

Beyond the X-Ray **Evaluation Study**

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EXECUTIVE SUMMARY

This evaluation study was conducted to examine the effectiveness of two design strategies used in *Beyond the X-Ray*: personal stories which were a part of the “Five Windows on the Body” and a separate kid area which was implemented in “Kid Radiology.”

Evaluation Questions:

1. How do visitors interact with and use the exhibits in *Beyond the X-Ray* that were created with the instructional design strategies that are the focus of this evaluation?
2. In what ways, if any, are the exhibits that are designed with the targeted strategies effective at achieving their stated goals?
3. What are the visitors’ perceptions of the value/effectiveness of the chosen instructional design strategies?

The “Five Windows on the Body” consist of a series of five panels about CT scan, X-Ray, Ultrasound, MRI, and PET scan. Each panel contained text labels about the technology, an audio label, a short video, and a story about a patient’s experience with the technology. For the study of the “Five Windows on the Body,” visitors 13 years of age and older were timed and tracked as they used the exhibits and a portion of the participants took part in an exit interview. In addition, 31 visitor groups were cued to use panels chosen by the evaluator in order to learn more about what visitors would learn from and feel about a panel if they had an in-depth experience.

“Five Windows on the Body” Findings:

1. Visitors use the panels more thoroughly now than they did in the previous evaluation study when there were no patient stories and the text on the panels was longer.
2. Visitors seem to be learning more about the imaging technologies than about the experiences of patients from the panels.
3. Visitors, who listen to the patient stories, value them because they add a personal perspective to the panels.

Implications for Future Use of Personal Stories:

1. Personal stories can be used to give a personal voice to an impersonal technology.
2. Personal stories can be used to provide a point of view other than the typical scientist or engineer point of view.
3. Personal stories cannot be expected to be the sole tool for conveying important goals and messages because they will not be used by everyone.

The “Kid Radiology” area consists of four exhibits designed for children between the ages of 5 and 8. Those exhibits are “Mystery X-Ray,” “Animal X-Ray,” “Reading Table,” and “Skeleton Puzzle.” For the study of “Kid Radiology,” visitors between the ages of 5 and 9 were tracked using the exhibits. A subset of these children was then interviewed as were some children who were not timed and tracked. In addition, the parents or guardians of the interviewed children were surveyed. Finally, all the groups who visited the “Kid Radiology” area over a three-hour period were tracked in order to understand who was using the space.

“Kid Radiology” Findings:

1. Children, who visit the “Kid Radiology” area, spend some of their time using the area without an adult.
2. Both children and adults feel that the “Kid Radiology” area is for everyone and not just kids.
3. Visitors to the “Kid Radiology” area report learning about X-Rays and what the insides of animals and other objects look like.

Implications for Future Use of Separate Kid Exhibit Areas:

1. Separate kid areas will allow adults to spend some time apart from their children.
2. If made robustly, separate kid areas can contain activities that are also appropriate for adults.
3. Separate areas for children may not be appropriate for very young children because adults will not feel comfortable leaving their children.

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I. INTRODUCTION

ABOUT THE EXHIBITION

The *Beyond the X-Ray* exhibition was created as a part of the Museum of Science (MoS) technology education plan. Through this plan, the Museum intends to present technology through three strands: showcase, playground, and forum. The showcase strand presents visitors with information about what technology is and what's going on in the field. The playground strand illustrates to visitors how technology is developed and how technology can be used to do useful and creative things, and the forum strand shows visitors how technology, society, and the environment affect each other and hopes to cause them to consider how we can make good decisions about using technologies (Bell, 2007). Exhibitions can cover one or multiple strands.

Beyond the X-Ray is a showcase exhibition about medical imaging technologies. Technologies presented in *Beyond the X-Ray* include X-Ray, Magnetic Resonance Imaging (MRI), Ultrasound, Computerized Axial Tomography (CT Scan), and Positron Emission Tomography (PET Scan), among others. The exhibition is split into the following areas:

- “Five Windows on the Body”: an overview of the five medical imaging technologies,
- “Fly through the Body”: a collection of movies created from CT Scans,
- “Radiologist for a Day”: an interactive activity where visitors get to diagnose patients based on lung images,
- “The Art of Imaging”: a collection of artworks composed of or inspired by medical images,
- “Kid Radiology”: a collection of interactive exhibits targeted to children between the ages of 5 and 8, and
- “Breast Imaging”: an overview of mammography and other breast imaging technologies.

The following report is an evaluation of the *Beyond the X-Ray* exhibition that examines the effectiveness of select instructional design strategies that could have potential use and value for future exhibitions. These instructional design strategies, as chosen by the project team, include personal stories that describe an individual's experiences with a particular technology and its impact on their life (as utilized in the “Five Windows on the Body” area) and designated kids' activities that are strategically placed next to opportunities for adult learning (as implemented in the “Kid Radiology” area).

The “Five Windows on the Body” are a series of panels about X-Ray, Ultrasound, CT Scan, PET Scan, and MRI imaging technologies. Each panel is composed of text labels about the history of the medical imaging technology, what the imaging technology is good for, how it works, how safe it is, and advances in the technology. In addition, each panel contains a video of images created by the technology, a patient story from someone who has experienced the technology, and an audio label of the text contained on the panel. The audio label also describes the layout of the “Five Windows on the Body” area.

The “Kid Radiology” area is composed of four interactive exhibits about X-Rays. The “Animal X-Ray” exhibit has a number of X-Rays of different animals including cats and lizards that

visitors can place on a light table to look at. The “Mystery X-Ray” exhibit is a series of X-Rays of five everyday objects including a lunchbox and a flashlight. When visitors flip up the X-Ray image, they see the actual object that the X-Ray was taken of. The “Skeleton Puzzle” is a large puzzle of a human skeleton that visitors can arrange on a magnetized wall. The “Reading Table” is a kid-sized table at which visitors can stop and read children’s books about the process of having an X-Ray taken.

EXHIBITION GOALS

In order to test the effectiveness of the “Five Windows on the Body” and the “Kid Radiology” area and their associated design strategies, it is important to know the team’s goals and messages for *Beyond the X-Ray*. As of the time when this evaluation was proposed in spring 2007, the overall goals for the Showcase strand, of which *Beyond the X-Ray* is a part, were the following:

1. Visitors will feel that learning about technology is for me.
2. Visitors will feel more knowledgeable & better informed about technology.
3. Visitors will feel that they can and are able to learn about technology.
4. Visitors will feel that the exhibit is relevant and important.

The main messages of the *Beyond the X-Ray* exhibition were the following:

1. Medical images are a useful way to see inside the body without cutting.
2. Different medical imaging technologies are good at seeing different things.
3. No single technology can see everything.
4. Medical images can reveal both structure and function.
5. Medical imaging can have an aesthetic appeal beyond the medical one.

The team also came up with individualized messages for the “Five Windows on the Body” and “Kid Radiology” areas. The main message that the project team hoped visitors would walk away with after using the “Five Windows on the Body” was that different medical imaging technologies reveal additional information about the human body. The main message for the “Five Windows on the Body” patient stories was that medical imaging may seem scary, but can be simple, straightforward and quick. The main message for the “Kids Radiology” area was X-rays are a way of seeing inside real objects without “opening” them, and that X-rays of objects can look different than real objects.

ABOUT THE EVALUATION

Instead of conducting a summative evaluation of the entire *Beyond the X-Ray* exhibition, it was decided that it would be more useful to the Museum to conduct a study about the effectiveness of the unique design strategies (personal stories and designated kids activity areas) that are a part of this exhibition. This is because the results generated about these design strategies can be used to inform the design of future exhibits and programs that address similar goals even if the exhibitions are not about medical imaging technologies. When measuring the effectiveness of these instructional design strategies, the Research and Evaluation Department at the Museum of Science examined how visitors interact with and learn from the “Five Windows on the Body” and “Kid Radiology” areas that employ these strategies. It was important, therefore, to consider

the stated educational goals and messages of these segments as they were one of the key areas by which the success of the given design strategies were measured. Based on these goals and messages, the overarching questions that drove the *Beyond the X-Ray* evaluation were the following:

- How do visitors interact with and use the exhibits in *Beyond the X-Ray* that were created with the instructional design strategies that are the focus of this evaluation?
- In what ways, if any, are the exhibits that are designed with the targeted strategies effective at achieving their stated goals?
- What are the visitors' perceptions of the value/effectiveness of the chosen instructional design strategies?

The planning for this evaluation began in February 2007. Evaluators collected data at the “Five Windows on the Body” and “Kid Radiology” areas from June through August 2007. The final evaluation report was released in April 2008.

II. METHODS

Data were collected at the Museum of Science, Boston in the summer of 2007. Multiple methods of data collection were employed including timing and tracking, behavioral observations, exit interviews, in-depth interviews, adult exit surveys, and area usage counts. By using multiple data collection methods, the evaluator was able to develop a more complete picture of how visitors used and learned from the “Five Windows on the Body” and “Kid Radiology” areas (Table 1). However, due to time constraints and changes to the evaluation plan, evaluators did not use all these data collection methods for both the “Five Windows on the Body” and “Kid Radiology” areas.

TABLE 1. Methodology Matrix.

Evaluation Questions	Data Collection Methods					
	Timing and Tracking	Behavioral Observations	Exit Interviews	In-Depth Interviews	Adult Exit Surveys	Area Usage Counts
How do visitors interact with and use the exhibits in <i>Beyond the X-Ray</i> that were created with the instructional design strategies that are the focus of this evaluation?	X	X		X	X	X
In what ways, if any, are the exhibits that are designed with the targeted strategies effective at achieving their stated goals?	X		X	X	X	X
What are the visitors’ perceptions of the value/effectiveness of the chosen instructional design strategies?			X	X	X	X

1. “FIVE WINDOWS ON THE BODY” PROTOCOLS

The data collection methods used to evaluate the “Five Windows on the Body” were tracking and timing, behavioral observations, exit interviews, and in-depth interviews. Individuals were selected to participate in the evaluation of the “Five Windows on the Body” exhibits if they were 13 years of age or older because this was the audience for whom the panels were designed. If the area was busy, then every third person who entered the area was chosen to be a part of the study. If the area was not busy, then a continuous random sampling method was employed. This meant that after the evaluator finished collecting data from a subject, she would choose the next eligible person to become her next subject. If participants came to the Museum of Science in a group, then only the first person fitting the criteria, who crossed an invisible line, was chosen to take part in the evaluation.

1.1 *Timing and Tracking and Behavioral Observations*

Sixty-three visitor groups were observed using the “Five Windows on the Body” exhibits. Demographic information was collected about the group’s size and type (whether it was an adult only, kid only, or adult and kid group). Since it would be difficult to observe the behaviors of every individual in an entire group, the first person, from the chosen group, to cross into the “Five Windows on the Body” area was chosen as the focus subject. The approximate age and gender of this individual was recorded as well as the group demographic information. To understand how visitors use the panels, evaluators tracked the panels visited by the focus subject (CT Scan, MRI, X-Ray, Ultrasound, or PET Scan), the amount of time the focus subject spent at each of these panels, and whether the focus subject used or listened to the text/video, patient stories, and audio label located at each panel. A copy of the timing and tracking and behavioral observation instrument can be found in Appendix A.

1.2 *Exit Interview*

As many timed and tracked focus subjects as possible were asked as they left the “Five Windows on the Body” area if they would take part in the exit interview. However, in order to ensure that only those who would have a good chance of being able to answer the questions were included in the exit interview data, focus subjects were only asked if they interacted with at least two of the panels or were in the exhibit for more than one minute. Using this protocol, twenty focus subjects were interviewed about their experiences using the “Five Windows on the Body.” The interviewed visitors were asked questions about the following:

- What they learned from the panel(s);
- What, if any, information on the panel(s) was personally relevant and meaningful;
- If they listened to a patient story, what did they recall hearing, how did the stories add value to their experience, and did they get any new perspective or insights through the stories;
- If they did not listen to a patient story, why didn’t they; and
- What could we change to make the panel(s) better.

Answers to the questions were coded, and evaluators had an inter-coder reliability rate of 90%.¹ A copy of the exit interview can be found in Appendix B.

¹ To calculate the inter-coder reliability rate, two evaluators were asked to code a subset of the qualitative data using a predetermined coding system. The percentage agreement between the two coders is the inter-coder reliability rate.

1.3 In-Depth Interviews

In order to gain a deeper understanding of visitors' reactions to the panels, 31 visitor groups were cued by the evaluator to use one of the panels that are a part of the "Five Windows on the Body." The number of groups cued for each panel was the following:

- Six groups for MRI,
- Five groups for X-Ray,
- Seven groups for Ultrasound,
- Six groups for PET Scan, and
- Seven groups for CT Scan.

Groups were asked to use a panel, chosen by the evaluator, as they normally would. At this time, evaluators observed the participants to see how long they used the panel and what parts of the panel they used. After the participants used the panel, they were asked a series of questions about their experiences. Because this process took 15 minutes or more, participants were given a small token for participating. The participants were asked to answer questions about the following:

- What they liked and disliked about the panel;
- What they learned from the panel;
- When they felt confused or unsure about the panel;
- What information they found personally relevant and meaningful;
- Why they did or did not like the patient stories;
- What they learned from the patient story;
- How the patient story added value to their experience; and
- What information they felt was missing from the patient story.

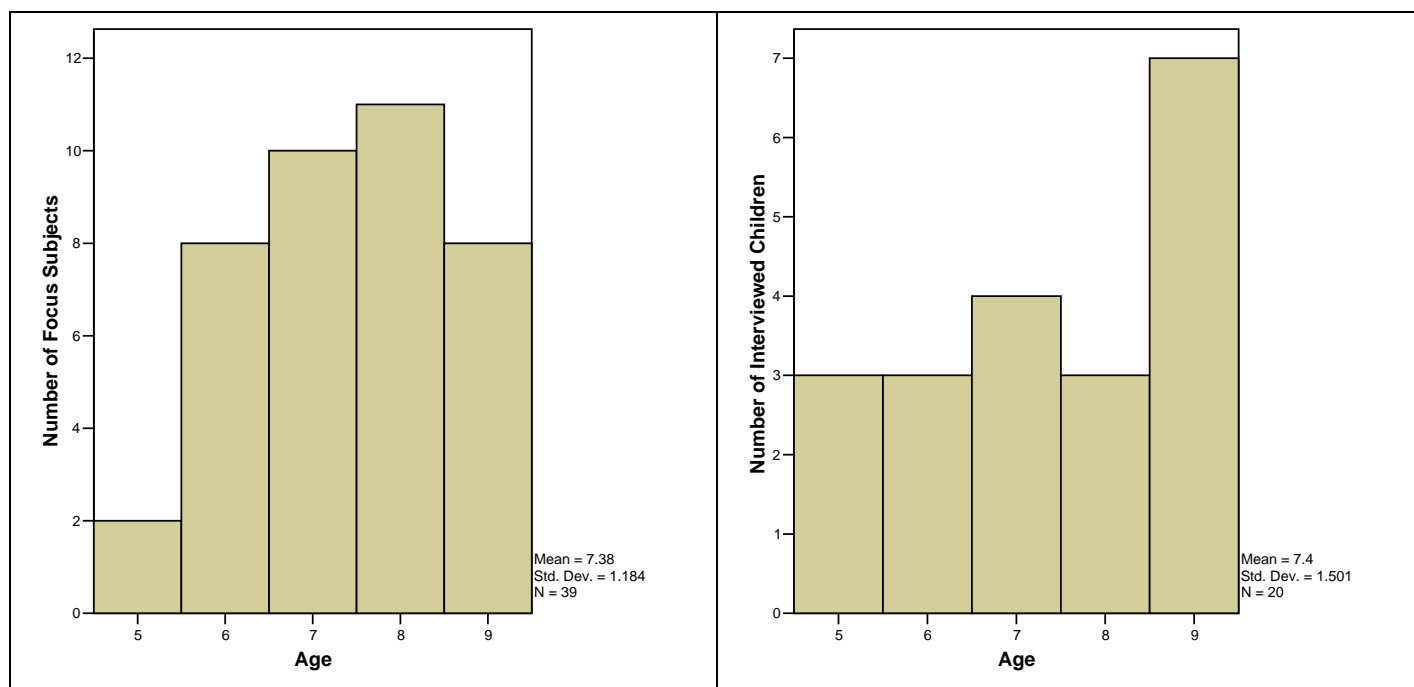
Data generated through this instrument was coded, and evaluators had an inter-coder reliability rate of 94%. A copy of the in-depth interview can be found in Appendix C.

