Generational Change in ARRL Contesting:
The Pending Demographic Cliff Ahead

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The radio sport of contesting is one of the top activities for ham operators [1]. The annual ARRL Sweepstakes contests in CW and Phone have broad appeal as contests and the numbers of participants has been increasing each year. Clearly, from an engagement viewpoint, it is one of the great success stories of the League. So, why are there hams within our fold who express concern about the potential for declining participation in contests like Sweepstakes? Why are there some alarmists among us who believe ham radio contesting may face a cliff with regard to drop-offs in participation? We hope this article will answer those concerns and clarify opportunities for the contesting community to "right the ship before it takes on too much water," so to speak.

Our analysis is based upon entries into the ARRL Sweepstakes contest, a popular contest among ham radio hobbyists in North America. The ARRL made available to us the participant entry data from the years 2000, 2005, 2011, 2015 and 2020 for a series of analyses designed to create opportunities for the contesting community to grow the ranks of contesters.

We discovered that Sweepstakes participants over the past two decades were from all over the world but mainly in the United States with a much smaller number from Canada. Figure 1 is a map of CW and Phone participants for the years 2000, 2005, 2011, 2015 and 2020 all combined within each transmission mode. [2] They are concentrated around metropolitan areas but especially in the Northeastern corridor, the West Coast, the Midwestern Rust Belt cities, and Florida. The Los Angeles, San Francisco and Seattle areas tend to be concentration zones as well as Chicago, Minneapolis and Detroit in the Midwest. The spatial patterns for CW and Phone participation are very similar with some tendency for CW participants to be in more rural areas. So Sweepstakes participants tend to be like most Americans, residing most in and around large cities with some outside of those metropolitan areas. That's great, right?

As the well-known sports announcer, Lee Corso, says: *not so fast!* The demographic processes shaping Sweepstakes participation, and perhaps most all long-standing contests, portend the potential for dramatic change to come in the next decade or so. We report the first results of a new study of Sweepstakes log submissions over the 2000-2020 period with age-matched data from ARRL Membership files and other enhancements by the authors. Using a number of data analytic procedures, we identify key *generational changes* in contest participation patterns that have not been previously identified. They paint a concerning picture for the attraction of new blood into the radio sport of contesting. But first, let's look at Sweepstakes participation itself for the past 20 years.

The growth in contest participants seems very clear from the numbers that the League compiles from the log submissions. Figure 2 lists numbers of logs successfully submitted by year and mode. From each five-year gap, the rates are positive and robust. For CW, the annualized growth rates of growth are from about 4-5 percent over each gap while Phone's annual rates of growth range from 4-7 percent, with more participation in Phone sweepstakes from both absolute participation numbers and percentage growth. Both CW and Phone declined slightly in annual growth rates during the past 5 years.

These results clearly suggest that the Sweepstakes participation is growing and includes hams from all around the U.S. and a noteworthy number outside the country, especially in nearby Canada. But like the sailor who ignores the dark clouds in the distance, there is a *demographic storm* on the horizon.

Generational Patterns of Participation in the Sweepstakes Contests

The ARRL kindly provided birth year for all of the call signs in the Sweepstakes Contests data where age information was available. [3] We used this information in our enhanced dataset to examine the age distributions for each year and also added actuarial life expectancy data from the U.S. Social Security Administration to each birth year (see Note 5 below). This gives us a unique perspective on not only the age patterns of these contesting hams but their likely remaining years until reaching Silent Key status. Each log call sign was also georeferenced to license address.

Some age demography theory here is necessary for interpreting the results. If the age structure of contest participation is such that new hams are being regularly drawn into the radio sport in sufficient numbers to replace those aging hams who exit, the *shape* of the distribution from 2000 until 2020 would remain almost identical. That is, amateurs from more *recent* generations would enter as *older* participants become physically or mentally unable to engage in the necessary “butt in chair” activities for major contests, or have relocated their housing into situations where participation in radio contesting is not possible. However, if the age distribution *continues to shift upward* from 2000 until 2020, then newer generation newcomers are not keeping up in replacing with those from earlier periods who are eventually leaving the contesting scene. Or, it could be a mixture of these two opposing scenarios. The empirical answer from these data is surprisingly clear.

We present a histogram of the age distribution for Sweepstakes participants in each observed contest year by mode in Figure 3. The median age over all contests and modes is 60 years. We insert this median into each distribution to give a fixed target through which to visualize trends in the respective age distributions over time. The results are striking, especially for CW participants. The bulk of the age distribution lies to the left (younger) side of the median in 2000 for each contest mode. But with each successive five-year snapshot, it moves like a caterpillar's crawl to the right (older) of the age 60 median. It reached a tipping point in 2011 with the middle bulk of participants being around the age of 60. By 2020, a clear majority of participants are above the median bar (older) but slightly more so for CW participants.

This picture suggests that the needed demographic *replacement* is not occurring as the Sweepstakes contesting participant pool is aging to the point where we need to examine carefully what is the demographic profile of newcomers and those exiting. Moreover, what is the life expectancy of those continuing to participate in the ARRL’s premier contesting program? We step through results addressing these issues from this dataset.

Some key indicators of demographic change are in Figure 4. The row labeled Continuation is the percent of call signs from the previous year (e.g., 2000) that matched the call sign logs submitted in the next contest observation (e.g., 2005). This tells us which individual call signs continue from five-year observation to the next observed contest. Only a third to a half of the call signs in a given year appear again in the next contest some five years later. This applies to both CW and Phone contests. However, the Phone contest continuation percentages are systematically smaller, never reaching 50 percent. It’s clear that readers should recognize that Sweepstakes participants, especially those in Phone, are not the same operators but they do tend to reflect the same generation, collectively moving in some lock-step

through the past two decades of the Sweepstakes. This suggests that Sweepstakes contesting is culturally rooted to one or more generations rather than a single collectivity of specific hams.

