaned across all files. The data were blocked into potential match groups using the ZIP code and address number fields. Then, matching weights were calculated for each field using a using a stochastic boosting algorithm with the *trainSupv* function using the R *RecordLinkage* package.[1] The resulting weights were used to identify likely households appearing across multiple lists, and then likely duplicates were removed. Records with common email addresses were also removed from the data file in preparation for a supplemental email sample, to be contacted by email only.

There were 122,700 households on the organization list frame with mailing addresses available that were eligible for the main sample. An additional 12,887 records had email addresses available but no mailing addresses. These households were eligible for the supplemental email sample, but not the main sample.

Address-Based Frame

To assure broad coverage of the Jewish community across the six-county Chicago metropolitan area, the study additionally conducted address-based sampling (ABS) from the aforementioned U.S. Postal Service CDSF. All addresses from the organization list frame were removed from the address-based frame.

[1] See Sariyar, M., & Borg, A. (2010). The *RecordLinkage* Package: Detecting Errors in Data. *R Journal*, *2*(2), 61.

Households from the CDSF that were identified by the vendor Infogroup as likely-Jewish based on mailing subscriptions and ethnic names were oversampled to increase the likelihood of reaching Jewish respondents. There were 87,256 such households who were not on the organization list frame. In addition, Marketing Systems Group (MSG) identified 435 separate households that were more likely to be Russian-speaking and Jewish as well as 6,590 households more likely to be both nonwhite and Jewish. Due to the importance of these groups for the study, these sets of households were oversampled as well.

Sample Design

A stratified sample design was employed for both portions of the frame to ensure representation of different population subgroups, to increase the likelihood of reaching Jewish households, and to assure broad coverage of the Chicago metropolitan area Jewish community.

Organization List Sample Design

The organization list frame grouped lists and records within lists into strata, both to increase the likelihood of reaching specific subgroups within the Metropolitan Chicago Jewish community and to obtain sufficient numbers of completed interviews to support estimation for different subgroups. The following describes the strata, with households that could be classified as belonging to multiple demographic groups assigned to the first stratum in the list for which they were classified:

- Likely Orthodox, including specific strata for reaching Lubavitch, Yeshivish/Litvish, and Modern Orthodox communities, as well as a stratum for lists not affiliated with a subgroup of Orthodox Jews;
- Likely young families to reach households likely having children ages 0 to 4. Due to interest in estimates regarding families with children enrolled and not enrolled in Jewish early childhood centers, two strata were formed corresponding to each group;
- Small subpopulations, including households with likely disabled individuals, households with likely LGBTQ individuals, likely interfaith households, likely Russian-speaking Jewish households, likely Israeli households, and households with likely nonwhite individuals. All cases in this stratum were identified based on list membership;
- An additional likely nonwhite stratum, using either names or geographic area of residence to increase the likelihood of reaching nonwhite Jewish households;
- Likely Israeli households;
- Likely young adults;
- Other families (with children older than age 4);
- Other adults, separating lists into strata based upon higher or lower likelihood of eligibility for the study by list.

In order to assure an even distribution of the sample across geographic areas of Metropolitan Chicago, the study team employed systematic sampling[2] to sort the frame within strata by region, zip code, block, street name, and street number and then sampling at regular intervals within strata. In

[2] Kish, L. (1965) *Survey sampling*. John Wiley and Sons, Inc., New York.

order to support estimates in the Far Northwest Suburbs, Southern Suburbs, and Western Suburbs, specific strata were separated from the Other Adults – Higher Eligibility stratum to be oversampled.

Table A1 shows stratum sizes and number of cases sample by stratum within the organization list frame. The stratum sizes reflect number of households with mailing addresses available who were eligible for the main sample as well as the total number with either mailing or email address available, as cases with email addresses were eligible for the supplemental sample regardless of the availability of a mailing address. The sample sizes for the main sample are shown as well as the sample size for the supplemental sample contacted by email only. Because strata were grouped for sampling for the supplemental sample, the number sampled is shown by those groupings. The supplemental sample was drawn after households had been selected for the main sample.

As previously described, any household that based on their source lists could be classified as belonging to multiple demographic groups were included in the first stratum appearing in the table for which they were classified.

Table A1. Organization List Sample Design

Stratum	Number of Households Eligible for Main Sample[a]	Number of Households Eligible for Full Sample[b]	Sample Size, Main Sample	Sample Size, Supplemental Sample
Likely Lubavitch	253	253	229	2,154
Likely Yeshivish/Litvish	1,480	1,480	1,268	
Likely Modern Orthodox	3,741	3,743	2,700	
Likely Orthodox (Any Subgroup)	628	628	568	
Likely Young Families (Jewish early childhood)	2,860	2,878	2,066	
Likely Young Families (Other)	2,870	2,935	2,344	
Small Subpopulations	1,043	1,552	1,043	
Likely Nonwhite (Names,	4,512	4,954	2,187	
Likely Young Adults	17,710	27,801	2,371	8,820
Other Families	16,131	17,617	2,539	2,337
Other Adults (Higher Eligibility, Far Northwest Suburbs)	2,765	2,765	715	8,687
Other Adults (Higher Eligibility, Southern Suburbs)	1,967	1,967	1,009	
Other Adults (Higher Eligibility, Western Suburbs)	1,920	1,920	699	
Other Adults (Higher Eligibility, Remaining Areas)	52,483	52,746	5,395	
Other Adults (Lower Eligibility)	12,337	12,348	2,879	2,105
Total	**122,700**	**135,587**	**28,012**	**24,103**

[a]To be eligible for main sample, households had to have a valid Chicago metropolitan area address on the sample frame.