2. "KID RADIOLOGY" PROTOCOLS

The data collection methods used to evaluate the "Kid Radiology" exhibits were tracking and timing, behavioral observations, child exit interviews, adult exit surveys, and area usage counts. For all the data collection instruments except the area usage counts, groups with children between the ages of 5 and 8 were selected to participate because this was the audience for whom the exhibits were designed. Because it is difficult to observe every member of a group, one child in the target age range was chosen as the focus subject. If there was more than one child in the group within this age range, the first child to start interacting with one of the "Kid Radiology" exhibits was chosen as the focus subject. If the area was busy, then every third group who began interacting with one of the exhibits in the area was chosen to be a part of the study. If the area was not busy, then a continuous random sampling method was used. This meant when an

evaluator completed collecting data from a group, they would choose the next eligible group to interact with the area to become the next participants. Evaluators found it difficult to guess if children were 8 years old or 9 years old. Therefore, all the focus subjects and interviewed children were between the ages of 5 and 9 (Graphs 1& 2).

GRAPHS 2 & 3. Ages of Timed & Tracked Focus Subjects (N=39)² and Children Exit Interviewed (N=20) for “Kid Radiology.”



2.1 Timing and Tracking and Behavioral Observations

Forty visitor groups were observed using the “Kid Radiology” exhibits. Demographic information was collected about the group size and type (adult only, kid only, or adult and kid). In addition, the approximate age and gender of the focus subject was recorded. To understand how children and adults use the exhibits in the “Kid Radiology” area, evaluators recorded the amount of time that the focus subjects spent at each of the exhibits (“Mystery X-Ray,” “Animal X-Ray,” “Skeleton Puzzle,” and “Reading Table”) with and without an adult. Evaluators also recorded whether the focus subject or group exhibited specific behaviors at each exhibit such as lifting doors, manipulating X-Rays or puzzle pieces, or reading a book. A copy of the “Kid Radiology” timing and tracking and behavioral observation instrument can be found in Appendix D.

² The age of one of the timed and tracked focus subjects was not recorded by evaluators.

2.2 *Child Exit Interview*

Twenty children between the ages of 5 and 9 were interviewed as they left the “Kid Radiology” area. Before the interview took place, a parent or guardian was asked for permission. Half of these children were participants in the timing and tracking study, and half were not. In order to ensure that participants had spent enough time interacting with the exhibits, they were only asked to participate if they had gone to two or more “Kid Radiology” exhibits or spent at least one minute interacting in the area. The children were shown pictures of the various “Kid Radiology” exhibits and asked questions about two. In order to facilitate answering the questions pictures corresponding to different answers were also shown to the children. The children were asked questions about the following:

- Whether they thought the activity was “good,” “okay,” or “bad” and why;
- Whether they thought the activity was about “animals,” “X-Rays,” “medicine,” “people,” or “bones” and why;
- Whether they thought “kids,” “families,” or “adults” would play with the exhibits, and why; and
- Which activity they had just talked about they liked best and why.

Qualitative answers associated with these questions were coded. Evaluators had an inter-coder reliability rate of 94%. A copy of the child exit interview can be found in Appendix E.

2.3 *Adult Exit Survey*

In order to keep the adult occupied while their child was taking part in the child exit interview as well as gain further information about the “Kid Radiology” exhibits, 19 surveys were collected from the parent or guardian who accompanied the focus subject. The questions asked of these adults included the following:

- The ages and genders of the adult and children in the group;
- Whether the adult and child(ren) liked the “Kid Radiology” activities;
- Whether the adult felt the exhibits were created for adults or children;
- Whether the adults, kids, or both used the activities;
- Whether the adult would feel comfortable leaving their child(ren) at the activity and why;
- What they learned from the activities; and
- What changes could be made to activities to make them better.

Qualitative answers associated with this survey were coded, and evaluators had an inter-coder reliability rate of 86%. A copy of the adult exit survey can be found in Appendix F.

2.4 Area Usage Counts

In order to better understand who uses the “Kid Radiology” area, evaluators tracked all the groups who entered and used the “Kid Radiology” area in two hours and 52 minutes over a three-day period. Observations were made between 12:00 PM and 4:10 PM in order to cover a range of times of day and on a Wednesday, Thursday, and Friday in order to cover a number of days of the week. In total over this time period, 111 groups were observed using the exhibits. Evaluators recorded the group type (adult only, kid only, or adult and kid), group size, and whether they perceived that anyone in the group was between the ages of 5 and 8. A copy of the area usage count instrument can be found in Appendix G.

3. DATA ANALYSIS

By collecting data in a variety of ways, the evaluator was able to triangulate the data. The logic behind triangulation is that “no single method ever adequately solves the problem of rival causal factors” (Patton, 2002, p.247). Therefore, if data is collected through many sources, evaluators can avoid the problems of a one-method study, which is “vulnerable to errors linked to that particular method (e.g., loaded interview questions, biased or untrue responses)” (Patton, 2002, p.248). Studies that utilize multiple methods allow “cross-data validity tests” (Patton, 2002, p.248), and thus reduce the likelihood that the evaluator will draw a false conclusion based on the limits of any one instrument. In this case, data from timing and tracking, behavioral observations, exit interviews, in-depth interviews, child exit interviews, adult exit surveys, and area usage counts were compared to ensure that findings are not susceptible to error, and to allow for an exploration of differences among data.

Data collected through the instruments were both qualitative and quantitative in nature. Quantitative data were analyzed through descriptive statistics such as percentages, counts, and means. In addition, comparative tests of significance were sometimes conducted. The level of significance was set at 0.05, and only statistically significant results are described in this report. Qualitative data were analyzed using inductive coding. Inductive coding analysis involves “immersion in the details and specifics of data to discover important patterns, themes, and interrelationships” and allowing the coding scheme to emerge from the data (Patton, 2002, p.41).

III. RESULTS AND DISCUSSION

Because of the differences in the design strategies studied and the data collection instruments used as a part of this evaluation, the Results and Discussion section of this report is split. The findings from the “Five Windows on the Body” area are discussed first. Then, the findings from the “Kid Radiology” area are presented.

1. “FIVE WINDOWS ON THE BODY” FINDINGS

The three main findings about the “Five Windows on the Body” are the following:

1. Visitors use the panels more thoroughly now than they did in the previous evaluation study when there were no patient stories and the text on the panels was longer.
2. Visitors seem to be learning more about the imaging technologies than about the experiences of patients from the panels.
3. Visitors often did not find the content on the panels personally relevant; however, some visitors found that the patient stories added this personal perspective to the panels.

1.1 Visitors use the panels more thoroughly now than they did in the previous evaluation study when there were no patient stories and the text on the panels was longer.

In the summer of 2005, a remedial evaluation was conducted on the “Five Windows on the Body.” As a part of this evaluation, a timing and tracking study was completed as was a label/text study (Boyce, Chin, Coit, Higgins, & Kunz, 2005). After this study, some changes were made to the “Five Windows on the Body” including shortening the text on the panels, changing some of the graphics, and adding the patient stories.

Comparing data collected through the 2005 study to the data collected for this study, it was found that since the changes have been made to the panels they are being more thoroughly used. In 2005, the mean amount of time that visitors spent at the panels was just under a minute and a half ($M=87.47$ seconds, $SD^3=77.87$ seconds). In the current study, the mean amount of time that visitors spent at the panels was over two minutes ($M=133.71$ seconds, $SD=132.56$ seconds). The difference in the amount of time that visitors now spend at the panels is significantly greater than the amount of time visitors spent at the panels in 2005, $t(87) = -2.1, p = .038$. In addition, visitors spend significantly more time at the MRI panel now ($M=68.97$ seconds, $SD=52.69$ seconds) than they did in 2005 ($M=37.72$ seconds, $SD=23.74$), $t(49) = 3.4, p = .001$ (Table 2).

³ SD stands for standard deviation.

TABLE 2. Mean Amount of Time “Five Windows on the Body” Tracked Visitors, Who Interacted with the Panel, Spent at Each Panel during the 2005 and 2007 Studies.

Panel	2005 Study (N=30)			2007 Study (N=63)		
	Number of Tracked Visitors ⁴	Mean (Seconds)	SD ⁵ (Seconds)	Number of Tracked Visitors ⁶	Mean (Seconds)	SD (Seconds)
CT Scan	17	29.71	36.39	24	56.38	55.02
MRI	18	37.72	23.74	34	68.97	52.69
PET Scan	12	48.13	38.15	27	41.77	47.92
Ultrasound	15	36.00	32.30	37	41.51	39.62
X-Ray	12	40.75	48.24	30	66.57	75.11

Despite differences in the amount of time spent at the panels, visitors are not actually visiting more panels now than they did in 2005. It was found during the 2005 study that visitors interacted with 2.5 panels on average (SD=1.4 panels). In the 2007 study, visitors interacted with an average of 2.4 panels (SD=1.3 panels). Visitors also interacted with all of the individual panels in the same frequencies as they did during the 2005 studies (Table 3).

TABLE 3. Number and Percent of “Five Windows on the Body” Tracked Visitors Interacting with Each Panel during the 2005 and 2007 Timing and Tracking Studies.

Panel	2005 Study (N=30)		2007 Study (N=63)	
	Number of Tracked Visitors	Percent of Tracked Visitors	Number of Tracked Visitors	Percent of Tracked Visitors
CT Scan	17	57%	24	38%
MRI	18	60%	34	54%
PET Scan	12	40%	27	43%
Ultrasound	15	50%	37	59%
X-Ray	12	40%	30	48%

Because visitors spent more time at the panels overall in the 2007 study but did not visit more panels, it seems the visitors are using the panels more thoroughly. As noted before, the changes made to the panels between 2005 and 2007 included shortening the text labels, changing some of the graphics, and adding the patient stories. It seems that one or many of these changes may be causing the visitors to use the panels more thoroughly. It is impossible to observe visitors and know whether they are reading a label. However, it is possible to tell if they use an audio label or the patient stories because they either have to pick up the hearphone or push a button.

⁴ The number of tracked visitors does not equal 30 for any individual exhibit because none of the exhibits were visited by all of the tracked visitors.

⁵ SD stands for standard deviation.

⁶ The number of tracked visitors does not equal 63 for any individual exhibit because none of the exhibits were visited by all of the tracked visitors.

Using this information, evaluators compared the difference in the amount of time visitors who use and do not use the audio labels and patient stories spend at the “Five Windows on the Body.” Evaluators found that under a quarter of the tracked visitors (24%) listened to at least one of the audio labels during the 2007 study. The amount of time tracked visitors who listened to an audio label spent at the panels (M=188.73 seconds; SD=167.19 seconds) was not statistically different than the amount of time those who did not listen to the audio labels (M=116.52 seconds, SD=116.56) spent at the panels. However, comparing those who did and did not listen to the patient stories, it was found that visitors who listened to at least one patient story, spent significantly more time at the panels (M=181.06 seconds, SD=149.54 seconds) than visitors who did not listen to at least one patient story (M=74.54 seconds, SD=75.21 seconds), $t(52) = 3.7, p = .001$. Over half the tracked visitors (56%) listened to at least one of the patient stories.

These data indicate that the audio labels do not affect the amount of time visitors spend at the “Five Windows on the Body.” However, these data do show that the patient stories can account for at least some of the increase in the amount of time that visitors are spending at the “Five Windows on the Body.” It is also possible that visitors are using the panels more thoroughly now because the text on the panels was cut and the graphics were changed. However, because it was difficult for evaluators to determine how much time visitors spent using labels as information delivery methods, it is unknown whether these modifications had any affect on visitor usage.

1.2 Visitors seem to be learning more about the imaging technologies than about the experiences of patients from the panels.

During the exit interviews and in-depth interviews about the “Five Windows on the Body,” visitors were asked open-ended questions about what they learned from the panels. On the exit interviews (6 of 20 interviewed visitors) and interactive observations (5 of 30 cued participants), a few participants reported learning nothing from the panels. One of these visitors said, “[I learned] nothing. [I] used to work in healthcare, so [I] know a lot” (Exit Interview #57). However, most visitors did report learning from the panels. The most common responses that visitors gave on the exit interviews were that they learned about the difference between medical imaging procedures (4 of 20 interviewed visitors), specific facts about different imaging technologies (4 of 20 interviewed visitors), or hearing about a new procedure they had not encountered before (4 of 20 interviewed visitors) from the panels (Table 4). Example visitor comments include the following:

“[I learned] the way different things work. [I also] didn't know [about] the sugar [used in PET scans, that in] Ultrasound no radiation [is] used, [and] why lead for X-Rays is needed.” (Exit Interview #42)

“[I] didn't know what a PET Scan was before. [I] have a friend that has one every six months and didn't feel comfortable asking [my] friend, so [I'm] glad to learn [about it].” (Exit Interview #9)

TABLE 4. Visitor Responses to the Exit Interview Question: “What, If Anything, Did You Learn from These Panels that You Didn't Know Before?” (N=20)⁷

	Number of Interviewed Visitors ⁸	Quotes
Nothing	6	"Nothing. It was just interesting." (Exit Interview #34)
The difference between the procedures	4	"[I] have to get an MRI. [I] didn't know the difference between them [the procedures before]." (Exit Interview #Test 8)
Specific facts about the different imaging technologies	4	"[I] didn't know sugar isotopes are used [in PET Scans]. [I did] know radioactive Gallinium [dye] which is what [I] use for breast MRIs." (Exit Interview #22)
A procedure that I didn't know of before	4	"[I] never heard of PET before: [it's] good [to know] if going to the doctor and need to know what PET is." (Exit Interview #14)
I didn't get to look at them closely.	2	"[I] didn't get a chance to look. [I] can't remember. [I] couldn't focus with [my son]." (Exit Interview #16)
What can be seen from the tests	2	"[They] show how much clarity they can see in tests." (Exit Interview #3)
A lot	1	"A lot." (Exit Interview #43)

Participants who took part in the in-depth interviews were cued to use a specific panel that was chosen by the evaluator. When these participants were asked what they learned from the panel, they reported learning about some of the same topics as reported on the exit interviews. These participant responses were that they learned specific facts about different imaging technologies (7 of 30 cued participants) or learned about a procedure that they did not know of before (4 of 30 cued participants). Example comments from the in-depth interviews include the following:

Person 1: [I learned that for CT Scans you] inject [dye. I also learned] some of the details of going through the process. Person 2: [I learned] you have to drink, take a tracer. (In-Depth Interview #18)

“[I] didn't know about sonogram.” (In-Depth Interview #15)

While the above paragraph indicates that participants who participated in the in-depth interviews shared some learning with the exit interview visitors, much of their learning was different. The most common response in-depth interview participants (11 of 30) gave was that they learned about the history of the medical imaging technology from the panel. One of these participants said, “[I learned MRI was] created in 1946 by two people” (In-Depth Interview #21). Other common responses given by the in-depth interview participants were

⁷ Exit interview numbers were chosen based on the sequence in which timing and tracking and exit interviews were collected. When exit interview and timing and tracking group numbers match then the data was collected about the same group.

⁸ Totals add up to more than 20 because some responses fit into more than one category.

that they learned what can be seen by conducting the tests (6 of 30 cued participants) and how the technology works (6 of 30 cued participants) (Table 5). One participant summed up this learning when she said, “[I learned] how X-Rays work [and] what exactly they show - not just bones” (In-Depth Interview #12).

