

# Length of Adherence to Vegetarianism

Allison Smith | Animal Charity Evaluators | November 2017

---

## Abstract

Many organizations focused on helping farmed animals do so at least in part through asking individuals to reduce consumption of animal products. But studies suggest that the majority of vegetarians<sup>1</sup> return to eating meat after a relatively short time. For instance, [Faunalytics \(2014\)](#) suggests that the number of former vegetarians in the U.S. is five times higher than the number of current vegetarians. In their representative sample, 10% of respondents described themselves as former vegetarians, whereas only 2% were current vegetarians.

To determine the good done by convincing someone to change their diet to one that is better for animals, we need to know how long the changes will last. In this write-up we will estimate a 90% [subjective confidence interval](#) (SCI)<sup>2</sup> on an arithmetic mean of the length of time that people continuously follow a vegetarian diet in the U.S. In other words, we will be looking at how long, on average, people stay vegetarian. In this write-up we only explored dietary vegetarianism/veganism, as opposed to other aspects (such as those to do with clothing, entertainment, household products, etc.).

*This text explains our approach and the reasoning behind our choices. Most of the calculation itself can be found in [this Guesstimate model](#). Note that many parts of the calculation depend on SCIs.*

---



ANIMAL CHARITY  
EVALUATORS

---

<sup>1</sup> In this write-up we refer to the combined groups of vegans and vegetarians as vegetarians for brevity.

<sup>2</sup> A subjective confidence interval (SCI) is a range of values that communicates a subjective estimate of an unknown quantity at a particular confidence level (expressed as a percentage). We generally use 90% SCIs, which we construct such that we believe the unknown quantity is 90% likely to be within the given interval and equally likely to be above or below the given interval. Our explainer page about SCIs can be found [here](#).

# Table of contents

[Abstract](#)

[Table of contents](#)

["Self-reported vegetarians" really means "animal product limiters"](#)

[Relevant survey details](#)

[Faunalytics \(2014\) study](#)

[Asher \(2017\) study](#)

[Our mathematical analysis](#)

[Calculating mean for current vegetarians](#)

[Multiplier](#)

[Calculating mean for former vegetarians](#)

[Multiplier for vegans](#)

[Calculation](#)

[Unaccounted-for periods of vegetarianism](#)

[Preliminary Estimate](#)

[Other considerations](#)

[Average length of adherence could be changing](#)

[Inaccurate survey answers](#)

[The survey excludes people who stopped being vegetarian due to death](#)

[Cultured meat alternatives](#)

[Global catastrophic risks](#)

[Final estimate](#)

[Use of cost-effectiveness estimates of veg\\*n advocacy](#)

[Resources](#)

[Archived reports](#)

## “Self-reported vegetarians” really means “animal product limiters”

Several studies exist that focus specifically on length of adherence to vegetarianism. However, most of these studies rely on people’s claims of identity categories like “vegetarian” and “vegan” rather than reports of the actual foods consumed. The best information we have about the actual dietary habits of self-reported vegetarians comes from an [analysis of data](#) from the Continuing Survey of Food Intake by Individuals (CSFII), conducted by the U.S. Department of Agriculture (USDA). This survey asked a large representative sample of Americans whether they identified as vegetarians, and on separate occasions asked detailed questions about what they had eaten in the past 24 hours. Of those who identified as vegetarians, 64% had eaten what the study considered a non-negligible ( $\geq 10\text{g}$ ) amount of meat in one or both 24-hour periods.<sup>3</sup>

Consequently, studies that ask for self-reported vegetarianism or former vegetarianism should be taken to refer broadly to animal-product-limiting diets, unless the study explicitly says it omitted any self-reported vegetarians who also eat meat, such as Faunalytics (2014). Faunalytics asked participants to report what foods they currently consume before the participants had any knowledge regarding the topic of the study. Respondents were then asked whether they identified as vegetarian or vegan. This multi-step approach allowed Faunalytics to omit any self-reported vegetarians or vegans who also ate meat. A similar approach was also used in [Asher \(2017\)](#).<sup>4</sup> Since these are the only studies we are aware of that use such an approach, we will base the rest of our analysis only on them.<sup>5</sup>

## Relevant survey details

To help understand our analysis of the studies, we will first describe the relevant aspects of their designs.

---

<sup>3</sup> However, even the self-reported vegetarians who had eaten meat had eaten significantly less of it on average than the non-vegetarians had (about 74% as much, by weight), and the meat they ate was significantly more likely to be fish, suggesting that at least some may have technically been pescetarians.

