SIMSURVEYS · DIGITAL TWIN VALIDATION

# Patient Twins vs. Real Respondents: HINTS 7

Do patient twins answer, and stay consistent, the way the real people behind them do?

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## Summary

We matched 200 Simsurveys patient twins to real respondents in HINTS 7, the National Cancer Institute's national health survey, and asked each twin 25 HINTS questions in sequence, the way Digital Twin Studio asks them. Each twin draws on its respondent's real answers to other HINTS questions, as patient twins do in the product, but never on the answer to the question being asked. We then compared the twins' answers with the real respondents' answers on two tests: the answer totals for each question, and how each person's answers link together across questions.

**0.049**
Average score on the answer totals (0.10 or less = strong match). 22 of 25 questions strong; 24 of 25 at 0.15 or less.

**0.82**
Pattern match of how answers link across all 300 question pairs, twins vs. real respondents (1.0 = identical pattern).

**43%**
Of answers where a twin chose exactly what its real respondent chose (about 24% by chance).

**What this means for your research:** patient twins can be used to compare patient groups and follow up on their answers, with each twin staying consistent with what it said before and with the real person behind it. The following pages show every question, including where the twins differed from the real respondents.

## Study design

- **Benchmark:** HINTS 7 (Health Information National Trends Survey), National Cancer Institute, public-use respondent file. Real answers from the respondents matched to the 200 twins.
- **Twins:** 200 U.S. adult patient twins from the Simsurveys patient pool. Each twin is matched to one real HINTS 7 respondent on age band, sex, race and education, and on health conditions (diabetes, high blood pressure, heart condition, lung disease, depression) where possible. Each twin carries that respondent's real answers to 195 HINTS questions.
- **Questions:** 25 HINTS 7 questions in four areas: health and care, isolation and mood, cancer information and beliefs, digital skills and costs. Exact HINTS wording and answer options.
- **How twins answered:** one question at a time through the Simsurveys patient model. Each prompt held the twin's demographics, a one-sentence study description, the question, the twin's own earlier

answers in this session, and the three of its respondent's real answers whose questions are most similar to the one being asked. The real answer to the question being asked was always held out.

- **Scoring:** answer totals with KL divergence per question (lower is closer). Links between answers with the correlation between real and twin answers for every pair of questions, then the correlation of those two sets of 300 values.
- **Run:** November 6, 2026, using the production patient twin setup.

# Results

## Answer totals

Average score 0.049 (median 0.033). 22 of 25 questions scored 0.10 or less and 24 of 25 scored 0.15 or less. The closest matches were trust in cancer information from charities (0.000), linking cancer with death (0.002) and doctors making sure you understood what to do (0.004).

## Individual answers

Twins chose exactly the same answer as their real respondent 43% of the time, against about 24% by chance. The twins track the individual people behind them, not only the group.

## Links between answers

Across all 300 question pairs, the pattern of links in the twins' answers matched the real respondents' at 0.82. For example, feeling isolated goes with feeling left out (correlation 0.81 real, 0.61 twins), and feeling down goes with feeling anxious (0.71 real, 0.50 twins). Average link strength was 0.12 for twins and 0.19 for the real respondents.

This is the property Digital Twin Studio and Voices Studio depend on: when you follow up with a twin, its answer stays consistent with what it said before.

| # | Question | Score | Band |
|---|---|---|---|
| Q1 | In general, would you say your health is… | 0.054 | Strong |
| Q2 | Overall, how would you rate the quality of health care you received in the past 12 months? | 0.007 | Strong |
| Q3 | How much do you trust the health care system (for example, hospitals, pharmacies, and other organizations involved in health care)? | 0.051 | Strong |
| Q4 | Overall, how confident are you about your ability to take good care of your health? | 0.012 | Strong |
| Q5 | In the past 12 months, how often did your doctors, nurses, or other health professionals explain things in a way you could understand? | 0.012 | Strong |
| Q6 | In the past 12 months, how often did your doctors, nurses, or other health professionals give the attention you needed to your feelings and emotions? | 0.135 | Good match |

