



THE 2017 GREATER PITTSBURGH JEWISH COMMUNITY STUDY

Technical Appendices
Methodology Only

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Appendix A: Methodology

Overview

CMJS/SSRI has developed innovative methods to estimate the size and characteristics of the Greater Pittsburgh Jewish community. As survey techniques have become more refined, the barriers to reaching respondents have become increasingly difficult to overcome. Researchers typically experience limitations in reaching respondents due to the proliferation of survey research, the prevalence of cell phones as well as caller ID/blocking. Low-incidence populations are particularly hard to reach using the traditional method of random digit dialing (RDD) because the likelihood of reaching someone in the target population depends upon the size of that group relative to the population as a whole. To address these barriers, CMJS has utilized a research design that incorporates two innovations:

- Data from an extended sample of email-only respondents
- Use of organizational data to correct for sampling bias

The research design for the Greater Pittsburgh Jewish Community Study utilizes random sampling from an identified frame, or list, of the known population. Community organizations provided their own lists. These lists were combined with a purchased list of likely Jewish households within the geographic area and were then deduplicated. The combined list constituted the sampling frame from which a random primary sample of households was drawn. Because this sample was a random selection from the overall frame, it is assumed to be representative of the entire frame. For that reason, data collected from the random sample were used to estimate overall population characteristics.

To supplement the random primary sample, a second sample was drawn from a frame consisting of the remaining households who had an email address. Information from these households increased the amount of data available from populations of interest and allowed for more detailed analysis of the characteristics of the community.

The methodology is described as follows:

1. Sampling frame
2. Sample design
3. Survey instrument and data collection
4. Field procedures
5. Enhanced RDD for population estimates
6. Weighting
7. Analysis
8. Bias and Limitations

1. Sampling Frame

The 2017 Greater Pittsburgh Jewish Community Study implemented a dual-mode Internet and telephone survey to reach year-round and seasonal residents of the Greater Pittsburgh area. In the absence of an area probability or RDD frame, we began to build a sampling frame from the combined mailing lists of Jewish organizations in the area. The names of the organizations included in the lists are shown in Table A1.

Table A1. Composition of strata

Number	Type	Organization
1	Oversample	Bet Tikvah
		Congregation B'nai Abraham
		Congregation Emanu-El Israel
		Israeli Women in Pittsburgh
		Keshet
		Pittsburgh Israeli Community
2	Parents/Children	Community Day School, parents
		Hillel Academy of Pittsburgh
		Camp Ramah, parents
		Yeshiva Schools
3	Young Adults	Birthright Israel, applicants
		Jewish Community Center of Greater Pittsburgh (JCC), young adults list
		Moishe House
		Repair the World
		The Edward and Rose Berman Hillel Jewish University Center of Pittsburgh
4	Synagogues	Adat Shalom Congregation
		Ahavath Achim Congregation
		Beth El Congregation
		B'nai Emunoh Chabad
		Chabad Fox Chapel - The Jewish Center
		Chabad of Cranberry/North Hills
		Chabad of Monroeville
		Chabad of the South Hills Jewish Center for Living and Learning
		Chabad Outreach (aka Chabad of Squirrel Hill)
		Congregation Beth Shalom
		Congregation Kether Torah
		Kollel Jewish Learning Center
		New Light Congregation / Ohr Chadash
		Parkway Jewish Center

		Poale Zedeck Congregation
		Rodef Shalom Congregation
		Shaare Torah Congregation
		Temple David
		Temple Emanuel of South Hills
		Temple Ohav Shalom
		Temple Sinai
		Young Peoples Synagogue
5	Adults	Birthright Israel, parents
		Community Day School, friends and donors
		Greater Pittsburgh Chapter of Hadassah
		Hebrew Free Loan Association
		Imperial House
		J Street Pittsburgh
		JCC, friends and donors
		Jewish Association on Aging
		Jewish Cemetery and Burial Association
		Jewish Family & Children's Service
		Jewish Federation of Greater Pittsburgh
		Jewish Residential Services, Inc.
		Jewish Women's Foundation
		Camp Ramah, not parents
		Riverview Towers
		The Jewish Chronicle
6	Ethnic names	Infogroup

In order to find any Jewish-connected households not already known to the organized Jewish community, a list of possible Jewish households was purchased from a commercial data broker, Infogroup, and was added to the sample. This list identifies households based on their geography, and then further restricts households to those with Jewish last or first names. This list, referred to as the "Ethnic names" list, consisted of 59,888 households that were identified as likely to include someone who was Hebrew-speaking or Jewish by ethnicity, ethnic group, or religion. Those households that appeared on this list and no organizational list—27,171 households—represented the "unaffiliated" Jewish community.

