# Dine Safe King County Research Findings

Brett Burnside
MS Candidate, Department of Human Centered Design & Engineering

Leilani Esther Roylo
BS Candidate, Department of Human Centered Design & Engineering

Will Richey
BS Candidate, Department of Human Centered Design & Engineering

# Executive Summary

## Overview

This research project looks at what information the general public wants and needs on a restaurant safety rating sign in order to meet two of the key design principles defined by King County Public Health and the stakeholder committees:

- The sign should be universally recognizable, easily identifiable, understood at a glance.
- The sign should accurately portray food safety risks without creating a false sense of security or heightened sense of risk.

We conducted two surveys and two focus groups between November 20, 2014 and February 23, 2015. Initial research focused on familiarizing ourselves with restaurant rating systems and their potential strengths and weaknesses. The first survey was designed to help us understand people's preconceptions about restaurant safety rating systems. The second survey and focus groups were designed to answer the questions:

- Is the rating easily understood?
- What information do people want and need on a restaurant safety rating sign?

Key findings from our research are:

- An average rating isn't easily understood and raised more questions than it answered.
  - Participants wanted to see the inspection scores and dates that went into determining the average.
  - Participants questioned the value of including older scores, particularly when considering staff turnover and changes in management and/or ownership.
  - Participants stressed that they were most interested in the most recent inspection score.
- Participants felt that a rating system that used stars looked too much like customer ratings, or some kind of award for the restaurant. It was the least popular in our survey results and focus groups.
- A pass/fail rating system didn't provide enough information. Participants wanted to know how much a restaurant passed or failed by.
- Participants highlighted the importance of dates regardless of the rating system; of particular importance to them was when the inspection took place and when the rating was posted.

## Research Summary

Our initial research was focused on developing an understanding of restaurant safety rating systems, how they are implemented, and some of the potential strengths and weaknesses of

these systems. We began with a review of restaurant safety rating systems currently in use in the United States, Canada, United Kingdom, and Australia to familiarize ourselves with the subject matter; read articles to understand the the impact of deploying these systems; and attended a King County Public Health meeting to understand how they were approaching the design of their system.

Once we had an understanding of restaurant safety rating systems, we wanted to evaluate what preconceptions the general public might have around restaurant safety ratings. To accomplish this we ran a survey where we asked questions to determine what people thought the safety rating was based on (most recent inspection, an average of inspections, etc.), which kind of rating system they might prefer (ABC, 1-5, stars, Pass/Fail, etc.), and what they thought the restaurant rating meant. We used three of the existing systems currently in use (ABC, 1-5, and stars) as examples in our survey to provide context and ask questions around what they thought the score meant as it pertains to restaurant food safety, the minimum score a restaurant could have and still consider dining there, and whether they felt there was enough information for them to make an informed decision about dining at a restaurant. We had 42 people take our survey.

- 57% of the respondents had never looked up a restaurant's health inspection
- 50% of the respondents felt that a rating system that used stars would represent customer reviews, while 33% thought the stars would represent media reviews, and only 12% said health inspection results
- 83% thought the rating would be based on the most recent health inspection
- 45% thought they would prefer a letter based system (ABC)
- 38% said they have never had a foodborne illness and 50% aren't sure

Based on the results of our first survey, we refined our questions and created our own prototypes of restaurant safety signs to begin collecting feedback on what information people want and need on a restaurant safety sign and try to determine if there was a preferred system. Our prototypes were of the systems currently being considered by King County Public Health (1-5 and five stars based on an average), along with a third one (Pass/Fail). To promote the survey and recruit for participants for our focus groups we printed fliers which we posted around Seattle and ran an ad on Craigslist. We had 87 people respond to our second survey, with results that supported what we had found in our first survey.

- 54% of the respondents felt that a rating system that used stars would represent customer reviews, while 23% thought the stars would represent media reviews, and only 18% said health inspection results
- For a number based system, only 29% said customer reviews, 15% said media reviews, and 49% said restaurant health inspection results
- 75% thought the rating would be based on the most recent health inspection
- Prior to seeing examples, 40% thought they would prefer a letter based system (ABC), 21% preferred a number based system, and only 9% preferred the star system

- After seeing examples, only 29% preferred the letter system, 26% preferred the number system, and 14% preferred the star system

In February we ran two focus groups to gather more feedback on our restaurant safety sign prototypes and generate a discussion about what information they expected to see on the signs. To warm participants up we asked general questions how frequently they dine out, whether they had ever contracted a foodborne illness, and whether they had ever looked up a restaurant's health inspection. We then moved on to our primary questions:

- What do these signs tell you?
- What do you wish these signs told you?