| | | | |
|---|---|---|---|
| Q7 | In the past 12 months, how often did your doctors, nurses, or other health professionals help you deal with feelings of uncertainty about your health or health care? | 0.250 | Look into |
| Q8 | In the past 12 months, how often did your doctors, nurses, or other health professionals involve you in decisions about your health care as much as you wanted? | 0.041 | Strong |
| Q9 | In the past 12 months, how often did your doctors, nurses, or other health professionals make sure you understood the things you needed to do to take care of your health? | 0.004 | Strong |
| Q10 | I feel isolated from others... | 0.062 | Strong |
| Q11 | I feel left out... | 0.019 | Strong |
| Q12 | I feel that people are around me but not with me... | 0.041 | Strong |
| Q13 | Over the past 2 weeks, how often have you been bothered by: Feeling down, depressed or hopeless? | 0.015 | Strong |
| Q14 | Over the past 2 weeks, how often have you been bothered by: Feeling nervous, anxious or on edge? | 0.033 | Strong |
| Q15 | Over the past 2 weeks, how often have you been bothered by: Not being able to stop or control worrying? | 0.008 | Strong |
| Q16 | In general how much would you trust information about cancer from scientists? | 0.070 | Strong |
| Q17 | In general, how much would you trust information about cancer from government health agencies? | 0.029 | Strong |
| Q18 | In general, how much would you trust information about cancer from charitable organizations? | 0.000 | Strong |
| Q19 | How much do you agree or disagree: When I think about cancer, I automatically think about death... | 0.002 | Strong |
| Q20 | How much do you agree or disagree: It seems like everything causes cancer... | 0.138 | Good match |
| Q21 | How much do you agree or disagree: There’s not much you can do to lower your chances of getting cancer... | 0.024 | Strong |
| Q22 | How much do you agree or disagree: There are so many different recommendations about preventing cancer, it's hard to know which ones to follow... | 0.059 | Strong |
| Q23 | How much do you agree or disagree: I have the skills to find the health information I need on the Internet. | 0.070 | Strong |
| Q24 | How much do you agree or disagree: I can use applications/programs (like Zoom) on my cell phone or computer without asking someone for help. | 0.007 | Strong |
| Q25 | In the past 12 months how often was the following true - You or someone in your household had difficulty paying or was unable to pay medical bills? | 0.084 | Strong |

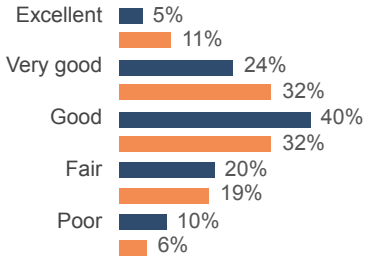
# Question by question

Real HINTS 7 respondents (n=200) Simsurveys patient twins (n=200)

## Health and care

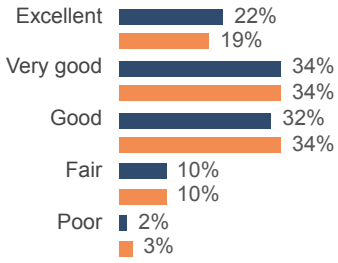
**Q1** In general, would you say your health is...

0.054 · Strong



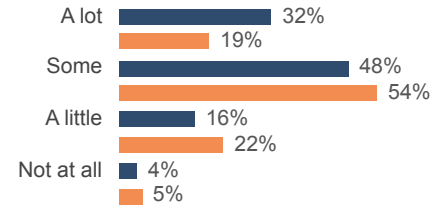

**Q2** Overall, how would you rate the quality of health care you received in the past 12 months?

0.007 · Strong



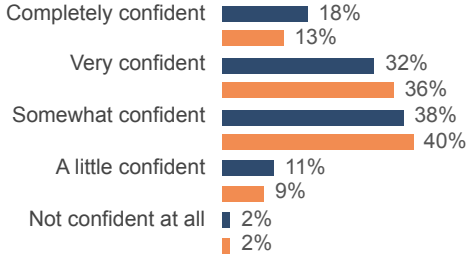

**Q3** How much do you trust the health care system (for example, hospitals, pharmacies, and other organizations involved in health care)?

0.051 · Strong



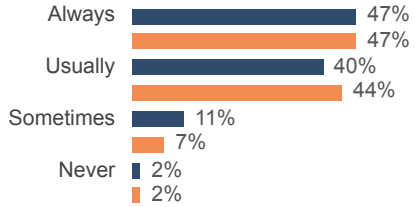

**Q4** Overall, how confident are you about your ability to take good care of your health?

0.012 · Strong



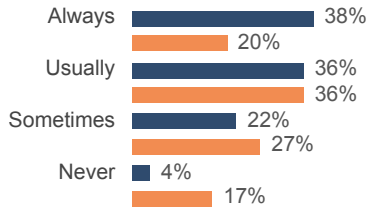
**Q5** In the past 12 months, how often did your doctors, nurses, or other health professionals explain things in a way you could understand?

0.012 · Strong



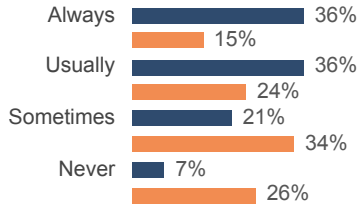

**Q6** In the past 12 months, how often did your doctors, nurses, or other health professionals give the attention you needed to your feelings and emotions?

