Insights from User Discussions on COVID-19 Testing in Non-Traditional Settings

Informational Discussion Readout

RADx – September 15, 2020

Northwestern

Introduction

Who we are, our goal, and a brief introduction of our approach

- Goal: To learn about the **opportunities and challenges** of COVID-19 testing at a variety of non-traditional venues and organizations in an effort to compile feedback and synthesize learnings to inform developers working on new testing products in RADx Initiative
- Approach: Speak with organization representatives and home users to understand **current and future needs** for COVID-19 testing products

Team Members

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Conflict of Interest

- **Kara Palamountain**
  - Minute Molecular Diagnostics
    - Co-Founder, Treasurer, and Secretary
    - Developing sample-to-answer molecular diagnostic devices
- **Karlie Stanton**
  - Stemloop
    - Business Development Intern
    - Developing heavy metal biosensors with cell-free processes

Presentation Overview

Methodology

User discussions included talk around user goals, concerns, and contextual factors for COVID-19 testing, as well as user feedback sessions regarding hypothetical products.

Open-Ended Discussion (30 min)

- Learn about user COVID-19 experiences, challenges, and plans.
- Discuss user testing goals and needs.
- Learn about user's ideal testing process.
- Uncover contextual factors and barriers to testing.
- Learn about testing-related questions, concerns, and uncertainties.

Concept Feedback Session (30 min)

- Users were shown a set of three concepts
- Concepts provided were based on user's testing needs (e.g., lab-processed, rapid PoC, home test)
- Users discussed preferences by comparing concept attributes

Methodology: Organizations

User discussions included user goals, concerns, and contextual factors for COVID-19 testing, as well as user feedback sessions regarding hypothetical products.

Process Overview

Discussion:

- Organizational COVID-19 Plans
- Testing Goals and Challenges
- Testing Process and Management

Concept Feedback:
Users were shown one of two different sets of products:

- Lab Processed
- Point-of-Care Processed

Preferred Product:

- Point-of-Care Product #3

Point-of-Care Concepts for Organization Feedback

PRODUCT 1	PRODUCT 2	PRODUCT 3
1. Nasopharyngeal	1. Saliva	1. Nasal
2. $25 per test	2. $10 per test	2. $40 per test
3. 90% accuracy	3. 80% accuracy	3. 99% accuracy
4. 128 tests per day	4. 32 tests per day	4. 800 tests per day
5. One hour for results	5. 15 minutes for results	5. 30 minutes for results
6. Lab Professional	6. Trained Professional	6. Anyone

1. **Sample Type**: The specimen that the device is testing for the live virus.
2. **Cost**: How much an employer/employee will have to pay to have a test.
3. **Accuracy**: The percent likelihood that the test a person takes provides the correct result.
4. **Throughput**: The quantity of tests that can be run and processed per a select time period.
5. **Time to result**: The amount of time between a patient having a test and receiving their result.
6. **Expertise Required**: What level of expertise is needed to administer and process the test?

Methodology : Home Users

User discussions included user goals, concerns, and contextual factors for COVID-19 testing, as well as user feedback sessions regarding hypothetical products

Process Overview

Discussion:

- COVID-19 Experiences
- Preferred Testing Process
- Home Use Tests

Concept Feedback:
Users were shown two different sets of products:

- Patient Initiated
- Home Use

Preferred Product:

- Home Product C

Home Use Concepts for User Feedback

PRODUCT A	PRODUCT B	PRODUCT C
1. Nasal	1. Saliva	1. Nasal
2. 95% accuracy	2. 80% accuracy	2. 90% accuracy
3. 1-day shipping	3. Same day pickup	3. 2-day shipping
4. 24 hours for results	4. 12 hours for results	4. 2 hours for results
5. Mailed in	5. Do it yourself	5. Video appointment

1. **Sample Type**: How and what the device is testing for the live virus.
2. **Accuracy**: The percent likelihood that the test a person takes provides the correct result.
3. **Obtaining Test**: How long it takes to receive the test and how you get it.
4. **Time to result**: Time between obtaining the test and receiving the result.
5. **Site of sample collection and processing**: Where would the sample be collected.

Discussions

We conducted discussions with 26 people and organizations, ensuring coverage across all RADx groups. Upon completion of discussions, we learned that findings were more closely aligned with attributes.

TOTAL DISCUSSIONS PER RADX GROUPING

RADx Group	# of Discussions	Descriptions
Healthcare Non-Clinical	3	Large Dental Group, Affiliate Dental Office, Private Dental Practice
Large Public	1	Large Stadium Venue
Large Semi-Contained	4	Large Public University, Large High School Network, Large Theater Organization, Small Private College
Small/Medium Public	3	Small Theater Group, Public Library System, Fitness Studio
Small/Medium Semi-Contained	4	Large Hair Salon, Small Community Center, Small State Department of Corrections, Small Private School
Home Users	11	Home users were identified through a Northwestern University medical database, granted to us post IRB Exemption and approval

*The organizations and home users that we had discussions with should not be considered a representative sample of the national population.

As we looked at the RADx groups independently, we noticed that there were not many group-specific findings, but rather attribute-specific findings. As such, we decided to display our findings in this manner.

Organizational Users

Attribute Overview

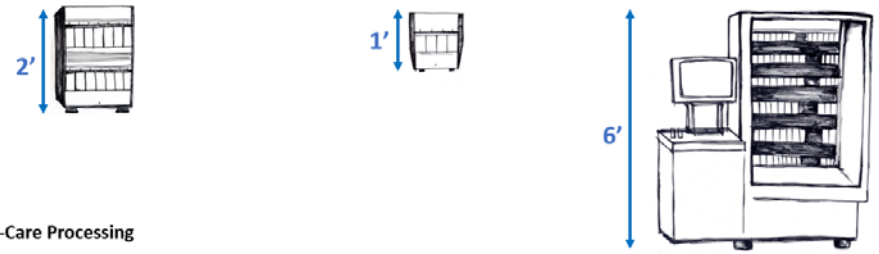
The attributes we chose were slightly different for on-site vs. off-site test processing, and 13 of 15 organizations preferred a point-of-care testing model over an off-site model

OFF-SITE PROCESSING

Attributes	Levels
1. Sample Type	Nasopharyngeal, Saliva, Nasal
2. Cost	$10, $25, $40
3. Accuracy	85%, 90%, 99%
4. Time to Result	1 day, 3 days, 5 days
5. Complexity of Test	Self-collected, Trained Professional, Nurse

POINT-OF-CARE PROCESSING

Attributes	Levels
1. Sample Type	Nasopharyngeal, Saliva, Nasal
2. Cost	$10, $25, $40
3. Accuracy	80%, 90%, 99%
4. Throughput	32 tests/day, 128 t/d, 800 t/d
5. Time to Result	15 min, 30 min, 60 min
6. Complexity of Test	Anyone, Trained Professional, Lab Professional



Point-of-Care Processing

Broad Findings

After speaking with 15 organizations, there were some striking, high-level takeaways that emerged from the conversations

Overwhelming Desire for a Guided Process

COVID-19 testing products will not be useful for many users unless the tests are part of a larger guided process recommended by reliable sources, including:

- Testing frequency
- Duration of result validity
- Protocols for sample collection & processing
- Proper patient privacy and confidentiality
- Sample disposal and biohazards
- Result reporting to patients & authorities
- Billing and insurance

The Need for Rapid Testing

Many organizations we spoke to discussed a pressing and compelling need for rapid tests, both among organizations that are already testing and ones that aren't.