The average age has moved upward over the past two decades some 15 years from 51 to 67 among CW contesters. Phone participants are slightly younger on average but they too have moved from 50 to 64 over this twenty-year period. Now a key element of this demographic mix is the age at licensure, created from the "check year" field in the required Sweepstakes log compared to the birth year. Phone participants tended to be licensed in their mid-twenties while CW contesters were in their late teens. These are averages, of course, and vary somewhat. We include the standard deviation under the mean score to better illustrate this variation. But this aids in our understanding of the tenure of being licensed. Participants in the CW Contest over the years have been licensed longer than similar Phone participants. They are culturally rooted in the era of amateur radio where they entered the hobby at a young age and may indeed reflect an earlier generation of ham radio in cultural beliefs about the hobby. In both cases, the vast preponderance of participating hams (88.9%) was born in the Traditionalist (pre-1945) or Baby Boomer (1945-1964) generations.

Demographic Sources of Newcomers and Exits from Contesting

Having described the dominant generational character of Sweepstakes participants, we remind the reader that these are not the same set of individual hams to participate year-in and year-out (e.g., 50% or less continuity). But what age demography are those who enter contesting? When did newcomers become licensed? How about those who get enthusiastic about amateur radio later in life? These factors are what will drive contesting into the future over the next 10-15 years.

To address these questions, we enhance the Sweepstakes dataset to compute measures of *exits* and *newcomers* into each five-year observation window. Because it can be complicated to just describe this data creation in just words, we rely on the diagram in Figure 5. From left-to-right, the years of data we obtained from the ARRL represent whether a specific call sign was in a contest for that year or not. [4] If a call was in 2000, for instance, and it was not in 2005, then we count that as an *exit* case for the 2000-2005 interval. If that call was also in 2005, then we consider that a *continuation (*as shown in Figure 2). If a call was not in 2000 but was in 2005, then we consider that a *newcomer*. These were computed separately for the CW and Phone Contests. We also recognize that we are not able to link callsigns to previously used callsigns so this aspect of our analysis is a weakness.

But taking into account that we do not have each and every single year's log data, this method could have a call sign that was in 2000-2004 but just missed 2005 and still be counted as an exit. The same thing could conversely be the case for newcomer. But to counteract this random absence case, we computed *long-term exits* and *entrants*. As the red box on the left designates, if a call sign was in either 2000 or 2005 but was not in any of the remaining contest files, we counted that as a ***long-term exit***. Accordingly, if a call sign was in 2015 or 2020 but not an any previous contests, we count that as a ***long-term newcomer***. These may be more reliable but longer-term indicators of the ebb-and-flow of Sweepstakes Contest participation than the 5-year measurements.

The short-term exits for CW and Phone are shown in Figure 6. There is a greater exodus during the 2000 to 2011 decade and is dominated by the Traditionalists and Baby Boomer generations. Some exits are prominent by Generation X members during the second decade of observation. Note that the number of those leaving this contest program *declines* over time, suggesting that it may indeed be age-related health issues rather than changes in interest. While exits exacerbate the generational problem,

Figure 7 contains data on newcomers, where replenishment of those leaving may be found. But here is what may be a surprising result. Newcomers tend *not* to come from later generations but from the wellspring of the Baby Boomers and their preceding generation. And while this is true for both contest modes, there is a nominally greater increase of Generation Xers and some token Millennials arriving in the Phone contest logs in the last five years. This trend is a potential strategy for the contesting community to grow participation in sweepstakes especially via the Phone contest.

The long-term exits and newcomers are described in Figure 8. In the CW Contest, long-term entrants are almost wholly from the Baby Boomer generation. While the small presence of other generations is observed, they pale by comparison to both long-term newcomers and exits by this generation.

Another potential source of new blood into radio sport are what the first author termed, "late-in-life hams," in his NCJ article series on Aging and Contesting. These are middle-aged adults who become licensed and engage in the hobby. Using the definition cited in the NCJ articles (see note 1), we computed *late-in-life-hams* using the age variable as license age being 40 or above. Out of the 12,663 logs with matched age data, a total of 1,655 (13%) were classified as late-in-life hams. While this is a small number in absolute terms, to what extent do they represent newcomers to the Sweepstakes? Figure 9 provides an answer.

The bar chart shows that there is an increasing number of hams licensed later in life joining each contest year. Well over 100 were present in each year since 2000 in the Phone Sweepstakes but less for CW. This is a clear differential in late-in-life hams favoring Phone over CW. In the past decade, this difference has become larger with over 250 such hams taking up Sweepstakes Phone entry as compared to no more than 100 in CW. Thus, late-comers to ham radio and Sweepstakes contest participation migrate to Phone much more than CW. These observations suggest that the phone Sweepstakes are a perfect entry way into HF contesting for newer licensees who want to try contesting by participating in a domestic event that fosters success with modest antennas (wires, verticals) and lower power (100 watts). It is an opportunity for all contesting clubs to find and invite such newer licensees to join Sweepstakes 2021 and beyond to experience the thrill and passion of HF contesting. This suggestion is made even more crucial to long-term contesting sustainability given the next trend we uncovered.

Life Expectancy and the Demographics Facing Sweepstakes

Our final analysis involves the estimated life expectancy of Sweepstakes participants, using the U.S. Social Security Administration's actuarial data for *average* predicted remaining life by age. [5] Some basic explanations of these data are warranted before proceeding. The predicted remaining life is the *average* and there is variation around that mean score (standard deviation is thought to be between 8 and 15 years, depending upon the time period referenced. See Note 5.). So, these are *population* characteristics and *individuals* (hams) will vary on length of time with regard to becoming Silent Key around this *average* score. Regardless, taken in aggregate, these projections are likely critical for understanding the cliff that HF contesting is about to experience.

If we think of the expected remaining years of life at a given age as a battery where "years of life" is a charge, we can examine patterns of life expectancy as being above or below the expected "charge" until reaching depletion (Silent Key status), whether SK status reflects relocation to a living situation where operations cannot occur or ultimately through death of a given individual. The presented data will underestimate the age when physical or mental infirmity precludes active contesting. We constructed a set of histograms similar to the age distribution by year and contest mode (Figure 3). Instead of age, we substituted *remaining life expectancy* computed as the difference of life expectancy and age. Instead of

the median life expectancy, we inserted a vertical line at zero which reflects the *average remaining life expected*, trading on the remaining battery charge metaphor. Figure 10 contains graphic representation for each Sweepstakes year and contest mode.