<sup>4</sup> Asher K. (2017). Doctoral Dissertation: [Is the Perfect the Enemy of the Good? The Role of Dietary Choices, Perceptions, and Experiences in Changing Meat Consumption Patterns in the U.S.](#) Note that Kathryn Asher, who is the author of Asher (2017) and one of the authors of Faunalytics (2014), is currently (as of June 2017) employed by Animal Charity Evaluators.

<sup>5</sup> Before these studies were conducted, we [estimated](#) the mean length of adherence to be 3.6–13.26 years.

## Faunalytics (2014) study

Invitations were sent to a U.S. representative sample aged 16 years and over. After data cleaning, 11,399 respondents participated in the study. Based on their answers, respondents who had experience with vegetarianism were assigned to one of four groups: former vegetarians, former vegans, current vegetarians, and current vegans. A multi-step verification process was used to identify current and former vegetarians/vegans to ensure accurate classification.<sup>6</sup> Specific wording was based on whether the respondent was answering about a vegetarian or vegan diet as well as whether this diet was currently being followed or had been adhered to in the past. If a respondent had in the past been both a former vegetarian and a former vegan, they were classified as the more recent of the two. Questions were only about the most recent period of vegetarianism or veganism. Individuals who moved from a vegan diet to a vegetarian diet were not counted as former vegans, but rather as current vegetarians. Respondents who were vegan or vegetarian at the time of the survey were only asked about their current period of adherence. More information about study methodology can be found [here](#) and the survey instrument can be found [here](#).

## Asher (2017) study

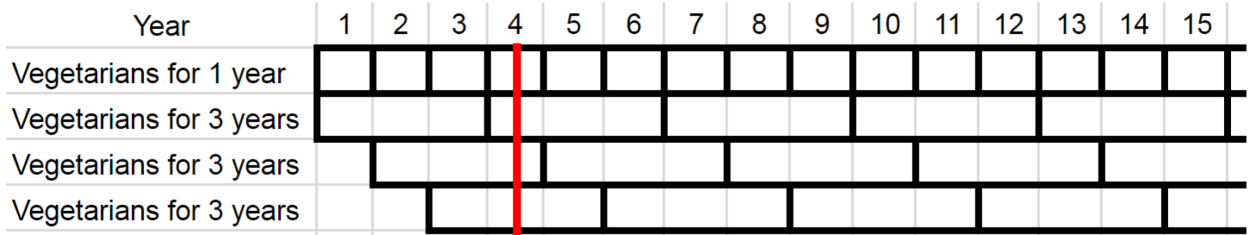
This survey was conducted for a [doctoral dissertation](#) that looked at the role of dietary choices, perceptions, and experiences in changing meat consumption patterns in the U.S. After data cleaning, the survey had 26,466 participants. Census balancing was applied by assigning different weights to respondents. Similar to Faunalytics (2014), in this study respondents were first asked about foods they consume. Those who indicated they ate no meat were asked whether they were “on a vegetarian or vegan diet,” with a definition provided. Those who answered in the affirmative were allowed to proceed in the survey and asked about length of their adherence. There were no questions about previous periods of adherence—respondents were only asked to specify how long they had maintained the diet without interruption. Study materials can be found [here](#).

---

<sup>6</sup> As mentioned, respondents were asked what foods they consume before they knew what the study was about. This diminishes concerns regarding the possible effects of [social desirability bias](#) and makes us more confident about the data on current vegetarians and vegans. Former vegetarians were similarly asked “Which foods did you eat when you were consuming a vegetarian diet?”

# Our mathematical analysis

Before analyzing the real data, we will demonstrate the basic method of our analysis using an example. Let's say that at the beginning of every year two people become vegetarians. Every time one of them stays vegetarian for 1 year and another for 3 years. The mean length of adherence in this world is  $(1 + 3) \div 2 = 2$  years. The graph below illustrates this example. Each rectangle represents a period of vegetarianism:



Let's say that a survey is taken in the middle of year 4 (red line). We get the following data:

Length of adherence in years	Former Vegetarians (#)	Current Vegetarians (#)
0.5	0	2
1	3	0
1.5	0	1
2.5	0	1
3	1	0

If we just average these responses, we get 1.375. We underestimated because we assumed that all current vegetarians stop being vegetarians immediately after the survey. To obtain an estimate that is closer to the real average times that these participants would remain vegetarian, we will assume that on average, current vegetarians reported a time about halfway through their period of vegetarianism and multiply reported durations by 2. We will examine this assumption in more detail later.