The organizational and purchased lists were combined, cleaned, and deduplicated to ensure that no unique household appeared on the list more than once. Households without any mailing address were removed from the sampling frame because they could not be fully identified. The combined sampling frame consisted of 81,125 households.

2. Sample Design

The households in the sampling frame were divided into six groupings, called strata, based on expected characteristics of the household inferred from the household's appearance on organizational lists. The composition of the six strata is shown in Table A1. Households that appeared on multiple lists were placed in the lowest-numbered strata for which they were eligible; for example, a household appearing on a parent/children list (stratum 2), a synagogue list (stratum 4), and the ethnic names list (stratum 6) would be assigned to stratum 2.

An original primary sample of 6,500 potential respondents was randomly selected from six different strata (Tables A2a and A2b). The sampling rate of each stratum was designed to oversample likely Jewish households and likely households with children in order to maximize the representation of those groups within the final sample. In order to be eligible for selection as primary sample, a case had to have a mailing address.

To guard against the possibility that the amount of sample released would prove insufficient to yield the desired number of telephone interviews, a back-up sample was set aside for potential later release. As with the primary sample, in order to be eligible for selection, a case had to have an address. A total of 2,962 cases were randomly drawn into the back-up sample.

Following selection of the sample, an email-only supplement was identified. This sample frame of 16,973 households for the email supplement included all households with email addresses that were not selected into the primary sample. All of those households were selected into the email-only supplement. A survey invitation was sent to one email address for each household followed by up to five email reminders. If email messages "bounced" or were undeliverable, another email address from the same household was substituted if available.

Through the process of data collection, it was determined that the primary and back-up samples proved to have a higher percentage of inaccurate or out-of-date contact information, as well as more ineligible households, than expected. Therefore, partway through data collection, a random sample of 3,104 cases previously unused from the frame were added to the overall primary sample.

The addition of the tertiary sample did not provide a sufficient number of eligible households. To remedy this, 1,996 randomly selected eligible cases that had been assigned to the supplementary sample were reclassified as part of the overall primary sample and added to the calling rotation as a quaternary sample (see Field Procedures below). The remaining supplementary sample consisted of 14,977 cases.

The combination of the primary, backup, tertiary, and quaternary samples constitutes the representative sample and totals 14,562 households. The representative sample plus the email-only supplement is referred to as the "full sample" and totals 29,539 households.

Table A2a. Representative sample phases by strata

Strata number	Description	Frame	Original Primary	Back-up	Tertiary (Prev. Unused)	Quaternary (Reclassified Supplement)
1	Over Sample	359	220	6	0	0
2	Parents/Children	5,932	850	357	158	500
3	Young Adults	11,017	800	363	339	500
4	Synagogues	6,283	780	288	388	497
5	Adults	30,363	850	448	1,851	499
6	Ethnic Names	27,171	3,000	1,500	368	0
	Total	81,125	6,500	2,962	3,104	1,996

Table A2b. Full sample size by strata

Strata number	Description	Frame	Representative	Supplement
1	Over Sample	359	226	90
2	Parents/Children	5,932	1,865	908
3	Young Adults	11,017	2,002	4,995
4	Synagogues	6,283	1,953	996
5	Adults	30,363	3,648	7,988
6	Ethnic Names	27,171	4,868	0
	Total	81,125	14,562	14,977

3. Survey Instrument and Data Collection

The survey instrument was designed in collaboration with a special advisory committee of the Jewish Federation of Greater Pittsburgh. 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, allowing for greater confidence in their reliability.

Two modes of data collection were utilized: online and telephone. The online and telephone instruments were identical—when a survey was completed over the phone, the telephone interviewer would fill out the online version.

The questionnaire was divided into two parts, a screener and the survey itself. 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 Greater Pittsburgh for at least part of the year and considered him- or herself to be Jewish. A total of 4,280 households completed the screener and of those, 2,278 were screened into the survey.

Thirty-six respondents were initially screened into the survey but after inspection of responses were determined to include no Jewish adults or that the adults were Messianic Jews and therefore ineligible for the survey.[1] An additional 131 respondents screened into the survey but did not complete the household roster, and so were not included in analyses. The final achieved sample consisted of 2,111 households.

Qualifying households proceeded to the main survey, which included sections on basic sociodemographic information, engagement in Jewish life, and perceptions of various aspects of Jewish communal life in Greater Pittsburgh. In order to minimize the burden on respondents, a series of complex skip patterns ("branching") were created to ensure that respondents were only asked questions that pertained to their specific life situation or experience. Thus, for example, a household with no children would not be asked questions about choice of schools and camps. The online survey took between 20-30 minutes to complete. Respondents completing the survey over the telephone usually completed it in 25-35 minutes. Median survey length was 24 minutes 36 seconds. However, the amount of time required to complete the survey varied for all respondents, regardless of mode of completion, depending on household composition and the degree of detail respondents were willing to offer for open-ended questions.