[b]To be eligible for full sample, households either had to have either a valid mailing address (eligible for main sample) and/or an email address (eligible for supplemental sample).

Address-Based Sample Design

Address-based sampling[3] was conducted using a stratified sample design was employed from the CDSF portion of the frame. Lists from vendor data sources were used to increase the likelihood of Jewish households. In addition, the design stratified census block groups in the study area based on estimated Jewish density. As previously described, vendor data from Infogroup was used to determine likely Jewish households to oversample, and data from MSG was used to identify two groups: households more likely to be Russian-speaking and Jewish and households more likely to have nonwhite Jewish household members.

The study team developed a measure related to the Jewish density at the census block group-level. The study team chose census block groups as a fairly small geographic unit for this as block groups typically designed by the U.S. Census Bureau to have between 600 and 3,000 residents on average. The resulting measures were developed by combining two input block group-level measures: (1) the percentage of households in the block group on the de-duplicated organization list frame and (2) the percentage of households in the block group identified by Infogroup as likely Jewish. The number of households in the area was taken from American Community Survey estimates. A principal component analysis was conducted of the two measures, and the first principal component was taken as a correlate of Jewish density. Block groups were ranked by the resulting Jewish density measure and then grouped into four categories of likely Jewish density: *high*, *medium*, *low*, and *very low*.

The Infogroup households were stratified into three groups based the block group classifications: *high*, combined *medium/low*, and *very low*. Among the remaining households on the frame, strata were formed for the *high* and *medium* density groups. Due to the large number of cases needing to be sampled to reach Jewish households in the *low* and *very low* block groups, the study team did not sample additional households in these areas who were not available from Jewish organization or vendor lists. Due to the concentration of the population in specific geographic areas as well as the population coverage from organization lists and vendor data, the study team estimates that the sample design covered 96.0% of Jewish households in the Chicago metropolitan area.

As for the organization list sample design, systematic sampling was used to draw an evenly distributed sample across the Chicago metropolitan area.

[3] Harter, R., Battaglia, M. P., Buskirk, T. D., Dillman, D. A., English, N., Fahimi, M., Frankel, M. R., Kennel, T., McMichael, J.P., McPhee, C. P., Montaquila, J., Yancey, T., & Zukerberg, A. L. (2016). Address-based sampling. Prepared for AAPOR Council by the Task Force on Address-based sampling, Operating Under the Auspices of the AAPOR Standards Committee. https://www.aapor.org/Education-Resources/Reports/Address-based-Sampling.aspx

Table A2 presents details of the sample design from the address-based frame.

Table A2. Address-Based Sample Design

Stratum	Stratum Size	Sample Size
Likely Jewish	**94,271**	**14,542**
Likely Russian-speaking and Jewish (MSG)	435	302
Likely Jewish and nonwhite (MSG)	6,590	786
Likely Jewish in high Jewish density areas (Infogroup)	15,444	3,992
Likely Jewish in medium/low Jewish density areas (Infogroup)	64,669	8,807
Likely Jewish household in very low Jewish density areas (Infogroup)	7,133	665
Not likely Jewish	**1,467,412**	**11,000**
Remaining, high density Jewish areas	153,177	3,000
Remaining, medium density Jewish areas	1,314,235	8,000
Total	**1,561,683**	**25,542**

Sample Releases

Sample for the study was released in three different waves in order to gauge the cooperation with the survey and release the amount of sample needed to achieve target numbers of completes overall and to support estimates for key groups. The first wave starting in October 2020 sampled 30,385 main sample households and all 24,103 households in the supplemental sample. The second wave started in November and sampled an additional 21,262 households. The final wave began in December 2020 and January 2021 and sampled 1,907 further households before data collection concluded in mid-January.

Survey Instrument and Data Collection

The survey instrument was designed in collaboration with JUF and informed by the input of community members. The questions were crafted to minimize potential bias and any burden on respondents. Where possible, questions, language, and definitions were adopted from previously published Jewish community survey questionnaires to support comparability of estimates to other communities, while adapting many questions for the content needs for the Chicago metropolitan area community.

The survey was designed and programmed for two modes: web and Computer Assisted Telephone Interview (CATI), with CATI interviews conducted by NORC telephone interviewers trained in the content of the questionnaire. Respondents had the option to complete both web and telephone interviews over multiple sessions.

The questionnaire was divided into two parts, a screener to determine eligibility for the survey and the survey itself for all respondents who screened in. The screener section was asked of all respondents to determine eligibility. Any household in the sample was considered eligible if it contained at least one adult aged 18 or older who lived in six county Chicago metropolitan area for at least part of the year and considered himself or herself to be Jewish.