If we then combine this modified data of current vegetarians with former vegetarian data, we have a random sample of living people who became vegetarians in the past. Then we can calculate the mean length of adherence in the standard way:

*Mean length of adherence* =

$$\frac{2 \times \text{Mean}_{\text{current}} \times n_{\text{current}} + \text{Mean}_{\text{former}} \times n_{\text{former}}}{n_{\text{current}} + n_{\text{former}}} = \frac{2 \times 1.25 \times 4 + 1.5 \times 4}{4+4} = 2 \text{ years}$$

where

$\text{Mean}_{\text{current}}$  is the mean length of adherence to vegetarianism for current vegetarians

$\text{Mean}_{\text{former}}$  is the mean length of adherence to vegetarianism for former vegetarians

$n_{\text{current}}$  is the number of respondents who were current vegetarians

$n_{\text{former}}$  is the number of respondents who were former vegetarians

We will now apply this method to the data from the studies we described.

## Calculating mean for current vegetarians

As explained before, we have two datasets for current vegetarians' length of adherence that were collected in different ways. We decided to use Asher (2017) instead of Faunalytics (2014) because:

- In Faunalytics (2014), responses to the question on length of adherence to vegan or vegetarian diet were categorized into the following categories: 0-3 months, 4-11 months, 1-2 years, 3-5 years, 6-10 years, and over 10 years. This complicates the task of calculating the mean length of adherence. This issue can be avoided by using Asher (2017) because it asks respondents to specify their length of adherence as precisely as they could remember (years, months, and/or days).
- Asher (2017) has a larger sample of current vegetarians (279 versus 221 in Faunalytics (2014)).<sup>7</sup>
- Asher (2017) is also a better approximation of the U.S. adult population (aged 18 years and over). The sample was census-balanced on non-interlocking quotas for age, gender, region, and race/ethnicity.<sup>8</sup>
- The data from Asher (2017) is newer.

---

<sup>7</sup> One respondent was excluded from our analysis of Asher (2017) because he reported being vegetarian for only 1 day. We decided that 1 day of abstinence from meat is not enough to be considered vegetarian.

<sup>8</sup> This means that answers of some respondents have more weight than others if that respondent represents a group that would otherwise be under-represented in the study.

The weighted mean length of adherence to vegetarianism (based on self-reported length by current adherents) according to survey data from Asher (2017) is 17.8–21.2 years.

## Multiplier

As explained before, we can get a better estimate of the full length of adherence by doubling respondents' reported lengths, because we assume that on average, current vegetarians were surveyed halfway through their period of vegetarianism. To adjust for [sampling error](#), we change the multiplier to a 90% confidence interval: 1.89–2.12.<sup>9</sup>

Note that if the number of vegetarians in the U.S. is increasing, in a random sample of current vegetarians we should expect to find more vegetarians that are in the first half of their period of being vegetarian. As a result, doubling the time they reported to have been vegetarians would underestimate their length of adherence to the diet. Similarly, doubling could overestimate the mean length of adherence if the number of vegetarians was decreasing. Limited evidence<sup>10</sup> is inconclusive but weakly suggests that the percent of vegetarians in the U.S. is increasing. What is more, the U.S. population is increasing. To take this into account, we widen the 90% SCI to 1.7–2.45. Note that the extent to which we widened the confidence

---

<sup>9</sup> Let  $X$  denote a proportion of vegetarianism period that has passed before the respondent is surveyed,  $0 < X < 1$ . Then  $X \sim \text{uniform}(0, 1)$ , expected value  $E(X) = 1/2$ , and it follows from the [formula for calculating the variance for a continuous random variable](#) that

$$\text{Variance}(X) = \int_0^1 (x - 1/2)^2 dx = 1/12$$

Then a 90% confidence interval of where in their vegetarianism period we survey people on average can be calculated as follows:

$$1/2 \pm 1.645 \sqrt{1/12} = 1/2 \pm 0.479 = 0.028$$

Lower bound for 90% confidence interval for the multiplier is  $1/2 + 0.479$  and upper bound is  $1/2 - 0.479$ .

That means that the multiplier value is 1.89–2.12.