The survey instrument is presented in the form of a codebook in Appendix D.

4. Field Procedures

Prenotification letters were mailed to the primary sample of 6,500 households on April 28, 2017. These letters explained the purpose of the survey and provided each household with a unique link to complete the survey independently online. Households for which one or more e-mail addresses were available also received these letters electronically on May 1, 2017. A sample of the prenotification letter is shown in Appendix F.

After one week, households that had not completed the survey were contacted by telephone. The primary goal of telephone contact was to administer the survey over the phone if the respondent was unable or unwilling to complete the survey online, or if the respondent simply preferred to complete the survey over the phone. If the respondent was unwilling to complete the survey over the phone at the time of the call, he or she was asked for a better time to be called again or for an email address to re-send the link to the survey online. Calling began on May 9, 2017, starting with the households for which phone numbers were available. Calling concluded on August 24, 2017. Eight email reminders were sent for all non-completed surveys on May 10, May 17, May 25, June 2, June 13, June 19, June 27, July 6, July 13, July 20, July 28, August 7, and August 16, 2017.

Data collection was conducted and supervised by Abt Associates. Abt was responsible for selecting and training callers, supervising and monitoring calling, tracking dispositions, and sending email reminders. Interviewers and supervisors were trained in survey procedures for this specific project. These procedures included:

- Survey sponsorship, target population, and eligibility.

- Moving between the computer-assisted telephone interview (CATI) software used for screening and dispositioning calls and the web-based software used for the main interview.
- The survey questionnaire.
- Pronunciation of selected words.
- Dispositions.
- Entering open-ends.

In addition to survey-specific training, interviewers also received general training in telephone procedures and interviewing techniques. Only interviewers who had undergone this basic training worked on the project. Interviewers were provided with paper sheets with frequently asked questions and "tack-ups" with pronunciation guides, names of Jewish organizations and congregations, and background information on selected concepts.

For households in the primary sample, a maximum of five attempts were allowed to contact the household by phone. The maximum number of attempts for a given phone number was eight with a median of three; this exceeded the five attempts if, for instance, an appointment was made or the case was resampled. The maximum number of attempts made for any one case (across all phone numbers) was 40. The median number of attempts for a case was six. Callers offered to conduct survey interviews over the telephone or, if requested, to email the household members their unique link to complete the survey online at their convenience.

Households were contacted repeatedly at different days and times to determine whether available contact information was correct. Households whose available contact information was confirmed to be outdated, who had no contact information, and those for whom the status was uncertain were searched in online public records databases to find updated information. Research assistants searched for additional contact information and added phone numbers to the calling list as they were identified.

On June 16, 2017, prenotification letters were sent to the back-up sample, which was then added to the representative sample. On June 20, 2017, the back-up sample and the "previously unused" sample were released to calling and added to the representative sample. On August 2, 2017, the reclassified sample was released to calling, and added to the representative sample.

The supplementary sample was conducted as an email-only survey that was not accompanied by prenotification letters or phone calls. The survey instrument for the email sample was identical to the one used for the primary sample. Email invitations were sent to the 16,973 households in the original email supplement for strata 1-5 on May 3, with up to four follow-up reminders sent to the not-reclassified supplement through July 31, 2017.

Skip errors

Skip errors were identified for a number of items and recontact efforts were initiated on June 16, 2017.[2] Respondents affected by the skip errors were recontacted by email and asked to complete a version of the survey containing the affected items.

Data outcomes

Data collection ended on August 28, 2017. In the representative sample, 3,778 households completed the screener; of those, 1,215 were screened into the full survey. The overall response rate was 28.6% for the representative sample (AAPOR RR3). For the combined primary plus supplemental sample, 5,684 households completed the screener, and of those, 2,111 were screened into the full survey, yielding an overall response rate of 24.6% (AAPOR RR3).

Table A3. Response rate by strata for representative sample (AAPOR)

	Sample	Screened In	Screened Out	Response Rate 3	Refusal Rate 2	Cooperation Rate 1	Contact Rate 2
Oversample	226	79	74	67.1%	4.9%	86.1%	77.9%
Parents / Children	1,865	355	260	32.2%	5.5%	75.2%	42.8%
Young Adults	2,002	328	291	32.8%	5.8%	77.8%	42.1%
Synagogues	1,953	305	285	32.9%	6.2%	75.6%	43.6%
Adults	3,648	134	808	22.9%	3.1%	81.2%	28.3%
Ethnic Names	4,868	14	845	26.0%	10.3%	69.5%	37.4%
Total	14,562	1,215	2,563	28.6%	6.7%	75.3%	38.2%

5. Enhanced RDD for Population Estimates

Since 2005, the Steinhardt Social Research Institute has identified and collected hundreds of data sources, primarily population surveys, that could be used to develop estimates of the Jewish population. These data are used to provide an independent, external reference on the basic demographic profile of the population, including national- and state-level population counts and distributions by age and education. 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 sample survey. Details of the methods are reported elsewhere.[3]

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 (JBR) population in the U.S. at the county level.[4] These county-level 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 Pittsburgh Jewish population.