The screener portion had a Spanish response option for both web and CATI. The main survey was available in English only.

Out of 3,877 completed main sample interviews, 3,288 were completed by web, 584 were completed using CATI, and 5 interviews were conducted in Russian over the phone by CMJS staff, with responses entered in the web instrument.

The web version of the survey typically took 20 to 35 minutes to complete with a median of 26 minutes. Phone interviews typically took 25 to 50 minutes to complete with a median of 37 minutes.

Sample Recruitment

Data collection ran from October 9, 2020 to January 19, 2021. Main sample members were contacted using differing materials based upon whether they were sampled from the organization list frame or the address-based frame.

The organization list sample was contacted using materials branded as "Metropolitan Chicago Jewish Population Study." As these households were affiliated with Chicagoland-area Jewish organizations, the study team identified the purpose of the study as a Jewish community study sponsored by JUF to encourage participation. Respondents were mailed an initial invitation letter with an access code to take the survey on the web and with information on the option to call NORC to complete the survey with a phone interviewer as well as to contact CMJS for Russian-language interviews. The letter was mailed with an FAQ card with information on the study. A few days later, an email was sent to sample members when available, with the link and access code to take the survey on the web as well as the phone number to request a phone interview. One week after mailing the letter, a thank you/reminder postcard was sent to respondents, followed by a second email a few days afterward. One week after mailing the reminder postcard, a second letter was sent to nonrespondents with an FAQ card. A few days after, NORC phone interviewers made phone calls to invite pending sample members for phone interviews, making up to five total calls per household. Additionally, further reminder emails were sent every one to two weeks until the end of the study period, varying language to recruit respondents.

The address-based sample was contacted using materials branded as "Chicagoland Speaks!" that discussed surveying sample members about issues facing Chicagoland residents. In order to recruit respondents regardless of their religious background, the materials did not identify the survey as a Jewish community study, nor mentioned JUF's sponsorship. Anticipating that participation rates in the survey may be otherwise lower for the address-based sample relative to the organization list sample, respondents were mailed a $2 bill with their initial invitation letter. The recruitment materials also offered a $10 post-incentive for respondents who screened in and completed survey, which was offered in the form a gift card of the respondent's choosing. To alert respondents as to the survey invitation and the $2 incentive in their invitation letter, respondents were mailed a pre-notification postcard a few days before the invitation letter was mailed. The invitation letter contained an FAQ card and a link and access code for taking the survey on the web as well as information for calling NORC to schedule a phone interview. The letter was two-sided with English on one side and Spanish on another side. The invitation letter was followed by a thank you/reminder postcard mailed one week later and a second letter with FAQ card mailed a week after that. No emails were sent to the address-based sample. Reminder phone calls followed the same protocol as for the address-based sample.

The supplemental sample from the organization list frame received similar emails to the main sample from the same frame, but were not mailed letters nor received phone call reminders.

Survey Weighting

Survey weights were developed to support estimation. The survey weighting process incorporated the following steps for household-level weights:

1. Base weights that reflect the sample design and probabilities of selection;
2. Adjustment for resolution of address and for nonresponse to the screener;
3. Raking adjustments to control totals that included demographic data on the full population from the ACS' demographic estimates on the Jewish by religion population from Brandeis University's American Jewish Population Project; and data collected by JUF on synagogue membership, day school enrollment, Jewish part-time school enrollment, Jewish preschool enrollment, donations to JUF, and PJ Library subscriptions;
4. Adjustment for nonresponse to the main interview among screened in households;
5. Trimming to reduce the influence of large survey weights on estimates; and
6. A final raking using JUF data and estimates use the raked weights among screener completes.

The above process produced the final household-level weight for estimates of all Jewish households in the metropolitan Chicago area. A weight for estimates of all adults living in these households was produced by multiplying the household-level weight by the number of adults in the household. In addition, a weight for estimates of all Jewish adults was produced by multiplying the household-level weight by the number of Jewish adults in the household.

The weighting process was conducted twice, once for the main sample alone and once for the full sample (combined main and supplemental samples). Thus, six survey weights were developed in total, with two sets of the three survey weights.

The following describes the details of each step of the weighting process.

Household-Level Base Weight

The base weight was calculated to adjust for the probability of being included in the sample. Specifically, for household *i*, the base weight was calculated as:

$$w_{1i} = \frac{1}{\pi_i},$$

where π_i is the probability of a household being selected for the sample, which for the main sample was calculated as the fraction of households sampled in the stratum to the total number of households in the stratum.

There were two versions of the base weights calculated for the main and full samples. To be eligible for the main sample, a mailing address must be available for the household. For the supplemental email sample, an email address must be available.