Both questions generated good conversations providing insights as to how understandable our prototypes were and the information needed to make them more so. We encouraged participants to write on the prototypes provided and otherwise make changes that they felt would improve the signs.

The data collected from our focus groups indicated that members of the general public want a system that is easily understood with just enough information. However, in both groups it became clear that a star-based rating system and an average rating aren't easy to understand. The key findings from the focus groups are:

- An average rating takes considerable effort to understand and raised many questions. In order to make an average score easy to understand, participants expressed a desire to see the individual scores that went into making the average along with the dates of the inspection
- A star-based system came across as more of an award or customer review rating as opposed to a health inspection rating, supporting our findings from our surveys
- A Pass/Fail system didn't provide enough information, and there were concerns around how much a restaurant passed or failed by
- Participants expected links to additional information would be about the restaurant and its inspection history, not additional information about the rating system itself.

## Summary of Implications for Design and Future Research
Overall, we found an average rating to require more effort to understand, however, there are ways to mitigate this. Adding the inspection scores and dates that were factored into the average rating is one way to address this, but it comes with the risk of creating a sign that has too much information also requiring extra effort to understand what is being presented.

Although most participants preferred the 1-5 numerical rating system, they also felt that it was an unnecessary abstraction of the actual restaurant inspection scores, also resulting in additional effort to understand. Presenting the average of the actual inspection scores would simplify this, but would also require additional research to ensure it is easily understood.

As the restaurant safety rating system is rolled out, it would be useful to follow the user-centered design process, iterating on design and research. Since King County Public Health is intending to roll out the signs in phases, it would be beneficial to test designs at each phase, using the findings to inform design improvements for the next phase's signs.

# Research Process

There are several commonly used restaurant inspection scoring formats used across the United States, as well as around the world. These include an ABC scoring format that's similar to the US schooling grading system, one that uses 5 stars, one that relies on either a Pass or Fail, and a numerical model that uses a rating of 1-5. One of the biggest challenges posed to the development of a system for King County is that the structures of these systems vary greatly, and the perception of their effectiveness is not widely agreed upon.

Having all of these formats to choose from prompted us to focus on a formative approach to our research. Rather than choosing one design to test with participants to elicit feedback, we incorporated all of the systems that seemed the likeliest to be used, and instead sought out comparative analysis to understand which of the systems made the most sense and were easiest to use before focusing on design details. Our goal was to find out which of these systems should be most seriously considered for implementation by our research participants along with what information they wanted and needed on the signs.

## First Survey

Our first survey was designed to evaluate what preconceptions people might have around restaurant safety ratings and thereby inform our design of sign prototypes and future research activities. The survey was open from 11/20/2014 - 12/03/2014, resulting in 42 responses. Of those that responded, 67% live in King County with the rest residing outside of the county; 55% were female and 45% male; 67% gave their age as 18 - 23, 12% 24 - 29, 2% 36 - 40, 12% 41 - 45, 2% 56 - 60, and 2% 61 - 65. Participants were able to enter a drawing for a $25 Amazon gift card for taking the survey.

Items of interest from the first survey that helped inform our design of prototypes and future research activities were related to people's preconceptions around what a star based system and the posted safety rating represented.

With 50% of the respondents indicating that a rating system that used stars would be customer reviews and another 33% indicating that the stars would represent media reviews, we explored alternative ways to arrange the stars to get away from the horizontal row that is commonly seen in customer reviews and ratings.

When asked what they thought the safety rating was based on, 83% said the most recent health inspection, indicating a need to explicitly state that the score was an average and highlighting the need to identify what additional information would be needed for diners to be able to easily understand the rating.

## Prototype Designs

The initial restaurant inspection placarding formats incorporated into our first survey were selected based upon their widespread current usage around the United States as well as the

world. It was decided that although not all formats were necessarily in the running for the King County Public Health project, that it would be worthwhile to gather the public's insight about any formats that have seen success or been widely used before. Because of the popular use of the ABC format, 5-star format, and 1-5 numerical rating format, these were chosen as the initial prototypes.