TABLE 5. Cued Participant Responses to the In-Depth Interview Question: “What, If Anything, Did You Learn from the Panels that You Didn’t Know Before?” (N=30)

	Number of Cued Participants ⁹	Quotes
The history of the imaging technology	11	"It started recently. Even though the technology is old, [they're] still making advances." (In-Depth Interview #20)
Specific facts about the different imaging technologies	7	"[PET is] based on glucose..." (In-Depth Interview #14)
What can be seen from the tests	6	"...what exactly they show - not just bones." (In-Depth Interview #12)
How the technology works	6	"...how CT takes slices [and makes them into] 3-D images" (In-Depth Interview #24)
Nothing	5	"Nothing." (In-Depth Interview #29)
A procedure that I didn't know of before	4	"[I] didn't know PET, [but I] do know all else." (In-Depth Interview #5)
The difference between the procedures	2	"[I learned] what a PET of an Alzheimer's patient [looks like] versus a plain MRI." (In-Depth Interview #7)
I already knew most of this information.	2	"Not much. [I] already knew some of it." (In-Depth Interview #1)
Saw what image is produced	2	"[I] had never seen a heart through an ultrasound." (In-Depth Interview #28)
Other	1	"...how is it safe" (In-Depth Interview #16)

The reason for the difference in learning reported on the exit interviews and in-depth interviews seems to be related to the methods used to collect the data. Visitors participating in the exit interviews were allowed to direct their own learning – going to as many panels as they wanted and choosing which panels they visited. This allowed visitors to learn about the differences between the medical imaging technologies as well as about new medical imaging technologies that they were not familiar with before. Cued participants, who took part in the in-depth interviews, were forced to visit a single panel that was chosen for them by the evaluator. Therefore, these visitors reported learning about the difference between the procedures and about a technology they were not familiar with to a lesser degree than those who took part in the exit interview. Instead, the learning that these participants reported related more strongly to particular sections of text found on each of the panels. These sections were the history of the technology, what the technology is good for, and how it works. These differences indicate that free choice learning visitors will gain more general

⁹ Totals add up to more than 30 because some responses fit into more than one category.

knowledge about the medical imaging technologies through the panels and that they are missing some of the content provided on the panel.

Evaluators were also interested in understanding what visitors learned from the patient stories. However, visitors did not mention learning from the patient stories when asked what they learned from the panels on the exit interview and in-depth interview. This may be because the wording of the question led visitors to answer only about content from the text labels or videos, because visitors expected that evaluators were interested in what factual information they learned, or because visitors did not feel they learned from the patient stories. However, when visitors were asked specific questions about the patient stories, they did report some learning.

Just over half of the visitors (12 of 20) who were given the exit interview listened to the patient stories. These visitors were asked a series of questions to understand what they learned from these stories. When visitors were asked what they recalled hearing from the patient stories, the most common responses were the steps of the procedure (7 of 12 interviewed visitors), the reason the patient had the procedure (6 of 12 interviewed visitors), and the diagnosis reached through the procedure (4 of 12 interviewed visitors) (Table 6). One visitor touched on all of these topics when she said, “[I recall hearing in the X-Ray story about a] young girl [who] broke her finger playing Frisbee. She had three x-rays and then three more. [They] used X-Ray [to set the broken finger]” (Exit Interview #38). These data indicate that visitors were gaining some information about the steps a patient has to go through and the diagnoses reached from the patient stories.

TABLE 6. Visitor Responses to the Exit Interview Question: “What Do You Recall Hearing about the Patients?” (N=12)

	Number of Interviewed Visitors¹⁰	Quotes
The steps of the procedure	7	"...stories helped you understand exactly what was going on" (Exit Interview #1)
The reason the patient had the procedure done	6	"[I remember hearing about an] ACL tear. [I] would have liked to have seen a normal person in comparison to stories." (Exit Interview #9)
The diagnosis reached through the procedure	4	"[I remember hearing] how x-rays helped to diagnose." (Exit Interview #19)
Other	2	"[I] don't remember. [I] listened to part about ultrasound" (Exit Interview #3)

To further understand visitor learning, visitors were also asked on the exit interview if they gained any new perspectives or insights through the patient stories. Most of the interviewed visitors said no (8 of 12 interviewed visitors) or that they did not pay enough attention to gain new insights (3 of 12 interviewed visitors). One interviewed visitor (of 12) said the patient stories would help her to better understand the X-Ray procedure if she had not had one

¹⁰ Totals add up to more than 12 because some responses fit into more than one category.

before (Table 7). These data indicate that visitors may not have felt that they learned much from the patient stories.

TABLE 7. Visitor Responses to the Exit Interview Question: “Did You Get Any New Perspectives or Insights from the Patient Stories?” (N=12)

	Number of Interviewed Visitors¹¹	Quotes
No	8	"No." (Exit Interview #57)
No because I didn't pay close enough attention.	3	"[I] didn't pay much attention." (Exit Interview #3)
Yes because it would help me better understand the procedure.	1	"I guess... if [I] hadn't gotten X-Rays before this would help me understand," (Exit Interview #1)

Almost all of the cued participants (24 of 30), who completed the in-depth interview, listened to the patient stories. These participants were asked directly, what they learned from the patient story. Many cued participants said that they learned nothing (6 of 24 cued participants), that they did not learn much (2 of 24 cued participants), or that they did not listen to the story long enough to learn from it (2 of 24 cued participants). However, other participants did say they learned. Most commonly, cued participants said that they learned about the steps of the procedure (5 of 24 cued participants) or what the experience of the procedure was like for the patient (5 of 24 cued participants) (Table 8). Some of these cued participants said the following:

“...[I learned you] have to do a lot of X-Rays.” (In-Depth Interview #13)

“[I learned it was] emotionally stressful for [the] patient (afraid of test), but the end result was good.” (In-Depth Interview #2)

¹¹ Totals add up to more than 12 because some responses fit into more than one category.

TABLE 8. Cued Participant Responses to the In-Depth Interview Question: “What, If Anything, Did You Learn from the Patient Story?” (N=24)

	Number of Cued Participants¹²	Quotes
Nothing	6	"Nothing" (In-Depth Interview #7)
The steps of the procedure	5	"[They] took three X-Rays before and after, which [I] thought was significant." (In-Depth Interview #16)
What the experience of the procedure was like for the patient	5	"[I learned that the] patient [was] not as nervous as expected going into tube." (In-Depth Interview #14)
Other	3	"[There] must be a lot of people who are fearful. The story had a lot of reassurance." (In-Depth Interview #20)
What the test shows	3	"[I learned] the PET can show things that other tests don't show." (In-Depth Interview #4)
I didn't learn much.	2	"[I] didn't learn much because trying to keep track of the kids." (In-Depth Interview #1)
I didn't listen to the story long enough.	2	"[I] didn't listen long enough." (In-Depth Interview #26)
The diagnosis reached through the procedure	1	"...[I learned] what it found..." (In-Depth Interview #18)
The reason the patient had the procedure done	1	"[It was] interesting that she had one at 18 months to check for a lump. [I] didn't know that was done" (In-Depth Interview #15)

The data from the exit interviews and in-depth interviews show that not all visitors felt that they learned from the patient stories if they listened to them. However, some visitors did indicate that the patient stories gave them a greater understanding of what a procedure is like and why it is given as well as the types of diagnoses that can be reached.

Data illustrate that visitors learned a variety of information through the “Five Windows on the Body.” Through the panels visitors learned more details about individual procedures, learned the differences between the procedures, and better understood the process that takes place when a patient has one of the five medical imaging procedures. Based on the content of the patient stories, it appears that little of this learning can be attributed to them. In addition, many visitors did not seem to attribute learning to the patient stories. Nevertheless, visitors did find the patient stories valuable for purposes other than learning.

1.3 Visitors often did not find the content on the panels personally relevant; however, some visitors found that the patient stories added this personal perspective to the panels.

On the exit interviews and in-depth interviews, visitors were asked a series of questions to understand what they valued about the “Five Windows on the Body.” These questions were asked because the goals and the messages for the exhibition cover not just what the team

¹² Totals add up to more than 24 because some responses fit into more than one category.

hopes visitors will learn but also how they feel about X-Ray, Ultrasound, CT Scan, MRI, and PET Scan after interacting with the “Five Windows on the Body.” These goals and messages include that visitors will feel that medical images can have an aesthetic appeal beyond the medical one, and that the patient stories will help people to understand that medical imaging may seem scary, but can be simple, straightforward and quick.

On both the exit interviews and the in-depth interviews, visitors were asked what they found personally relevant and meaningful about the panels, and in both cases, many people did not say that they found the panels personally relevant and meaningful (exit interviews: 13 of 20 interviewed visitors; in-depth interviews: 18 of 30 cued participants). However, on the exit interviews, a few visitors said that the panels were personally relevant and meaningful if they (3 of 20 interviewed visitors) or a loved one (2 of 20 interviewed visitors) had experienced one of the procedures (Table 9). One of these visitors said, “[It was relevant and meaningful because I have a] friend with [a] PET Scan, [and I] had an MRI on [my] spine ... [I was] looking for an image of that” (Exit Interview #9). On the in-depth interviews, a few cued participants (6 of 30) said that the panel was personally relevant or meaningful because of the content and information presented on the panel. One of these participants said, “[It was personally relevant and meaningful to me because of the] heart disease information and picture” (In-Depth Interview #23). Other cued participants agreed with the interviewed visitors that the panels were personally relevant and meaningful because they (2 of 30 cued participants) or a loved one (2 of 30 cued participants) had experienced the procedure (Table 10).

TABLE 9. Visitor Responses to the Exit Interview Question: “Was There Any Information on the Panels that You Found Personally Relevant and Meaningful?” (N=20)

	Number of Interviewed Visitors¹³	Quotes
No	11	"No: but liked the stories" (Exit Interview #57)
Yes: other	3	"[It] related to [my] internship. [There was] information [I] didn't know before" (Exit Interview #1)
Yes because I had experienced one of the procedures before.	3	"[I've] had a CT scan, so that was interesting." (Exit Interview #4)
Yes because a friend/family member had experienced one of the procedures before.	2	"[My] daughter had an X-Ray..." (Exit Interview #26)
No, but I or a friend/family member experienced one of the procedures.	2	"No: I had an MRI done and a CT scan" (Exit Interview #19)

¹³ Totals add up to more than 20 because some responses fit into more than one category.

TABLE 10. Cued Participant Responses to the In-Depth Interview Question: “Was There Any Information on the Panels That You Found Personally Relevant and Meaningful? What Information Was That?” (N=30)

	Number of Cued Participants ¹⁴	Quotes
No	14	"No: interesting, but not personally relevant." (In-Depth Interview #12)
Yes because of the information presented.	6	"Yes: [I'm] interested in kidney vasculature." (In-Depth Interview #13)
No because I've never had the procedure.	4	"No: [I] never had one before, but will know about them if do." (In-Depth Interview #30)
Yes: Other	2	"[It] helped with language to use with his patients." (In-Depth Interview #2)
Yes because I had experienced one of the procedures before.	2	"[I] had an X-Ray when pregnant and lead was used (safety); related to story because she had an X-Ray for an injury recently." (In-Depth Interview #16)
Yes because a friend/family member had experienced something related to the panel.	2	"[I] thought about friend's shoulder injury." (In-Depth Interview #20)

While many visitors did not seem to find the panels personally meaningful and relevant, they did find that the value of the patient stories were that they added that personal voice to the panels. On the exit interviews and in-depth interviews, the most common response given was that people found the patient stories valuable because they made the panels more personal (exit interviews: 3 of 12 interviewed visitors; in-depth interviews: 11 of 24 cued participants). Some of these visitors said the following:

“It makes it more personal.” (Exit Interview #38)

“[The patient story is] not just spitting facts. [It’s] speaking to you instead of at you.” (In-Depth Interview #18)

“It made it more real.” (In-Depth Interview #10)

Others felt that the patient stories added value to the panels because they helped them understand the panel better (exit interviews: 2 of 12 interviewed visitors; in-depth interviews: 2 of 24 cued participants). One of these visitors said, “...[I value the patient stories because I] understand process better” (Exit Interview #57). Additionally, on the in-depth interviews, some cued participants (3 of 24) said they valued the patient story because it gave a patient’s perspective (Table 12). One of these participants said, “[I valued the patient story because I] saw [an] actual person with terrible disease that could be treated” (In-Depth Interview #14). Only a few exit interview visitors (4 of 12) and no in-depth interview participants said they did not value the patient stories. Some of these interviewed visitors (3 of 12) said they did not value the patient stories, but that they could see how they could be of value to others.

¹⁴ Totals add up to more than 30 because some responses fit into more than one category.

Others (2 of 12 interviewed visitors) said they did not find value in the stories because they themselves work in a medical profession (Table 11). One person summed up these thoughts when she said, “[I did not find the patient stories valuable because I’m a] nurse, [but] the stories did help [my] granddaughter who did not have the same knowledge” (Exit Interview #19).

TABLE 11. Visitor Responses to the Exit Interview Question: “Do You Think the Patient Stories Added Value to Your Experience?” (N=12)

	Number of Interviewed Visitors¹⁵	Quotes
No, but might be valuable to others.	3	"No...might be helpful to a child who is afraid." (Exit Interview #9)
Yes because it made it more personal.	3	"Yes: gives voice: not just a doctor's description; not just medical" (Exit Interview #51)
Yes: Other	2	"Yes: it would if she were younger; [she would] learn more" (Exit Interview #62)
No because I work in the medical profession.	2	"No: because she is a nurse and hears it all the time..." (Exit Interview #4)
Yes, but I didn't hear everything.	2	"Yes: just going through quickly; didn't really listen" (Exit Interview #3)
Yes because it helped me understand things better.	2	"Yes...a lot of info helped piece together what stuff on the video was saying" (Exit Interview #1)

TABLE 12. Cued Participant Responses to the In-Depth Interview Question: “Overall, Do You Think Listening to the Patient Story Added Value to Your Experience?” (N=24)

	Number of Cued Participants¹⁶	Quotes
Yes because it made it more personal.	11	"It makes it a little more personal." (In-Depth Interview #4)
It was long.	4	"[I] just wanted to be done by that point." (In-Depth Interview #22)
Other	3	"[I] would like to have seen x-rays." (In-Depth Interview #13)
Yes because it gave a patient's perspective.	3	"[It] gives insight into what a patient is feeling." (In-Depth Interview #2)
Yes: Other	2	"[I've] had broken bones before." (In-Depth Interview #25)
I didn't hear everything.	2	"[I] did not listen to whole thing..." (In-Depth Interview #21)
Yes because it helped me understand things better.	2	"[It was] helpful to know how it works out..." (In-Depth Interview #16)
Yes: I liked it.	2	"It was great." (In-Depth Interview #1)

¹⁵ Totals add up to more than 12 because some responses fit into more than one category.

¹⁶ Totals add up to more than 24 because some responses fit into more than one category.

Visitors learned a great many facts from the panels about the different medical imaging technologies, but often they did not find the “Five Windows on the Body” personally relevant and meaningful. It seems that these panels only had personal meaning and relevance if the viewer or a loved one experienced the medical imaging procedure that the panel was about. However, many visitors found that the patient stories added that personal voice which may have otherwise been missing from their experience. This was not the message or goal that the team had planned for the patient stories. Nonetheless, the patient stories seem to have in some way added that personal connection to the content on the panels for visitors. This means that personal stories may be a valuable tool in future exhibits to connect people to technologies that they may not otherwise have a familiarity or association with.

2. “KID RADIOLOGY” FINDINGS

The three main findings about the “Kid Radiology” area are the following:

1. Children, who visit the “Kid Radiology” area, spend some of their time using the area without an adult.
2. Both children and adults feel that the “Kid Radiology” area is for everyone and not just kids.
3. Visitors to the “Kid Radiology” area report learning about X-Rays and what the insides of animals and other objects look like.

2.1 Children, who visit the “Kid Radiology” area, spend some of their time using the area without an adult.

In order to find out how the “Kid Radiology” exhibits are being used, groups containing children between the ages of 5 and 9 were timed and tracked using the area. Because of the difficulty of tracking every member in a group, one child in the target age range was chosen to be the focus subject tracked. Evaluators found that these 40 focus subjects spent, on average, just under two minutes in the “Kid Radiology” area (M=112.98 seconds, SD=100.44 seconds). Just about half this time was spent with an adult (M=63.26 seconds, SD=81.06 seconds), and half this time was spent without an adult (M=51.05 seconds, SD=77.02 seconds).¹⁷ Additionally, it was found that the focus subjects, on average, split their time at each individual exhibit between adult and non-adult interaction (Table 13). Overall, just under a quarter of the focus subjects (23%) never spent any time at the “Kid Radiology” area without an adult, 38% spent some of their time in the area with an adult and some time without an adult, and the other 38% of the focus subjects spent no time with an adult (Table 14).

¹⁷ The mean time spent with and without an adult is calculated using data from 39 groups because this information was not calculated correctly for one group.