It is important to note that a significant part of this presentation is predicated on the understanding that estimates developed through the SSRI data synthesis approach use hundreds of representative samples of adults in the target area. In comparison, targeted studies, including the Pittsburgh Jewish community study, employ a standard approach among survey research generally. In the latter example, estimates observed in a single survey presume to represent the true population based on a hypothetical—that if the survey were repeated, 95 out of 100 times

the survey would yield an estimate within the 95% confidence interval observed in the survey. However, these repeated surveys are never actually done. Rather than rely on the hypothetical, the SSRI data synthesis approach directly estimates what the data look like across actually observed repeated independent samples. The approach is very different than simply pooling or aggregating multiple surveys.[5] One important distinction is that variation in survey level characteristics can be modeled and controlled for across samples.

Summary of Data

The full sample of surveys in the SSRI database currently spans the years 2000 to 2016, with an additional sample of surveys from 1988 to 1992, for a total of more than 750 independent samples and a total combined sample size of more than 900,000 respondents, of whom over 22,000 identify as Jewish by religion. The present report is based on the most recent data subset to counties within the Pittsburgh area, from the years 2010 to 2016.[6] This subset consists of 139 samples with a total of 11,808 respondents of whom 364 identify as Jewish by religion.

Samples include those conducted as part of a series, such as the General Social Survey (GSS), a National Science Foundation study which has been conducted biennially since 2000,[7] the American National Election Studies, and the survey of Religion and Public Life conducted annually by the Pew Forum on Religion and Public Life. In addition, the sample includes surveys conducted regularly by major news organizations (ABC, CBS, NBC), and a number of independent studies, such as the Baylor Religion Survey,[8] and the Panel Study on Religion & Ethnicity.[9] 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.[10] For surveys that included oversamples, only the representative portion of the samples were included in the analyses unless the oversamples were of groups estimated directly in the population models—for example, age or race—in which case the over-sample contributed only to estimation of that particular group.

About half of the surveys (49%) were standard RDD telephone surveys. Forty-nine percent were cell phone surveys and approximately 2% were in-person interviews, mail or other (e.g., WebTV/PC). Landline surveys account for 63% of the cases, and cell phone surveys account for 31% of the cases. Cell phone surveys are typically included as an additional independent sample collected along with a landline sample. This is done because it improves estimation of particular demographic groups that tend to be under-represented in landline samples, such as younger and less affluent groups.[11] Given the different methods of selection for landline and cell-phone surveys, we treated each as separate independent samples in the analyses.

All of the surveys 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.[12] Often the religious identification question is asked as "What is your religion? Is it Protestant, Roman Catholic, Jewish, something else, or no religion?" Nearly all include Jewish as one of the discrete options. An increasing number of surveys provide no discrete options and ask simply, "What is

your religion, if any?" and record all self-generated responses to the question. Question wording is recorded in order to examine whether there are differences in Jewish population estimates across the surveys. Overall, 10% of surveys asked an open-ended religious identification question while 90% asked closed ended questions. Most of the surveys (92%) specifically included a "no religion" option (none, non-religious, atheist, or agnostic). Recent research has suggested that the inclusion of none as a specific option increases the proportion of those who identify as "no religion."[13] Given that a substantial proportion (up to 25%) of the national Jewish population might identify as no religion when asked about religion, this aspect of question wording was also recorded to see if it is also associated with lower estimates of Jewish identification by religion, and if higher proportions identifying as "no religion" is associated with lower estimated proportions of Jewish identification overall.

Modeling

The full post-stratification model specification included fixed effects for demographic and geographic (county) variables and random effects for survey. Covariates in the model include basic demographic variables (age, race, sex, and education). These mirror the categories used in the national data synthesis model. Race was represented by four categories; age as six; education as two; and sex as two. Geographic variables were also included to account for variability in Jewish population density at the county level.

Pittsburgh Jewish Population Estimates

Results from the model provide overall population estimates as well as estimates of the distribution of Jews by demographic groupings (age, race, sex, county, etc.). The latter is critical for understanding the characteristics of the population, for evaluating external data, and for providing the basis of weighting for targeted local studies.