For our first round of surveys, we chose existing signage examples from around the world that best displayed each format. It was decided after this pilot however, that pruning these designs and making them uniform and very simplistic would better allow participants to focus their considerations and criticism on the formats themselves, rather than superfluous design details. We understood that some of these extra design details may have had an effect on our participants choices and responses, and felt more directed feedback could be achieved. This prompted us to develop black and white designs that used simple text and shapes and contained the minimum amount of information to be comprehensible. We used these subsequent designs for our second survey and both focus groups. We additionally opted out of proceeding with the ABC rating system used in the first survey based on some of the confusion it caused participants. We opted to use the pass/fail system in its place.

We planned to probe further in our participatory design groups to gather feedback about the designs from participants, indicating what should or should not be included in any of the formats, and what they would prefer to see. The lack of design specifics was expected to provide more detailed conversations in our focus groups about prospective preferred information. We decided to provide a full scale in our rating prototypes, due to the ability to provide context about the scale of the system. Many currently adopted 1-5 and star systems show a full scale, which was deemed appropriate for our research as well. We were also interested in hearing what citizens had to say about including a system of averaging for the scoring, rather than only the most recent inspection. It was heard at one of the stakeholder meetings that posting an average score may be more desirable to the restaurant community than having to post a low score if the inspection happened at a particularly inopportune time, so we felt this was worth investigating.

## 1-5 Numerical Rating Format

One of the formats included in both surveys and focus groups was the 1-5 Numerical rating format. As currently used, the scale affords that a rating of 1 is as low as a restaurant could score and stay open, with 5 being the highest inspection rating possible. A restaurant that has scored so low to be closed would not receive a number rating.

## KING COUNTY HEALTH INSPECTION SCORE

1     2     **3**     4     5

*Score an average of the last 3 inspections

info.kingcounty.gov

**Pass/Fail Rating Format**

Another format popularly used is a simple pass/fail system. In a system such as this, if a restaurant were to fail an inspection, they would not be able to post a pass until a satisfactory re-inspection occurred.

## KING COUNTY HEALTH INSPECTION SCORE

# PASS

*Score an average of the last 3 inspections

info.kingcounty.gov

**5-Star Rating Format**

Another system is the 5 star rating format. This system is configured similarly to the 1-5 system, in which 1 star is the lowest score possible without restuarant closure, with a 5 star being the highest score possible. Because of the possibility for confusion with current 5-star

rating systems that represent many other restaurant ratings (such as deliciousness, atmosphere, service, etc) we chose to indicate the stars in proximity rather than the traditional line.



## Second Survey

After reviewing the result of the first survey, we were able to see how a second survey would be useful to collect feedback on our own prototype designs of restaurant safety rating systems. We refined the questions that we wanted to carry forward and created our prototypes to begin collecting feedback on what information people want and need on a restaurant safety sign and try to determine if there was a preferred system. Our prototypes were of the systems currently being considered by King County Public Health, 1-5 numerical system and 5-star system, both based on an average, along with a third, pass/fail system. To promote the survey and recruit for participants for our focus groups we printed fliers which we posted around Seattle and ran an ad on Craigslist.

The second survey was open from 02/08/2015 - 02/23/2015, resulting in 87 responses. Of those that responded, 67% live in King County with the rest residing outside of the county; 63% were female and 36% male, while 1 person preferred not to say. The ages of respondents was more evenly distributed for this survey with 7% giving their age as 18 - 23, 10% 24 - 29, 16% 30 - 35, 10% 36 - 40, 11% 41 - 45, 13% 46 - 50, 8% 51 - 55, 11% 56 - 60, 7% 61 - 65, 3% 66+, and 2% preferred not to say.

The results of our second survey supported our findings from the first and provided new insights into people's attitudes about restaurant safety ratings in general, the rating systems presented, and their expectations for a restaurant safety rating.

As with the first survey, the majority of respondents (54%) felt that a rating system that used stars would represent customer reviews, while 23% thought the stars would represent media reviews, and only 18% said health inspection results. However, for a number based system, only 29% said customer reviews, 15% said media reviews, and 49% said restaurant health inspection results, indicating that a numerical rating system might be more readily differentiated from rating systems by customer, media, and other ratings related to the restaurant's service and food.

