

**A STUDY OF VISITORS TO  
GENOME: THE SECRET OF HOW LIFE WORKS**

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Smithsonian Institution

Office of Policy and Analysis  
Washington, DC 20560-0405

**Office of Policy and Analysis  
Study Team**

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## FOREWORD

This study of **Genome: The Secret of How Life Works** focuses on visitors' perceptions of the exhibition. It draws attention to interactive aspects of the exhibition as well as to underlying conceptual dimensions: basic genome science and applied genome science. To produce information on the success of the exhibition, it captures responses to key factors in the exhibit, such as visitor satisfaction with respect to interactive activities and visitor satisfaction concerning physical attributes and explores the relationships among these factors through correlational analysis.

The study was designed and administered by Ioana Munteanu, who analyzed the data and wrote this report; several colleagues from the Office of Policy and Analysis offered helpful advice on various parts of the study.

Carole M. P. Neves  
Director  
Office of Policy and Analysis

## **PART I. BACKGROUND**

Fifty years ago, Nobel Prize winners Francis Crick and James Watson first visualized the three-dimensional molecular structure of deoxyribonucleic acid's (DNA) double helix. Since they accomplished that extraordinary feat, scientists have made remarkable progress in the field of modern genomics, including sequencing the human genome.<sup>1</sup>

The traveling exhibition, **Genome: The Secret of How Life Works**, sponsored by Pfizer and produced by Clear Channel Entertainment-Exhibition, opened for display in a 5,000-square foot gallery in the Smithsonian Institution's Arts and Industries Building (A&I Building) on June 6, 2003. The exhibition celebrated the 50<sup>th</sup> anniversary of the discovery of the double helix. The first half of the exhibition focused on the history of genomics, explored the mysteries of the human gene and detailed the basics of genome science; the second half explained the benefits of genome science and the potential benefits of gene research. The exhibition closed January 4, 2004.

### **Purpose of the Study**

Smithsonian Secretary Lawrence Small requested that the Office of Policy and Analysis (OP&A) assess Smithsonian visitors' satisfaction with this highly interactive exhibition. Examining what does and does not work is of great interest to the Smithsonian. This report presents the results of a study that examined how visitors responded to physical aspects of the exhibition, including the level of noise, the maintenance of interactives, videos and other devices, the path through the exhibition, the entrance, and crowding. In addition, the OP&A study team looked at other factors that influenced visitors' levels of satisfaction, such as visitors' most satisfying experiences in the exhibition; the display, quantity, and usefulness of the information; and the activities visitors engaged in. The study team also collected background and demographic information on visitors.

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<sup>1</sup> Genomics involves looking at genes as a dynamic system to determine how they interact and influence biological pathways, networks and physiology (from [http://www.genomicglossaries.com/content/Basic\\_Genetic\\_Glossaries.asp](http://www.genomicglossaries.com/content/Basic_Genetic_Glossaries.asp)).

## **Methodology**

To assess the level of visitor satisfaction with the exhibition and to determine how satisfaction might be influenced by the different exhibition features and activities, the OP&A study team asked visitors to fill out a one-page questionnaire designed to take a visitor about three minutes to complete. OP&A pretested the survey instrument extensively and conducted open-ended interviews with more than 15 visitors to the A&I Building. The pretesting and open-ended interviews were used to refine the survey instrument.

The OP&A study team conducted the survey in the first half of October 2003. Using variable interval sampling, the study team asked 943 eligible visitors, ages 12 and older, who were exiting the exhibition to complete the questionnaire. Close to nine-tenths of the selected visitors did so. Those who refused stated that limited English and insufficient time prevented them from participating in the assessment.

Including this section, the study consists of three parts. Part Two, Findings, presents the data collected with the survey questionnaire. Part Three provides the analysis of the data conducted by the OP&A study team. Appendix A contains the questionnaire.

## **PART II. FINDINGS**

### **Demographics**

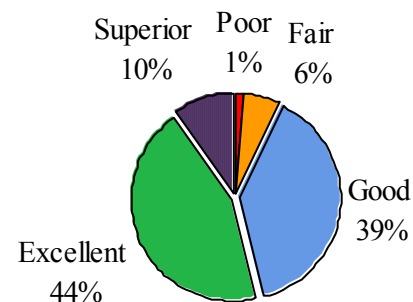
Fifty-two percent of respondents to the survey were male, and 48% were female. The average age for all respondents was 39 years, and three fourths were between the ages of 27 and 57. Sixty-nine percent of the respondents possessed university degrees (37% post graduate and 32% undergraduate). Fifty-seven percent lived outside the Washington, DC metropolitan area, 26% resided in the metropolitan area, 10% lived in other countries, and 7% lived in Washington, DC. Three out of four respondents saw the exhibition alone or were accompanied by one or more adults. One in four respondents came with children.