The overall estimate of the Pittsburgh adult population who identify as Jewish by religion is 2.1% (95% CI: 1.5%-2.7%), corresponding to 34,900 adults (95% CI: 25,900 to 45,800; See Table A4). Distributions within the Jewish population varied by age, education, race, and county. For example the proportion of JBR adults who are college educated varies from 65% in Pittsburgh (Allegheny County) to 54% in the outer Pittsburgh region (Beaver, Butler, Washington, and Westmoreland counties). The age distribution is likewise varied by county, from just 8% of JBR adults in the outer Pittsburgh region ages 25-34 to 13% of JBR adults ages 25-34 in Allegheny County.

Table A4: 2010 to 2016 Greater Pittsburgh population model: Adult Jewish population by religion estimates based to Census Population Estimates Program 2016

	Pittsburgh Adults		Jewish Adults				
	Population	Pct	Percentage of Pittsburgh Adults (CI)		Population	Lower Bound	Upper Bound
Total All Groups	1,679,904		2.1	(1.5,2.7)	34,900	25,900	45,800
Age							
18-24 years	158,281	9.42	2.3	(1.4, 3.6)	3,700	2,200	5,700
25-34 years	284,057	16.9	1.5	(0.9, 2.2)	4,300	2,600	6,400
35-44 years	239,220	14.2	1.3	(0.7, 2.0)	3,100	1,800	4,700
45-54 years	284,902	17.0	1.8	(1.2, 2.5)	5,000	3,300	7,200
55-64 years	322,568	19.2	2.6	(1.9, 3.6)	8,500	6,100	11,600
65+ years	390,876	23.3	2.7	(1.9, 3.5)	10,400	7,600	13,800
Education							
Non-College	1,149,050	68.4	1.1	(0.7, 1.5)	12,700	9,200	17,700
College Grad	530,854	31.6	4.2	(3.1, 5.4)	22,200	16,500	28,900
Sex							
Male	806,472	48.0	2.1	(1.6, 2.8)	17,100	12,500	22,800
Female	873,432	52.0	2.0	(1.5, 2.7)	17,800	13,200	23,700
Race							
Non-Hisp. White	1,485,815	88.5	2.3	(1.7, 3.0)	34,400	25,400	44,800
Non-Hisp. Black	125,351	7.46	0.2	(0.0, 0.4)	200	100	500
Hispanic	19,915	1.19	0.6	(0.2, 1.3)	100	0	300
Non-Hisp. Other	48,822	2.91	0.5	(0.0, 1.0)	200	100	500
County							
Allegheny	961,161	57.2	3.3	(2.4, 4.3)	31,700	23,200	41,600
Outer Pittsburgh Region *	718,743	42.8	0.4	(0.1, 1.0)	3,200	900	6,300

Notes: a) Source: Census Population Estimates Program, 2016. Adjustment for education made using ACS 2016 and post-stratified for household population using 2010 Census.
* Includes Beaver, Butler, Washington, and Westmoreland counties

Estimating the number of JNRs (Jews of no religion)

The next step in estimating the size of the adult Jewish population was to estimate the number of adult JNRs. Estimates of the number of JNRs are not directly available from the data synthesis and must be approximated from other sources. In this study, the proportion of JNRs was estimated using data from the Pew study of American Jews, which reported an Eastern United States regional rate of 18.2%.

Thus, the preliminary Jewish adult population was estimated by Enhanced RDD as

	35,100 JBR
+	7,700 JNR
	42,800 Jewish adults

These numbers were later adjusted slightly to account for the estimate of the numbers of adults who answered "Jewish" to the religion question (and counted as JBR in the Enhanced RDD estimates) who were later identified as not Jewish.

6. Weighting

Overview of weighting procedures used

The purpose of developing survey weights for the sample is to adjust the survey data so that they will represent the population from which they were drawn. This is done in two ways: base weights, which are based on sample design, and poststratification weights, which are adjustments to external benchmarks.

For base weights, the data are adjusted to match the sampling frame by calculating the strata-specific probabilities of selection into the sample and rates of response. By adjusting weights upwards for respondents from strata in which households were less likely to be selected or to respond, and adjusting weights downward for respondents from strata in which households were more likely to be selected or to respond, the resulting weights adjust the data to match the frame from which they were drawn.

Poststratification, the second phase of weighting, adjusts the data to match known population parameters. In this case, the known parameters that were utilized were the Enhanced RDD estimates of the JBR adult population and their age distribution, as described in the previous section, the number of children currently enrolled in Jewish day schools and part-time schools, and the number of synagogue members. After applying the base weights, the sample is adjusted again to match these parameters. This step yields the primary sample weights for households and respondents.