TABLE 13. Mean Amount of Time “Kid Radiology” Tracked Visitors, Who Interacted with the Exhibit, Spent With and Without an Adult. (N=40)¹⁸

Exhibit	Number of Tracked Visitors ¹⁹	Time with an Adult		Time without an Adult	
		Mean (Seconds)	SD (Seconds)	Mean (Seconds)	SD (Seconds)
Animal X-Ray	30	36.87	47.33	16.57	17.19
Mystery X-Ray	21	29.81	29.37	13.90	16.01
Reading Table	3	5.67	9.82	169.67	233.04
Skeleton Puzzle	24	31.92	51.71	28.88	44.06

TABLE 14. Number and Percent of “Kid Radiology” Tracked Visitors Spending Time With an Adult, Without an Adult, and Spending Some Time Both With and Without an Adult. (N=39)

	Number of Tracked Visitors	Percent of Tracked Visitors
Spent no time with an adult	15	38%
Spent some time with and some time without an adult	15	38%
Spent no time without an adult	9	23%

Many adults agreed on their exit surveys that they spent some of their time in the “Kid Radiology” space without their children. Almost half of the surveyed adults (9 of 19) said that while their children used the activities in the “Kid Radiology” area, they used other activities. In addition, half of the surveyed adults (8 of 16) said that they would feel comfortable if they left their children at these activities so that they could use others. These adults said they would feel comfortable because they felt that they could still keep their eyes on their children in the area (5 of 19 surveyed adults) or because their children were engaged and learning (4 of 19 surveyed adults). One of these adults said, “[I was comfortable because it was] almost a small contained area, [and the kids] kept their attention in one area” (Exit Survey #A27). Surveyed adults who would feel uncomfortable leaving their children in the “Kid Radiology” area while they used other exhibits said that this was because they do not like leaving their child alone (3 of 19 surveyed adults), because of potential safety issues (2 of 19 surveyed adults), because they might lose track of their child (1 of 19 surveyed adults), or because their child was young (1 of 19 surveyed adults) (Table 15). Some of these adults said the following:

“I like to keep a close eye on the kids.” (Exit Survey #A46)

“My children are young.” (Exit Survey #A31)

¹⁸ The total number of tracked visitors equals 40 for all exhibits except the “Mystery X-Ray” (N=39) because the amount of time spent with and without an adult was not recorded correctly for one participant.

¹⁹ The number of tracked visitors does not equal the total number of tracked visitors for any individual exhibit because none of the exhibits were visited by all of the tracked visitors.

TABLE 15. Visitor Responses to the Adult Exit Survey Question: “Why Would You Feel Comfortable / Uncomfortable Visiting Other Activities While Your Child(ren) Stay in the ‘Kid Radiology’ Area?” (N=19)²⁰

	Number of Surveyed Adults ²¹	Quotes
I felt comfortable because I could keep track of the kids.	5	"The area is very open and it is easy to see the kids at the stations." (Exit Survey #A42)
N/A	4	--
I felt comfortable because my child was engaged and learning.	4	"I think that he was exploring and discovering by himself." (Exit Survey #A22)
I would feel uncomfortable because I don't like leaving my child alone.	3	"Just not comfortable with leaving him anywhere, away from me." (Exit Survey #A6)
I would feel uncomfortable because of safety issues.	2	"[I would feel uncomfortable because of] safety." (Exit Survey #A41)
I would feel uncomfortable because I might loose track of my child.	1	"[I would feel] uncomfortable, as I would get too involved and not be able to keep as good of track of my child." (Exit Survey #A37)
I would feel uncomfortable because my children are young.	1	"[I would feel uncomfortable because] my children are young." (Exit Survey #A31)

These data indicate that many children spend at least some of the time in the “Kid Radiology” area without an adult. This may have meant that the adult used another exhibit in the area, that they stood nearby but did not interact with the focus subject, or that they interacted with another child in the “Kid Radiology” area. Whatever the adults were doing, these data show that most of them were spending at least some of their time not interacting with their child. However, the adults were split as to whether they would feel comfortable using other exhibits while their child is in the “Kid Radiology” area. About half of the adults said they would feel comfortable using other exhibits while their child was in the “Kid Radiology” area and half did not. These data illustrate that the concept of kid’s areas that allow adult to interact with separate exhibits is viable. However, because of safety concerns as well as comfort, some parents will never leave their children in any area of the Museum so that they can use exhibits on their own.

2.2 Both children and adults feel that the “Kid Radiology” area is for everyone and not just kids.

In order to find out who was actually using the “Kid Radiology” area, information about all the groups who interacted with the exhibits over a two hour and 52 minute period were recorded. It was found that of these 111 groups, over half (59%) were composed of adults and kids, 25% were compose of adults only, and 15% were composed of kids only (Table

²⁰ Survey numbers were chosen based on the sequence in which timing and tracking, adult exit surveys, and child exit interviews were collected. When adult exit survey, child exit interview, and timing and tracking group numbers match then the data was collected about the same group.

²¹ Totals add up to more than 19 because some responses fit into more than one category.

16). It was also estimated that nearly two-thirds of the groups (63%) observed as a part of the usage study contained children between the ages of 5 and 8. These data indicate that though many groups contained children, most of these groups also include adults.

TABLE 16. Number and Percent of Different Group Types Observed Using the “Kid Radiology” Area During the Usage Study. (N=111)

Group Type	Number of Groups	Percent of Groups
Adults Only	28	25%
Kids Only	17	15%
Adults & Kids	66	59%

Adults and children were asked who they thought the “Kid Radiology” area was for on the adult exit surveys and child exit interviews. On the adult exit survey, nearly all the surveyed adults agreed that both they (18 of 19 surveyed adults) and their children (18 of 19 surveyed adults) enjoyed the “Kid Radiology” activities. Additionally, almost all the surveyed adults agreed that they activities were created for children (15 of 16 surveyed adults) and adults (16 of 18 surveyed adults) (Table 17). This indicates that adults felt that the “Kid Radiology” area is suitable for visitors both young and old.

TABLE 17. Number of Surveyed Adults who Agreed and Disagreed With Statements about who the “Kid Radiology” Area Was For on the Adult Exit Survey.

	Number of Surveyed Adults who Agreed or Strongly Agreed	Number of Surveyed Adults who Disagreed or Strongly Disagreed	Total Number of Surveyed Adults Answering the Question
I enjoyed using the activities.	18	1	19
My child(ren) enjoyed using the activities.	18	1	19
I feel the activities were created for children.	15	1	16
I feel the activities were created for adults.	16	2	18

On the child exit interview, the interviewed children were asked whether they thought the “Kid Radiology” area was for kids, adults, or families and why. Just over half the interviewed children (11 of 20) felt that kids would play with the “Kid Radiology” area, and just under half of the interviewed children (9 of 20) felt families would play with the activities. When the interviewed children were asked why they felt the activities were for kids, they said they felt this way because the area is for kids (2 of 20 interviewed children), the content is on a kid’s level (2 of 20 interviewed children), or the activities could help kids learn (2 of 20 interviewed children). Some of these children said the following:

“[I think the activities are for kids] because they are easy.” (Exit Interview #K23)

“[I think the activities are for kids] because it's kid stuff.” (Exit Interview #K31)

The interviewed children said they felt the “Kid Radiology” activities were for families because the activities were for anyone (7 of 20 interviewed children), adults could help kids with the activities (2 of 20 interviewed children), and both adults and kids could learn from the activities (2 of 20 interviewed children) (Table 18). Some of these children said the following:

“[The activities are for families because they’re] for any age range, [and] because you can do them all together.” (Exit Interview #K12)

“[The activities are for families] because the parents can help the kids.” (Exit Interview #K15)

TABLE 18. Visitor Responses to the Child Exit Interview Question: “Why Did You Think Kids or Families Would Play with These Activities?” (N=20)²²

	Number of Interviewed Children ²³	Quotes
Families would play with the activities because they are for anyone.	7	"Cause it doesn't have to be for just kids to put it together--families can put it together." (Exit Interview #K37)
Kids: Other	2	"Because they like to play stuff" (Exit Interview #K25)
Kids: No Answer Why	2	--
Kids would play with these activities because the area is for kids.	2	"This is where kids go." (Exit Interview #K41)
Kids would play with the activities because they would help them learn.	2	"So kids can learn and know what x-rays are." (Exit Interview #K13)
Kids would play with the activities because the content is on their level.	2	"I think adults should know that." (Exit Interview #K42)
Families would play with these activities because adults and kids could learn from them.	2	"Because it's good to have everyone enjoy this knowledge together." (Exit Interview #K16)
Families would play with the activities because adults can help the kids.	2	"Because children can do it and adults can help them." (Exit Interview #K19)

The data in this section indicate that visitors think that the “Kid Radiology” area is not just for kids. Not only do groups with children use the exhibits, but so do groups containing only adults. In addition, when asked, almost all the adults surveyed and many of the children

²² Survey numbers were chosen based on the sequence in which timing and tracking, adult exit surveys, and child exit interviews were collected. When adult exit survey, child exit interview, and timing and tracking group numbers match then the data was collected about the same group.

²³ Totals add up to more than 20 because some responses fit into more than one category.

interviewed, felt the “Kid Radiology” activities were appropriate not just for children but also for adults. These data indicate that although the “Kid Radiology” area was created for children—specifically those between the ages of 5 and 8, people of other ages also enjoyed the exhibits and felt that the content was appropriate for them.

2.3 Visitors to the “Kid Radiology” area report learning about X-Rays and what the insides of animals and other objects look like.

On the adult exit surveys and child exit interviews, visitors to the “Kid Radiology” area were asked what they learned from the exhibits. The most common response given by surveyed adults (6 of 19) on an open-ended question was that they learned about X-Rays. One of these adults said, “[We learned] how to look at an X-Ray” (Exit Survey #A15). Other surveyed adults (3 of 19) said they learned about what the insides of animals look like. One of these adults said, “I think the kids got a better understanding of the workings inside humans/ animals” (Exit Survey #A1). A few other surveyed adults did not seem to understand what exhibits were a part of the “Kid Radiology” area. Some of these adults said that they learned about a medical imaging technique other than X-Ray (3 of 19 surveyed adults) (Table 19).

TABLE 19. Visitor Responses to the Adult Exit Survey Question: “What Did You and Your Child(ren) Learn from the ‘Kid Radiology’ Activities That You Didn’t Know Before?” (N=19)

	Number of Surveyed Adults ²⁴	Quotes
We learned about X-Rays.	6	"...[We learned] that you can x-ray anything, even your lunch." (Exit Survey #A42)
N/A	5	--
We learned what it looks like inside animals.	3	"[We learned] what is inside the bodies of humans and animals." (Exit Survey #A47)
Other	3	"Interested in seeing the bones." (Exit Survey #A46)
We learned about medical imaging techniques besides x-ray.	3	"I learned about the science behind magnetic resonance imaging." (Exit Survey #A42)

On the child exit surveys, the children were asked whether they thought a “Kid Radiology” exhibit they visited was about “animals,” “X-Rays,” “medicine,” “people,” or “bones.” If they visited multiple exhibits, an interviewed child was asked to answer this question about two “Kid Radiology” exhibits. On the close ended question, most interviewed children felt that the “Animal X-Ray” (9 of 13 interviewed children) and “Mystery X-Ray” (8 of 13 interviewed children) were about “X-Rays.” Other children thought that the “Animal X-Ray” (5 of 13 interviewed children) and “Mystery X-Ray” (3 of 13 interviewed children) were about “animals.” Most of the interviewed children felt that the “Reading Table” (1 of 1

²⁴ Totals add up to more than 19 because some responses fit into more than one category.

interviewed children) and the “Skeleton Puzzle” (9 of 11 interviewed children) were about “bones” (Table 20).

TABLE 20. Visitor Responses to the Close-Ended Child Exit Interview Question: “What Do You Think This Activity Is About?” (N=20)

Exhibit	Number of Interviewed Children ²⁵	Number of Children Responding: ²⁶					
		"Animals"	"X-Rays"	"Medicine"	"People"	"Bones"	No Answer
Animal X-Ray	13	5	9	0	0	2	0
Mystery X-Ray	13	3	8	0	1	1	1
Reading Table	1	0	0	0	0	1	0
Skeleton Puzzle	11	0	2	0	1	9	1

Interviewed children gave similar responses as to why they felt their exhibit was about “X-Rays,” “bones,” or “animals.” When asked why they felt their chosen activity was about “X-Rays,” the most common response (9 of 20 interviewed children) was that the activity was about “X-Rays” because the activity contained and showed X-Rays. One of these children said, “[It’s about] X-Rays because it was X-Rays” (Exit Interview #K1). Another common response was that their activity was about “X-Rays” because it shows the insides of objects (5 of 20 interviewed children). One of these children said, “[It’s about X-Rays because it] showed different animals and how they look inside” (Exit Interview #K16). When asked why they felt their activity was about “bones,” the most common response (10 of 20 interviewed children) was that it was about “bones” because it shows a skeleton or bones. One of these children said, “[It’s about bones] cause it showed your bones and stuff” (Exit Interview #K37). Fewer interviewed children thought one of the activities was about “animals.” Many of these children thought their activity was about “animals” because it shows the insides of animals (7 of 20 interviewed children) (Table 21). One of these children said, “[It’s about animals] because it shows you how to see the body of the animals” (Exit Interview #K25).

²⁵ All 20 interviewed children were asked this question, but they only answered it about two of the “Kid Radiology” activities that they visited.

²⁶ The columns do not add up to the number of children interviewed about the exhibit because children were allowed to give up to two responses for each exhibit.

TABLE 21. Visitor Responses to the Child Exit Interview Question: “Why Do You Think the Activity Is About Animals, X-Rays, Medicine, People, or Bones?” (N=20)

	Number of Interviewed Children²⁷	Quotes
I think it's about bones because it shows a skeleton / bones.	10	"Shows bones inside the body." (Exit Interview #K15)
I think it's about X-Rays because it shows X-Rays.	9	"Because it shows X-Rays." (Exit Interview #K46)
I think it is about animals because it shows the insides of animals.	7	"Because one of them swallowed a rubber band." (Exit Interview #K41)
I think it is about X-Rays because it shows the insides of stuff.	5	"Cause it just shows things inside bodies and skins." (Exit Interview #K2)
I think it's about X-Rays, but I don't know why.	4	--
I think it's about the subject of the images.	4	"Toys: Some of them was toys. Some of them was things you need to do homework. Some were about the dark [the flashlight.]" (Exit Interview #K13)
Other	4	"Read the title and it said X-Rays." (Exit Interview #K1)
I think it's about X-Rays because it shows a skeleton / bones.	3	"Because they are showing bones." (Exit Interview #K31)
I think it's about bones, but I don't know why.	3	--
I think it's about animals, but I don't know why.	2	--
N/A	2	--
I think it's about bones because you put the bones together.	2	"Because it was putting bones together." (Exit Interview #K12)

These data indicate that many visitors to the “Kid Radiology” area understood that the exhibits in this area were about X-Rays. Many of the visitors also understood the message that “X-Rays allow you to see inside real objects.” Other visitors expressed that the exhibits were about bones or animals. However, many of the reasons they gave for why the exhibits were about these topics also indicate that they understand that the “Kid Radiology” exhibits allowed them to see the inside of objects. No interviewed or surveyed visitors expressed the other exhibit message that “X-Rays of objects can look different than real objects.” This may be because the questions that the adults and children were asked did not lead them to discuss that X-Rays look different than the objects they represent. It is also possible that it may be difficult for children in the target age range (5 – 8 years of age) to express this idea.

²⁷ Totals add up to more than 20 because interviewed children answered this question about two exhibits and some responses fit into more than one category.

IV. CONCLUSION

The purpose of this evaluation was to test the effectiveness of two exhibit design strategies: personal stories and separate exhibit areas for children. These design strategies were integral to two different parts of *Beyond the X-Ray*. The “Five Windows on the Body” contained personal stories, and the “Kid Radiology” exhibits were designed specifically so that the adults could interact with other exhibits while their young children used the area. These two strategies were chosen for study because it was felt that they may be used in future Museum of Science exhibitions, and that the Museum could benefit from learning more about them.

The data collected for this study indicate that there were many benefits to including personal stories as a part of the “Five Windows on the Body.” Comparing data collected about the panels in 2005 to data collected as a part of the current study, it was found that since the text on the panels was shortened, the graphics were modified, and the personal stories were added visitors are using the panels more thoroughly. They are not visiting more panels, but they are spending more time at the panels that they do visit. Data indicate that one of the reasons visitors spend more time at the panels now is the personal stories. Visitors, who listened to a personal story, spent significantly more time at the panels than visitors who did not listen to a personal story. Another benefit of the personal stories was the value that visitors found in them. Many visitors did not find the panels personally relevant and meaningful unless they or a loved one had experienced the medical imaging procedure. However, when asked about the personal stories, many visitors said that their value was the personal voice that they lent to the content. While this was not the intended message for the personal stories, it was still important because it meant that visitors had some view into what medical imaging procedures can be like for patients. These findings indicate that personal stories can be an effective tool to personally connect visitors to content that they may not be familiar with and to provide visitors with a different perspective besides a science, technology, or research point of view.