The main sample base weight was determined based on the number of households with mailing addresses available in the stratum. The full sample base weight was calculated differently in three scenarios: (1) if a household had only a mailing address available, (2) if a household had only an email address available, and (3) if a household had both a mailing address and an email address

available. If a household had only a mailing address available, the full sample base weight was the same as the main sample base weight. If a household had only an email address available, then the base weight was calculated based on the probability of selection for the supplemental sample. If a household had both a mailing address and email address available, the base weight was calculated based on the sum of the probability of being selected for the main sample and the product of the probabilities of both not being selected for the main sample and subsequently being selected for the supplemental sample.

Adjustment for Resolution of Address and Screener Nonresponse

Not all households sampled are occupied and therefore eligible to take the screener. In addition, some households sampled from the organization list frame were confirmed to live outside the metropolitan Chicago area and therefore also not eligible for the screener. Further, there was nonresponse among households eligible to complete the screener. The weighting procedure conducted an adjustment for resolution of the address and screener nonresponse in one step.

This adjustment was conducted within cells defined by the sampling strata. The sampling strata reflect different source lists for the frame, different demographic groups and kinds of engagement with the Jewish community, and geographic areas with different levels of Jewish density around the metropolitan Chicago area. These aspects led the strata to capture meaningful differences in survey eligibility and cooperation among the sample. Thus, the sampling strata were ideal candidates to form cells for weighting adjustments.

For the full sample weighting process, the adjustment cells were formed based on both sampling strata and sample type (main or supplemental), as the supplemental sample had different levels of eligibility for and cooperation with the survey due to the email-only recruitment. Cells that were less than 30 in sample size were combined with other cells to assure sufficient sample size for conducting this adjustment.

Specifically, the resulting weight at this stage for household *h* in adjustment cell *C* was calculated as:

$$w_{2i} = w_{1i}\left(\frac{\sum_{j\in C} w_{1j}\left[I_j^{SC} + I_j^{KE} + I_j^{UE}\left(\frac{\sum_{j\in C} w_{1j} I_j^{KE}}{\sum_{j\in C} w_{1j}\left[I_j^{KE} + I_j^{KI}\right]}\right)\right]}{\sum_{j\in C} w_{1j} I_{SC}}\right),$$

where I_j^{SC} is a 1/0 indicator for whether a household completed the screener, I_j^{KE} is an indicator for whether a household has known eligibility but did not complete the screener, I_j^{UE} indicates that the household's eligibility for the screener is unknown, and I_j^{KI} indicates that the household is known to be ineligible for the screener.

Generalized Raking to Population Totals

The weights for all households that completed the screener were then adjusted to match population estimates from external data sources using a generalized raking procedure. As the external estimates included both household-level and person-level information for adults 18 and older and because

person-level information was reflected in the household-level dataset as count variables, a generalized raking procedure was implemented that incorporated both binary household-level and count person-level variables.[4] The following describes the population estimates used for adjustment in the raking procedure.

American Community Survey estimates on the overall 18+ population in the six-county area were used regarding:

- Age and educational background combinations (18 to 34 year old non-college graduates, 35 to 64 year old non-college graduates, 65 years and old non-college graduates, 18 to 34 year old college graduates, 35 to 64 year old college graduates, 65 years and old college graduates);
- Sex (male, female);
- Race/ethnicity (White non-Hispanic, Other non-Hispanic, Hispanic);
- Geographic regions defined at the sampling stage of the project (City Far North, City North, City Other, Far Northwest Suburbs, Near North Suburbs (East), Near North Suburbs (West), Near Northwest Suburbs, North Shore/Far North, West Suburbs, South Suburbs).

In addition, American Jewish Population Project estimates on the overall 18+ Jewish by religion population in the six-county area were used regarding:

- Age and educational background combinations (18 to 34 year old non-college graduates, 35 to 64 year old non-college graduates, 65 years and old non-college graduates, 18 to 34 year old college graduates, 35 to 64 year old college graduates, 65 years and old college graduates);
- Sex (male, female);
- Race/ethnicity (White non-Hispanic, Other non-Hispanic, Hispanic);
- Geographic regions (City of Chicago; Combined Near North and North Suburbs; Combined Northwest, West, and South Suburbs).

See below for more information on the development of the American Jewish Population Project estimates.
Data provided by JUF were used in raking adjustments regarding:

- The number of households with synagogue memberships, separate for Orthodox, Conservative, Reform, and other synagogues;
- The number of children enrolled in Jewish preschool, Jewish day school, and Jewish part-time school[5];

[4] Deville, J. C., Särndal, C. E., & Sautory, O. (1993). Generalized raking procedures in survey sampling. *Journal of the American Statistical Association*, *88*(423), 1013-1020, and Lumley, T. (2011). *Complex surveys: A guide to analysis using* R (Vol. 565). John Wiley & Sons.

[5] JUF provided these three numbers regarding the number of children enrolled in different kinds of schools. For raking, the study team used an estimate of the number of households enrolled calculated using survey data to estimate the number of children enrolled per household.

- The number of households with subscriptions to PJ Library; and
- The number of households donating to JUF.

The resulting weight was w_{3i}.