The positive results are that all but one time-to-expected-SK status is on the right side of zero (or positive). If newcomers to the Sweepstakes contest program averaged the age distribution in this participation pool, there would be a supply "re-charge" (replenishment of SK contesters with newer contesters with life expectancies of several decades) that would sustain it for over two decades or so. The clear and dramatic exception is in the CW contest where fully one-half of the 2020 participants have used half of their expected remaining time until SK status. This does not take into account physical or mental impairments that would take hams out of the contesting participation pool. Thus, future participation in the CW Sweepstakes would fade out within a decade or two based upon these data unless younger hams enter the CW sector of radio sport.

What Do These Results Mean for the Sweepstakes and Other Contests?

The current participation numbers for the Sweepstakes contests look good, even promising future extended growth, if we only take the raw counts of submitted logs into consideration. This is exciting for those of us who are long-term contesters as well as the ARRL contest itself. However, there is more to what we have observed. The loss rate of contesters leaving the ARRL Sweepstakes contest is high and reflects the aging demographics of our hobby, as well as the lack of adequate replenishment of newer, younger contesters

Because of these demographic patterns, it appears to be a culturally-situated issue riding a demographic storm. If it were just promoting the Sweepstakes contests to other age groups, the activity would be attractive by itself. However, note the maximum continuity rates never reaching more than 50 percent across each five-year period. Yet, it was almost one-half of the second year's participants that were also from the Baby Boomer (or perhaps Traditionalists) generation, not Gen-Xers or Millennials. Certainly not Post-Millennials which could be counted on two hands. This is strong evidence that Sweepstakes contesting as we know it is a cultural practice that appeals to those born before 1965 and, while nominally growing among Gen-Xers, does not attract younger participants thus far.

That said, we also recognize that it is not too late to reverse these trends and interrupt the aging-related decline that is happening in contesting and that will soon result in dramatic reductions in numbers of participants. Sweepstakes, especially Phone Sweepstakes, attracts new participants from among those recently licensed, regardless of their generational age. Growth in Sweepstakes is not occurring from a new hobbyist "teenage" demographic, which is how many of us entered ham radio. There are plenty of data describing how ham radio does not have the same allure today as it did in the 1950's-1970's. We cannot undo cultural trends and changes in new technology. We can however create new marketing/recruitment strategies to welcome adults of all ages into the hobby, and to encourage them to give contesting a try. Phone Sweepstakes is one such 'gateway' to contesting it seems. The data already point to that, and it is an observation that suggests ways for the contest clubs throughout North America to target and draw in new participants.

Our data analysis reveals several indisputable facts. First, Sweepstakes participation remains popular despite the folklore that it is not growing, although that annual growth is small. Second, the participants in Sweepstakes are typically experienced ham operators who have been licensed for many decades. Third, the number of younger generation hams (under age 40) has not contributed to any measurable change in Sweepstakes participation. Fourth, there are newer licensees (not necessarily younger in age)

who are participating in Sweepstakes and largely contributing to its growth. Fifth, Sweepstakes has ‘curb appeal’ to newer licensees, especially Phone Sweepstakes.

These observations suggest several pathways forward to sustain contesting, enrich the hobby and replace our senior contesters who are becoming SK’s.

Contesters and contesting clubs can create new marketing/recruitment strategies to welcome adults of all ages into the hobby, and to encourage them to give contesting a try. Phone Sweepstakes is one such ‘gateway’ to contesting. Contest sponsors, like the ARRL, can ensure that any changes in the rules of Sweepstakes should reflect changes that encourage rather than discourage new participants. The ARRL might consider creating some awards which target exclusively newer entrants into Sweepstakes, like a ‘rookie category’ but without the culturally offensive stigma of calling a middle-aged adult a ‘rookie’. (We suggest using Newcomer instead.) The Contest Advisory Committee may want to critically evaluate the Sweepstakes data and offer additional innovative ways to attract more participants.

Finally, these data suggest that there are plenty of new hams in the hobby but not enough contesters. Local, regional and national contest clubs must re-evaluate outreach strategies and meeting formats to attract, mentor and retain new contesters within our ranks. Individual contesters can also contribute to contest growth. *We can dispel the popular myth that a successful contest station requires multiple towers, Yagi stacks, vertical arrays and teams of operators.* There is a role for these sophisticated, team-based contesters. They often lead through innovation and performance, stimulating the rest of us to pick it up a notch or two. But there are plenty of ways that individual contesters can enjoy the hobby and be successful, whether through modest stations at their home, through mobile contesting or even portable activities like the SOTA, POTA, the Portable Operations Challenge and others.

It is also important to acknowledge the impact the housing transitions from a home without antenna restrictions to a property with severe restrictions is likely impacting participation, especially later in life for those who wish to continue as contesters. It is imperative that we acknowledge this reality and work to create opportunities to contest via remote stations or through shared club stations, such as exists in The Villages in central Florida. The ham radio hobby has always been about innovation and response to challenges. The challenges we face in contesting are no different. The demographic “cliff” we observe and describe with contesting need not be a self-fulfilling prophecy.

Notes

1. Frank M. Howell. "Aging and Radiosport — Part 1" National Contest Journal, July/August, pp. 3-8.

2. With the approval of ARRL CEO David Minster NA2AA, these data were kindly supplied by Bart Jahnke, Radio Sport and Field Services Manager, at ARRL Headquarters. He handled follow-up questions in a very timely manner and our thanks are expressed here.

3. A total of 12,873 birth years were supplied for the 15,390 logs sent to us by the ARRL. This resulted in 2,517 (or 16.4%) not having age data. We examined patterns of missing age data against several key variables that are independent of age: US call vs international, year of contest, absence of year contests by mode, mode over all years, state location, precedent category, long-term exits and entries, and total number of CW and Phone contests. All except long-term phone entry were statistically significant. But examining the cross-tabulations, the percent difference in any category was about 5 percent of the cases. We do not see these differences as substantially reducing our ability to generalize age patterns to the full Sweepstakes dataset used in this study.