Potential Community Testing Center

Some organizations, like schools, churches, libraries, and dental offices mentioned that they could serve as a community testing center for residents in their neighborhoods.

Sample Type

In our concept feedback discussions, the products included **nasopharyngeal, saliva, and shallow nasal** sample types.

Nasopharyngeal is a Deal-Breaker

Nasopharyngeal tests were strongly opposed by all organizations except the department of corrections. Organizations who would be testing children, or testing people repeatedly, were especially opposed.

Limited Knowledge of Sample Types

Very few organizations demonstrated knowledge of COVID-19 testing options beyond nasopharyngeal tests, and very few knew it by that name.

Shallow Nasal Vs. Saliva

Most organizations felt no preference between shallow nasal and saliva tests, which were broadly considered equally acceptable.

When testing would include children, saliva tests were less preferable than shallow nasal tests.

Nasopharyngeal by Association

Potential users may automatically associate all types of nasal tests with their mental models of nasopharyngeal tests, so manufacturers need to be intentional about distinguishing them.

Accuracy

We combined sensitivity and specificity into the overarching “accuracy” attribute in our concept feedback discussions. The three levels of accuracy were **80%, 90%, and 99%.**

THE MOST IMPORTANT ATTRIBUTE

Most organizations considered test accuracy the most important attribute, except those who are treating everyone as positive already (e.g., dental offices) and those who considered surveilling populations such as schools.

THRESHOLD OF ACCEPTABILITY

Organizations that considered accuracy important commonly viewed 90% as the threshold of acceptability (implicitly or explicitly). Test accuracy higher than 90% broadly felt good, while an accuracy of 80% did not.

COST VS. ACCURACY TRADEOFF

Though most organizations considered accuracy the most important test attribute, when it came to the tradeoff between accuracy and cost, there was a broader spread of where organizations landed.

Cost vs. Accuracy Tradeoff

$10 per Test
80% Accuracy

$40 per Test
99% Accuracy

Low Cost → **High Accuracy**

Group 1
Accuracy is not very important

- Dental Office #1
- Small Private Grade School #1
- Large Salon

Group 2
Accuracy is important but we can't afford it

- Public Library
- Small Theatre Group

Group 3
Both are important, noncommittal

- Small Private Grade School #2
- Large Theatre Organization
- Dental Office #2

Group 4
Accuracy is important, we'll find a way to pay

- Community Center
- Large Sport Stadium
- Grade School Network

Group 5
Cost is not really an issue

- Department of Corrections
- Small Private College
- Large Dental Organization
- Large University

Time to Result

We gauged the speed at which different organizations need results for testing to be feasible. In our concepts, the times to result were **one hour**, **30 minutes**, and **15 minutes**.

EVERY MINUTE MATTERS

In some organizations, each additional minute added in the testing process makes a significant difference.

Ex: in schools, kids show up last minute before class, even skipping free breakfast. So to test before school, every minute counts.

SOME NEED ZERO WAITING TIME

In some situations, no appreciable length of waiting time is feasible – tests need to be processed nearly instantaneously for it to work.

Ex: a theatre group worried about patrons waiting outside for results in cold weather, citing limited space and elderly audiences.

THRESHOLD OF ACCEPTABILITY

Overall, for most organizations, results in less than 10-15 minutes satisfies logistical speed requirements.

This can mean both serial and batch testing, depending on the organization.

Throughput & Footprint

We discussed required PoC test throughputs based on arrival patterns, and footprint limitations based on space availability. The throughputs used were **32/day, 128/day, and 800/day**.

BATCH VS. SERIAL PROCESSING

The number of organizations that would benefit more from PoC batch processing was roughly equal to the number that would benefit more from PoC serial processing.

SERIAL PROCESSING NEEDS

For serial testing organizations, most volume needs ranged from 1 at a time (dental offices) to 5 at a time (large salon).

BATCH PROCESSING VOLUME

A batch volume of 30 tests would meet the needs of most of the batch organizations without being oversized.

PHYSICAL EQUIPMENT FOOTPRINT

No organizations considered device size or footprint a major hurdle for their implementation of rapid testing.

Required Expertise

We discussed with organizational users the barriers of staffing and expertise in testing operations. In our concepts, the three required expertise levels were **1) lab professional, 2) trained staff, 3) anyone**.

Hiring Professionals is a Barrier:

Hiring a lab professional or healthcare worker for on-site test processing would be a major challenge for many organizations.

Willing to Train Employees:

However, nearly all organizations were willing to have a staff member trained in collection and processing who they did not have to pay an additional fee to.

Anyone-Can-Test Creates Flexibility:

Having a test process that did not require an expert or trained staff was a "game-changer" for some organizations (e.g., small college, small private school).

Home
Users

Attribute Overview

The attributes we chose were slightly different for patient-initiated vs. home use only tests, but focused on aspects of testing that were of particular interest to users who may want to test on their own terms

PATIENT-INITIATED TESTING

Attributes	Levels
1. Sample Type	Nasopharyngeal, Saliva, Nasal
2. Cost	$10, $20, $40
3. Accuracy	85%, 90%, 95%
4. Time Taken to Receive a Test	Same day, Next day, Two days
5. Time Taken to Receive Results	2 hours, 1-2 days, 3-5 days
6. Where Sample will be Collected	Walk-in Clinic, Drive-thru, Home

HOME TESTING

Attributes	Levels
1. Sample Type	Nasopharyngeal, Saliva, Nasal
2. Accuracy	80%, 90%, 95%
3. Obtaining a Test	Same day pickup, 1 day shipping, 2 day shipping
4. Time Taken to Receive Results	2 hours, 12 hours, 24 hours
5. Method	Mailed in, video appointment with HCP, Self-collected

Group Findings

After speaking with 11 potential home users, several common threads and interesting patterns emerged.

Home Users Are Excited But Seek Guidance

Before trusting and embracing COVID-19 home tests, potential users want advice and guidance from trustworthy sources (CDC, NIH, and major pharmacy stores).