Adjustment for Interview Nonresponse

The data were subsetted to Jewish households eligible for the main interview. Not all households eligible for the main interview proceeded to complete it. Similar to the adjustment for screener response, cells were formed to adjust the weights for interview nonresponse based on sampling strata for the main sample weighting process and sampling strata combined with sample type (main or supplemental) for the full sample weighting process. Cells that were less than 30 in sample size were combined with other cells to assure sufficient sample size for conducting this adjustment.

Specifically, the resulting weight at this stage for household *h* in adjustment cell *C* was calculated as:

$$w_{4i} = w_{3i}\left(\frac{\sum_{j\in C} w_{3j}\left[I_j^{IC} + I_j^{IN}\right]}{\sum_{j\in C} w_{3j} I_j^{IC}}\right),$$

where I_j^{IC} is a 1/0 indicator for whether a household completed the interview, I_j^{IN} is an indicator for whether a household was an interview non-complete that was eligible for the main interview.

Trimming

To reduce the influence of observations with large weights on study estimates, weights were trimmed. The trimming reallocated the weights so the sum of the weights among all interview completes was the same before and after trimming. The resulting weight was w_{5i}.

Final Raking for Household-Level Weight

After conducting interview nonresponse adjustment and trimming, the final weight for analyses of Jewish households was produced by conducting a final bounded generalized raking step using the following data:

- Unbiased estimates on the number of 18+ Jews by religion and Jews of no religion resulting from the screener complete weighting phase using w_{3i};
- The number of households with synagogue memberships, separate for Orthodox, Conservative, Reform, and other synagogues;
- Enrollment in Jewish preschool, Jewish day school, and Jewish part-time school;
- The number of households with subscriptions to PJ Library; and
- The number of households donating to JUF.

The resulting weight was $w_{HH,i}$.

Person-Level and Jewish Person-Level Weight

The final weight for analyses of all adults living in Jewish households was calculated by multiplying the household-level weight by the number of age 18 and older total adults living in the household P_i:

$$w_{P,i} = P_i w_{HH,i}.$$

The final weight for analyses of all Jewish adults was calculated by multiplying the household-level weight by the number of age 18 and older Jewish adults living in the household JP_i:

$$w_{JP,i} = JP_i w_{HH,i}.$$

Data Collection Outcomes

Table A3 summarizes data collection results. Results are presented for the overall main and full samples, and the separately for the combined organization list strata, vendor data strata, ABS remainder strata, and supplemental email sample. The AAPOR Response Rate 3 (RR3) is also presented unweighted, weighted by the main sample base weight, and weighted by the full sample base weight.

Table A3. Data Collection Outcomes

	Main Sample	Full Sample	Organization List Strata	ABS Likely Jewish	ABS Not Likely Jewish	Supplemental Email Sample
Sample size	**53,554**	**77,657**	**28,012**	**14,542**	**11,000**	**24,103**
Likely households	15,358	34,435	2,825	9,707	2,826	19,077
Confirmed household, unscreened	29,928	32,599	20,899	2,495	6,534	2,671
Non-residential	2,009	2,316	537	901	571	307
Ineligible – Not in Metro Chicago	231	413	231	0	0	182
Ineligible – Religion	2,056	2,110	152	922	982	54
Eligible household, incomplete interview	95	152	72	21	2	57
Completed interviews	**3,877**	**5,632**	**3,296**	**496**	**85**	**1,755**
AAPOR RR3 (Unweighted)	**15.1%**	**13.3%**	**15.0%**	**15.4%**	**14.6%**	**9.5%**
AAPOR RR3 (Main Sample Base Weighted)	**14.4%**	**-**	**12.9%**	**15.2%**	**14.5%**	**-**
AAPOR RR3 (Full Sample Base Weighted)	**14.4%**	**14.2%**	**10.7%**	**15.2%**	**14.5%**	**8.9%**

For the main sample, there were 3,877 completed interviews among 6,028 who completed the screener and lived in the metropolitan Chicago area. Completed interviews were defined as completing all questions on the roster of adults and children in the household. The final response rate was 15.1% unweighted and 14.4% weighted. When using the final household-level weight to analyze the main sample for all completed interviews, the design effect is 2.99 and the margin of error is +/- 2.7%.

For the full sample that included the supplemental email sample, there were 5,632 completed surveys among 7,894 households who completed the screener and live in the metropolitan Chicago area. The final response rate was 13.3% unweighted and 14.2% weighted. When using the final household-level weight to analyze the full sample for all completed interviews, the design effect is 3.53 and the margin of error is +/- 2.5%.

Final Population Estimates

Population numbers presented in the report were rounded so as to avoid overprecision – that is, the misleading implication that our estimates are correct down to the single digit.

The precise population estimates with 95% confidence intervals are shown in Table A4. For example, the best estimate of the total Jewish population is 319,551 people. Given the size of the sample and possible sampling and non-response error, we can be 95% confident that the true value lies somewhere between 307,024 people and 332,077 people.