4. We recognize that call signs can and do change. While georeferencing each log record, we took note of this potential by examining the log entity (person, club, etc.). It did not appear to be very prevalent enough to warrant concern by us.

5. See https://www.ssa.gov/oact/STATS/table4c6.html. We used these data to construct expectated (mean) life span and compared it to current age in the contest year to compute remaining life expectancy. Our narrative discusses the standard deviation around this average life expectancy. See, for instance, this article by Edwards at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3285408/ which suggests that 15 years is a good approximation. Others, such as Hennington (https://www.actuaries.digital/2020/08/12/standard-deviation-around-life-expectancy-is-eight-years-what-this-means-for-retirees/) suggest that 8 years is a better current estimate.

Figure Caption List

Figure 1. U.S. Area Participants in CW and Phone Sweepstakes Contests for 2000, 2005, 2011, 2015, and 2020

Figure 2. ARRL Sweepstakes Contest Participation by Year and Mode of Transmission

Figure 3. Age Distribution of Sweepstakes Participants by Year and Mode

Figure 4. Age, Age Licensed, Tenure and Generation of Sweepstakes Participants by Year and Mode

Figure 5. Schematic Diagram for Sweepstakes Contest Log Database Construction for Exits and Newcomers

Figure 6. Exits from Sweepstakes Contests by Period

Figure 7. Entrants to Sweepstakes Contests by Period

Figure 8. Long-Term Exits and Newcomers by Birth Generation, 2000-2020

Figure 9. Late-in-Life Hams by Year of Contest and Mode

Figure 10. Life Expectancy of Sweepstakes Participants by Year and Mode

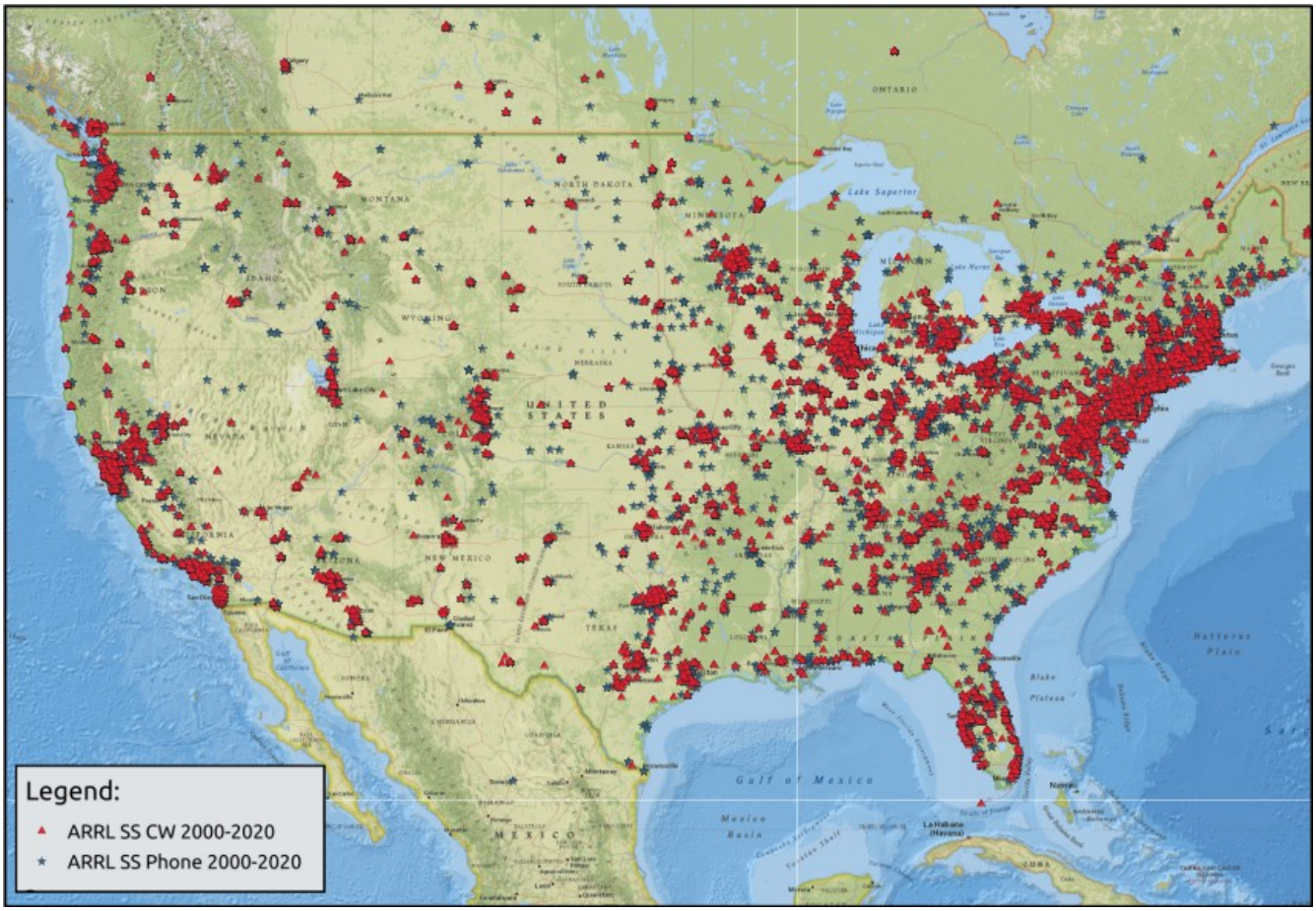


Figure 1. U.S. Area Participants in CW and Phone Sweepstakes Contests for 2000, 2005, 2011, 2015, and 2020

Participation in ARRL Sweepstakes Contests by Year and Mode

Year	CW	Chg	Chg %	Phone	Chg	Chg %	Total	Chg	Chg %
2000	1,238	---	---	1,610	---	---	2,848	---	---
2005	1,204	-34	-0.03	1,441	-169	-10.5%	2,645	-203	-7.1%
2011	1,404	200	0.17	1,826	385	26.7%	3,230	585	22.1%
2015	1,350	-54	-3.8	1,826	0	0.0%	3,176	-54	-1.7%
2020	1,444	94	7.0%	2,047	221	12.1%	3,491	315	9.9%
Total	6,640	206*	16.6%*	8,750	437*	27.1%*	15,390	643*	22.6%*

Note: * 2000-2020 change. Annualized change for CW is 0.83% and Phone is 1.13%.