0.135 · Good match



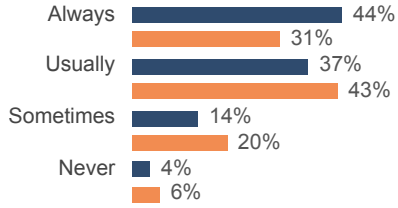

**Q7** In the past 12 months, how often did your doctors, nurses, or other health professionals help you deal with feelings of uncertainty about your health or health care?

0.250 · Look into



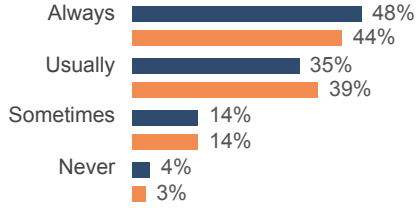

**Q8** In the past 12 months, how often did your doctors, nurses, or other health professionals involve you in decisions about your health care as much as you wanted?

0.041 · Strong




**Q9** In the past 12 months, how often did your doctors, nurses, or other health professionals make sure you understood the things you needed to do to take care of your health?

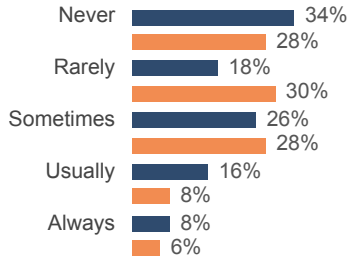
0.004 · Strong



## Isolation and mood

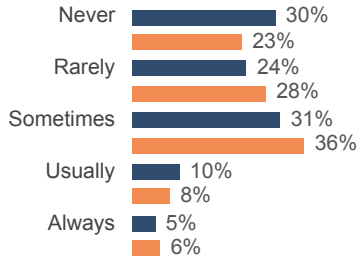
**Q10** I feel isolated from others...

0.062 · Strong



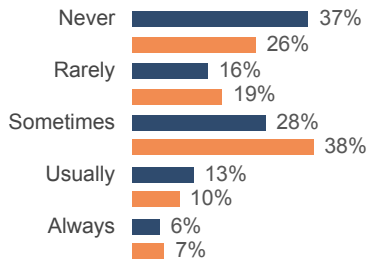

**Q11** I feel left out...

0.019 · Strong



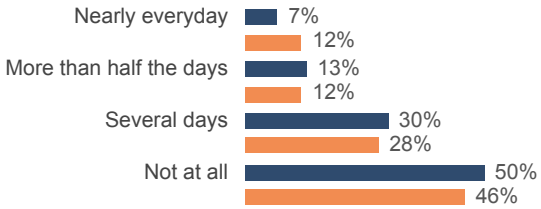

**Q12** I feel that people are around me but not with me...

0.041 · Strong



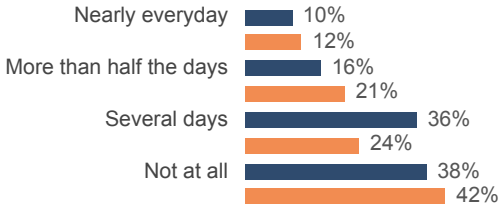

**Q13** Over the past 2 weeks, how often have you been bothered by: Feeling down, depressed or hopeless?

0.015 · Strong



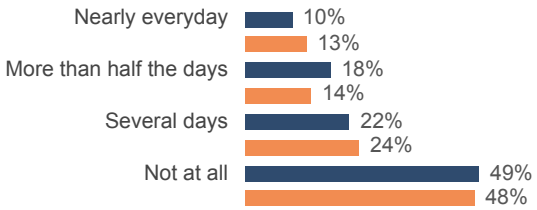

**Q14** Over the past 2 weeks, how often have you been bothered by: Feeling nervous, anxious or on edge?

0.033 · Strong



**Q15** Over the past 2 weeks, how often have you been bothered by: Not being able to stop or control worrying?

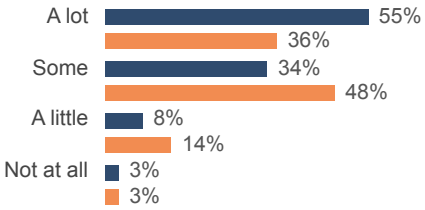
0.008 · Strong




## Cancer information and beliefs

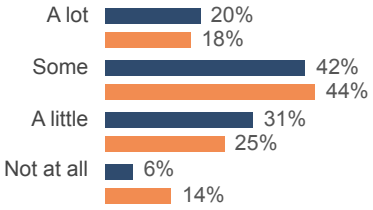
**Q16** In general how much would you trust information about cancer from scientists?