<sup>10</sup> See [our summary of vegetarianism surveys](#). Main evidence comes from:

- [Food Demand Surveys](#) which have been asking about 1,000 people if they are vegetarian or vegan every month since 2013. Data from the surveys suggest that proportion of vegetarians is increasing.
- [Polls by Vegetarian Resource Group](#) which ask about consumption rather than identity. Their results weakly suggest that vegetarianism was becoming more popular between 1994 and 2011 and that there was some decrease in its popularity since then. This data doesn't lead to strong conclusions due to small sample sizes and inconsistent question formulations.
- The only polls that asked about both identity and consumption were Asher (2017) and Faunalytics (2014). Their results could be interpreted as suggesting that percent of vegetarians decreased from 1.9% in 2014 to 1.1% in 2017. However, a direct comparison between these studies is problematic because Asher (2017) was census-balanced and Faunalytics (2014) was not. What is more, Asher (2017) suggests that differences in the results could also be attributed to the differences in questions between the studies.

interval is based on our intuitions. What is more, this method of predicting length of adherence of current vegetarians is imperfect because it doesn't use all the relevant information.<sup>11</sup>

We can see in [the Guesstimate model](#) that after multiplying, the length of adherence for current vegetarians is 32–49 years.

## Calculating mean for former vegetarians

Data about length of adherence of former vegetarians was only collected in Faunalytics (2014). Here are the results obtained from their [datasets](#):

Category	Number of Former Vegetarians (excluding vegans)	Number of Former Vegans	Gussed Mean Length of Adherence (90% SCI)
Up to 3 months	323	55	0.7–1.8 months
4–11 months	191	25	6–8 months
1–2 years	191	12	1.3–1.9 years
3–5 years	96	6	3.4–4.4 years
6–10 years	56	7	7.1–7.9 years
More than 10 years	67	3	12.5–17.5 years
“Don't know” / no answer	113	21	0.5–7 years
<b>Totals</b>	<b>1037</b>	<b>129</b>	

To be able to calculate the mean, we also had to guess the means for each category. Note that our guesses tend to be on a lower side. This is because a bigger percentage of people are likely to quit in the beginning of any period for two reasons:

---

<sup>11</sup> We could also use the former vegetarian data to inform us how long we should expect people to remain vegetarians. However, it would require a more complex mathematical method like [fitting a model by maximizing the likelihood](#). For now we chose not to do it because of a limited amount of time we have for this report.

Another relevant piece of information is respondents' ages and the life expectancy at their ages. One respondent reported being vegetarian for 75 years. Currently we are doubling the length of his adherence even though it would be unreasonable to expect him to remain vegetarian for another 75 years. It's unclear what would be the correct way to take life expectancies into account. Currently we adjust for the fact that the survey excludes people who stopped being vegetarians due to death by subjectively reducing the lower bound of our 90% confidence interval of the mean length of adherence in the *Other Considerations* section.



- There are more (or the same amount of) people in the beginning of any period
- The longer people stay vegetarian, the less they are likely to quit in the next month<sup>12</sup>

It is also unclear which option respondents selected if they have been vegetarians for 2 years and 8 months, for example. As a result, we had to use wider 90% SCIs.

The value of the mean for people who chose the option “More than 10 years” has a lot of impact on the final answer. Former vegetarians who chose this option had an average age of 48.1 years and an average age of first adoption of 24.9 years. This means that the mean is less than  $48.1 - 24.9 = 23.2$  years. We use a 90% SCI of 12.5–17.5 years as our value of the mean.

Since we are trying to calculate a 90% SCI for the mean length of adherence, we must include people who answered “Don’t know” (or provided no answer to the length of adherence question) into the analysis. It could be that people who were vegetarian for a very short or a relatively long period of time tended to choose this option. We must use a wide 90% SCI (0.4–8 years) to take this uncertainty into account.<sup>13</sup>

Using these numbers we calculate the means for former vegetarians and former vegans. Due to Guesstimate limitations, in variance calculation we assumed that lengths of adherence in each category are distributed log-normally, even though that is unlikely to be the case.<sup>14</sup>

	<b>Former Vegetarians (excluding vegans)</b>	<b>Former Vegans</b>
Mean length of adherence (preliminary)	2.1–3.2 years	1.3–2.8 years

<sup>12</sup> This does not apply to someone who has been vegetarian for 100 years, for example, due to lower life expectancy at such an age. However, this is not a big concern because we only use this reasoning for periods that are shorter than 10 years.

<sup>13</sup> One minor piece of evidence for the mean of people who didn’t know how long they were vegetarians is the number of times they switched away from vegetarian diets. Out of 90 respondents, 17 stated that they had only been vegetarians once, 11 stated that they were vegetarians “5 or more times” and 56 answered “Don’t know” to the question about number of switches. This weakly suggests that average length of adherence for people in this category is low. The average age of people in this category is 54.2 years and average age of first adoption is 39.3 years. This means that the mean is less than  $54.2 - 39.3 = 14.9$  years.