While this exhibit strategy was effective in many ways, it also had some drawbacks. Just over half of the tracked visitors used the personal stories that were a part of the “Five Windows on the Body,” and most visitors did not listen to more than one of the patient stories. Therefore, it cannot be expected that the personal stories will be attractive to all visitors. In addition, it appears that visitors have some fatigue when it comes to the personal stories and can only be expected to interact with one.

The data collected through this evaluation for the “Kid Radiology” area proved the viability of creating separate exhibit areas for children. Timing and tracking showed that many of the children spent at least some of their time in the “Kid Radiology” area without an adult. In addition, many adults agreed that they spent some of their time using other activities while their children used the area, and that they would feel comfortable using other exhibits while their children used this area. The “Kid Radiology” area was also effective for other reasons. A strength of the “Kid Radiology” area was that while many adults separated from children for a period of time, the adults and children still felt that the exhibits contained activities that are appropriate for visitors of any age. Furthermore, many adults were observed using the area even if they did not have a child with them, and many of the adults surveyed about the area agreed that they, and not just their children, enjoyed them. The “Kid Radiology” exhibits themselves were

effective at conveying many of its goals and messages. Both adults and children recognized that the focus of the “Kid Radiology” area was X-Ray, and understood that X-Rays allow you to see what the insides of objects look like.

Still, the data indicate that there were some ways in which this design strategy was ineffective. Many of the adults surveyed about the “Kid Radiology” area indicated that they would not feel comfortable leaving their children alone in the area because of safety issues or because they would not be able to keep track of their children. It is possible that if *Beyond the X-Ray* was located in an area that was more enclosed some parents may have felt more comfortable using other exhibits without their children. Still, other parents may never feel comfortable leaving their children alone in the Museum, especially if their children are 9 years old or younger. Therefore, it may be necessary to re-think who this strategy is effective for and how it should be implemented.

Overall, this study indicates that personal stories and separate exhibit areas for children are design strategies that can be effective exhibit design tools. Personal stories give a personal voice to an impersonal technology, and kid areas do allow adults to spend some time apart from their children. However, in order for these design strategies to be effectively implemented, exhibit teams also need to understand the limitations of these strategies. Personal stories will not be used by everyone no matter how they are presented, so they cannot be expected to be the sole tool for conveying important goals and messages. Also, separate areas for children may not be appropriate for young children because adults may not feel comfortable leaving their children no matter the circumstances.

REFERENCES

Bell, L. (2007). *The Museum's Thematic Approach to Technology Education in the Museum*. Boston, MA: Museum of Science.

Boyce, A., Chin, E., Coit, S., Higgins, M., & Kunz, E. (2005). *Beyond the X-Ray: Formative and remedial evaluations*. Boston, MA: Museum of Science.

Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage Publications, Inc.

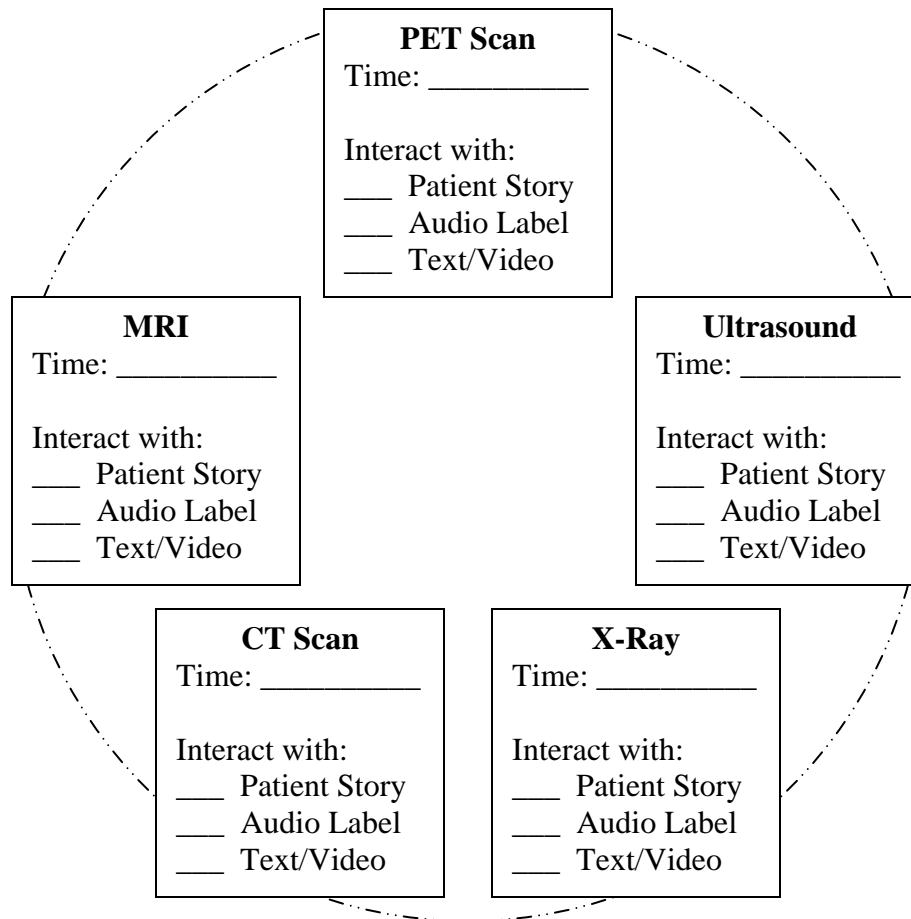
APPENDIX A: “FIVE WINDOWS ON THE BODY” TIMING AND TRACKING INSTRUMENT

Date: _____ **Time:** AM or PM **Data Collector:** _____ **Group #:** _____

Group Size: _____ **Focus Subject Gender:** Male or Female **Focus Subject Age:** _____

Group Type: Adults Only Adults and Kids Kids Only Other: _____

Total Time: _____



NOTES:

APPENDIX B: “FIVE WINDOWS ON THE BODY” EXIT INTERVIEW

Protocol: Interview any visitors, who appear to be at least 13 y.o., that interact with at least two of the panels or are in the exhibit for more than 1 minute. Approach people you are timing and tracking as they appear to be leaving the exhibition area and ask them if they would be willing to participate.

Before starting the interview, explain the purpose of the interview to the visitor:

- Hello, my name is [blank], and I work here at the Museum of Science. The Museum is looking for feedback from our visitors about our medical imaging exhibition, and I noticed you visited the panel(s) about (X and Y). Would you be willing to give some feedback about your experiences with these exhibits?
- The interview will take about 5 minutes. Feel free to skip questions if don't feel comfortable answering them and stop the interview at any time if you need to.

Interview questions:

1. What did you think about these panel(s)?
[Probe: What did you like about them? What did you dislike about them?]
2. What, if anything, did you learn from these panel(s) that you didn't know before?
3. Was there any information on the panel(s) that you found personally relevant and meaningful? Yes or No
(If yes) What information was that?
4. Did you listen to any of the patient stories on the panels? Yes or No
(If yes) What do you recall hearing about the patients?

(If yes) Overall, do you think listening to the patient stories added value to your experience? [Probe: (If yes) How? (If no) Why not?]

(If yes) Did you get any new perspectives or insights from the patient stories?

(If no) Why didn't you listen to the stories?
5. What could we change to make the panel(s) better?
6. Is there anything else you'd like to add?

Thank you for your help. Have a great day!

APPENDIX C: “FIVE WINDOWS ON THE BODY” IN-DEPTH INTERVIEW

Protocol: Approach groups as they near the “Five Windows on the Body” exhibit, and ask them if they would be willing to participate as a group.

Say to visitor:

- Hello, my name is [blank], and I work here at the Museum of Science. We are trying to get feedback on the medical imaging exhibition, and I was wondering if you would be willing to help me? I am asking groups of visitors if they would use the [CT Scan, X-Ray, Ultrasound, MRI, or PET Scan] panel while I observe them and then answer a few questions. You can stop at any time if you need to.
- Please use this [blank] panel as you normally would. As you use the exhibit think about what you like and dislike about it and if there’s anything you find confusing. Once you’re finished using the exhibit, I’ll ask you some questions about it.

Group #:	Date:	Time: AM or PM	# Males:	# Females:	Data Collector:
Group Type:	<input type="checkbox"/> Adults Only	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Adults and Kids	<input type="checkbox"/> Other:	
Panel used:	<input type="checkbox"/> X-Ray	<input type="checkbox"/> Ultrasound	<input type="checkbox"/> CT Scan	<input type="checkbox"/> MRI	<input type="checkbox"/> PET

Do the visitors interact with:

<input type="checkbox"/> What’s it good for?	<input type="checkbox"/> Video with caption	<u>Notes:</u>
<input type="checkbox"/> History of...	<input type="checkbox"/> Patient story	
<input type="checkbox"/> Advances in...	<input type="checkbox"/> Hearphone:	
<input type="checkbox"/> How does it work?	<input type="checkbox"/> Round button	
<input type="checkbox"/> How safe is it?	<input type="checkbox"/> Square button	

In-Depth Interview

1. Can you describe to me what you did at this panel? What did you read and not read?
2. What, if anything, did you like about the panel?
3. What, if anything, did you dislike about the panel?
4. What, if anything, did you learn from the panel that you didn’t know before?
5. Were there any moments when you felt confused or unsure about the content on the panels? When?

6. Was there any information on the panel that you found personally relevant and meaningful?
Yes or No
(If yes) What information was that?
7. I noticed that you (did or didn't) read the patient story. Can you tell me why you decided to listen (or not to listen) to it?
8. (If didn't listen to story) What did you think this story would be about?
9. (If listened to story) What, if anything, did you learn from the patient story?
10. (If listened to story) Overall, do you think listening to the patient story added value to your experience?
(If yes) How? (If no) Why not?
11. (If listened to story) Was there anything that you wanted to hear in the story but didn't?
What was that?
12. Is there anything else you like to add?

APPENDIX E: “KID RADIOLOGY” CHILD EXIT INTERVIEW

Protocol: Interview family groups that include a child in the 5-8 age range who interact with at least two of the exhibits in “Kid Radiology” or are in the exhibit for more than 1 minute. Approach people you are timing and tracking as they appear to be leaving your exhibition area and ask them if they would be willing to participate.

Before starting the interview, explain the purpose of the interview to the visitor:

- Hi, my name is [blank] and this is my colleague [blank], and we work at the Museum. The Museum is looking for feedback from our visitors about our medical imaging exhibition, and I noticed you and your child visited “Animal X-Rays,” “Mystery X-Rays,” the book table, and/or “Skeleton Puzzle,” and I would like to talk the two of you about these exhibits. Would you be willing to give some feedback about these exhibits?
- If it is alright with you, we will sit over here, and I will ask your child some questions while you fill out a survey. The interview will take about 5 minutes. You can skip questions if don’t feel comfortable answering them and stop the interview at any time if you need to.
- Hand the parent the survey and ask them to fill it out.
- Show the child a picture of one of the “Kid Radiology” exhibits that they just visited and take them through the questions about the exhibit.
- Then, ask them the same questions about other exhibits they visited.
- Finally, ask them about what exhibits they liked best.

Interview Questions

Exhibit #1: _____

1. What do you think about this activity? Good Okay Bad
2. Why do you think it was (good, okay, bad)?
3. What is this activity about? Animals X-Rays Medicine People Bones
4. Why do you think the activity is about (animals, X-Rays, medicine, people, bones)?
5. Do you think this activity is about anything else?

Exhibit #2: _____

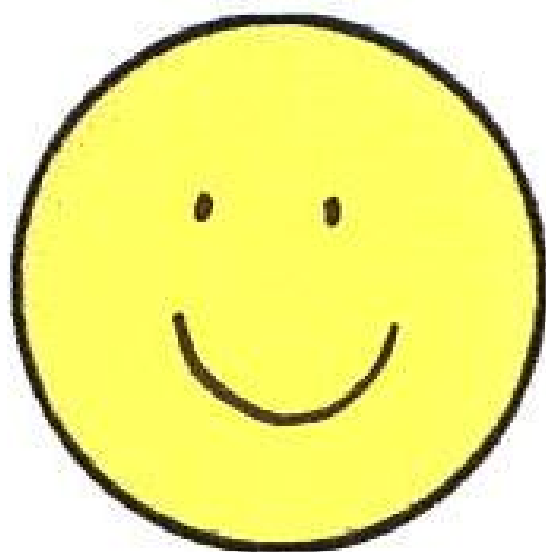
1. What do you think about this activity? Good Okay Bad
2. Why do you think it was (good, okay, bad)?
3. What is this activity about? Animals X-Rays Medicine People Bones

4. Why do you think the activity is about (animals, X-Rays, medicine, people, bones)?
5. Do you think this activity is about anything else?

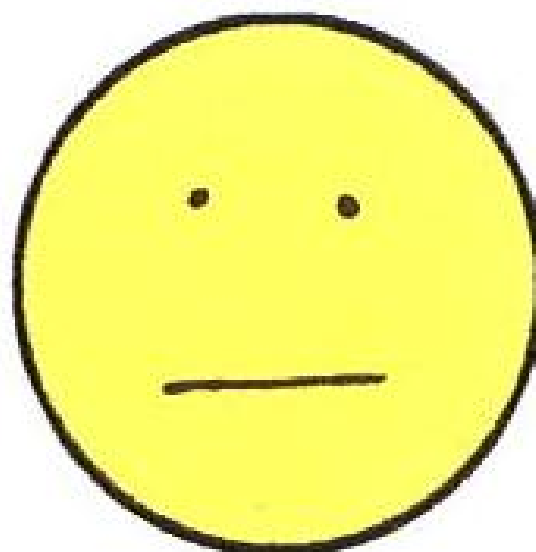
Overall Questions

1. Who do you think would play with these activities? Kids Families Adults
2. Why do you think they would play with the activities?
3. (Show them the pictures of the exhibits) Which one of these activities that you just talked to me about did you like best?
4. Why did you like it best?
5. Can you tell me what you did at that exhibit?

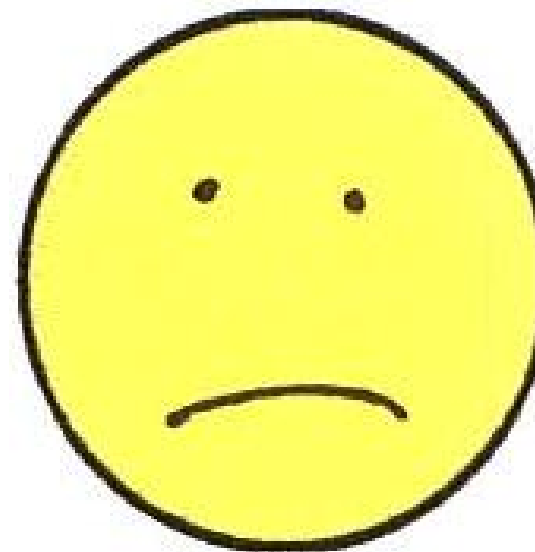
What do you think about this activity?