The weighted primary sample was used to estimate the size of the adult population for multiple categories of religious identity as well as the distribution of Jewish denominational affiliation.

For the supplemental sample, base weights were calculated for the email portion of the frame based on differential probability of selection and response. After applying base weights, poststratification weights were calculated to adjust the full sample to the JBR and age estimates from data synthesis, the number of children in day school, as well as the JNR estimate and denominational affiliation calculated from the primary sample.

At the end of the process, a datafile was created with one record per household. In this file, each record has four weights:

1) wtprimhh: the weight of the household for the primary sample
2) wtfullhh: the weight of the household for the full sample
3) wtprimresp: the respondent's individual weight for the primary sample
4) wtfullresp: the respondent's individual weight for the full sample

Design and base weights

Base weights were calculated separately for the primary sample and the supplemental sample. Base weights are calculated as the product of the design weight (inverse of the probability of selection into the sample) and the nonresponse weight (inverse of the probability of responding after being selected into the sample).

For the primary sample, data were weighted separately within each sub-stratum by the probability of selection into the sample (design weights) and nonresponse. To calculate the design weight, the preliminary frame size was adjusted to account for the presumed ineligibility of a proportion of the households in the sample frame. Ineligible households identified during the data collection period of the survey are those households that are found to be duplicates, deceased, or infirm.
The adjusted frame size for each stratum was calculated as:

> Adjusted frame size = Frame size × (Number eligible households ÷ Number selected households)

The design weight for each stratum was calculated as:

> Design weight = Adjusted frame size ÷ Number eligible households

Respondents were those who partially or fully completed the survey. Partial surveys were those in which the screening data were completed (whether the respondent was screened in or out). The nonresponse weight for each stratum was calculated as:

> Nonresponse weight = Number eligible households ÷ Number respondent households

The base weight is calculated by multiplying the design weight by the nonresponse weight:

> Base weight = Design weight × Nonresponse weight

Poststratification

To adjust the sample to account for the known population of Jews in the Greater Pittsburgh area, the process of poststratification was used.[14]

To adjust to the number of JBR adults, the survey data were reviewed based on responses to religion questions for each adult in the household. Each adult received a preliminary designation of Jewish by religion (JBR), Jewish not be religion (JNR), Jews of multiple religions (JMR), Jewish background (JB), Jewish affinity (JA), or not Jewish. All households with no JBR, JNR, or JMR adults were classified as non-Jewish and reclassified as screened out of the sample.

The first stage of the poststratification was conducted on an individual rather than a household level.[15] The file was converted to an individual-level file with one record created for each adult in the household. The weights of the individual records initially were set at the weights of the household record, resulting in a total weight that added up to the number of individuals rather than the number of households.

The individual records were poststratified to match the JBR and JNR counts. Individuals in the data file who were JNR or JMR were adjusted to the total JNR. The ages, genders, and educational attainment of the JBR adults were adjusted to match the JBR age estimates from meta-analysis. The ages of the JNR adults were adjusted to match the age distribution of JNR adults in the Pew study.

The result of this step were *interim individual* poststratification weights for each individual adult. Because further poststratification weights were conducted at the household level, the *interim individual weights* were converted to preliminary household weights by taking the mean of all of the individual poststratified weights for all adults in the household for the respondent record.[16] All records for non-respondents were dropped.

Poststratifying to known parameters

The second stage of postestimation applied to households rather than individuals. In this stage we further poststratified the sample using known parameters of the Jewish community: day school enrollment, part-time school enrollment, and synagogue membership. To make use of these numbers, the education enrollment numbers needed to be converted to a number of households that they each represented.

Local schools provided an estimate of 792 children enrolled in Jewish day schools and 998 in Jewish part-time schools. To use these estimates for individual adult weights, we estimated the number of households that they represented and the number of adults in those households.

For each household, we categorized it as a day school household if any children were enrolled in day school and a part time household if any children were enrolled in part time school. We coded synagogue households if they were members of an Orthodox, Conservative, or Reform synagogue.

For households that had any children in school we estimated:

Mean (weighted) DS students per DS household
Mean (weighted) PT students per PT household

To estimate households, we used the following formula:

DS household count = (DS students total ÷ mean DS students per household)
PT household count = (PT students total ÷ mean PT students per household)

For synagogue households, data provided by local congregations indicated that there were 800 households belonging to Orthodox synagogues, 1,120 to Conservative, 2,700 to Reform, and 400 to unaffiliated congregations.

The last stage of the poststratification of the primary sample was to adjust the number of households to match the day school households, part-time school households, and denominational synagogue households. The results of this step yielded the *primary household weight.*

Respondent weights

Weights for individual respondents, *primary respondent weights*, were created for analysis of individual level characteristics. Respondents were poststratified to represent all adults in the population.