<sup>14</sup> In reality, the length of adherence is subject to exponential decay. A decay rate decreases as time passes because the longer people stay vegetarian, the less likely they are to quit in the next month. Ideally, we would use a slice of such an exponential distribution for each of the categories. However, we don’t think that the correct choice of distribution for variance calculations has a lot of impact on the final estimate. We chose a lognormal distributions because that allowed us to keep all the calculations in Guesstimate and made the model less complex. We chose it over a normal distribution because we expect more people to be quitting vegetarianism at the beginning of any period. For example, we expect that more than a half of the people who stayed vegetarian for less than 3 months quit in the first month and a half.

Variance	43	47
Standard error	0.24	0.58
Mean length of adherence <sup>15</sup>	1.86–3.24 years	0.72–3.38 years

### Multiplier for vegans

Some people may have been vegetarians immediately before becoming vegan, or may have remained vegetarian after they stopped being vegan.<sup>16</sup> One way to account for this bias is to multiply all vegan periods by some constant. For example, if the value of this multiplier was 1.5, that would mean that people who are vegan for 2 years on average are vegetarian for  $2 \times 1.5 = 3$  years. The 3 years of adherence to vegetarianism here includes the 2 years of adherence to veganism. We don't have much evidence for what the value of this constant could be. The little evidence we do have<sup>17</sup> suggests a high value. As a result, we must use a wide 90% SCI for the multiplier: 1.3–2.5.

### Calculation

We can now calculate the mean length of adherence to vegetarianism for former vegetarians and vegans using this formula:

$$Mean_{former} = \frac{Mean_{former\ vegetarians\ (excluding\ vegans)} \times n_{former\ vegetarians\ (excluding\ vegans)} + Mean_{former\ vegans} \times n_{former\ vegans} \times Multiplier_{vegans}}{n_{former\ vegetarians\ (excluding\ vegans)} + n_{former\ vegans}}$$

We can see in the [Guesstimate model](#) that our 90% SCI for  $Mean_{former}$  is 1.9–3.5 years.

### Unaccounted-for periods of vegetarianism

If we combine the samples of former and current vegetarians, we have a random sample of living people who became vegetarians in the past. However, the survey asks people only about the most recent period

<sup>15</sup> Guesstimate does not have a ± operator. As a result, in Guesstimate we widen confidence intervals using multiplication. We choose multiplier values so that the resulting confidence interval would be as close to the ones written here as possible. This introduces some imprecision.

<sup>16</sup> Note that in Faunalytics (2014) former vegans who are current vegetarians were categorized as current vegetarians, not former vegans.

<sup>17</sup> In [this study](#) that surveyed readers of Vegetarian Journal, 62 vegans were surveyed in 2006. The same people were surveyed again in 2012. Of these, 81% were still vegan, 16% were now vegetarian, 3% were not vegetarian. This suggests that we should use a high value for the multiplier. However, the results may only apply to short term vegans. Additionally, the results of this study cannot necessarily be extrapolated to the general population.

of being vegetarian, so we don't yet have a random sample of periods of adherence to vegetarianism—which is what we ultimately care about. The Faunalytics survey allows us to estimate how many periods of vegetarianism respondents had in total:

In the past, how many times have you switched from a vegetarian/vegan diet to one that includes meat?	Gussed mean number of switches (90% SCI)	Former Veg*ns (#)
1	1	590
2	2	187
3	3	62
4	4	19
5 or more	6–10 <sup>18</sup>	65
Don't know	2–6 <sup>19</sup>	190
No answer	1–5 <sup>20</sup>	53

Using this data, in [the Guesstimate model](#) we estimate that former vegetarians in the study sample had 900–2,050 periods of vegetarianism during their lives that we haven't yet accounted for. Uncertainty about the number of periods is due to:

- People who answered “5 or more,” for which we have no indication of an upper bound
- People who answered “Don't know”
- People who did not answer the question

<sup>18</sup> Looking at the table we can see a pattern: the higher the number of switches, the lower the number of people in the category. As a result, we should expect the number of people who switched exactly 5 times to be lower than the number of people who switched exactly 4 times, fewer people who switched exactly 6 times than exactly 5 times, etc. But we don't know how steep this trend is. There may also be some outliers who frequently switch their diet and increase the mean. Overall, we are highly uncertain how many times people in this category have switched their diet and therefore we must use a wide SCI.