Figure 2. ARRL Sweepstakes Contest Participation by Year and Mode of Transmission

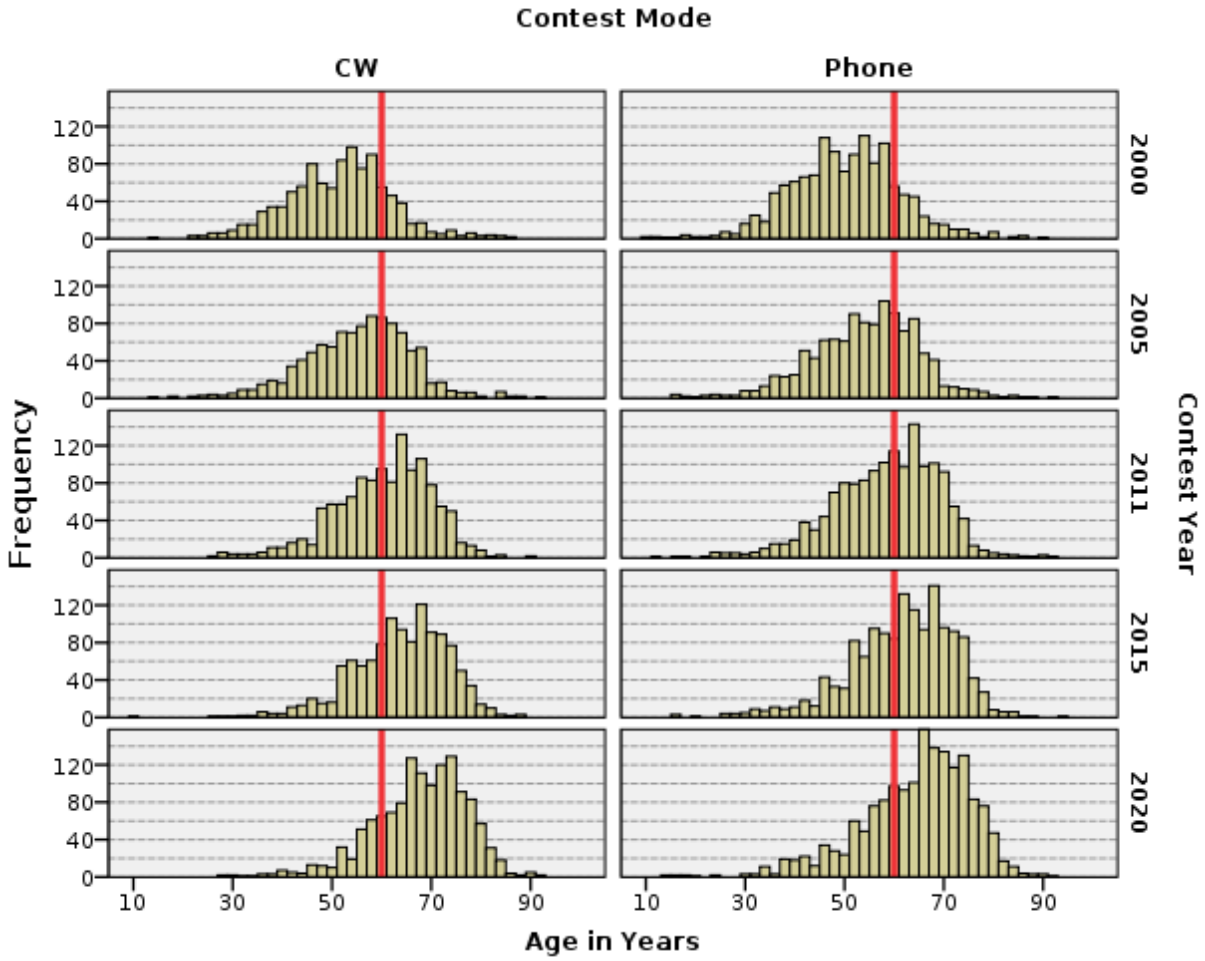
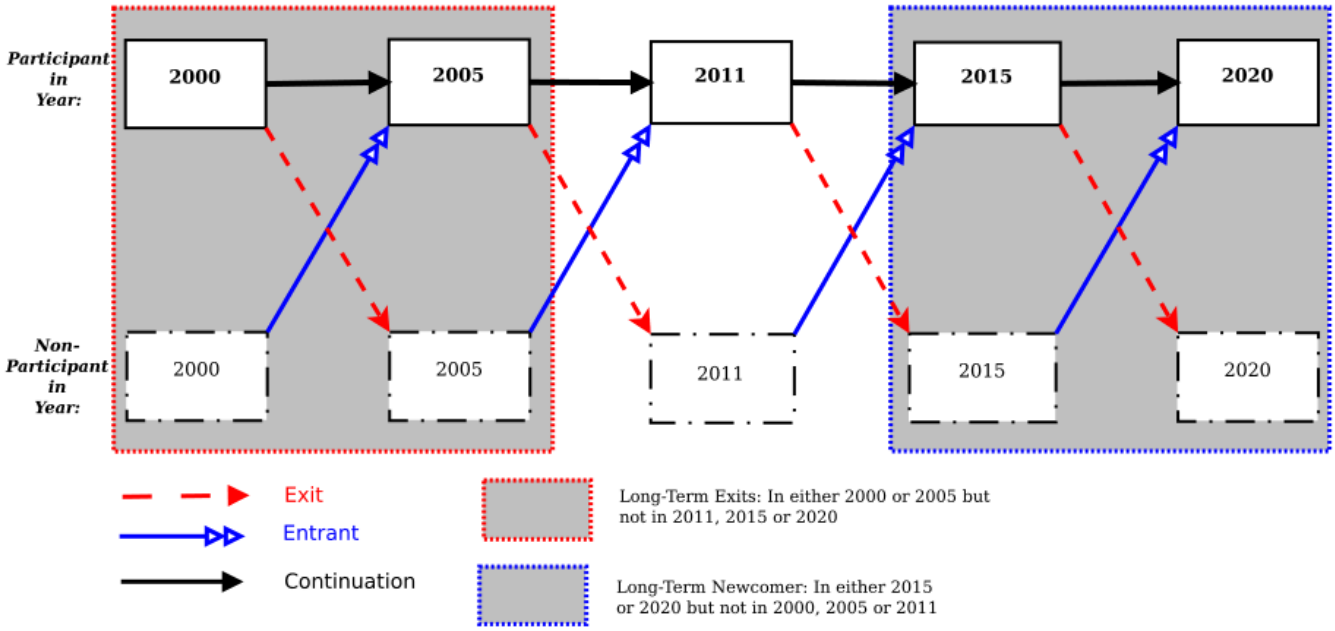