Accuracy Is The Main Driver

Test accuracy was typically the most important overall factor for home users, though other attributes were sometimes dealbreakers.

Perceptions And Risk

Most home users expressed concern over the potential for home COVID-19 tests to give a false sense of security. However, most also said that receiving a negative test would enable them to visit family and friends, especially older relatives.

Home users also felt uncertain about trusting others' home tests, citing improper sampling and a lack of self-reporting.

Sample Type

Sample type was the first attribute in our tradeoff discussions, and we discussed **nasopharyngeal**, **saliva**, and **nasal** tests with home users.

Uncomfortable With Nasopharyngeal

- Most users were uncomfortable with the idea of administering nasopharyngeal tests at home, both due to physical discomfort and perceived difficulty.
- Several pointed out that children would have an even lower tolerance for nasopharyngeal tests.

Nasal vs. Saliva Tests

- Most users had little preference between saliva and nasal tests, although some did quote concerns with small children and teens correctly using a saliva collection cup.

Non-COVID-19 Medical Home Test Analogy

- 23andMe was the analogy users brought up most often to a medical test conducted in the home settings. Most people had positive experiences with this test, aside from the large quantity of saliva needed.

https://www.garmaonhealth.com/low-price-dna-test/spit-in-cup-for-23andme-dna-test/

Accuracy

Accuracy was a key driver for home users, with 8 out of 11 users citing it as the most important attribute for them in whether they would purchase a test. The tests we showed had accuracies of **80%**, **90%** and **95%**.

ASYMMETRICAL CONFIRMATION

Home users were far more likely to confirm a positive home test result with an additional test than a negative home test result.

TRUSTING THE RESULTS

Home users unanimously raised concerns about incorrectly self-administering a home test, and worried about the sample collection being complex.

THRESHOLD OF ACCEPTABILITY

Some home users felt that 90% was an acceptable accuracy threshold for a home test, while others felt it should be 95% or higher. Only one user felt 80% was an acceptable accuracy figure.

ACCURACY PRECONCEPTIONS

Home users equated the nasopharyngeal test with higher accuracy, despite its invasive reputation.

Time to Result

The methods of sample collections and processing influenced the time to result. In our concepts, the times to result were **2 hours**, **12 hours**, and **24 hours**.

LARGER THRESHOLD THAN ORGANIZATIONAL USERS

Home user threshold for time to result was much longer, especially when compared to organizational users. Home test users usually were not in a rush to get the results back.

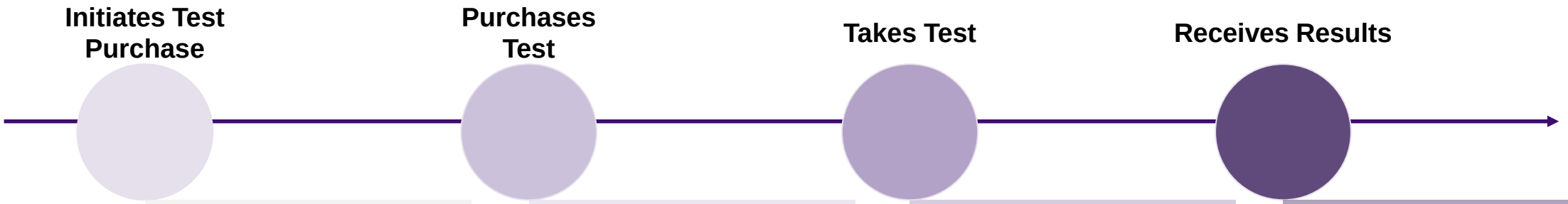
WAITING UP TO 24 HOURS ARE ACCEPTABLE

All home users were fine with waiting up to 24 hours for results, as they would be home anyway, so whether 2 hours or 12 hours, the wait time did not matter.

Testing Process

The process home users described tended to have the same few steps with very similar key drivers to one-another

TESTING PROCESS



Users Would Consider Taking A Test When:

- they are experiencing symptoms
- someone they have recently in contact with tested positive
- or have elderly family members to visit

Obtaining From Nearby Pharmacy

Over half of people cited they preferred obtaining their tests from a pharmacy or drug store, although they preferred to get it before they experienced symptoms.

Visual Aids

Visual aids as the mode of training for self-administered tests are considered the best way ensure proper usage.

Video Appointment

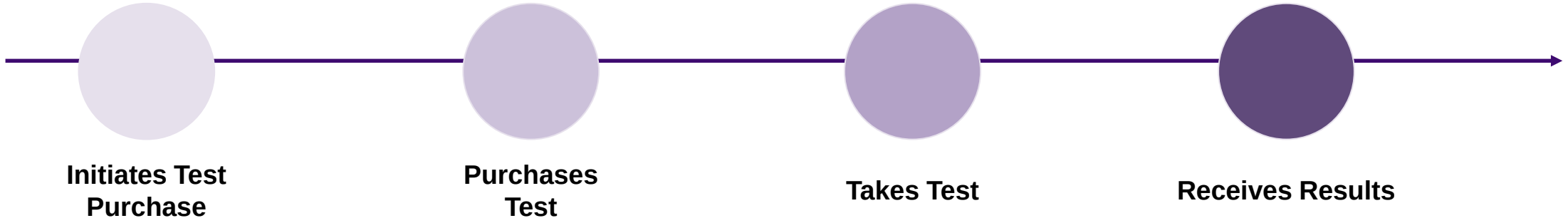
Most users mentioned having an HCP tele-observe their testing at home made them feel confident in their results.

Reporting Results

There are mixed results about whether people are required to report their results.

Perceived Benefits

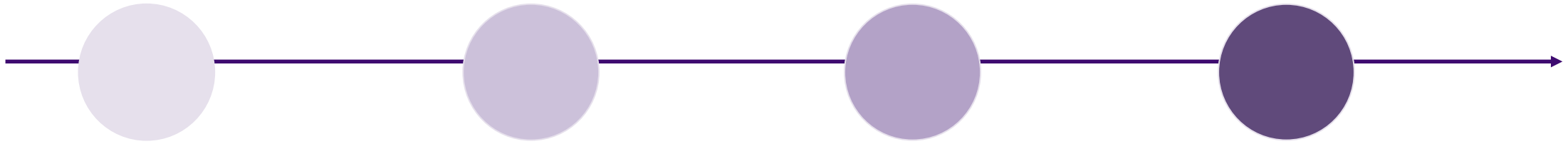
There were many perceived benefits from our discussions with users when it came to potential home testing products