<sup>19</sup> It seems unlikely that many people who have only been vegetarians once chose this option. As a result, we chose 2 as the lower bound of our 90% SCI. It seems likely that this option could have been chosen by people who were not strict vegetarians, because they could have been unsure of something (e.g., whether consuming one meal with meat constitutes switching their diet). It's unclear how our calculation should handle such people. We widen the confidence interval when faced with uncertainty, so we chose a high value for the upper bound.

<sup>20</sup> We calculated that former vegetarians who did answer the question (including those who answered “Don't know”) switched an average of 1.7–2.8 times. The mean for the people who did not answer the question might be similar, but it is uncertain whether that is the case. As a result, we use a wider 90% SCI of 1–5 switches.

- [Margin of sampling error](#)<sup>21</sup>

Current vegetarians in Faunalytics (2014) were only asked “Was there a time when you moved from a vegetarian/vegan diet to a diet with meat and then to a vegetarian/vegan diet?” 33 out of 211 respondents answered “Yes.” That means that there were at least 33 more unaccounted-for periods of vegetarianism.<sup>22</sup> However, we don’t know how many times these respondents switched their diets. We created a 90% SCI of 35–90 periods of vegetarianism, which means that in total we are assuming approximately 935–2,140 unaccounted-for periods of vegetarianism.

We don’t know the lengths of these unaccounted-for periods. We should expect them on average to be a bit shorter than the mean length of the most recent periods of vegetarianism (which we estimated to be 1.9–3.5 years). The more times someone switches their diet, the shorter we should expect each vegetarianism period to be. We can see some evidence of this by taking a closer look at the [survey data](#): people whose most recent period was longer tended to have fewer periods of vegetarianism. We guess that these unaccounted-for periods on average have 0.6–1.1 the length of the mean for most recent periods from former vegetarians. After multiplying the mean length of the most recent periods of vegetarianism by 0.6–1.1 in Guesstimate we get a 90% SCI of the mean of unaccounted-for periods, which is 1.3–3.3.

## Preliminary estimate

We can now calculate a preliminary estimate of the mean length of adherence using this formula:

$$\text{mean length of adherence (preliminary)} = \frac{n_{\text{current}} \times \text{Mean}_{\text{current}} + n_{\text{former}} \times \text{Mean}_{\text{former}} + n_{\text{unaccounted}} \times \text{Mean}_{\text{unaccounted}}}{n_{\text{current}} + n_{\text{former}} + n_{\text{unaccounted}}}$$

where:

*mean length of adherence* is the mean length of adherence to a vegetarian diet

---

<sup>21</sup> Guesstimate does not have a ± operator. As a result, in Guesstimate we widen confidence intervals using multiplication. We choose multiplier values so that the resulting confidence interval would be as close to the ones written here as possible. This introduces some imprecision.

<sup>22</sup> Note that even though we are using Asher (2017) for calculating average length of adherence for current vegetarians, we use Faunalytics (2014) for calculating number of vegetarianism periods in all 3 categories (current, former, and unaccounted-for).

$n_{current}$  is the number of respondents who were current vegetarians in Faunalytics (2014),<sup>23</sup> which is 221

$Mean_{current}$  is the mean length of adherence to vegetarianism for current vegetarians—using Asher (2017) we estimated this to be 32–49 years

$n_{former}$  is the number of respondents who were former vegetarians in Faunalytics (2014), which is 1,166

$Mean_{former}$  is the mean length of adherence to vegetarianism for former vegetarians, which we estimated to be 1.9–3.5

$n_{unaccounted}$  is the estimated number of vegetarianism periods that Faunalytics' sample had before the most recent/current period—we consider these periods to be unaccounted for because respondents were not asked about their lengths (we estimated that there are 935–2,140 such periods)

$Mean_{unaccounted}$  is an estimated mean length of unaccounted-for periods (1.3–3.3 years)

We can see in the [Guesstimate model](#) that the value of this preliminary estimate is 4.3–6.7 years.

However, there are still some concerns which we will now take into account by widening this 90% SCI.

## Other considerations

### Average length of adherence could be changing

To use data from any survey, we have to assume that the average length of adherence is the same for people who became vegetarians in the past and future vegetarians. But this is not necessarily true. For example, future vegetarians might be able to stick to their diet longer due to the increasing vegetarian food options in restaurants and grocery stores.