Figure 3. Age Distribution of Sweepstakes Participants by Year and Mode

Continuation, Age and Licensing Characteristics of Sweepstakes Participants by Year and Mode					
	2000	2005	2011	2015	2020
CW					
Continuation (%)*	---	36.4	49.6	55.3	57.5
Age	51	54.9	59.9	63.3	67.3
Age Licensed	19.8	18.51	19.73	19.44	20
Tenure	31.72	36.84	40.38	43.97	47.41
Generation (%):					
Traditionalists	37.3	34.7	30.6	27.5	22.3
Baby Boomer	55.8	56.7	61.5	64.3	68.2
Gen-X	6.8	7.7	7	7.5	8.3
Millennials	0.1	0.8	1	0.6	1.1
Post-Millennials	0	0.1	0	0.1	0
Phone					
Continuation (%)*	---	26.4	35.7	43.1	44.8
Age	49.8	53.7	58	61	63.9
Age Licensed	24.4	23.1	25.4	26.2	27.5
Tenure	25.8	30.9	32.7	35	36.5
Generation:					
Traditionalists	33.1	30	25.3	21.6	14.6
Baby Boomer	58.3	59.4	61.2	64.7	66.3
Gen-X	7.8	9.3	11.9	11.5	15.9
Millennials	0.8	1.2	1.5	2	2.8
Post-Millennials	0	0.1	0.1	0.2	0.4

* For continuation, this refers to the percent of call signs in the column year that were also in the preceding column year (e.g., 2005 is 2000-2005).

Figure 4. Age, Age Licensed, Tenure and Generation of Sweepstakes Participants by Year and Mode



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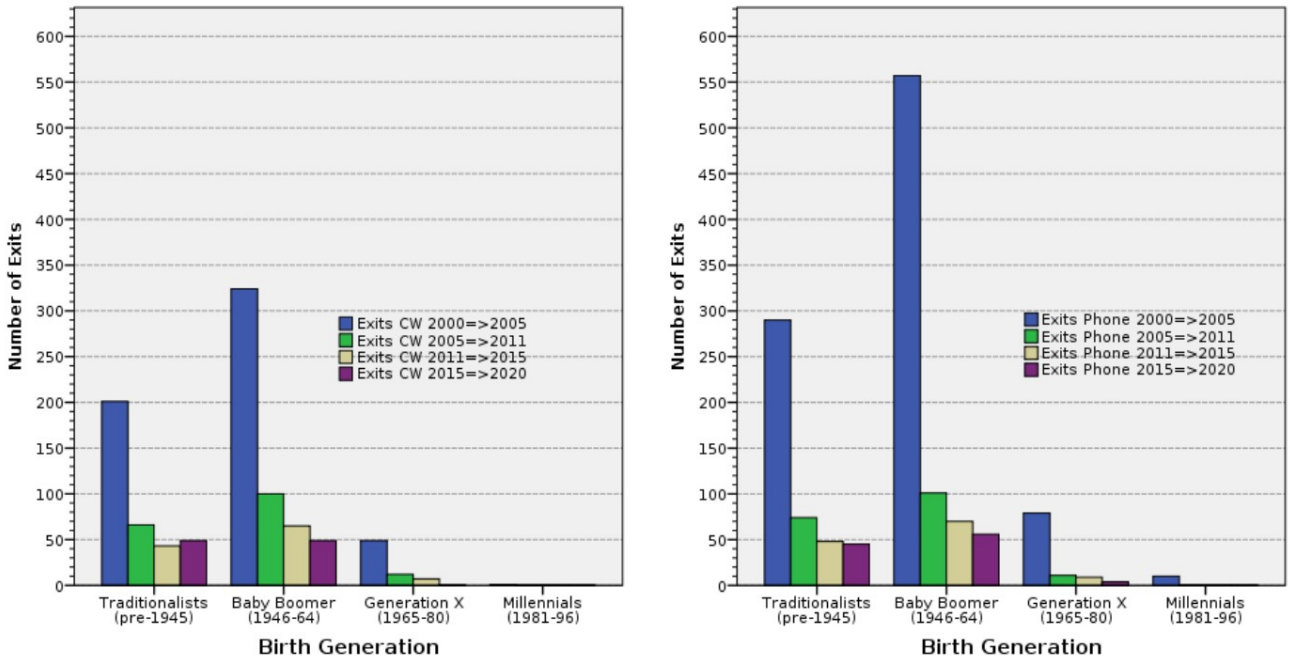