When asked about their familiarity with genome/genes before they entered the exhibition, 33% of visitors ranked their knowledge at the lowest two points on a five-point scale, 30% of visitors at the middle point, and 38% at the highest two points. Forty three percent of the responding visitors said that they were equally interested in basic and applied genome science and 8% said they were not interested in either; 38% said they were interested in the uses of genome science; and 10% related to basic genome science.

### Overall Satisfaction

When asked to assess their overall satisfaction with their visit to **Genome**, 10% of respondents rated the exhibition as superior, 44% as excellent, and 39% as good (Figure 1). The remaining 7% rated it as fair or poor.

**Figure 1. Satisfaction with Genome Exhibition**



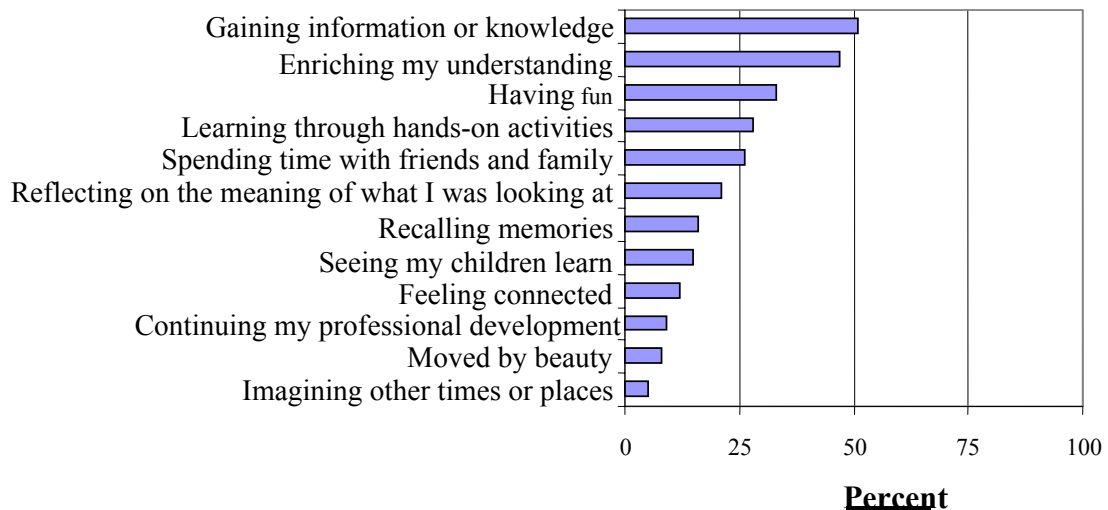
Compared with other exhibition similarly measured, the percentage of respondents choosing the top two categories was at the lower end. For example, according to visitor satisfaction surveys conducted by OP&A, 84% of visitors to **Nature’s Jewels** indicated that they were more than “fully satisfied” or “very satisfied” and 66% of visitors to **Fast Attacks and Boomers: Submarines in the Cold War** indicated that the exhibition was “delightful” or “fully satisfying;” however, only 50% of visitors to **What Next, Columbus?** said that they were “delighted” or “fully satisfied.”

### Satisfaction with Diverse Experiences

Respondents were asked to state which of a list of possible experiences with **Genome** they found especially satisfying. Around half of the respondents said that experiences relating to the content of the exhibition were especially satisfying—51% mentioned “gaining information or knowledge” and 47% “enriching my understanding.” Slightly

over one-fourth mentioned “learning through hands-on activities.” Having fun and spending time with friends and family were especially satisfying for approximately one-third of the respondents. Figure 2 shows how the responding visitors rated their experiences.