Using the *primary household weights*, estimates were generated for the total number of adults for the following parameters:

- Jewish type (JBR, JNR/JMR) or non-Jewish
- Age and gender
- Jewish denomination (Orthodox, Conservative, Reform, Other, None)
- Adults in DS household
- Adults in PT school household
- Adults in synagogue (Orthodox, Conservative, Reform, Unaffiliated)

The starting weight for the respondent poststratification was the *interim individual weight* for the respondent. This was poststratified using the parameters listed above to yield the *primary respondent weight.*

Weights for the full sample

For the full sample, base weights were calculated differently than for the primary sample but the poststratification processes were similar. The full sample was a combination of the primary (including backup, tertiary, and quaternary samples) and the supplement, or email-only, samples. All households in the frame were eligible to be selected into the primary sample, but only households with email addresses could be selected into the supplement. Furthermore, households

in the supplement received a lower level of effort than did those in the primary, resulting in different probabilities of response.

The full frame was divided conceptually into an email and a non-email frame. All households with email addresses were assigned into the email frame. For households without email addresses, the base weight was calculated identically to the way it was for the primary sample.

For households with email addresses, households were considered to have been selected into the full sample if they were in the primary or the supplement.

The design weight for each email stratum was calculated as:

> Design weight = Email frame size ÷ (primary email sample + supplement email sample)

The probability of response depended on the level of effort so was different for primary and supplement subsets.

> Nonresponse weight, email primary =
> Primary email sample ÷ Primary email respondents

> Nonresponse weight, email supplement =
> Supplement email sample ÷ Supplement email respondents

The base weight is calculated by multiplying the design weight by the nonresponse weight:

> Base weight = Design weight × Nonresponse weight

Poststratification of full sample

Poststratification of the full sample was conducted in the same way as for the primary sample, as described above. However, all poststratification targets for the full sample were the estimates generated from the primary sample only.

7. Final Population Estimates

Margin of error

Many studies report a margin of error instead of reporting confidence intervals. The margin of error is the 95% confidence interval that would be expected if ALL survey respondents had answered a question; if there were only two response choices; if about half gave each response; and if the survey design had used a simple random sample. Given these conditions, the margin of error is dependent solely on the sample size and population size. Furthermore, the margin of error is only applicable to percentages, not to totals or means.

In our sample, with 1,215 respondents in the primary sample, the margin of error would have been ±2.74% if we had used a simple random sample. Applying an adjustment factor to account for the use of a stratified random sample increases the margin of error to about ±6%.

Precise population estimates with confidence intervals

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 A5. For example, the best estimate of the total Jewish population is 49,152 people, but given the size of the sample and possible sampling and non-response error, we can only be 95% confident that the true value lies somewhere between 43,057 people and 55,247 people.

Table A5. Population Estimates with Confidence Intervals Shown

	Estimate	Lower bound	Upper bound
Total Jews	49,152	43,057	55,247
Adults	50,524	44,116	56,932
Jewish	42,749	36,964	48,534
Non-Jewish	7,768	5,283	10,254
Children	8,466	6,101	10,831
Jewish	6,403	4,963	7,844
Non-Jewish	2,062	283	3,842
Total people	58,990	51,669	66,311
Total households	26,840	23,248	30,432

8. Analysis

All analyses were completed using statistical software Stata, version 15. Unless otherwise noted, all analyses were restricted to Jewish households (in which at least one adult was Jewish) as well as individual Jewish adults and Jewish children who were specifically identified by respondents as being Jewish. Analysis of characteristics of the entire population were based only on the primary sample with appropriate weights applied. All analyses of subgroups or subsets of the population were conducted using the full sample with appropriate weights applied. In certain circumstances, noted in the main report, cases were excluded from analysis because the unusually large weights assigned to them unduly skewed results. Data about the household in general was calculated using household weights and data about individual adults or respondents only was calculated using respondent weights.

9. Bias and Limitations

Every effort to create a representative sample was made in order to prevent bias or, where bias was unavoidable, to identify and reduce it. Nevertheless, some groups are particularly likely to

be underrepresented in the sample. Most significant among these are unaffiliated Jews (including new residents and intermarried families) and young adult Jews. Young adult Jews are also likely undercounted for other reasons. Young adults in general are notoriously difficult to reach for telephone surveys, in part due to the increasing rate of cell phone-only households and in part because they tend to move more frequently than older adults; both conditions render young adults harder to track.

Newcomers who are not known to the community are very likely undercounted, though they may have appeared on the ethnic names list. Interfaith families may also be underrepresented to the extent that they are unaffiliated and reside in households with directory listings that do not fit the selected ethnic name parameters.