Good

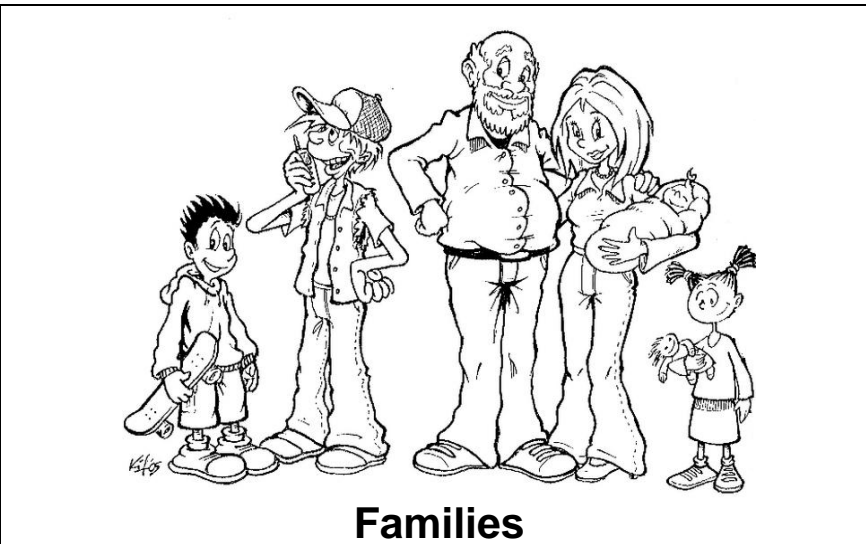
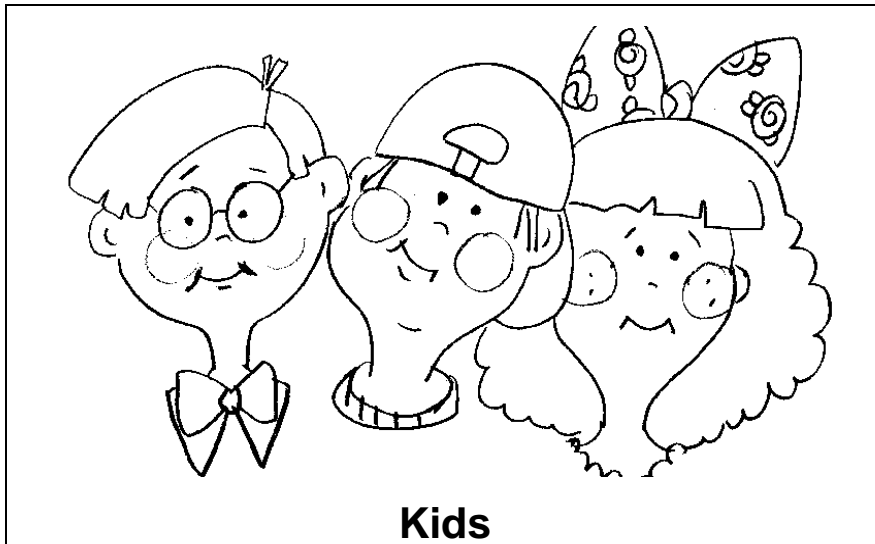


Okay

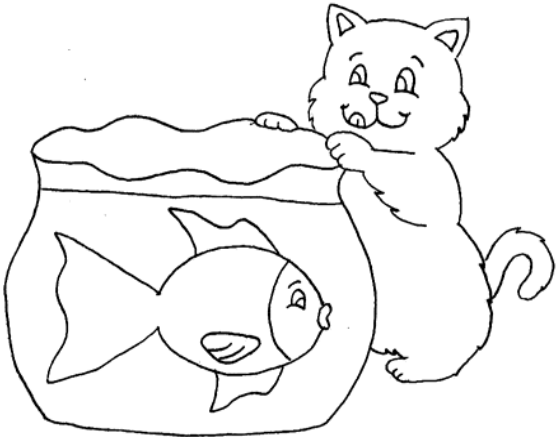
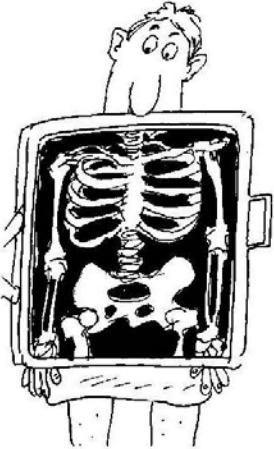


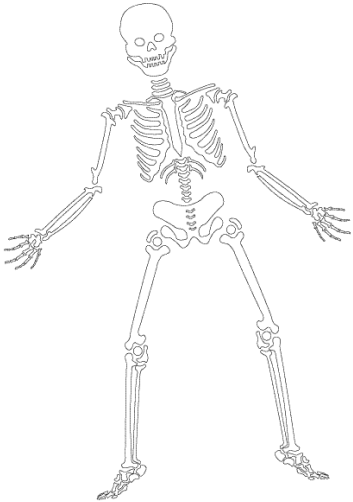


Bad

Who do you think would play with this activity?



What is the activity about?

 <p>Animals</p>	 <p>X-Rays</p>	 <p>Medicine</p>
 <p>People</p>		 <p>Bones</p>

APPENDIX F: “KID RADIOLOGY” ADULT EXIT SURVEY

Instructions: Please answer the following questions as completely as possible. Skip questions you are not comfortable answering and stop the interview at any time if you need to.

Please rate your agreement with the following statements about the “Kid Radiology” area:

	Strongly Disagree	Disagree	Agree	Strongly Agree
I enjoyed using the activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My child(ren) enjoyed using the activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel the activities were created for children.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel the activities were created for adults.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please check the answer that best describes how your group interacted with the “Kid Radiology” area:

The activities were used by:	<input type="checkbox"/> The adult(s)	<input type="checkbox"/> The kid(s)	<input type="checkbox"/> The adult(s) & the kid(s)
While the kid(s) used the activities, I:	<input type="checkbox"/> Used other activities	<input type="checkbox"/> Didn't use other activities	
If I left the kid(s) at these activities so I could use others, I would feel:	<input type="checkbox"/> Comfortable	<input type="checkbox"/> Uncomfortable	

Why would you feel comfortable / uncomfortable visiting other activities while your child(ren) stay in the “Kid Radiology” area?

What did you and your child(ren) learn from the “Kid Radiology” activities that you didn't know before?

What could we change to make the “Kid Radiology” activities better?

About your group...

Your Gender: Male Female **Your Age:** _____
Child #1 Gender: Male Female **Child #1 Age:** _____
Child #2 Gender: Male Female **Child #2 Age:** _____
Other Child(ren)'s Gender(s) and Age(s): _____

APPENDIX G: “KID RADIOLOGY” AREA USAGE COUNTS

Date: _____

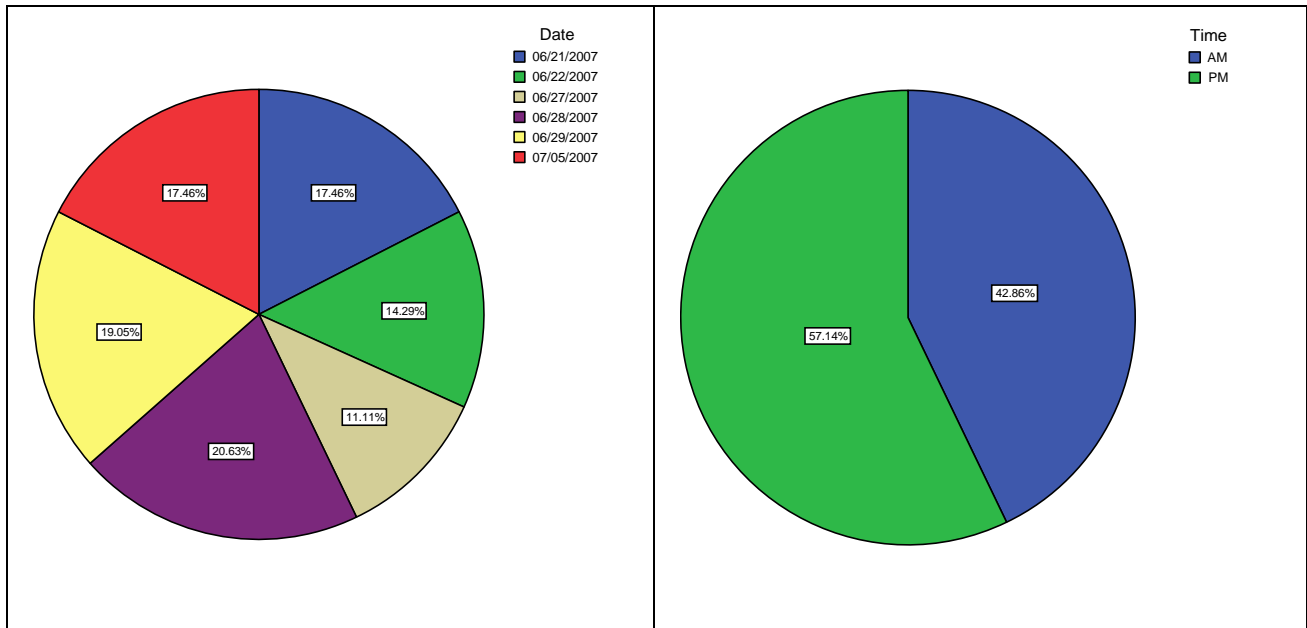
Time: AM PM

Data Collector: _____

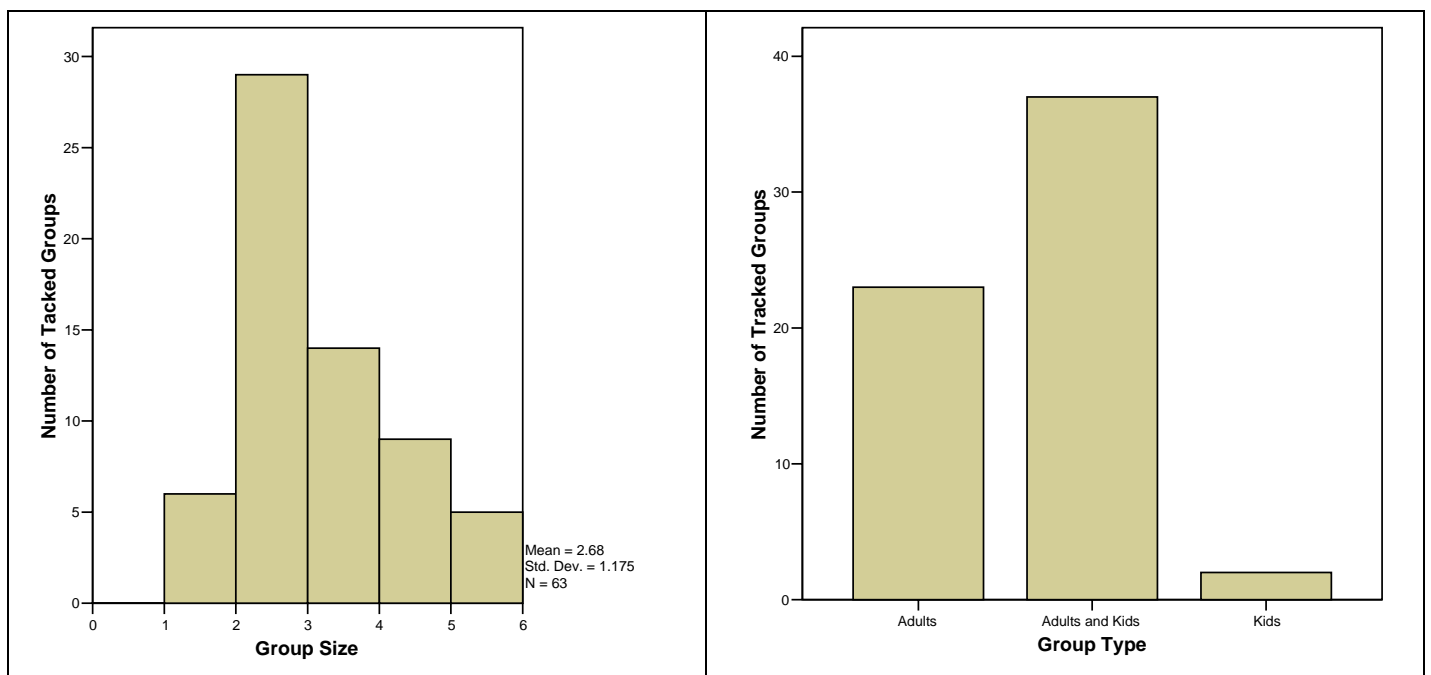
Group observed?		Kids between 5 and 8?		Group size	Group type			
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____
Yes	No	Yes	No		<input type="checkbox"/> Adults Only	<input type="checkbox"/> Adults & Kids	<input type="checkbox"/> Kids Only	<input type="checkbox"/> Other: _____

APPENDIX H: OTHER “FIVE WINDOWS ON THE BODY” TIMING AND TRACKING DATA

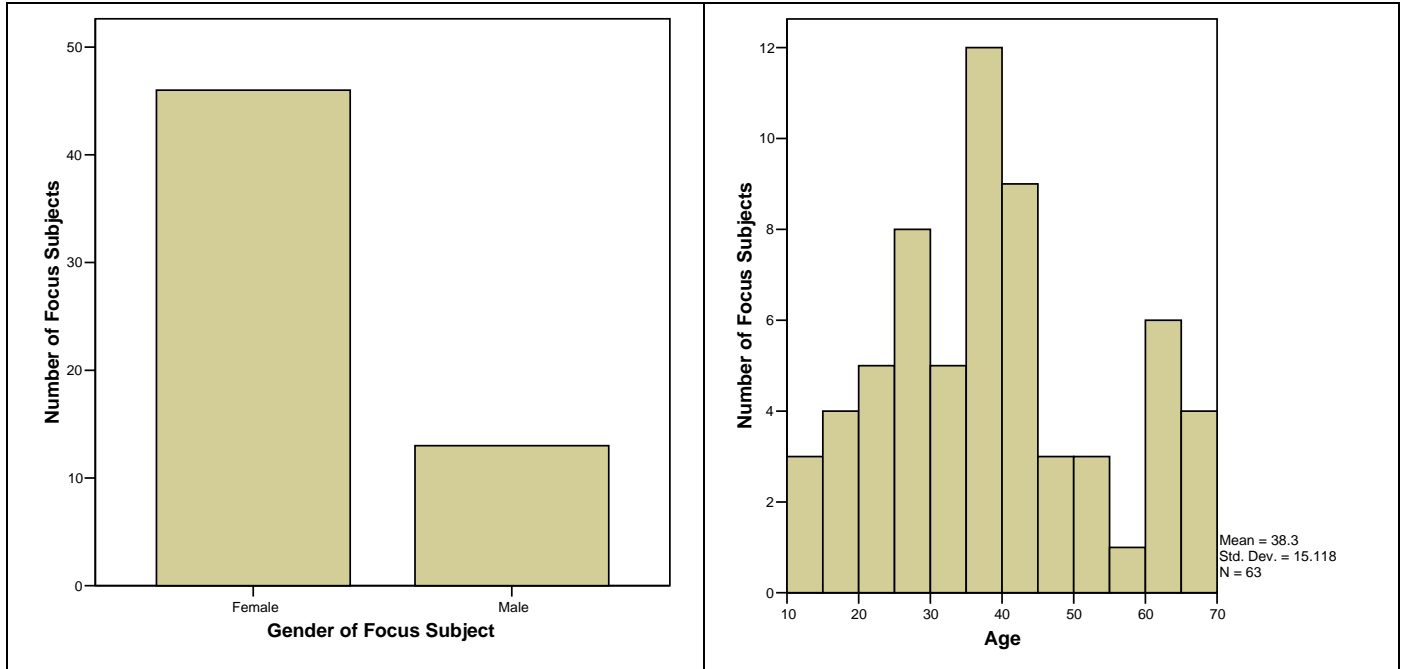
GRAPH H1 & H2. Dates and Times when “Five Windows on the Body” Timing and Tracking Data was Collected. (N=63)



GRAPHS H3 & H4. Group Size and Group Type of Those Timed and Tracked for the “Five Windows on the Body.” (N=63)



GRAPH H5 & H6. Genders and Ages of Focus Subjects Timed and Tracked for the “Five Windows on the Body.” (N=63)



Graph H7 & H8. Total Time and Number of Panels Visited by Focus Subjects at the “Five Windows on the Body”. (N=63)