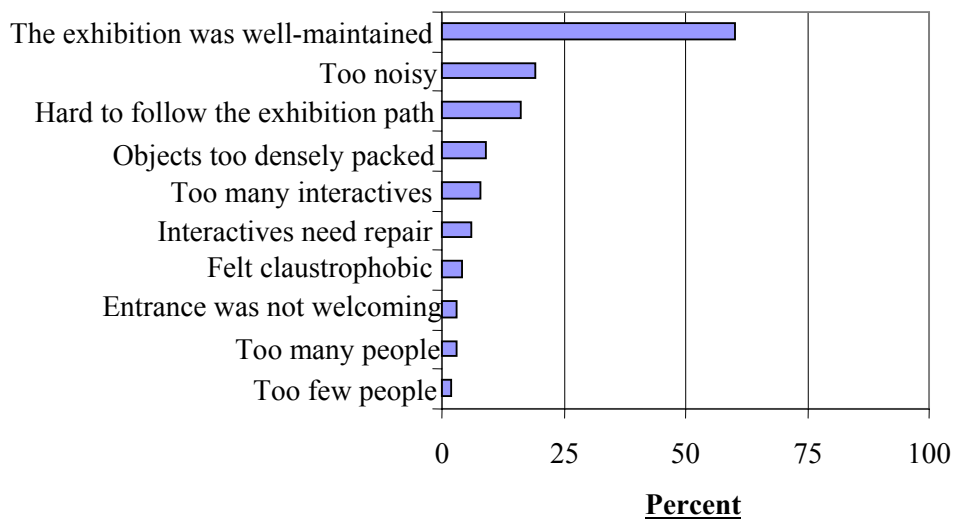
**Figure 2. Especially Satisfying Experiences in the Genome Exhibition**



### **Physical Aspects of the Exhibition**

Three-fifths of the respondents said that the exhibition was well-maintained (Figure 3). Most did not identify any physical aspect as problematic. One-fifth said that the exhibition was too noisy, and one-sixth that it was hard to follow the exhibition path. Fewer than 10% of respondents mentioned other aspects.

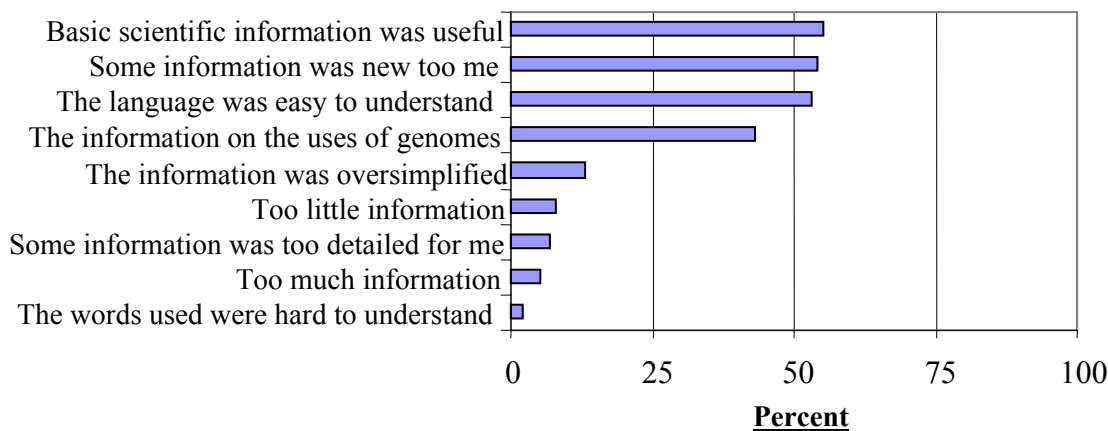
**Figure 3. Opinions about the Physical Aspects of Genome**



#### **Usefulness of Information and Its Presentation**

More than half of the respondents indicated that the basic scientific information in the exhibition was useful, that some information was new, and that the language was easy to understand. Further, 43% of the respondents said that the information on the uses of genome science was useful. Relatively few visitors found that the information was oversimplified (13%), too sparse (8%), too detailed (7%), too much (5%), or too difficult (2%) (Figure 4).