TESTING PROCESS	Initiates Test Purchase	Purchases Test	Takes Test	Receives Results
PERCEIVED BENEFITS	• Patients can choose to take the test at their own will, without the need of an HCP to recommend or approve a test	• Do not have to leave the house and potentially get someone else sick or be around infected people to purchase a test • The mental burden of going to hospitals/testing tents/waiting in line with potential exposed crowds will be alleviated with home tests		• Have a higher chance of getting results sooner than with traditional lab processing

Perceived Challenges

Home users frequently had the same set of challenges with home testing with steps in the testing process, often centered around lacking the needed guidance in each phase along the way



TESTING PROCESS	Initiates Test Purchase	Purchases Test	Takes Test	Receives Results
PERCEIVED CHALLENGES	Users were unclear which test they should purchase and how they know the claims about the test's efficacy is accurate	If tests are available on shelves, there is a concern that people will hoard them in their homes, creating accessibility issues	Large concern that people will use the tests incorrectly and receive incorrect results	Receiving a negative result may cause people to have a false sense of security and drive them towards hazardous behavior

Next Steps

When considering our findings, there are some next steps that we would recommend for product developers to figure out best market fit and attributes for a specific test use case

- Interview more organizations, especially in the large public space
- Quantitative conjoint study of attributes
- User interviews around a test-matching service for organizations
- Ensure resources for availability and training meet user needs

Acknowledgements

Thank you!

We would like to express our sincere gratitude to NIH, NIBIB, and POCTRN networks, especially colleagues from RADx Initiative and at Northwestern University, for providing us with the up-to-date learnings, and kindly offering us resources and connections to make many great discussions happen.

We would also like to extend our gratitude to the organization representatives and individual home users whom we've talked to, for sharing with us their experiences, thoughts and insights around this topic.

Thank You

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Index

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PRODUCTS USED FOR TRADEOFF DISCUSSION

PRODUCT 1

1. Nasopharyngeal
2. $25 per test
3. 90% accuracy
4. 128 tests per day
5. One hour for results
6. Lab Professional

PRODUCT 2

1. Saliva
2. $10 per test
3. 80% accuracy
4. 32 tests per day
5. 15 minutes for results
6. Trained Professional

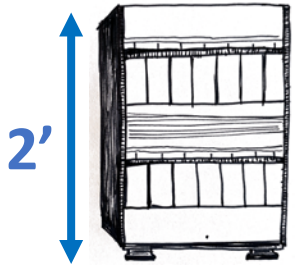
PRODUCT 3

1. Nasal
2. $40 per test
3. 99% accuracy
4. 800 tests per day
5. 30 minutes for results
6. Anyone

1. **Sample Type**: The specimen that the device is testing for the live virus.
2. **Cost**: How much an employer/employee will have to pay to have a test.
3. **Accuracy**: The percent likelihood that the test a person takes provides the correct result.
4. **Throughput**: The quantity of tests that can be run and processed per a select time period.
5. **Time to result**: The amount of time between a patient having a test and receiving their result.
6. **Complexity of test**: How difficult the test is to administer (could a layperson successfully administer the test or does a healthcare professional need to administer).

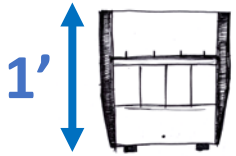
PRODUCT 1

1. Nasopharyngeal
2. $25 per test
3. 90% accuracy
4. 128 tests per day
5. One hour for results
6. Lab Professional



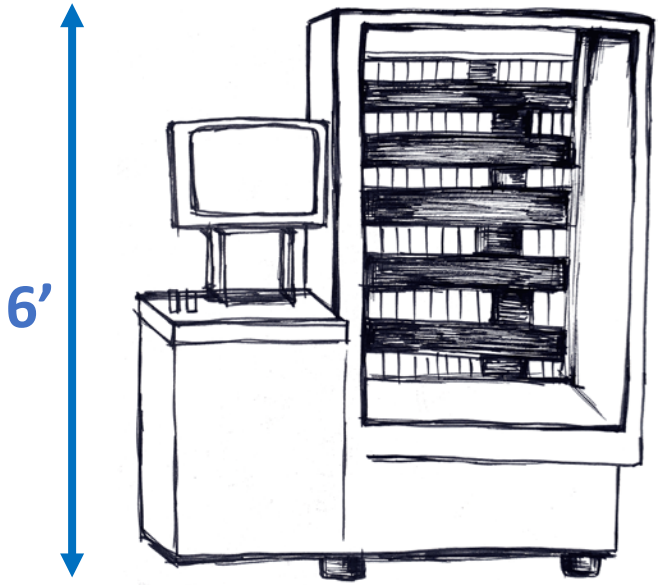
PRODUCT 2

1. Saliva
2. $10 per test
3. 80% accuracy
4. 32 tests per day
5. 15 minutes for results
6. Trained Professional



PRODUCT 3

1. Nasal
2. $40 per test
3. 99% accuracy
4. 800 tests per day
5. 30 minutes for results
6. Layperson



Point-of-Care Processing

PRODUCT 1

1. Nasopharyngeal
2. $25 per test
3. 90% accuracy
4. 5 days for results
5. Nurse

PRODUCT 2

1. Saliva
2. $10 per test
3. 85% accuracy
4. 1 day for results
5. Trained Professional

PRODUCT 3

1. Nasal
2. $40 per test
3. 99% accuracy
4. 3 days for results
5. Self-collected

1. **Sample Type**: The specimen that the device is testing for the live virus.
2. **Cost**: How much an employer/employee will have to pay to have a test.
3. **Accuracy**: The percent likelihood that the test a person takes provides the correct result.
4. **Time to result**: The amount of time between a patient having a test and receiving their result.
5. **Complexity of sample collection**: How difficult the sample is to collect (could an individual successfully collect the sample or do trained personnel and/or nurses need to collect).

Off-Site Processing

PRODUCT 1

1. Nasopharyngeal
2. $10 per test
3. 90% accuracy
4. Same day
5. 3-5 days for results
6. Walk-In Clinic

PRODUCT 2

1. Saliva
2. $40 per test
3. 95% accuracy
4. Next day
5. 1-2 days for results
6. Drive-thru

PRODUCT 3

1. Nasal
2. $20 per test
3. 85% accuracy
4. 2 days
5. 2 hours for results
6. Home

1. **Sample Type**: How and what the device is testing for the live virus.
2. **Cost**: How much a person will have to pay to have a test.
3. **Accuracy**: The percent likelihood that the test a person takes provides the correct result.
4. **Time it Takes to Schedule / Receive Test**: How long it takes to schedule or obtain the test.
5. **Time to receive the results**: Time between obtaining the test and receiving the result.
6. **Where your sample will be collected**: Where would the sample be collected and processed?