### Inaccurate survey answers

It's important to account for the fact that respondents may have given incorrect or inaccurate answers due to misremembering, social desirability bias, lack of attention, or other factors. Both studies depend on self-reported dietary data which has been [criticized](#) as being undependable in academia, even though it is

---

<sup>23</sup> Even though we use Asher (2017) to calculate the mean length of adherence for current vegetarians, we use Faunalytics (2014) for the proportion between current and former vegetarians.

typical in large academic and government studies and has its [defenders](#). What is more, former vegetarians in Faunalytics (2014) were asked “Which foods did you eat when you were consuming a vegetarian/vegan diet?” after they indicated that they have eaten vegetarian or vegan diet in the past. It seems likely that some of them excluded non-vegetarian products in the answer out of desire to be consistent with their previous answer, even if they did consume some meat or fish. If present, this effect inflated the number of former vegetarians in the study and hence decreased the estimate of the mean length of adherence. On the other hand, answers about length of adherence are suspect to inflation due to [social desirability bias](#), especially answers by current vegetarians.<sup>24</sup>

The way Faunalytics collected their data allowed us to check some answers of current vegetarians for consistency.<sup>25</sup> Out of 212 respondents we found 10 who gave inconsistent answers (e.g., one respondent reported that she is 39, she first adopted vegetarian diet at the age of 35 and that she has been vegetarian without interruption for “more than 10 years.” Another respondent reported that he is a 45 year old vegetarian, who first adopted a vegetarian diet at the age of 16, never switched to a diet that includes meat but has been vegetarian without interruption only for 4–11 months. These answers could be interpreted as him never fully switching to a diet that includes meat but consuming some meat at some point in the last year. Still, such inconsistencies cause us to be concerned about the accuracy of the rest of the answers.

## The survey excludes people who stopped being vegetarian due to death

We also haven’t yet accounted for the fact that people who die soon after becoming vegetarian are unlikely to be in the survey sample. Only people whose vegetarian period ended for reasons other than death are in the survey sample. This might have caused us to slightly overestimate the mean length of adherence. It’s unclear what would be the correct way to account for this bias but it seems unlikely that it has a significant impact on the final estimate.

---

<sup>24</sup> The majority of the current vegetarians probably have a positive opinion on vegetarianism. As a result, their answers are susceptible to social desirability bias. It’s unclear to what degree this applies to former vegetarians. In Faunalytics (2014) the answers to the open-ended questions suggested that many respondents were happy to be finished with their vegetarianism, particularly as far as food satisfaction was concerned. However, 37% of former vegetarians indicated that they are interested in resuming a vegetarian (or vegan) diet, which suggests that a significant proportion of them still have a positive opinion on vegetarianism.

<sup>25</sup> Note that we did not use Faunalytics’ current vegetarian data in our analysis. However, inconsistencies in this data indicate that the similar data we did use has some incorrect answers as well.

## Cultured meat alternatives

Another important consideration we haven't yet taken into account is the possibility that cultured meat (also known as clean meat) alternatives will become available at a similar or lower price to farmed animal products, making vegetarianism less relevant for animal welfare. There is a lot of [uncertainty](#) about when this could happen. Within the next 5–20 years, while cultured meat alternatives are pretty likely to start coming on the market, they are unlikely to completely dominate the market to the point where individual diet choices such as vegetarianism are no longer broadly relevant; in fact, in that time period they might act more as a factor making it easier to adhere to a diet that causes less farmed animal suffering. A deeper analysis of this effect is likely to be complicated. In addition to the uncertainty about timelines for cost-competitiveness, alternatives for different products might gain popularity gradually and at different times.

## Global catastrophic risks

There is also a possibility that people's lives (and therefore their vegetarianism periods) will be cut short by a global catastrophe such as a nuclear war or a global pandemic some time in the future. The likelihood of this risk is unclear.<sup>26</sup>

Note that the value of the final estimate is very sensitive to how long exactly long-term vegetarians adhere to the diet. For example, if we limited the number of years people can be vegetarian to 40, it would reduce the value of the final estimate of the mean length of adherence by more than 1 year. As a result, cultured meat and global catastrophic risks considerations significantly decrease the lower bound of our estimate.

## Final estimate

We account for these concerns by widening the 90% SCI for the mean length of adherence as follows:

---

<sup>26</sup> The U.K.'s Stern Review on the Economics of Climate Change (2006) used an extinction probability of 0.1% per year in calculating an effective discount rate (U.K. Treasury 2006, Chapter 2, Technical Appendix, p. 47). According to a small and informal 2008 survey of a group of experts on different global catastrophic risks at the Global Catastrophic Risk Conference at the University of Oxford, there is about 19% chance of complete human extinction before the year 2100 (Sandberg, A. & Bostrom, N. (2008): "[Global Catastrophic Risks Survey](#)," Technical Report #2008-1). The conference report cautions that the results should be taken "with a grain of salt." Additionally, the results might be biased because conference attendees were particularly likely to think that such risks are significant. The probability of an event where a large portion of the U.S. population dies is higher than the probability of human extinction. For example, there could be a nuclear war that does not result in human extinction but kills a large portion of the U.S. population.