Table A4. Population estimates with confidence intervals shown

	Estimate	Lower bound	Upper bound
Total Jews	319,551	307,024	332,077
Adults	346,805	331,864	361,746
Jewish	264,632	254,237	275,027
Non-Jewish	82,173	73,992	90,354
Children	73,537	65,714	81,361
Jewish	54,918	49,853	59,984
Non-Jewish	18,619	12,365	24,873
Total people	420,342	401,347	439,338
Total households	175,799	169,498	182,100

American Jewish Population Project Estimates

Since 2005, the American Jewish Population Project (AJPP) at the Steinhardt Social Research Institute (SSRI) has identified and collected hundreds of nationally representative surveys of the US population to produce estimates of the Jewish population in the United States, its states, metropolitan areas, and counties (or groups of counties). These estimates provide an independent, external reference for the basic demographic profile of the Jewish population. This population profile serves as a point of reference for the community as a whole and for those who conduct targeted surveys of the population and have no frame of reference for evaluating the representativeness of their survey sample. Details of the methods are reported elsewhere.[6]

The data synthesis method demonstrates how an auxiliary data source can be constructed to provide independent, census-like estimates of the size and characteristics of the adult Jewish by religion

[6] Tighe, E., et al. AJPP Technical Report 2020: ZIP Code-Based Jewish Population Estimates. American Jewish Population Project, Mar. 202. https://ajpp.brandeis.edu/documents/2020/AJPPTechnicalReport2020.pdf. Saxe, L., & Tighe, E. (2013). Estimating and understanding the Jewish population in the United States. *Contemporary Jewry, 33*, 43-62; Tighe, E., Livert, D., Barnett, M., & Saxe, L. (2010). Cross-survey analysis to estimate low-incidence religious groups. *Sociological Methods & Research, 39*, 56-82; Tighe, E., Saxe, L., Kadushin, C., Magidin de Kramer, R., Nursahedov, B., Aronson, J., & Cherny, L. (2011). *Estimating the Jewish population of the United States: 2000-2010*. Waltham, MA: Steinhardt Social Research Institute, Brandeis University; Tighe, E., Saxe, L., Magidin de Kramer, R., & Parmer, D. (2013). *American Jewish population estimates: 2012*. Waltham, MA: Steinhardt Social Research Institute, Brandeis University.

(JBR) population in the U.S. at the county level.[7] These estimates of the adult JBR population may then be used to generate new post-stratification weights. These new post-stratification weights are then applied to the targeted study of the Jewish population.

Summary of Data

The full sample of surveys in the AJPP dataset consists of data from surveys of nationally representative random samples of the adult population in the U.S. conducted between 1997 and 2020. The dataset includes surveys identified in major data repositories, such as the Inter-university Consortium for Political and Social Research (ICPSR) and the American Religion Data Archive (ARDA), as well as in poll archives at the Roper Center, Gallup, and Pew Research Center. Surveys include the American National Election Studies, Pew Political and social surveys, Gallup Daily Tracking poll, the Cooperative Congressional Election Study (CCES) and other surveys. The dataset includes more than 1,200 independent samples and a total combined sample size of more than 2.9 million respondents, of whom over 69,000 identify as Jewish by religion. Where a single survey may have included multiple sampling methods or frames (e.g., landline versus cellphone), each is treated as a separate independent sample, with unique identifiers to indicate series membership.[8] For surveys that included oversamples, only the representative portion of the samples were included in the analyses.

All of the surveys in the sample provide data on those who identify as Jewish by religion (JBR), which is the largest proportion of the Jewish population and therefore serves as the baseline group for generating population estimates. A smaller number of surveys include assessment of religious upbringing or parents' religious/ethnic identification, or non-religious Jewish identification (for instance, "Do you consider yourself Jewish?") in addition to current religious affiliation.[9]

The present report is based on a custom analysis for the 2020 Metropolitan Chicago Jewish Population Study. The analysis includes data from a subset of 254 national samples that were conducted between the years 2015 and 2019. Several additional surveys are included for the years 2014 and 2020 to increase the sample size, with the assumption that the size and characteristics of the Jewish population does not change substantially in this time period. The subset sample includes just over 26,000 respondents in the Chicago area. In addition to religious identification, all of the surveys in the custom analysis include the following baseline demographic information for respondents: gender, race, educational attainment, age, and ZIP Code.

Modeling

The full model includes seven categories of age (18-24; 25-34; 35-44; 45-54; 55-64; 65-74, 75+), three categories of race and ethnicity (Non-Hispanic White; Hispanic; Non-Hispanic Other), two

---

[7] Tighe et al., *American Jewish population estimates: 2012*. Saxe, Leonard & Tighe, Elizabeth & Boxer, Matthew. (2014). Measuring the Size and Characteristics of American Jewry: A New Paradigm to Understand an Ancient People. Magidin de Kramer, R., Tighe, E., Saxe, L., & Parmer, D. (2018). Assessing the Validity of Data Synthesis Methods to Estimate Religious Populations. Journal for the Scientific Study of Religion, 57(2), 206-220.

[8] Series identification is included in the dataset to be able to examine differences across surveys that can be accounted for by survey series.

[9] Currently there are too few surveys of representative samples of all U.S. adults that include alternative methods of Jewish identification. Thus, the present analyses focus on the JBR population only.

categories of sex (Male/Female), and two categories of educational attainment (Non-College / College).