PRODUCT A

1. Nasal Swab
2. 95% accuracy
3. 1-day shipping
4. 24 hours for results
5. Mailed in

PRODUCT B

1. Saliva
2. 80% accuracy
3. Same day pickup
4. 12 hours for results
5. Do it yourself

PRODUCT C

1. Nasal swab
2. 90% accuracy
3. 2-day shipping
4. 2 hours for results
5. Video appointment

1. **Sample Type**: How and what the device is testing for the live virus.
2. **Accuracy**: The percent likelihood that the test a person takes provides the correct result.
3. **Obtaining Test**: How long it takes to receive the test and how you get it.
4. **Time to result**: Time between obtaining the test and receiving the result.
5. **Method**: Where would the sample be collected.

INDEX OF INTERVIEW PREFERENCES

Product Preference Summary: Organization

User	Pref. Product	Driving Factors	User	Pref. Product	Driving Factors
Large Theatre Organization	PoC #3	Complexity, Accuracy	Dental Organization	PoC #3	Accuracy
Dental Office #1	PoC #2	Cost, Time to Result	Dental Office #2	PoC #3	Sample Type, Time to Result
Small Private Grade School #1	PoC #2	Cost, Time to Result	Large Stadium Venue	PoC #3	Accuracy, Throughput, Time to Result
Large University*	Home C	Time to Result	Large School Network	Lab-Processed #3	Accuracy, Testing Type
Public Library	PoC #3	Accuracy	Small Theatre Group	PoC #2	Cost, Time to Result
Community Center	PoC #3	Complexity, Time to Result	Large Salon	PoC #2	Cost, Time to Result
Department of Corrections	PoC #3	Accuracy, Time to Result	Small Private College	PoC #3	Accuracy, Complexity
Small Private Grade School #2	PoC #3	Accuracy, Complexity, Time to Result	Fitness Studio	Home (N/A)	Cost, Complexity

* Represents expert opinion on home testing feasibility.

Product Preference Summary: Home Users

User	Pref. Product	Driving Factors	User	Pref. Product	Driving Factors
Home User 1	Patient-Initiated #2; Home A or C	Accuracy, Sample Type	Home User 7	Patient-Initiated #2; Home C	Accuracy, Time to Result
Home User 2	Home C	Accuracy, Method	Home User 8	Home C	Method, Obtaining Test
Home User 3	Home A	Accuracy	Home User 9	Home C	Accuracy, Method
Home User 4	Patient-Initiated #3; Home C	Time to Result, Sample Type, Method	Home User 10	Home C	Accuracy, Time to Result
Home User 5	Patient-Initated #2; Home A	Accuracy, Cost, Time to Result	Home User 11	Home A	Accuracy, Method
Home User 6	Patient-Initated #2; Home C	Accuracy, Sample Type, Method			

Throughput & Time to Result

Given limited data on throughput, we have collated all the throughput needs of each of the organizations we held discussions with

Organization	Throughput Description	Ideal Type	Organization	Throughput Description	Ideal Type
Large Theatre Organization	Want to test performers before shows – 20 on average, maybe more than 100 (symphony).	Batch: 20-100 processed at a time.	Small Private School #1	Would hope to test everyone at beginning of terms (350 ppl) & test samples of student/staff population periodically (50 ppl).	Batch: time to result < 24 hours.
Dental Office #1	20-40 patients per day, come in at staggered times throughout the day, need results in <10 min.	Serial: 1 at a time fine, <10 min results.	Dental Office #2	Lab-processed testing right now, ideally would do rapid tests at appts. Have 4-5 patients in at a time.	Serial: 2-3 at a time, 15 min results.
Small Private College	Would ideally test entire campus (2500) weekly, more likely sample surveillance plus populations potentially infected.	Batch: 50 at a time for athletic teams, potential hotspot dorms.	Large Stadium Venue	To test 3000 employees before a game, need fastest possible testing/result time for staff.	Serial: process dozens at a time, <5 min. results.
Public Library	1500-2000 patrons daily across 4 locations and 110 staff, need results in < 10 minutes.	Serial: multiple processed at a time, <10 min results.	Small Theatre Group	To test unionized performers and staff, need to minimize time in theatre for testing 25 people.	Batch testing: 25-30 processed at once needed.
Community Center	20 staff to test at 9am, support groups up to 25 people, some individuals throughout the day.	Batch: 25 processed at a time.	Large Salon	Ideally test 45 staff and 150+ clients per day.	Serial: 5-10 processed at a time, 15 min.
Department of Corrections	Do batch lab-processed testing now, would ideally do serial testing at correctional facilities for clients and staff.	Serial: 1 at a time fine, 15 min results.	Small Private School #2	Would ideally test students when they enter the building in the morning, which they do in groups of 20-40.	Batch: 20-40 tests at a time, need results in <15 minutes.

LARGE STADIUM VENUE

Large Public

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Throughput, Time to Result

- The accuracy of the test is paramount, and P3 is 99%.
- Can't pick and choose who to test because it looks like profiling, so need capacity to test all people (highest throughput).

Who would the organization use this on?

- Staff (n = 3000), not patrons. Players and on-field personnel are handled separately by the NFL, not by Soldier Field.

What challenges would they face with using this product?

- Any amount of added time needed for testing 3rd party employees – even just a few minutes – poses contractual challenges when it comes to needing them to come in early for tests.

LARGE THEATRE ORGANIZATION

Large Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Complexity, Accuracy

- Being administered by anyone cuts the cost of needing to hire a medical professional.
- Accuracy is important psychologically.
- Tests per day is important for large groups like symphonies, for example.

Who would the organization use this on?

- Cast members and backstage staff

What challenges would they face with using this product?

- They would have to require actors/actresses to keep their masks on during the process and while waiting for results
- Cost will be an issue for smaller theaters (probably 70% of theaters), especially when adding the new cleaning costs, etc.

SMALL PRIVATE COLLEGE

Large Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Complexity

- The accuracy rate and the fact that anyone can do it is a bit of a game changer
- It they can use this product, they are able to expand the testing a lot

Who would the organization use this on?

- Ideally everyone (students, faculty, employees, contract staff)

What challenges would they face with using this product?

- Very satisfied with this product and think it would replace the test types (saliva test, pcr test, etc.) they've planned
- Product 2 can be used in a broad surveillance testing plan

LARGE UNIVERSITY

Large Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : C

WHY DID THEY PREFER IT?

Driving Factors: Time to Result

- He was worried about time to response. His models showed that 24 hours was far too long to wait for a response

**He was looking at these from an expert perspective, as UIUC was already testing

Who would the organization use this on?

- Staff and patients

What challenges would they face with using this product?

- Worried about scalability and traceability. Cited concern about connecting the sample to the testing center, and how to relay the results from a home testing perspective.
- Voiced concern about lack of trust with the broader population

PUBLIC LIBRARY

Small/Medium Public

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Accuracy

- 99% accuracy indicates higher level of confidence
- Lab testing would be almost useless for a library

Who would the organization use this on?