[1] Messianic Jews claim Jewish identity, but their claim is typically rejected by the vast majority of the Jewish community. Respondents who identified as Messianic Jews in this study were treated as non-Jews.

[2] The affected items consisted of CITISRHH, CITISRRESP, GLBHH, GLBRESP, INTERHH, RACEHH, RACERESP, RESPDENOM, YADATEJ, YAKIDSJ, YAMARJ, YARELRELIG, YAISGOTH, and YASTUD.

[3] 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.

[4] Tighe et al., *American Jewish population estimates: 2012*.

[5] cf. Hartman, H., & Sheskin, I.M. (2012). The relationship of Jewish community contexts and Jewish identity: A 22-community study. *Contemporary Jewry, 32*, 237-283.

[6] For a description of search strategies used to identify surveys and inclusion criteria, see Tighe et al., 2010, 2011.

[7] Smith, T.W., Marsden, P.V., & Hout, M. (2011). General Social Survey, 1972-2010 [cumulative file]. ICPSR31521-v1. Storrs, CT, and Ann Arbor, MI: Roper Center for Public Opinion Research, University of Connecticut, and Inter-university Consortium for Political and Social Research [distributors].

[8] Baylor Institute for Studies of Religion. (2007). *The Baylor Religion Survey, Wave II*. Waco, TX: Baylor Institute for Studies of Religion, Baylor University.

[9] Emerson, M.O., Sikkink, D., & James, A.D. (2010). The Panel Study on American Religion and Ethnicity: Background, methods, and selected results. *Journal for the Scientific Study of Religion, 49*, 162-171.

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

[11] Baker, R., Blumberg, S.J., Brick, J.M., Couper, M.P., Courtright, M., Dennis, J.M., Dillman, D., Frankel, M.R., Garland, P., Groves, R.M., Kennedy, C., Krosnick, J., & Lavrakas, P. (2010). Research synthesis: AAPOR report on online panels. *Public Opinion Quarterly, 74*, 711-781; Biemer, P., & Link, M.W. (2006). Evaluating and modeling

early computer bias in RDD surveys. Paper presented at the Second International Conference on Telephone Survey Methodology; Blumberg, S.J., & Luke, J.V. (2014). *Wireless substitution: Early release of estimates from the National Health Interview Survey, July-December 2013*. National Center for Health Statistics; Lavrakas, P.J., Blumberg, S., Battaglia, M., Boyle, J., Brick, M., Buskirk, T., DiSogra, C., Dutwin, D., Fahimi, M., Fienberg, H., Fleeman, A., Guterbock, T.M., Hall, J., Keeter, S., Kennedy, C., Link, M., Piekarski, L, Shuttles, C.D., Steeh, C., Tompson, T., & ZuWallack, R. (2010). *New considerations for survey researchers when planning and conducting RDD telephone surveys in the U.S. with respondents reached via cell phone numbers*. AAPOR Cell Phone Task Force; Link, M., Battaglia, M.P., Frankel, M., Osborn, L., & Mokdad, A. (2007). Reaching the U.S. cell phone generation: Comparison of cell phone survey results with an ongoing landline telephone survey. *Public Opinion Quarterly, 71*, 814-839; Pew Research Center for the People & the Press. (2006). *National polls not undermined by growing cell-only population*. Washington, DC: Pew Research Center for the People & the Press.

[12] 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.

[13] Putnam, R.D., & Campbell, D.E. (2010). *American grace: How religion divides and unites us*. New York: Simon & Schuster.

[14] Poststratification was conducted in Stata using the user-generated survwgt command (https://ideas.repec.org/c/boc/bocode/s427503.html#cites) and the ipfraking command (Kolenikov, Stanislav. "Calibrating survey data using iterative proportional fitting (raking)." The Stata Journal 14.1 (2014): 22-59.)

[15] For a discussion of the challenges of simultaneously poststratifying at the individual and household level, see Kolenikov, S., and Hammer, H. (2015) Simultaneous Raking of Survey Weights at Multiple Levels. Survey Methods: Insights from the Field, Special issue: 'Weighting: Practical Issues and 'How to' Approach. Retrieved from http://surveyinsights.org/?p=5099. DOI:10.13094/SMIF-2015-00010. Multiple approaches were compared to identify the one with consistent results.

[16] Multiple approaches were compared for this conversion, and the mean weight was determined to be most reliable. See Kolenikov, S., and Hammer, H. (2015). Simultaneous Raking of Survey Weights at Multiple Levels. Survey Methods: Insights from the Field, Special issue: 'Weighting: Practical Issues and 'How to' Approach. Retrieved from http://surveyinsights.org/?p=5099. DOI:10.13094/SMIF-2015-00010