The lowest level of geography available for analysis was the ZIP Code of the respondent. The area included in the analysis is comprised of 309 zip codes in 11 counties in the Chicago metropolitan area. There are too few observations per ZIP Code, so ZIP Codes were clustered into groups based on regions defined at the sampling stage for the Metropolitan Chicago Jewish Population Study. The model includes 10 ZIP Code clusters (see description of these areas below).

The model is displayed below, where the outcome variable y_i represents the Jewish identification of the respondent i.

$$\Pr(y_i = 1) = logit(\beta_0 + \alpha_{j[i]}^{female} + \alpha_{k[i]}^{age} + \alpha_{l[i]}^{edu} + \alpha_{m[i]}^{race-ethn} + \alpha_{k,l[i]}^{age.edu} + \alpha_{o[i]}^{geo} + \alpha_{p[i]}^{survey})$$

$$\alpha_j^{female} \sim N\left(0, \sigma_{female}^2\right) \text{ for } j = 1, 2 \; categories \; of \; sex$$
$$\alpha_k^{age} \sim N\left(0, \sigma_{age}^2\right) \text{ for } k = 1, \dots, 7 \; categories \; of \; age$$
$$\alpha_l^{edu} \sim N(0, \sigma_{edu}^2) \text{ for } l = 1, 2 \; categories \; of \; educational \; attainment$$
$$\alpha_m^{race-eth} \sim N(0, \sigma_{race-eth}^2) \text{ for } m = 1, 2, 3 \; categories \; of \; race - eth$$
$$\alpha_{k,l}^{age.edu} \sim N\left(0, \sigma_{age.edu}^2\right) \text{ for } k, l = 1, \dots 14 \; categories \; of \; age.edu$$
$$\alpha_o^{geo} \sim N(0, \sigma_{zclust}^2) \text{ for } o = 1, \dots 10 \; of \; ZIP \; Code \; clusters \; geographical \; areas$$
$$\alpha_p^{survey} \sim N\left(0, \sigma_{survey}^2\right) \text{ for } p = 1, \dots \# \; of \; surveys$$

The model was fit using the Bayesian software Stan[10] in R using the *rstan* package[11]. Preliminary multilevel logistic regressions were run using the lme4 package for R [12]. Table A5 shows the assignment of zip codes to the 10 zip code clusters used in modeling.

[10] Stan Development Team (2020). "RStan: the R interface to Stan." R package version 2.21.2, http://mc-stan.org/.

[11] R Core Team (2020). R: A Language and Environment for Statistical Computing. https://www.R-project.org

[12] Bates D, Mächler M, Bolker B, Walker S (2015). "Fitting Linear Mixed-Effects Models Using lme4." Journal of Statistical Software, 67(1), 1–48.

Table A5. Regions and Zip codes

Geographic Area	Zip Codes
City Far North	60626 60640 60645 60659 60660
City North	60601 60610 60611 60613 60614 60618 60647 60654 60657 60664 60681
City Other	60499 60602 60603 60604 60605 60606 60607 60608 60609 60612 60615 60616 60617 60619 60620 60621 60622 60623 60624 60628 60629 60630 60632 60633 60634 60636 60637 60638 60639 60641 60642 60643 60644 60646 60649 60651 60652 60653 60656 60661 60668 60669 60670 60673 60674 60675 60677 60678 60680 60682 60684 60685 60686 60687 60689 60690 60691 60693 60694 60695 60696 60697 60699 60706
Far Northwest Suburbs	60002 60010 60011 60020 60030 60038 60041 60046 60047 60048 60055 60060 60061 60067 60073 60074 60078 60084 60094 60095 60107 60159 60168 60169 60173 60179 60192 60193 60194 60195 60196 60012 60013 60014 60021 60033 60034 60039 60042 60050 60051 60071 60072 60081 60097 60098 60102 60110 60118 60142 60152 60156 60180 61038
Near North Suburbs (East)	60076 60201 60202 60203 60204 60208 60712
Near North Suburbs (West)	60016 60017 60018 60019 60025 60026 60029 60053 60068 60077 60631 60666 60714
North Shore/Far North	60015 60022 60031 60035 60037 60040 60043 60044 60045 60062 60064 60065 60075 60079 60082 60083 60085 60086 60087 60088 60091 60093 60096 60099
Near Northwest Suburbs	60004 60005 60006 60007 60008 60009 60056 60069 60070 60089 60090
South Suburbs	60401 60403 60404 60406 60407 60408 60409 60410 60411 60412 60415 60416 60417 60418 60419 60421 60422 60423 60425 60426 60428 60429 60430 60431 60432 60433 60434 60435 60436 60438 60439 60440 60441 60442 60443 60445 60446 60447 60448 60449 60451 60452 60453 60454 60455 60456 60457 60458 60459 60461 60462 60463 60464 60465 60466 60467 60468 60469 60471 60472 60473 60475 60476 60477 60478 60480 60481 60482 60484 60487 60491 60501 60586 60655 60803 60805 60827 60940 60950
West Suburbs	60137 60138 60189 60502 60517 60532 60540 60563 60564 60565 60566 60567 60101 60103 60105 60106 60108 60116 60117 60122 60126 60128 60132 60133 60139 60143 60148 60157 60172 60181 60184 60185 60186 60187 60188 60190 60191 60197 60199 60399 60490 60503 60504 60514 60515 60516 60519 60521 60522 60523 60527 60544 60555 60559 60561 60572 60585 60598 60599 60104 60130 60131 60141 60153 60154 60155 60160 60161 60162 60163 60164 60165 60171 60176 60301 60302 60303 60304 60305 60402 60513 60525 60526 60534 60546 60558 60688 60701 60707 60804 60109 60119 60120 60121 60123 60124 60134 60135 60136 60140 60144 60147 60151 60174 60175 60177 60178 60183 60505 60506 60507 60510 60511 60538 60539 60542 60543 60554 60560 60568