	Lower bound	Upper bound
Preliminary estimate	4.3	6.7
Average length of adherence could be changing	-0.1	+0.3
Inaccurate survey answers	-0.3	+0.2
The survey excludes the people who stopped being vegetarian due to death	-0.1	--
Cultured meat alternatives	-0.3	+0.2
Global catastrophic risks	-0.1	--
<b>Adjusted estimate</b>	<b>3.4</b>	<b>7.4</b>

Note that all these adjustments are highly subjective. We can see that after the adjustments our final 90% SCI of the mean length of vegetarianism period is **3.5–7.4 years**.

## Use of cost-effectiveness estimates of veg\*n advocacy

We estimated the length of the average period of vegetarianism. The main purpose of this estimate is to allow us to evaluate the cost-effectiveness of veg\*n advocacy programs. For example, if we calculated that leafleting caused 10 people to become vegetarians, we would calculate that it caused 35–74 years of vegetarianism. However, people who were influenced to become vegetarians by veg\*n advocacy (such as leaflets or online ads) could have a different mean length of adherence than the general population. They might—for example—have fewer vegetarian friends on average than other vegetarians and consequently may find it harder to stick to the diet. There is also some evidence of differing adherence rates based on different reasons for going vegetarian. In one study<sup>27</sup> individuals endorsing ethical reasons reported maintaining the diet longer. Since veg\*n advocacy often focuses on ethical reasons, people they convince may adhere to the diet longer. Overall, it is highly uncertain how big the difference is and whether it is positive or negative.

Out of 279 current vegetarians, 31 adopted the diet at the age of 5 or younger. It is highly unlikely that they were influenced to become vegetarian by ads or leaflets. If we exclude them from our analysis, the

---

<sup>27</sup> Radnitz, C., Beezhold, B., & DiMatteo, J. (2015). [Investigation of lifestyle choices of individuals following a vegan diet for health and ethical reasons](#). *Appetite*, 90(1), 31–36.



90% SCI for the mean length of adherence of current vegetarians changes from 32–49 years to 23–35 years. Consequently, the preliminary estimate of the mean length of adherence changes from 4.3–6.7 years to 3.5–5.6 years.

We now have to do all the same adjustments as we did in the previous section. We also have to take into account the possible differences between the general vegetarian population and the people who were influenced to become vegetarians by veg\*n advocacy.

	<b>Lower bound</b>	<b>Upper bound</b>
Initial estimate	3.5	5.6
Average length of adherence could be changing	-0.1	+0.3
Inaccurate survey answers	-0.3	+0.2
The survey excludes the people who stopped being vegetarian due to death	-0.1	--
Cultured meat alternatives	-0.3	+0.2
Global catastrophic risks	-0.1	--
Differences between the general vegetarian population and the people who were influenced to become vegetarians by veg*n advocacy	-0.2	+0.2
<b>Adjusted estimate</b>	<b>2.4</b>	<b>6.5</b>

Again, note that all these adjustments are highly subjective. We can see that after the adjustments our final 90% SCI of the mean length of vegetarianism period for use in cost-effectiveness estimates of veg\*n advocacy is **2.5–6.5 years**.

We still have a couple of concerns with regard to this estimate being used for cost-effectiveness estimates:

- Veg\*n advocacy might lead some people to reduce their consumption of meat, but not to entirely eliminate it. What is more, it causes some people to become vegans rather than vegetarians. Currently it is difficult for us to take these effects into account because we don't know the mean length of adherence to these diets.
- We calculated the mean length of vegetarianism period (in contrast to length of adherence over lifetime) because if a leaflet convinced a former vegetarian to become vegetarian again, we don't want to attribute past adherence to the same leaflet. However, the same leaflet or ad can cause

multiple periods of vegetarianism. Both surveys asked about length of adherence “without interruption” (with the words underlined). Some respondents may have been vegetarian for a long time with occasional interruptions (like consuming some meat by accident or only having one meal with meat) which led them to report a short length of the most recent period of vegetarianism and multiple periods of adherence before it. If present, this effect may lead us to underestimate the impact of veg\*n advocacy.

## Resources

[Faunalytics 2014 Study](#)

[Asher 2017 Study](#)

## Archived reports

[2015 Vegetarian Recidivism Report](#)