**Figure 4. Opinions about the Information in Genome**

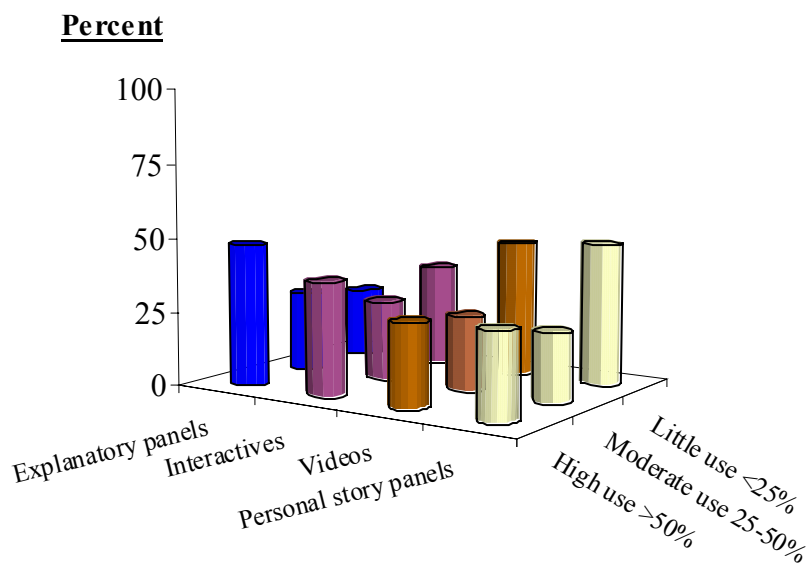




## Engagement with the Exhibition

Respondents were asked to assess the percentage of the exhibition features that they had read or used. The data show that they read or used explanatory panels and interactives more than they read or used personal story panels and videos (Figure 5). Half the respondents said they read more than half of the explanatory panels; more than one third said they used more than half of the interactives. Slightly over one-fourth said they viewed more than half the videos and read more than half the personal story panels.

**Figure 5. Visitor's Engagement with Genome Activities**



## Additional Findings

- When asked which section of the exhibition they liked best, 38% of responding **Genome** visitors mentioned the applied genome science; 33% had no preference; and 29% said the basic genome science.
- When asked how relevant the exhibition was for them personally on a 5-point scale, 43 % rated relevance at the two highest points, 36% at the middle point and 21% at the lowest two points.

## PART III. FURTHER ANALYSIS OF THE FINDINGS

The OP&A study team considered factors that most influenced overall satisfaction and how distinct elements of the exhibition related to satisfaction.

### **Most Influential Factors Regarding Overall Satisfaction<sup>2</sup>**

*The most important factors influencing overall satisfaction were whether respondents found the information on the uses of genome science useful and the exhibition was personally relevant.*

Of the one in two responding visitors who said that information on the uses of genome science was useful, 71% rated the exhibition as “excellent” or “superior,” as opposed to 42% of the responding visitors who did not believe the information was useful. Of the one in four visitors who found the exhibition personally very relevant, 81 percent rated **Genome** as “excellent” or “superior,” as opposed to only 19% of those who said it was not personally relevant. The same subgroup of visitors said that the exhibition had the right amount of information.

### **Other Factors That Correlate with Overall Satisfaction<sup>3</sup>**

#### *Visitors’ Experiences and Satisfaction*

*Satisfying learning-type experiences contributed to overall satisfaction.*

Of the respondents who reported that the exhibition enriched their understanding, 66% rated the exhibition as “excellent” or “superior,” versus 42% for those who did not report having learning-type experiences. Similarly, among the respondents who chose gaining information or knowledge as especially satisfying, 60% rated their overall satisfaction in the top two categories, as opposed to only 47% of the respondents who said they had not

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<sup>2</sup> The OP&A study team used AnswerTree to conduct this analysis.

<sup>3</sup> The OP&A study team used cross tabulations to establish the significance of the factors, and analysis of contingency tables and measures of associations to establish the direction and the association of the variables. When the team analyzed two-interval variables, it used Spearman’s correlation coefficient; for nominal variables it used Cramer’s V.

gained new information or knowledge. Further analysis showed that the more explanatory panels the respondents had read, the more likely they were to choose “gaining information or knowledge” or “enriching my understanding” as especially satisfying experiences.

Respondents who selected “learning through hands-on activities” as a satisfying experience were more likely to rate their overall satisfaction as high: 66% rated it as “excellent” or “superior” as compared with 49% of the sample as a whole. More in-depth analysis revealed that the more interactive activities the respondents had completed, the more likely they were to say that “learning through hands-on activities” was a satisfying experience.

*An entertaining experience positively influenced overall satisfaction.*

Of the respondents who said they were “having fun” in the exhibition, 67% rated their overall satisfaction with the exhibition in the top two categories. Among those who did not select “having fun,” 47% gave those ratings. The more interactive activities respondents completed, the more likely they were to say they had fun. More than half the people who said they completed over 75% of the interactive activities also said they “had fun,” as compared to one-fifth of the people who said they did not complete any activity. Respondents who said they had fun were more likely to have liked the first half of the exhibition, which addressed basic genome science, than the second half, which focused on applied genome science.

Other experiences, including “Reflecting on the meaning of what I was looking at,” “Seeing my children learn,” “Feeling connected,” and “Moved by beauty,” were positively correlated with respondents’ overall satisfaction with the exhibition. However, the relationships were weak.