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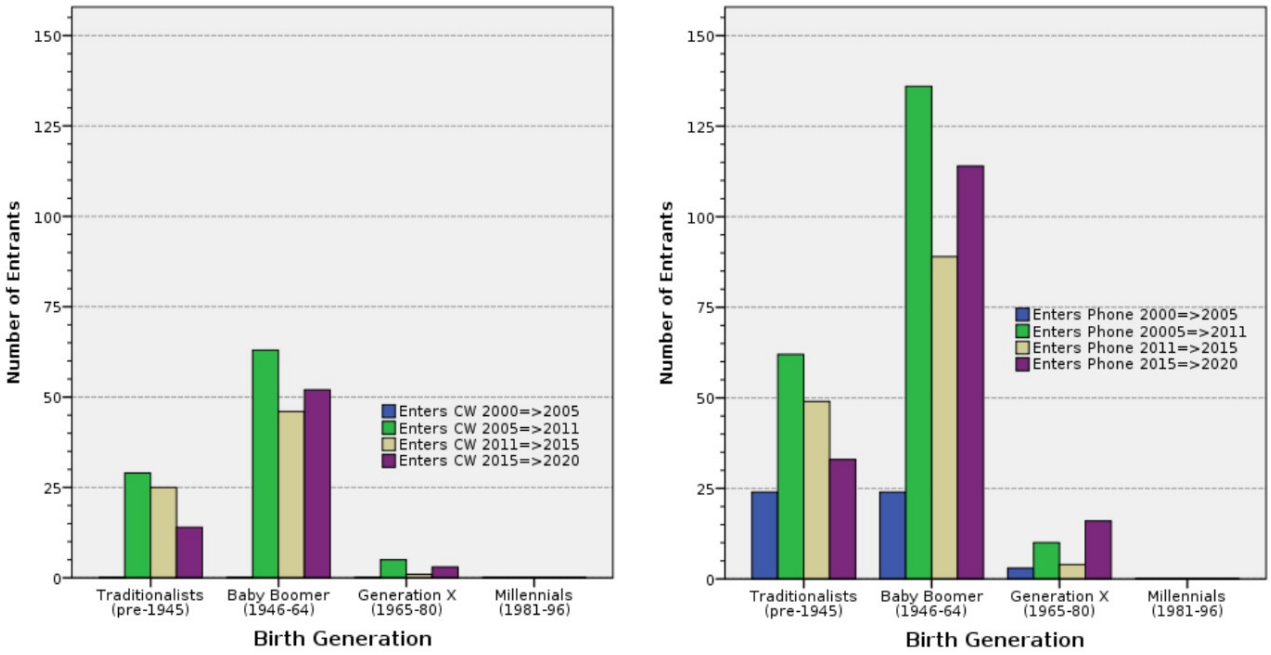

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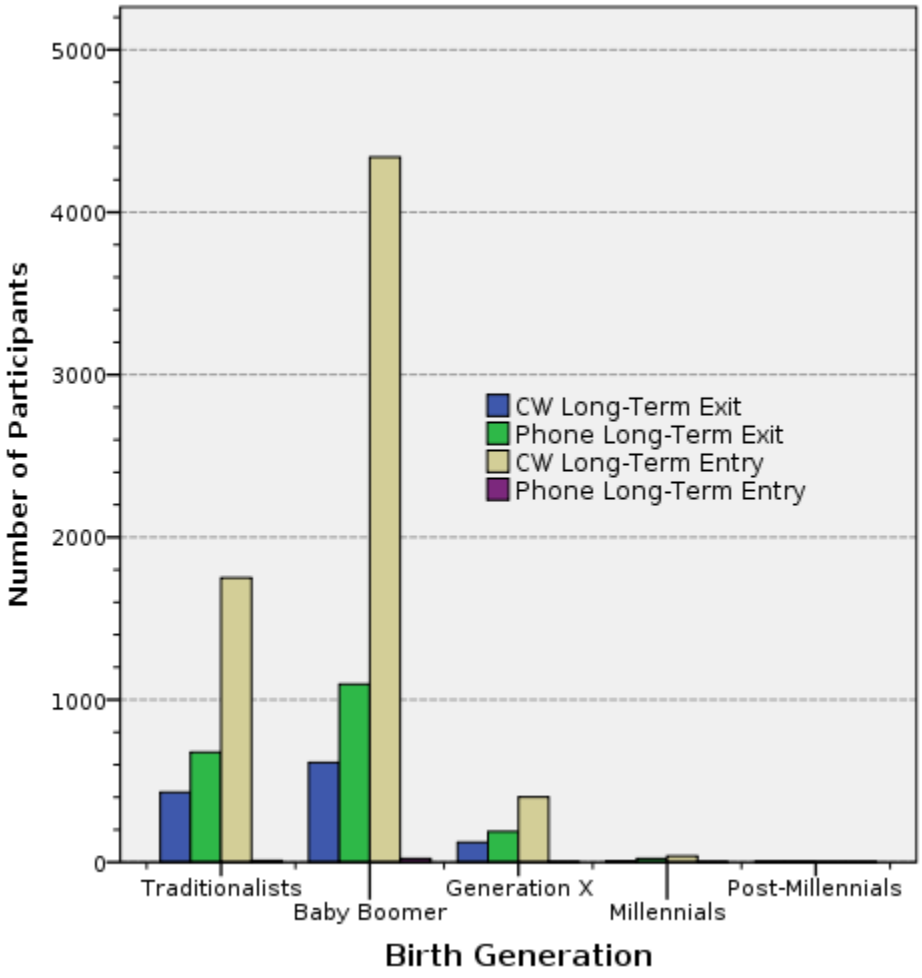