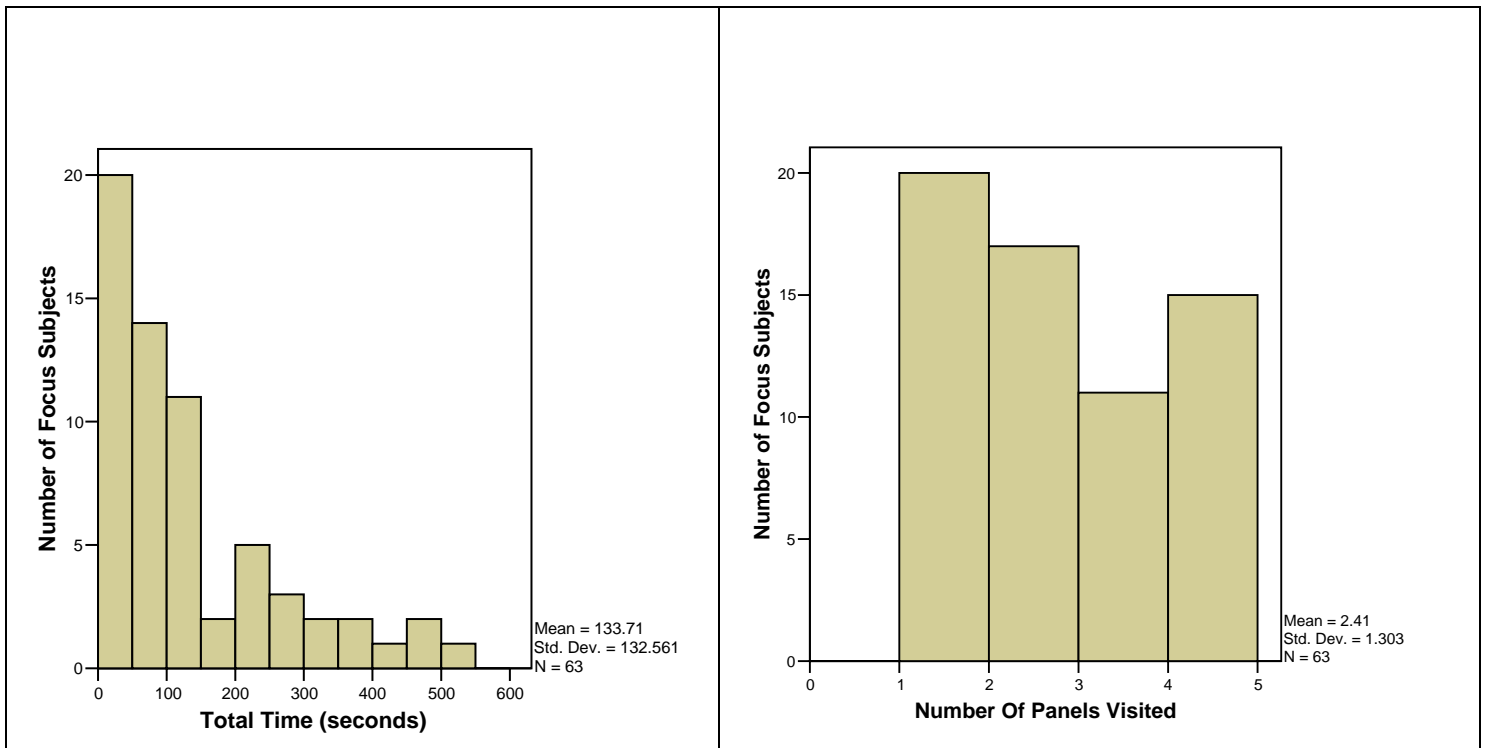


TABLE H1. Number of Focus Subjects Tracked at the “Five Windows on the Body” Who Used the Text/Video, Audio Label, or Patient Story. (N=63)

Number of Tracked Visitors who:	Panel				
	CT Scan	MRI	PET Scan	Ultrasound	X-Ray
Used the Text/Video	24	34	27	37	30
Used the Audio Label	1	2	2	3	7
Used the Patient Story	7	11	5	14	12

TABLE H2. Number of Patient Stories Used by Focus Subjects Tracked Using the “Five Windows on the Body.” (N=63)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0	28	44.4	44.4	44.4
1	26	41.3	41.3	85.7
2	6	9.5	9.5	95.2
3	2	3.2	3.2	98.4
5	1	1.6	1.6	100.0
Total	63	100.0	100.0	

TABLE H2. Number of Audio Labels Used by Focus Subjects Tracked Using the “Five Windows on the Body.” (N=63)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0	48	76.2	76.2	76.2
1	15	23.8	23.8	100.0
Total	63	100.0	100.0	

APPENDIX I: OTHER “FIVE WINDOWS ON THE BODY” EXIT INTERVIEW DATA

TABLE I1. Visitor Responses to the Exit Interview Question: “What Did You Think About These Panels?” (N=20)

	Number of Interviewed Visitors ²⁸	Quotes
I liked them because I learned from them.	8	"Really informative; didn't know the difference between [them] before; seemed [they were] all x-ray before" (Exit Interview #42)
I liked them because they were interesting.	5	"Really interesting. [What did you like?] It told you harmful side effects and explained what they do." (Exit Interview #9)
I liked them because they explained imaging to others.	4	"Good; gives kids information on inside of body..." (Exit Interview #47)
I didn't like them.	2	"Only looked at one; not good; should have showed pictures of story." (Exit Interview #62)
I liked them because they prepare you for imaging procedures.	2	"... it was good preparation." (Exit Interview #4)
I liked them because they were interactive.	2	"fun, interactive" (Exit Interview #34)
Other	1	"Enjoyed seeing them; didn't look for a long time; don't even know much about it." (Exit Interview #38)

TABLE I2. Visitor Responses to the Exit Interview Question: “Why Didn't You Listen to the Patient Stories?” (N=8)

	Number of Interviewed Visitors	Quotes
My time was limited.	4	"Running short on time." (Exit Interview #47)
I already hear these stories.	2	"He has his own stories!" (Exit Interview #26)
Other	2	"Didn't realize they were there." (Exit Interview #14)

²⁸ Totals add up to more than 20 because some responses fit into more than one category.

TABLE I3. Visitor Responses to the Exit Interview Question: “What Could We Change to Make the Panels Better?” (N=20)

	Number of Interviewed Visitors²⁹	Quotes
Nothing	5	"Can't think of anything; thought they were good." (Exit Interview #3)
I don't know.	4	"Don't know." (Exit Interview #1)
Change the content	4	"Too much information; should have information for all levels; make more user friendly; How seeing MRI with a magnet? not clear to lay person; [Who do the panels appeal to now?] Medical person--a student would love them." (Exit Interview #51)
Add images to the patient stories	2	"... images instead of words [patient story]." (Exit Interview #34)
Other	2	"Make [it] more interactive, quicker; it would take too long to listen to all [of them]." (Exit Interview #49)
Change the look of the panel	2	"Add more color; font doesn't pop." (Exit Interview #54)
Make the video/patient story easier to view	2	"...time the images [on the video] slower so it is easier to see the lesions in the images." (Exit Interview #26)

²⁹ Totals add up to more than 20 because some responses fit into more than one category.

APPENDIX J: OTHER “FIVE WINDOWS ON THE BODY” IN-DEPTH INTERVIEW DATA

TABLE J1. Cued Participant Responses to the In-Depth Interview Question: “Can You Describe to Me What You Did at this Panel?” (N=31)

	Number of Cued Participants ³⁰	Quotes
I read the text.	23	"[I] looked at various boxes with info." (In-Depth Interview #10)
I listened to the patient story.	11	"Listen to patient story..." (In-Depth Interview #16)
I looked at the pictures.	7	"...looked at some pictures of story" (In-Depth Interview #22)
I looked at the video.	5	"[I] saw normal patients vs. Alzheimer's patients; remarkable: didn't know can see Alzheimer's." (In-Depth Interview #7)
I listened to the audio (not sure which).	4	"[I] pushed the button and listened" (In-Depth Interview #1)
I listened to the audio label and patient story.	3	"Audio description mostly; patient story" (In-Depth Interview #3)
Other	3	"[I] looked for new things..." (In-Depth Interview #13)
I listened to the audio label.	2	"[I] picked up cone." (In-Depth Interview #4)

³⁰ Totals add up to more than 31 because some responses fit into more than one category.

TABLE J2. Cued Participant Responses to the In-Depth Interview Question: “What, If Anything, Did You Like About This Panel?” (N=31)

	Number of Cued Participants³¹	Quotes
I liked the video.	10	"Video - catches one's eye." (In-Depth Interview #10)
I liked the panel because it was informative.	7	"Explain things; didn't know what PET was but heard of it before." (In-Depth Interview #4)
I liked the design of the panel.	7	"Balance of stable and moving portions [of panel]." (In-Depth Interview #13)
I liked the patient story.	7	"Story was accessible, natural; good that text was on the screen [easier to follow along]." (In-Depth Interview #20)
I liked the pictures.	4	"Actual ultrasound pictures." (In-Depth Interview #28)
I liked a specific text section.	4	"...'How Safe is it?'" (In-Depth Interview #9)
Other	3	"Personable; should give more detail." (In-Depth Interview #3)
I think something about the panel should be changed.	3	"...Audio text would have been cool if longer." (In-Depth Interview #15)
I liked the panel because it was interesting.	2	"Interesting..." (In-Depth Interview #24)
I liked the level of information provided.	2	"...simple without being simplistic." (In-Depth Interview #11)
I didn't like anything about the panel.	1	"Nothing" (In-Depth Interview #1)
I liked everything about the panel.	1	"...everything..." (In-Depth Interview #31)

³¹ Totals add up to more than 31 because some responses fit into more than one category.

TABLE J3. Cued Participant Responses to the In-Depth Interview Question: “What, If Anything, Did You Dislike About the Panel?” (N=31)

	Number of Cued Participants ³²	Quotes
There was nothing I disliked.	8	"Nothing" (In-Depth Interview #17)
I thought the patient story was too long.	5	"Patient story was too long (didn't finish)." (In-Depth Interview #9)
I think some of the information on the panel should be changed.	5	"Not enough info [on] how it works and what it does to the body." (In-Depth Interview #3)
I would like some of the pictures changed.	4	"[Have] more realistic pictures, magnified, pictures of equipment" (In-Depth Interview #8)
The video should be changed.	4	"... maybe video can be larger but it's not a problem." (In-Depth Interview #19)
I had problems with the headphone or audio.	4	"Pushed auditory but no sound; should have picked up cone." (In-Depth Interview #7)
I thought the panel was too long.	2	"...lengthy and wordy" (In-Depth Interview #18)
I think the design of the panel should be changed.	2	"Would be more fun if more interactive" (In-Depth Interview #26)
Other	1	"I don't want to be radiated; pretty neutral on it [said after both questions asked]" (In-Depth Interview #1)

TABLE J4. Cued Participant Responses to the In-Depth Interview Question: “Were There Any Moments When You Felt Confused or Unsure About the Content on the Panels?” (N=31)

	Number of Cued Participants ³³	Quotes
I was never confused or unsure about the content.	25	"[It was] pretty straight forward; I could look at the panel if I needed help." (In-Depth Interview #1)
I didn't understand some of the information on the panel.	4	"'How does it work?' can't do justice to it too short; want more information on differences in density and how works..." (In-Depth Interview #11)
I didn't understand how to use the panel.	2	"[I] didn't know where to start (so much)." (In-Depth Interview #5)

³² Totals add up to more than 31 because some responses fit into more than one category.

³³ Totals add up to more than 31 because some responses fit into more than one category.

TABLE J5. Cued Participant Responses to the In-Depth Interview Question: “Why Did You Decide to Listen (or Not Listen) to the Patient Story?” (N=30)

	Number of Cued Participants ³⁴	Quotes
I listened because I was curious about what the patient story was about.	5	"[I was] curious to see what it is." (In-Depth Interview #24)
I listened to the patient story because I was asked to.	2	"[I listened] cause you asked me to push the buttons." (In-Depth Interview #1)
I listened: Other	2	"...[I thought it] might give more information than panel, which didn't have enough." (In-Depth Interview #8)
I listened because I wanted more information about the video content.	5	"[I] first thought [it] would be about Alzheimer's because of the video which is what prompted her to listen." (In-Depth Interview #14)
I listened to the patient story because it was a part of the panel.	4	"[I] figured it was a significant part of the panel." (In-Depth Interview #16)
I listened because it gave the story of a real person.	6	"[I listened because] it made it more personal; factual for a human being." (In-Depth Interview #29)
I listened because the patient story was interactive.	3	"I like to push buttons." (In-Depth Interview #26)
I didn't listen because I didn't want to take the time.	4	"[I didn't listen because it] would take time that [I] didn't want to take." (In-Depth Interview #13)
I didn't listen because I work in medicine and already hear these stories.	2	"[I didn't listen] because [I] have had thousands of patients who have had CTs." (In-Depth Interview #23)
I didn't listen: Other	1	"[I didn't listen because] usually you can't hear..." (In-Depth Interview #30)

TABLE J6. Cued Participant Responses to the In-Depth Interview Question: “What Did You Think the Patient Story Would Be About?” (N=6)

	Number of Cued Participants ³⁵	Quotes
I thought it would be a personal experience with the technology.	5	"[I thought it would be] someone who needed an x-ray and had a positive outcome from." (In-Depth Interview #12)
I have no idea.	1	"[I have] no idea." (In-Depth Interview #13)

³⁴ Totals add up to more than 30 because some responses fit into more than one category.

³⁵ Totals add up to more than 6 because some responses fit into more than one category.

TABLE J7. Cued Participant Responses to the In-Depth Interview Question: “Was There Anything That You Wanted to Hear in the Story But Didn't?” (N=24)

	Number of Cued Participants ³⁶	Quotes
No	14	"No" (In-Depth Interview #31)
I'd like to know the conclusion to the story.	3	"[I] didn't see what happened to person but maybe conclusion hasn't happened yet; didn't finish whole [thing] guy was in treatment." (In-Depth Interview #6)
I would like video/pictures added to the story.	3	"Not hear, but want to see something... see CT scans." (In-Depth Interview #18)
The story was long.	2	"It seemed long." (In-Depth Interview #13)
I would like other information about the procedure.	2	"[I would like] info on using it to take measurements for health, e.g. limb lengths and head circumference." (In-Depth Interview #15)
I would rather have heard more information about the video.	1	"[I would] rather hear about Alzheimer's." (In-Depth Interview #7)

TABLE J8. Cued Participant Responses to the In-Depth Interview Question: “Is There Anything Else You'd Like to Add?” (N=30)

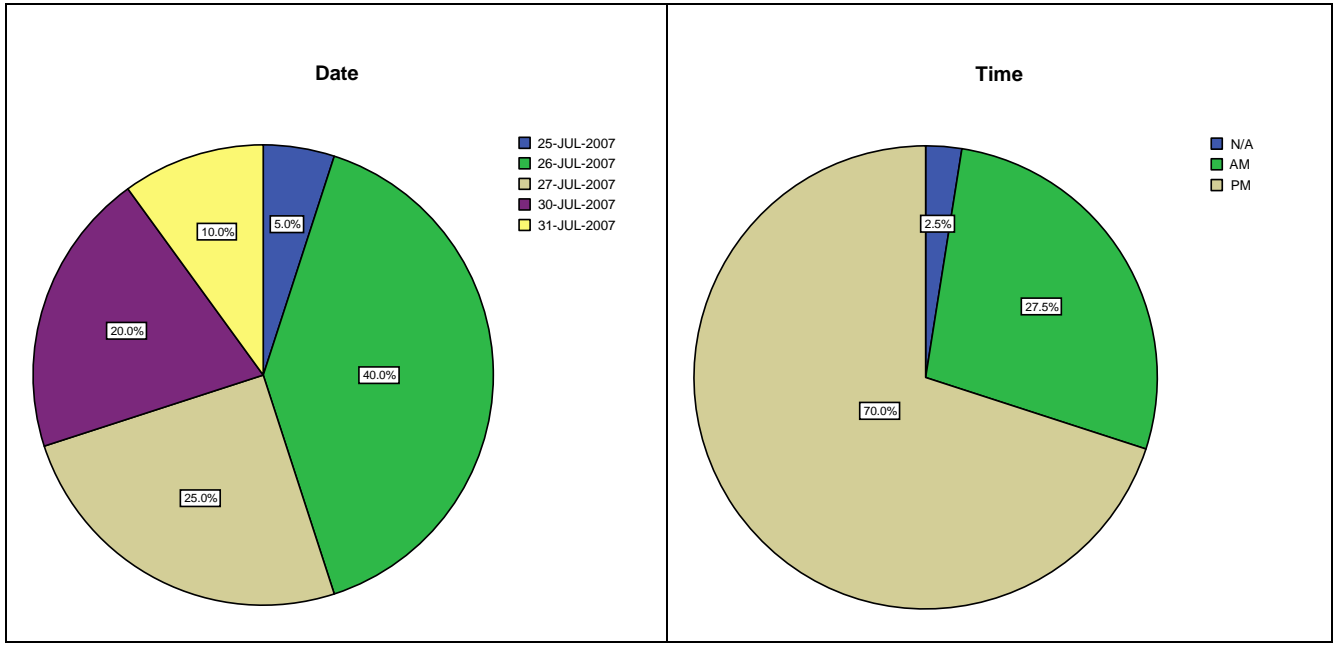
	Number of Cued Participants ³⁷	Quotes
No	14	"No" (In-Depth Interview #17)
No answer	12	--
The panel was good.	3	"Panel just technical enough so it could be understood." (In-Depth Interview #14)
I think you should change the panel.	2	"Size is nice, what's it good for should be more on eye level, and history section higher. Circle layout is good." (In-Depth Interview #19)

³⁶ Totals add up to more than 24 because some responses fit into more than one category.