When comparing the number system and star system, 51% of respondents indicated a rating of "3" is the minimum rating they would be willing to eat at while 54% of respondents assumed a rating of "3" would mean a restaurant is "Somewhat sanitary". Similarly, with the star rating system, 54% of respondents indicated a rating of "3 stars" is the minimum rating they would be willing to eat at with the understanding of 59% of respondents that "3 stars" meant the restaurant is "Somewhat sanitary". Most respondents are willing to tolerate a restaurant that is "somewhat sanitary" on both the number and stars scales, which are both generally interpreted in the same way.

It was interesting how even after showing our own prototypes, when we asked which systems they prefer, 29% of respondents indicated they still prefer a letter grading system. The comments regarding letter grades were mostly positive expressing how letter grading is easy to understand by everyone because it is most familiar to them. Suggestions for a letter grading system included incorporating pluses and minuses for fine tuning. 26% of respondents preferred the number scoring system but the comments regarding this number system were both positive and negative. Some respondents expressed how the number system is clear and acceptable, whereas at least one respondent expressed that the number system was confusing not knowing what the numbers actually mean.

## Focus Groups
The goal of conducting focus groups was to aid our initial designs by engaging participants in a participatory design process. Our participants came from both our second survey respondents and the ad on Craigslist. Prior to sending official invitations to participants, we asked those who expressed an interest to fill out a short screener survey with questions asking why they are interested in participating as well as if they have ever participated in a focus group before. Based on the responses from this screener, we chose and invited 17 people total while taking into account last minute cancellations or no-shows.

Our initial plan was to conduct one focus group closer to downtown Seattle and one outside of the Seattle area. As we began the library reservation process, our locations were slightly limited, but we were able to successfully reserve library spaces in two different locations, one in West Seattle and the other in Burien.

Both focus groups began with an introduction of the team members and their roles, and continued with a short explanation of the purpose of this study. We had each participant read and sign an Informed Consent Form, which outlined their rights and responsibilities as focus group participants. By signing this form each participant acknowledged the terms outlined. Group introductions followed where we asked each person to share their name as well as answer questions about how often they dine out, how they choose places to dine out, and what is most important to them when it comes to food safety.

The next part of the focus groups required the participants to engage in discussion about the sign prototypes we created.  We provided a stack of post-it notes for each participant to write down their individual thoughts to the following questions about each sign : "What do they tell you?" and "What do you wish they told you?". This sparked interesting discussion between participants in both focus groups. As the participants engaged in discussion, many agreements and disagreements were made regarding each sign and what they meant.

Based on the information the participants shared about what they wished the signs had told them, we asked each participant to, again, write down their thoughts on the post-it notes as to what changes they would make to the signs in front of them. We were glad to see all the participants active and engaged in these activities. Many of the participants were very eager to share their thoughts not only with each other, but also with King County Public Health by participating in these focus groups.

We concluded each focus group with an opportunity for each participant to share their last minute thoughts or questions and we also had them fill out a form to collect simple demographics such as name, age, zip code, and any last thoughts or suggestions. Each participant received a $35 gratuity for participating in the focus group.

## Focus Group 1
We conducted our first focus group in the Seattle Public Library, Southwest Branch, 9010 35th Ave SW, Seattle, WA 98126 on Thursday February 19, 2015 from 6pm - 7pm. Nine participants were invited to participate and only five participants attended. Of the five participants, there were four females and one male. In this particular focus group, each participant was from a different zip code. According to the demographic forms filled out by each participant at the end of the focus group, the consensus of this group was that the number system was best of the choices given. Some people noted in their own suggestions that even a percentage score would be best.

One of the main concerns among all participants was adding a date to these signs to indicate when the food establishment was last inspected. As far as the score shown on each sign, some participants would have thought the score represented the most recent inspection if the note was not included that the score is based on an average. The fact that the sign indicated the score represented an average sparked debate on whether or not this would be effective or how to make it effective. There was very minimal to no talk about letter grading during the

spoken discussions. All of the participants expressed their interest in being able to see other detailed information, such as specific violations, on the signs that would help them understand what exactly contributed to the score the restaurant received.