- Staff on a regular basis
- Patrons maybe (Is it feasible and necessary?)

What challenges would they face with using this product?

- P3 is very ideal except for the cost, has to be free for library users
- Government should pay for the tests
- Inexpensive rapid tests would make a big difference to workers, families, schools, etc.

SMALL THEATRE GROUP

Small/Medium Public

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 2

WHY DID THEY PREFER IT?

Driving Factors: Cost, Time to Result

- Though the accuracy isn't ideal, the $10 cost is the only feasible choice, and the 15-minute results are important too.
- Would need multiple tests throughout a production cycle with people taking public transit & in close proximity. 32 tests per day would be fine.

Who would the organization use this on?

- Staff, performers, and patrons ideally. If there is a wait time for results, can't test audience, because there's nowhere for them to wait.

What challenges would they face with using this product?

- 80% accuracy may not be reassuring for performers, regardless of test outcome
- Need addt'l staff for testing, processing, delivering results, & reporting results

COMMUNITY CENTER

Small/Medium Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Complexity, Time to Result

- The complexity of test is very important – if you could give yourself a test, that's simpler process
- Time to result is big – we want to go quick

Who would the organization use this on?

- Staff and clients

What challenges would they face with using this product?

- Comfort level is important, but I haven't had enough conversations with people to see if the current form is prohibitive that way
- Throughput capabilities: more than 25 ppl is good for us, not too big

DEPARTMENT OF CORRECTIONS

Small/Medium Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Time to Result, Accuracy

- Accuracy would save them money in the long run by not creating universal situations
- Time to result would change from the 2+ days they are facing now.

Who would the organization use this on?

- Staff and patients

What challenges would they face with using this product?

- Cost could potentially become an issue (if they switched to universal testing)
- Some states may have a higher throughput requirement, meaning they would need multiple machines in a world where they already have extremely limited space

LARGE SCHOOL NETWORK

Small/Medium Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Lab-Processed

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Testing Type, Complexity

- Test accuracy (99%) is the most important attribute. Nasal is acceptable, and self-collected is great – students could do it themselves.
- Lab processing evokes validity, confidence, and learning opportunities for students. We can figure out the cost. 3-day results feels reasonable.

Who would the organization use this on?

- Potentially students, teachers, staff

What challenges would they face with using this product?

- Concern from staff and students on data privacy and testing purposes (drug test concerns, undocumented student concerns, health privacy concerns).
- Contact tracing following a positive result (with 3-day delay) may be major challenge.

LARGE SALON

Small/Medium Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 2

WHY DID THEY PREFER IT?

Driving Factors: Cost, Time to Result, Sample

- If we can increase the throughput (multiple devices), then the low cost ($10), saliva, and 15-min turnaround are all ideal.
- Accuracy is less important, because we'd think about it like a bonus screening, given we are already using PPE

Who would the organization use this on?

- Staff and potentially clients.

What challenges would they face with using this product?

- Not a lot of room for people to wait for results (might be 5 clients at once). Need to test a couple hundred people per day potentially.
- Staff wouldn't be able to pay for their own tests (though clients might).
- Home testing might be logistically easier.

SMALL PRIVATE GRADE SCHOOL #1

Small/Medium Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 2

WHY DID THEY PREFER IT?

Driving Factors: Cost, Sample Type, Time to Result

1. Preferable if school wants to do recurring testing.
2. Lower accuracy is fine for broader surveillance.
3. PoC 3 preferable for a one-time snapshot of the school at the start of the schoolyear. After that, PoC 2 is better (cheaper, faster).

Who would the organization use this on?

- Teachers, staff, and students (volunteer)

What challenges would they face with using this product?

- Lower accuracy (80%) might mean a positive case slips through the cracks for several days.
- Low throughput (32/day) means more devices or less testing - there are 300 students.
- Need student volunteers to come outside of school hours due to the 30-minute wait time.

SMALL PRIVATE GRADE SCHOOL #2

Small/Medium Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Complexity, Cost

- 99% accuracy important, 80% too low.
- Without a school nurse, complexity could be a challenge.
- School administration might balk at the cost of $40 per test.

Who would the organization use this on?

- Students (350) and Staff (60) ideally

What challenges would they face with using this product?

- May face pushback from parents if they were to require it.
- No school nurse leaves uncertainty on who would staff the operation.
- Students would have a difficult time waiting outside for results for even 15 minutes.

Fitness Studio

Small/Medium Semi-Contained

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : N/A

WHY DID THEY PREFER IT?

Driving Factors: Cost, Complexity, Time to Result

- Studios and gyms unlikely to bear any testing costs unless it's legally required.
- Studios often only have one staff member on-site at a time (the instructor), so POC or on-site testing would be a major challenge.

Who would the organization use this on?

- Students (350) and Staff (60) ideally

What challenges would they face with using this product?

- May face pushback from clients if they were to require home tests.
- Already difficult to get people to come back into exercise facilities, requiring testing would make it even harder.
- Only would be considered if it meant clients didn't have to wear masks in the facility.

DENTAL OFFICE #1

Healthcare Non-Clinical

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 2

WHY DID THEY PREFER IT?

Driving Factors: Cost, Time to Result

- The cost ($10) and the time involved to do the testing (30 min) is the most reasonable
- For dental office, the sample type saliva is easy to collect

Who would the organization use this on?

- Staff and patients

What challenges would they face with using this product?

- The accuracy is low so it might be a good pre-screening test and will need to hand them off to another facility to verify the results
- Would be willing to try the testing for 3 months before making it a requirement

LARGE DENTAL ORGANIZATION

Healthcare Non-Clinical

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Accuracy

- They felt it was the most compelling for patient care
- They valued accuracy above all else
- They were not worried about the price, as they were billing insurance

Who would the organization use this on?

- Staff and patients

What challenges would they face with using this product?

- Worried that a smaller office wouldn't have space for the machine
- Not every office would be able to fill this many tests. Unclear about whether the test can be run if machine isn't full

DENTAL OFFICE #2

Healthcare Non-Clinical

WHAT PRODUCT DID THEY PREFER?

Testing type: Point-of-Care

Product : 3

WHY DID THEY PREFER IT?

Driving Factors: Sample Type, Time to Result

- It's easy to do a nasal swab
- 30 min to wait for a result is not bad
- It's super accurate

Who would the organization use this on?

- Staff and patients

What challenges would they face with using this product?