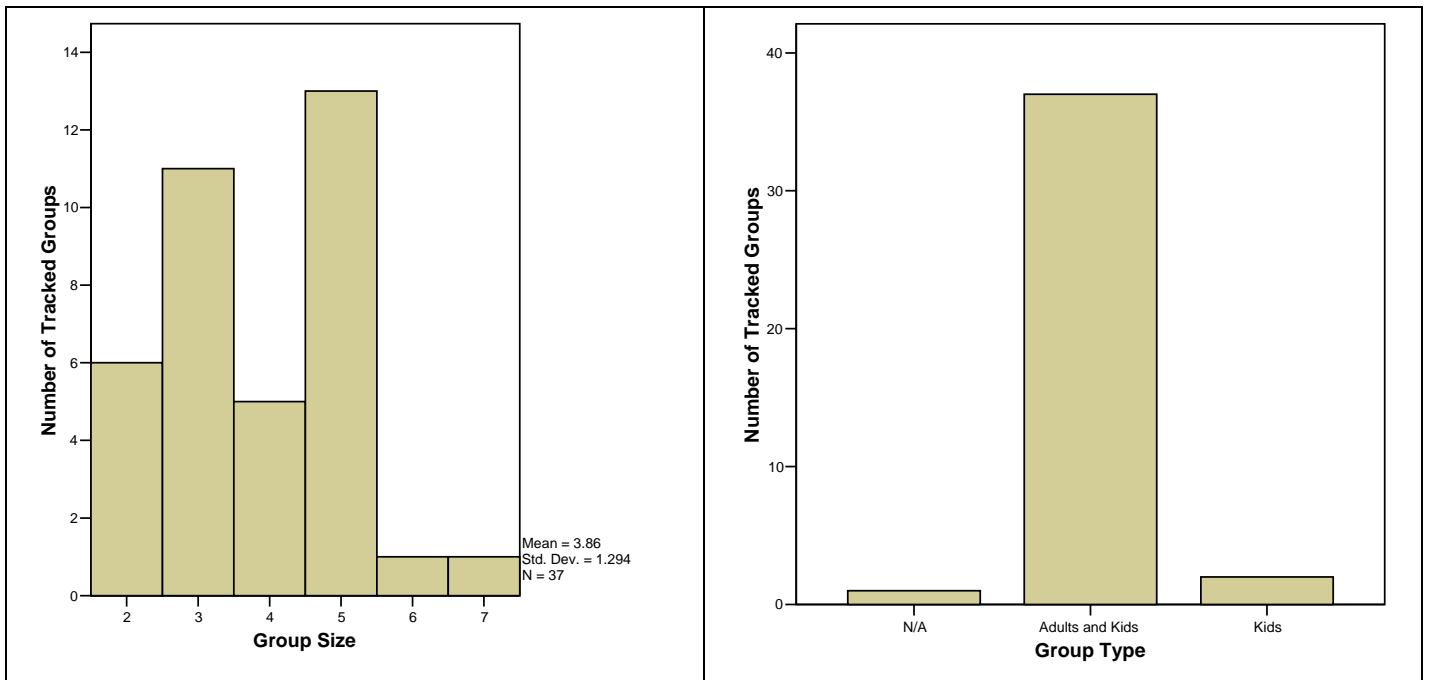
³⁷ Totals add up to more than 30 because some responses fit into more than one category.

APPENDIX K: OTHER “KID RADIOLOGY” TIMING AND TRACKING DATA

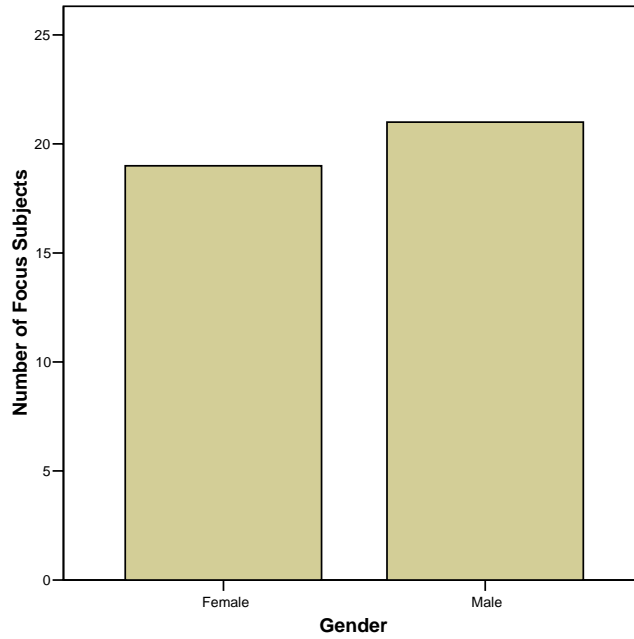
GRAPH K1 & K2. Dates and Times when “Kid Radiology” Timing and Tracking Data was Collected. (N=40)



GRAPHS K3 & K4. Group Size (N=37) and Group Type (N=40) of Those Timed and Tracked for “Kid Radiology.”



GRAPH K5. Genders of Focus Subjects Timed & Tracked for “Kid Radiology.” (N=40)



Graph K6 & K7. Total Time and Number of Exhibits Visited by Focus Subjects at “Kid Radiology.” (N=40)

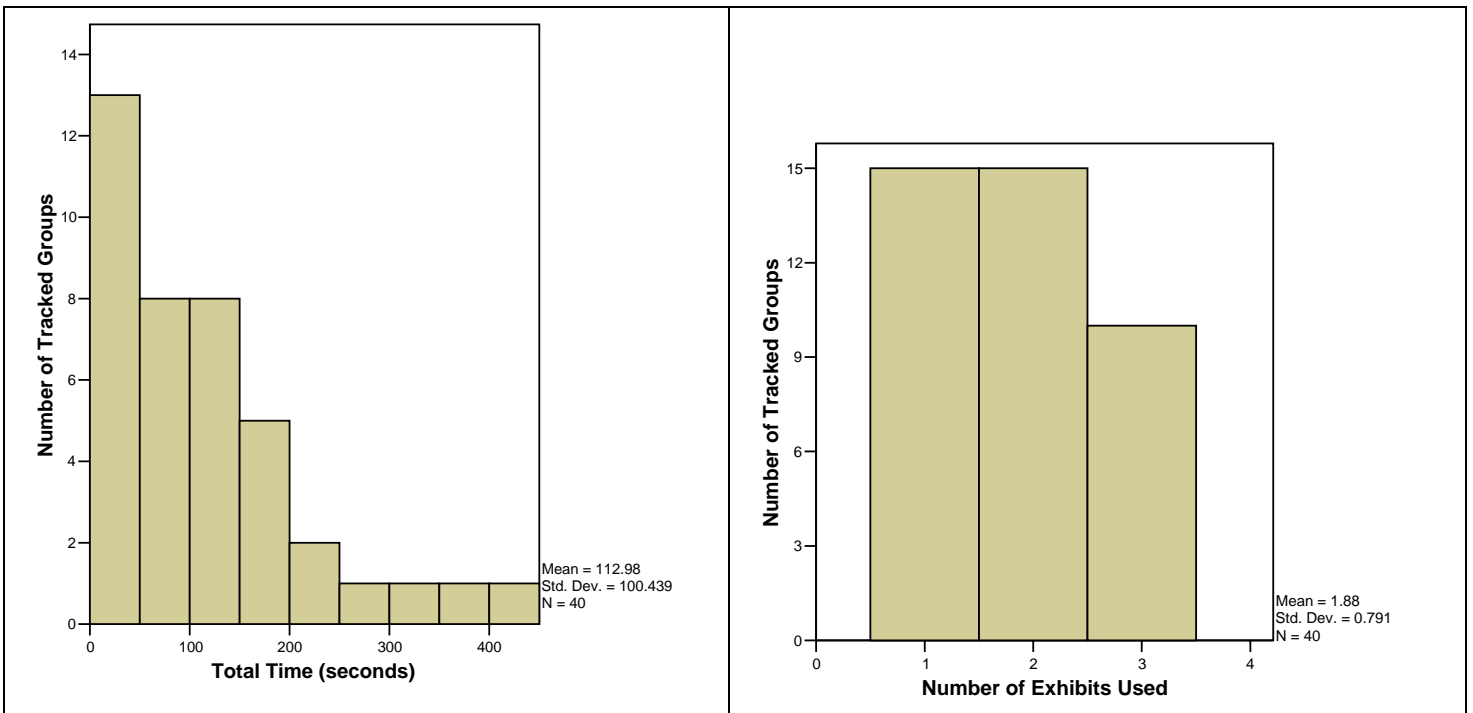


TABLE K1. Mean Amount of Time “Kid Radiology” Tracked Visitors, Who Interacted with the Exhibit, Spent at Each Exhibit. (N=40)³⁸

Exhibit	Number of Tracked Visitors ³⁹	Mean (Seconds)	SD (Seconds)
Animal X-Ray	30	53.43	44.62
Mystery X-Ray	21	44.33	22.80
Reading Table	3	175.33	228.96
Skeleton Puzzle	24	60.79	65.46

TABLE K2. Number of Focus Subjects Using the “Kid Radiology” Exhibits and Discussing Them with Members of Their Group. (N=40)

Exhibit	Use	Discuss
Animal X-Ray	30	20
Mystery X-Ray	22	14
Skeleton Puzzle	24	13

TABLE K3. Number of “Mystery X-Ray” Doors Lifted by the Timed and Tracked Focus Subjects. (N=22)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0	4	18.2	18.2	18.2
2	1	4.5	4.5	22.7
3	2	9.1	9.1	31.8
4	7	31.8	31.8	63.6
5	8	36.4	36.4	100.0
Total	22	100.0	100.0	

³⁸ The total number of tracked visitors equals 40 for all exhibits except the “Mystery X-Ray” (N=39) because the amount of time spent with and without an adult was not recorded accurately for one participant.

³⁹ The number of tracked visitors does not equal the total number of tracked visitors for any individual exhibit because none of the exhibits were visited by all of the tracked visitors.

APPENDIX L: OTHER “KID RADIOLOGY” ADULT EXIT SURVEY DATA

TABLE L1. Gender of the Adults Who Filled out the “Kid Radiology” Exit Survey. (N=19)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	1	5.3	5.3	5.3
	Female	14	73.7	73.7	78.9
	Male	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

TABLE L2. Visitor Responses to the Close-Ended Adult Exit Survey Question: “The Activities Were Used By: The Adult(s), The Kid(s), or The Adult(s) & The Kid(s).” (N=19)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	The Kids	2	10.5	10.5	10.5
	The Adults & The Kids	17	89.5	89.5	100.0
	Total	19	100.0	100.0	

TABLE L3. Visitor Responses to the Adult Exit Survey Question: “What Could We Change to Make the ‘Kid Radiology’ Activities Better?” (N=19)

	Number of Surveyed Adults ⁴⁰	Quotes
N/A	7	--
Nothing	4	"Nothing I would say." (Exit Survey #A22)
Make the area larger	2	"[I would like] a bigger section-- the kids enjoyed it." (Exit Survey #A31)
Change the audio or text labels.	2	"[Have] audio [available] in different languages." (Exit Survey #A8)
Add different content.	2	"[Add] X-Rays of the human body." (Exit Survey #A2)
Make the area more hands-on.	2	"[Make it] more hands on." (Exit Survey #A46)

⁴⁰ Totals add up to more than 19 because some responses fit into more than one category.

APPENDIX M: OTHER “KID RADIOLOGY” CHILD EXIT INTERVIEW DATA

GRAPHS M1 & M2. Genders of the Children Interviewed for the “Kid Radiology” Child Exit Interview. (N=20)

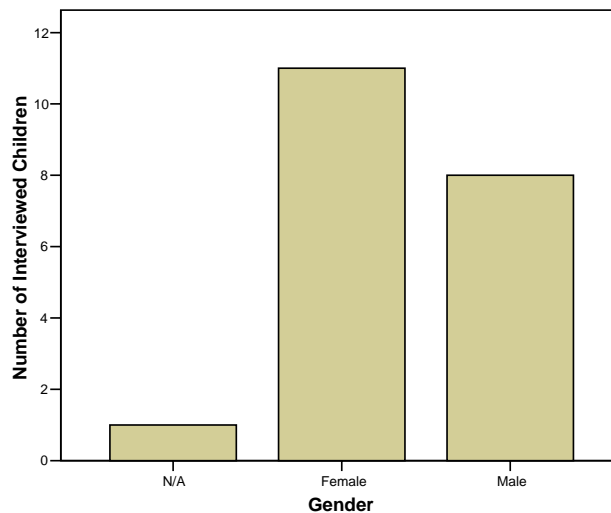


TABLE M1. Visitor Responses to the Close-Ended Child Exit Interview Question: “What Do You Think About This Activity?” (N=20)

Exhibit	Number of Interviewed Children ⁴¹	Number of Children Responding:		
		"Good"	"Okay"	"Bad"
Animal X-Ray	13	11	2	0
Mystery X-Ray	13	8	5	0
Reading Table	1	1	0	0
Skeleton Puzzle	11	8	3	0

⁴¹ All 20 interviewed children were asked this question, but they only answered it about two of the “Kid Radiology” activities that they visited.

TABLE M2. Visitor Responses to the Child Exit Interview Question: “Why Do You Think the Exhibit Was Good, Okay, or Bad?” (N=20)

	Number of Interviewed Children⁴²	Quotes
I thought it was good because I liked to see the inside of things / animals.	13	"It was fun to see inside animals." (Exit Interview #K47)
I thought it was good/okay, but I don't know why.	5	"Because, you know..." (Exit Interview #K22)
I thought it was good because I like the activity.	5	"Guessing the pictures was fun." (Exit Interview #K12)
I thought it was okay because it was too easy.	4	"It was a little obvious. [I] knew what it was." (Exit Interview #K15)
I thought it was okay: Other	3	"It was a little magnet." (Exit Interview #K6)
I thought it was good because I could do it.	3	"...because he knew animals on the X-Rays." (Exit Interview #K23)
I thought it was good because I like the subject (animals, people).	2	"Because you...it in you." (Exit Interview #K22)
I thought it was good because I make it more challenging.	2	"Because it was on X-Rays of animals." (Exit Interview #K42)
N/A	2	--
I thought it was good because: Other	1	"[I could] guess what it was--lunch box." (Exit Interview #K1)

TABLE M3. Visitor Responses to the Child Exit Interview Question: “Which One of These Activities That You Just Talked to Me About Did You Like Best?” (N=18)⁴³

Exhibit	Number of Children Interviewed About the Activity⁴⁴	Number of Children Picking the Activity⁴⁵
Animal X-Ray	13	8
Mystery X-Ray	13	5
Reading Table	1	1
Skeleton Puzzle	11	5
Other Exhibit	--	1

⁴² Totals add up to more than 20 because interviewed children answered this question about two exhibits and some responses fit into more than one category.

⁴³ Only 18 of the 20 interviewed children answered this question because two of them did not visit two or more exhibits.

⁴⁴ Totals add up to more than 18 because children were interviewed about two of the “Kid Radiology” exhibits.

⁴⁵ Totals add up to more than 18 because some interviewed children picked more than one activity as their favorite.

TABLE M4. Visitor Responses to the Child Exit Interview Question: “Why Did You Like ‘Animal X-Rays,’ ‘Mystery X-Rays,’ ‘Skeleton Puzzle,’ or the ‘Reading Table’ Best?” (N=18)⁴⁶

	Number of Interviewed Children⁴⁷	Quotes
N/A	6	--
I liked the exhibit best because I liked looking at the image.	4	"[I] like looking at the bodies." (Exit Interview #K1)
I liked the exhibit best because I liked doing the activity.	4	"Because I thought it was fun." (Exit Interview #K12)
I liked the exhibit best because I learned from it.	3	"They tell you something." (Exit Interview #K13)
I liked the exhibit best because it was about animals.	2	"Because you can see animal bodies." (Exit Interview #K25)
Other	2	"It was talking about a girl with a broken bone." (Exit Interview #K27)

⁴⁶ Only 18 of the 20 interviewed children answered this question because two of them did not visit two or more exhibits.

⁴⁷ Totals add up to more than 18 because some responses fit into more than one category.

APPENDIX N: OTHER “KID RADIOLOGY” EXHIBIT USAGE DATA

GRAPH N1. Size of Groups Observed Using the “Kid Radiology” Area During the Usage Study. (N=111)