### ***Physical Aspects of the Exhibition and Satisfaction***

Respondents who believed that the exhibition was well-maintained were more likely to have a high level of satisfaction with the exhibition overall—62% of them rated it “excellent” or “superior,” while only 41% of those who thought it was poorly maintained did so.

Respondents who perceived that the exhibition was too noisy, that it was hard to follow the exhibition path and that there were too many interactives were slightly more likely to give lower ratings for overall satisfaction.

### ***Information in the Exhibition and Overall Satisfaction***

There was a significant, moderate positive correlation between satisfaction with the information in **Genome** and the exhibition overall. Respondents who said that the basic scientific information was useful, that some information was new to them, that the language was easy to understand and that the information on the uses of genome science was useful were more likely to give high ratings for overall satisfaction than was the rest of the sample.

### ***Level of Engagement and Overall Satisfaction***

The OP&A study team found a statistically significant positive relationship between overall respondents’ satisfaction and the number of activities they engaged in. The respondents who completed more interactive activities, watched more videos, and read more explanatory and personal story panels rated the exhibition higher than did visitors who participated in fewer activities.

## **APPENDIX: A**

### **The Survey Instrument for Genome: The Secret of How Life Works**

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**Genome: The Secret of How Life Works**

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		<input type="radio"/> LL	<input type="radio"/> Y4					

Note: Each questionnaire should reflect the opinion of ONE person. Please fill in the circles.

1. How would you rate your experience in this exhibition today?

- Poor
- Fair
- Good
- Excellent
- Superior

2. How would you rate your knowledge of genome/genes before you entered this exhibition, on a scale of 1 to 5 where 1 is unfamiliar and 5 is very familiar?

- |                       |                       |                       |                       |                       |               |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| Unfamiliar            |                       |                       |                       |                       | Very familiar |
| 1                     | 2                     | 3                     | 4                     | 5                     |               |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |               |

3. Which interests you more: basic genome science or applied genome science?

- |                       |                       |                        |                          |
|-----------------------|-----------------------|------------------------|--------------------------|
| Basic genome science  | Equally interested    | Applied genome science | Not interested in either |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  | <input type="radio"/>    |

4. Which of the following experiences did you find especially satisfying in this exhibition today? [mark all that apply]

- Recalling memories
- Moved by beauty
- Gaining information or knowledge
- Continuing my professional development
- Spending time with friends/family
- Enriching my understanding
- Having fun
- Seeing my children learn
- Reflecting on the meaning of what I was looking at
- Learning through hands-on activities
- Imagining other times or places
- Feeling connected

5. Thinking about the physical aspects of this exhibition which of the following applies to you? [mark all that apply]

- Felt claustrophobic in the exhibition
- Interactive activities needed repairs
- Too noisy
- Too many interactive activities
- Too few people
- Too many people
- Hard to follow the exhibition path
- Objects too densely packed into the exhibition
- The exhibition was well maintained
- The entrance was not welcoming

6. Thinking about information in this exhibition, which of the following applies to you? [mark all that apply]

- Some information was new to me
- The information was oversimplified
- The language was easy to understand
- Some information was too detailed for me
- The words used were hard to understand
- Too much information
- Too little information
- Basic scientific information was useful
- The information on the uses of genomes was useful

7. What percent of the following features did you read or use in this exhibition?

	None	Less than 25%	25-50%	50-75%	Over 75%
Interactive.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Videos.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Explanatory panels...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal story panels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Which section of the exhibition did you like best?

- Basic genome science (first half of the exhibition)
- Applications of genome science (second half)
- No preference

9. How relevant is this exhibition for you personally on a scale of 1 to 5, where 1 is not relevant and 5 very relevant?

Not relevant					Very relevant	
1	2	3	4	5	stat	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		

\*10. Where do you live?

- Washington DC
- Other US State: \_\_\_\_\_
- VA/MD Suburbs
- Other Country: \_\_\_\_\_

\*11. With whom are you visiting today?

- Alone
- Adult(s) with child(ren)
- One other adult
- Group of teens
- Group of adults
- Tour/School group

\*12. Your age: \_\_\_\_\_ years

\*13. Your gender:  Female  Male

\*14. What is the highest level of education you have completed?

- Less than High School Graduate
- Jr. College/Associate Degree
- High School Graduate
- Bachelor's Degree
- Some College
- MA/PHD/Professional

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Please use the back of this sheet for comments. Thank you for your assistance!