- They are never going to need to do 800 tests, and in a smaller office, the size could be an issue
- The price is high enough that, even though they are billing insurance, it makes the office manager uncomfortable

HOME USER 1

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Patient-Initiated

Product : 2 (drive thru)

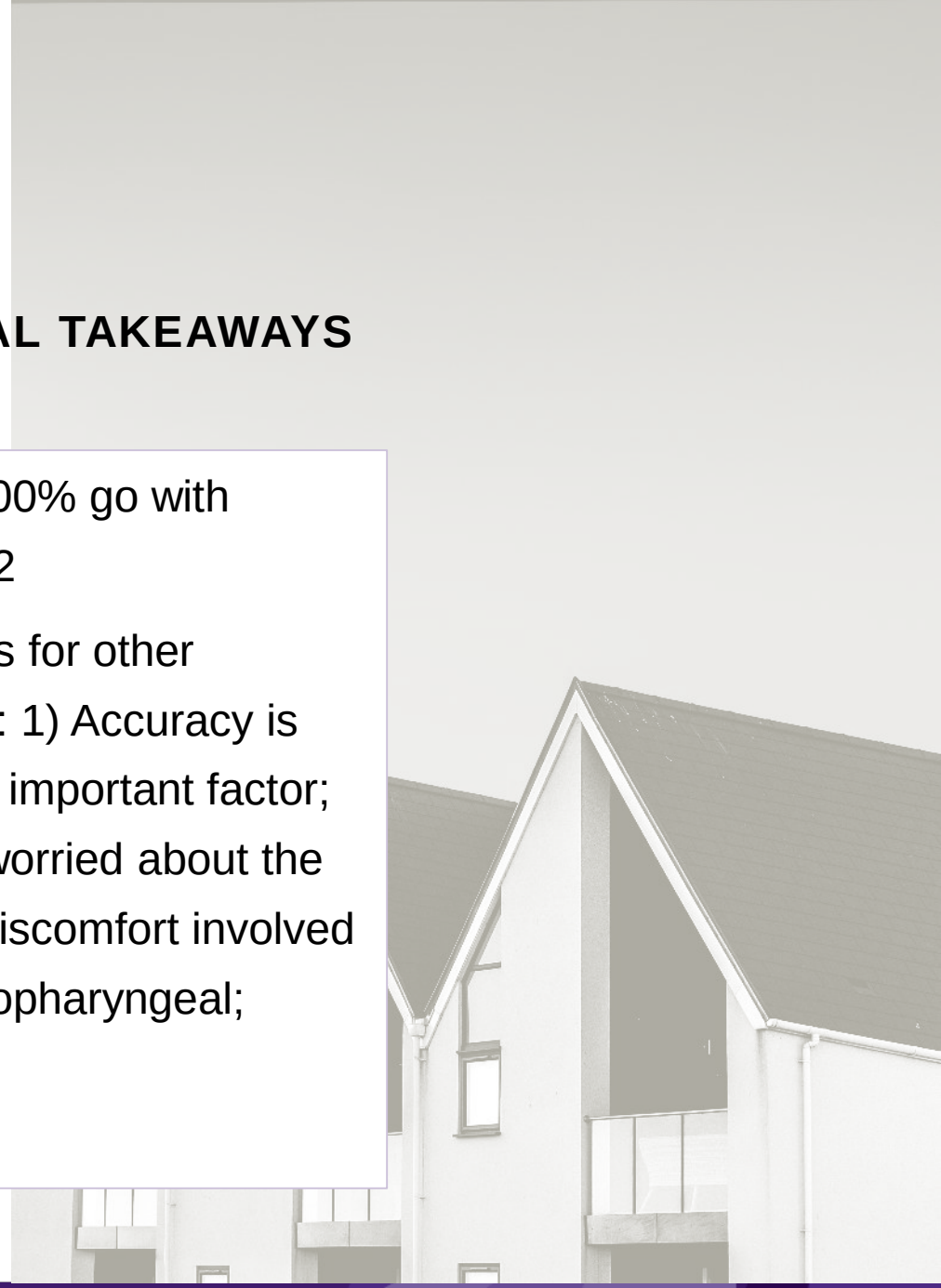
WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Sample Type

- 99% accuracy very important
- Saliva sample preferred over others
- Cost not a big issue

ADDITIONAL TAKEAWAYS TO NOTE:

- Would 100% go with Product 2
- Concerns for other products: 1) Accuracy is the most important factor; 2) Very worried about the pain or discomfort involved with nasopharyngeal;



HOME USER 1

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : A or C

WHY DID THEY PREFER IT?

Driving Factors: Accuracy

- Product B: 80% accuracy is too low

ADDITIONAL TAKEAWAYS TO NOTE:

- Product A: Mail in: If the product is big enough need to go to the post office then it's a barrier
- Product C: Doesn't want to pay more for the doctor part

HOME USER 2

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : C (tele-observed)

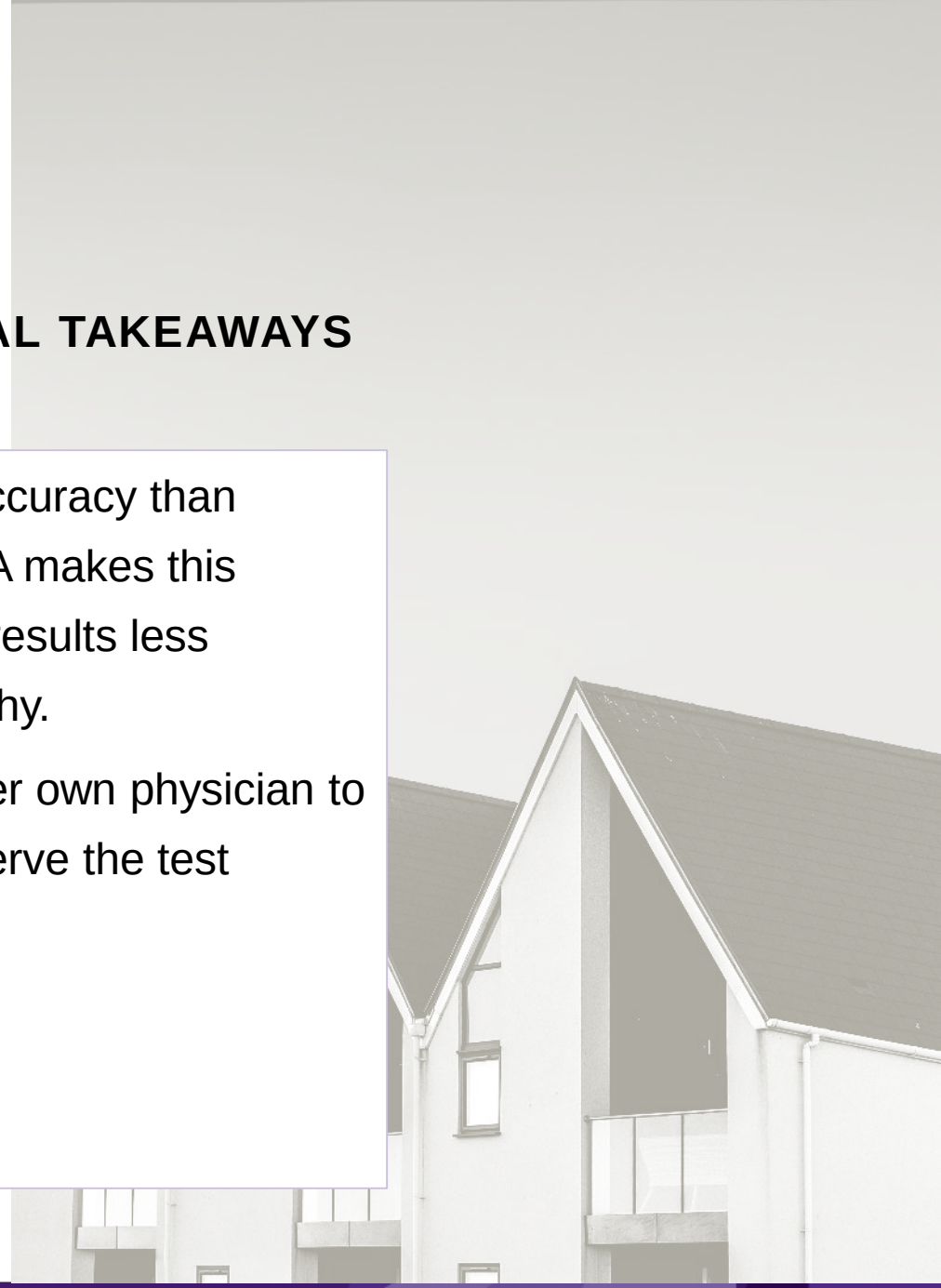
WHY DID THEY PREFER IT?