**Focus Group 2**
We conducted the second focus group in a conference room at the King County Public Library, Burien Branch, 400 SW 152nd St, Burien, WA 98166 on Saturday February 21, 2015 from 2pm - 3pm. Of the eight participants invited, six people attended. Three participants were female, and the other three were male.

This focus group had a slightly different dynamic than the first group. It seemed as though there were much stronger opinions expressed by the people in this session. The letter grading system was a much larger topic in this focus group compared to the first, and many of the participants strongly believed letter grading would be the best system. In the demographic forms filled out at the end of the session, all but one participant made note that they would like to see a letter grading system with pluses and minuses integrated into restaurant inspections. The next popular answer was to have a percentage as each restaurant's score.

Each participant had their own opinions on what was good or bad about each rating sign we presented to them, and also made sure to note how they would change those signs. The issue of not including the date, or date range in the case of average scoring, in the prototypes also became a very prominent discussion in how important it is for people to know when an establishment was last inspected. Very similar to the first group, the members of this second focus group mentioned that they would also like to see other bits of detailed information about a previous inspection that could further help them make a decision about dining at a certain establishment whether it be listed as a supplement to the posted sign, or as a link/QR code users can easily access.

# Findings
Our research found that an average rating isn't easily understood and raises more questions than it answers. When presented with rating systems based on an average, participants wanted to see the inspection scores and dates that went into determining the average rating. Additionally, some participants questioned the value of including older scores, particularly when considering staff turnover and changes in management and/or ownership and stressed that they were most interested in seeing the most recent inspection score on the sign. However, some people pointed out the benefit of seeing when a restaurant had received a low score along with how much it had improved in the next inspection.

Participants highlighted the importance of dates regardless of the rating system; of particular importance to them was when the inspection took place and when the rating was posted.

Additional information our participants were interested in was related to cross-contamination from the perspective of vegetarian items being prepared and handled separately from meat to ensure they are truly vegetarian and the perspective of food allergies to prevent a life-threatening allergic reaction.

When discussing the pros and cons of the three prototypes, participants agreed overall, that a rating system that used stars looked too much like customer ratings, or some kind of award for the restaurant, and was the least popular in our survey results and focus groups. Participants felt that the pass/fail rating system didn't provide enough information and wanted to know how much a restaurant passed or failed by. The number based system was generally the best received of the three prototypes, but also needed improvement. There was some disagreement as to whether 1 should be the high score or the low score.

We also asked participants if there was a different system they would like to see implemented instead of the three they were presented with. There was no clear consensus and some suggestions were: showing the average of the actual restaurant inspection scores (including the scores that made up the average), just show the most recent inspection score, just post the actual inspection report, and using the letter grade system with pluses and minuses for a broader range of scores. The second focus group was most vocal about using the letter grade system saying that it was the easiest to understand from small children to seniors.

The primary takeaway was that members of the general public like the idea of having restaurant safety ratings posted and share the desire to have a sign that is universally recognizable, easily identifiable, understood at a glance with King County Public Health. they also recognize that this is not an easy problem to solve.

## Implications for Design and Future Research

The effort required to understand or learn something is known as cognitive load and the use of an average rating that is an abstraction of the actual inspection score carries significant cognitive load. However, there are ways to mitigate this. Adding the inspection scores and dates that were factored into the average rating is one way to address this, but it comes with the risk of creating a sign that is information dense, which could also result in significant cognitive load. Presenting the average of the actual inspection scores would simplify this, but would also require additional research to ensure it is easily understood.

It also might be beneficial to find a graphical way of representing the restaurant's safety rating other than the star-based system. One potential solution would be to use a heat graph that was a gradient of red, yellow, and green (left to right) and an indicator of of where the restaurant's safety rating was on the graph, along with the score, inspection date, and date the sign was posted. If there is still a strong desire to post an average rating, it would could be beneficial to show a trend line below the heat graph showing the trend of the restaurant's inspections with callouts that contained the inspection dates and scores that made up the

average. Clearly, this is one possible design of many. Looking at other rating systems in use by other industries might also be beneficial such as those used by film, TV, and game industries.

As the restaurant safety rating system is rolled out, it would be useful to follow the user-centered design process, iterating on design and research. Since King County Public Health is intending to roll out the signs in phases, it would be beneficial to test designs at each phase, using the findings to inform design improvements for the next phase's signs.