0.070 · Strong



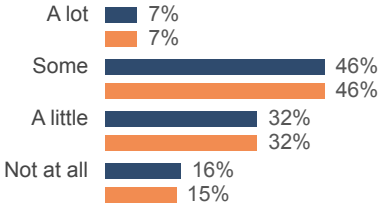

**Q17** In general, how much would you trust information about cancer from government health agencies?

0.029 · Strong



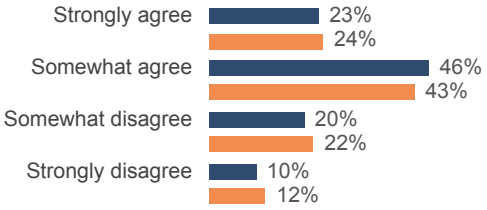

**Q18** In general, how much would you trust information about cancer from charitable organizations?

0.000 · Strong



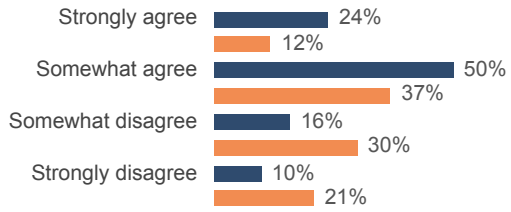

**Q19** How much do you agree or disagree: When I think about cancer, I automatically think about death...

0.002 · Strong



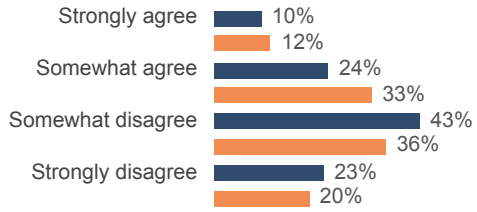
**Q20** How much do you agree or disagree: It seems like everything causes cancer...

0.138 · Good match



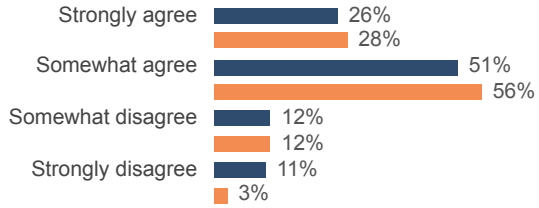

**Q21** How much do you agree or disagree: There's not much you can do to lower your chances of getting cancer...

0.024 · Strong




**Q22** How much do you agree or disagree: There are so many different recommendations about preventing cancer, it's hard to know which ones to follow...

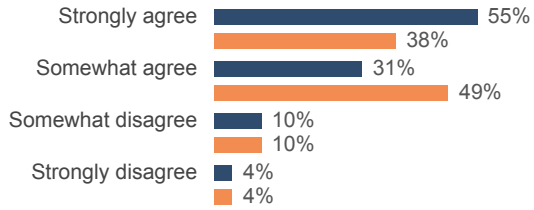
0.059 · Strong




## Digital skills and costs

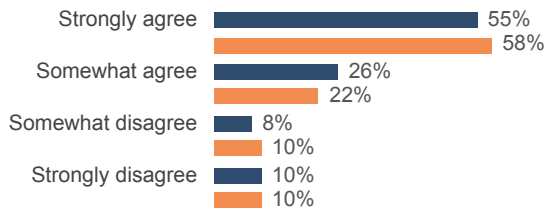
**Q23** How much do you agree or disagree: I have the skills to find the health information I need on the Internet.

0.070 · Strong



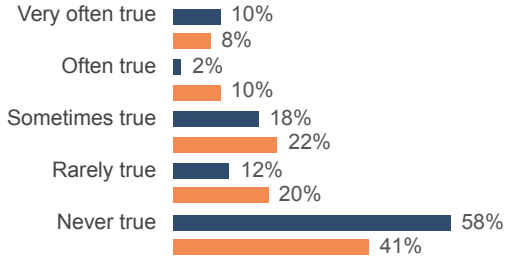

**Q24** How much do you agree or disagree: I can use applications/programs (like Zoom) on my cell phone or computer without asking someone for help.

0.007 · Strong



**Q25** In the past 12 months how often was the following true - You or someone in your household had difficulty paying or was unable to pay medical bills?

0.084 · Strong




Simsurveys · Patient Twin Validation: HINTS 7 · Report November 2026. Questions: Joel Friedman, jlf@simsurveys.com, 773-251-5571. HINTS is a public-use dataset of the National Cancer Institute; this report is not affiliated with or endorsed by NCI.