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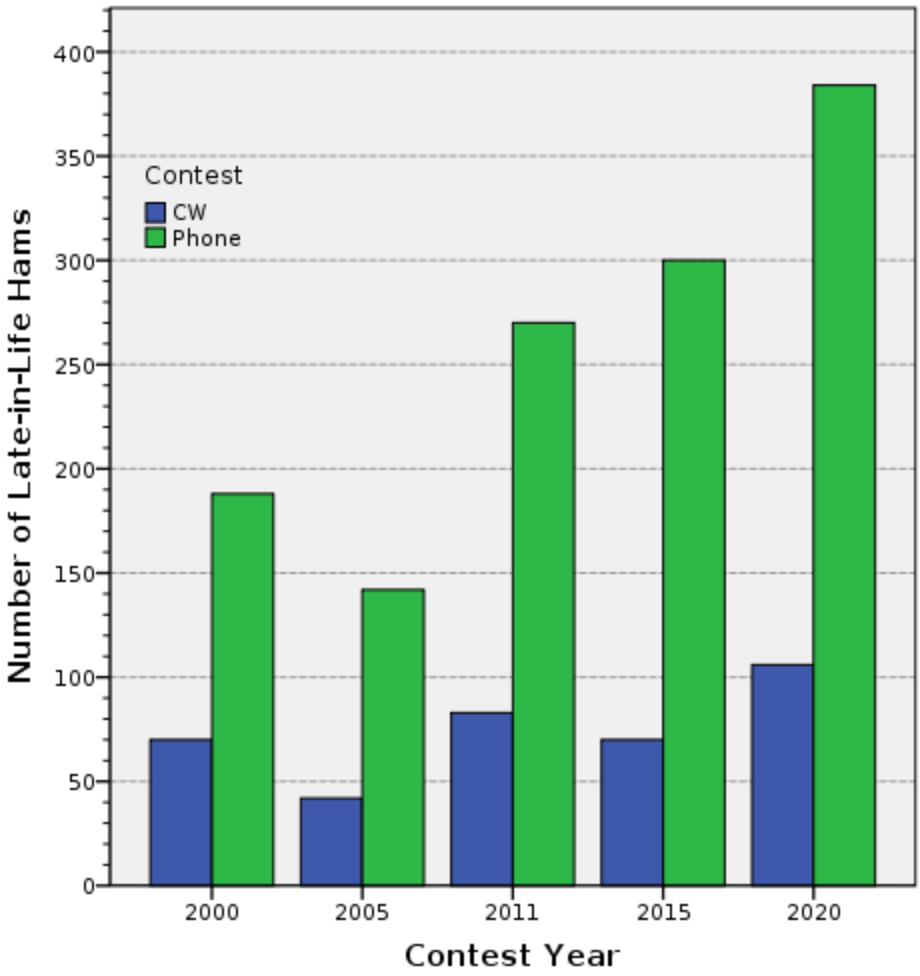

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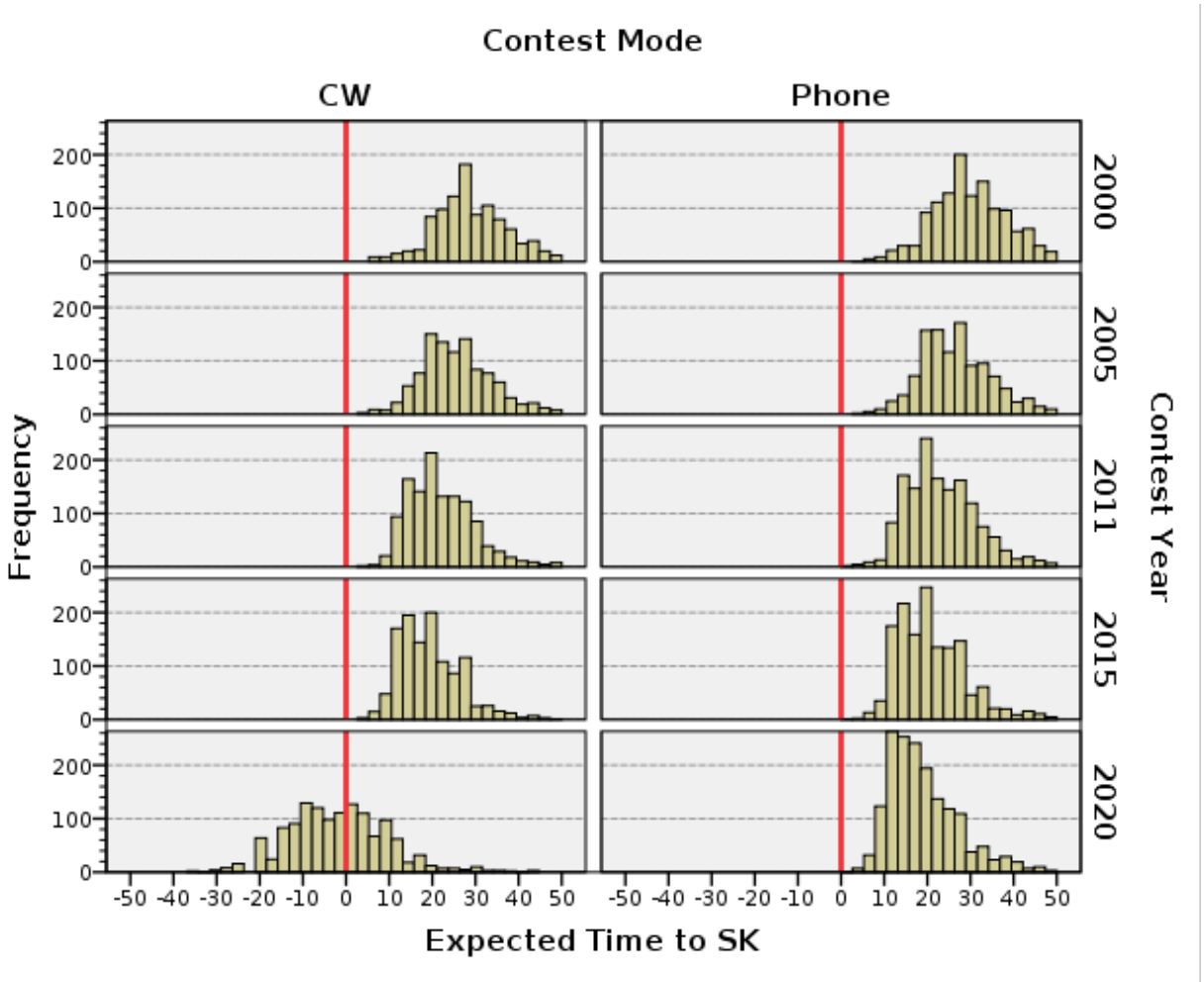

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