Jewish Population Estimates

Results from the model provide overall population estimates as well as estimates of the distribution of Jews by demographic characteristics for the 10 ZIP Code areas in the Chicago metro area.

The overall estimate of the adult population who identify as Jewish by religion in the Chicago metro area is 184,900 corresponding to 2.86% of the adult population in the same area. The distributions within the adult Jewish population varied by age, education, gender and race as well as by geography. Table A6 presents this information.

Table A6. 2020 Chicago Metropolitan Area Population Estimates for JBR Adults

	All Adults [a]	JBR Adults [b]			
	Pop.	Percentage of all Adults (CI)		Pop.	CI: Low	CI: Hi
Greater Chicago Metropolitan Area	6,475,600	2.9	(2.7, 3.1)	184,900	172,200	198,100
Age						
18-24 years	753,800	2.1	(1.6, 2.7)	16,000	12,200	20,100
25-34 years	1,172,000	2.5	(2.1, 2.9)	29,100	24,300	34,300
35-44 years	1,127,500	2.1	(1.7, 2.5)	23,800	19,300	28,400
45-54 years	1,096,500	2.4	(2.1, 2.8)	26,400	22,600	30,800
55-64 years	1,065,200	3.1	(2.7, 3.5)	32,900	28,900	37,300
65-74 years	748,000	3.9	(3.4, 4.4)	28,800	25,400	32,700
75+ years	512,700	5.4	(4.7, 6.3)	27,800	24,000	32,100
Education						
Non-College	4,179,000	1.7	(1.4, 1.9)	69,000	60,100	78,900
College Grad	2,296,600	5.1	(4.7, 5.4)	115,900	107,100	123,900
Gender						
Male	3,132,200	2.8	(2.6, 3.1)	88,900	81,500	96,100
Female	3,343,400	2.9	(2.6, 3.1)	96,000	88,400	104,000
Race						
White, non-Hispanic	3,572,800	4.7	(4.4, 5.0)	167,000	155,300	178,500
Hispanic	1,280,100	0.9	(0.6, 1.2)	11,400	7,800	15,600
Other non-Hispanic	1,622,700	0.4	(0.3, 0.6)	6,500	4,100	9,500
Geography						
City Far North	241,600	6.1	(4.9, 7.3)	14,600	11,800	17,600
City North	383,900	8.2	(7.0, 9.4)	31,500	26,900	35,900
Near North Suburbs (East)	93,700	13.0	(10.8, 15.3)	12,200	10,200	14,300
Near North Suburbs (West)	228,100	6.0	(4.8, 7.3)	13,600	10,900	16,600
North Shore/Far North	286,600	13.1	(11.5, 14.7)	37,600	33,000	42,000
Near Northwest Suburbs	229,700	7.7	(6.3, 9.3)	17,700	14,500	21,400
Far Northwest Suburbs	776,800	1.7	(1.3, 2.1)	12,800	10,000	15,900
City Other	1,386,800	1.6	(1.3, 1.9)	21,800	17,800	26,000
South Suburbs	1,141,800	0.5	(0.3, 0.6)	5,300	3,500	7,400
West Suburbs	1,706,500	1.1	(0.9, 1.3)	17,900	14,700	21,400

Notes:

a) U.S. adult population source: Claritas 2020[13] sex by age adjusted for adults in households, educational attainment, race & ethnicity using the American Community Survey 2014-2018.

b) Jewish Adults' Includes adults who identify their religion as Jewish.

[13] Claritas, Inc. Claritas ZIP Code Demographic Data, 2020.

Bias and Limitations

The study team made every effort to field a representative sample of the Metropolitan Chicago area Jewish population to assure the quality of estimates, including developing a comprehensive sampling frame, collecting survey data by web and telephone, and conducting extensive nonresponse follow-up. Nonetheless, there are limitations. Certain subgroups of the area Jewish population may be less likely to respond to the survey than others. Statistical adjustments used in the survey weighting process commonly assume that after adjusting for certain variables, the characteristics of responding and nonresponding households similar. However, this assumption may not always hold, which may lead to bias for estimates. In addition, changes in the population occurring between sample frame development and the data collection period may not be fully reflected in estimates. Because of this, newcomers to the community may be underestimated.