Driving Factors: Method, Accuracy

- Preferred video appt. to mail-in
- Accuracy was most important, but product C felt more credible as a whole process.
- Time to result in Product C was the best

ADDITIONAL TAKEAWAYS TO NOTE:

- Lower accuracy than product A makes this product results less trustworthy.
- Prefer her own physician to tele-observe the test



HOME USER 3

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : A (mailed in)

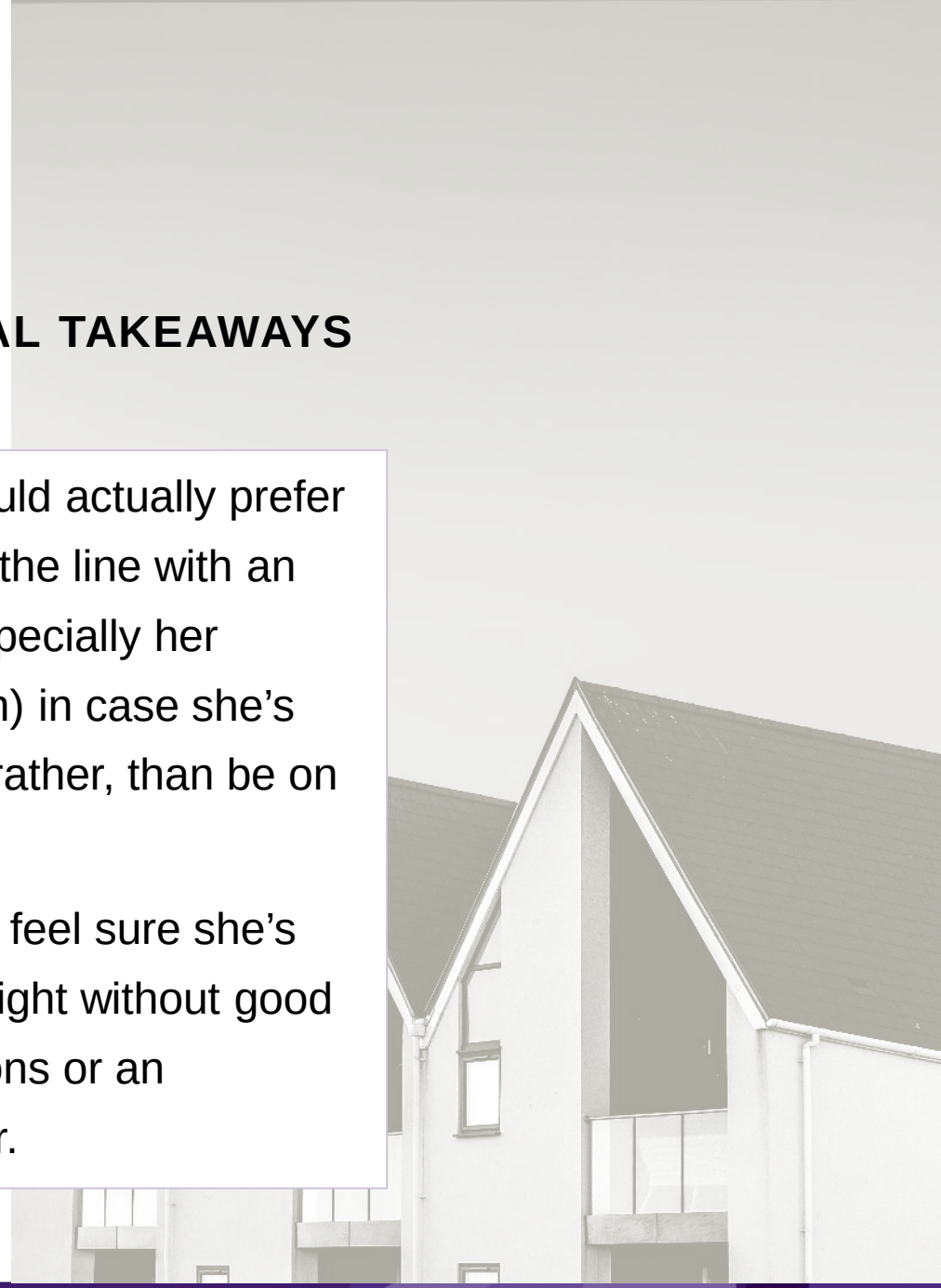
WHY DID THEY PREFER IT?

Driving Factors: Accuracy

- 95% accuracy felt great, 90% felt okay.
- Would buy it in advance so shipping not an issue.
- Prefers the other methods over mail-in but accuracy is by far the most important driver.

ADDITIONAL TAKEAWAYS TO NOTE:

- They would actually prefer to be on the line with an HCP (especially her physician) in case she's positive rather, than be on her own.
- Wouldn't feel sure she's doing it right without good instructions or an instructor.



HOME USER 4

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Patient-Initiated

Product : 3

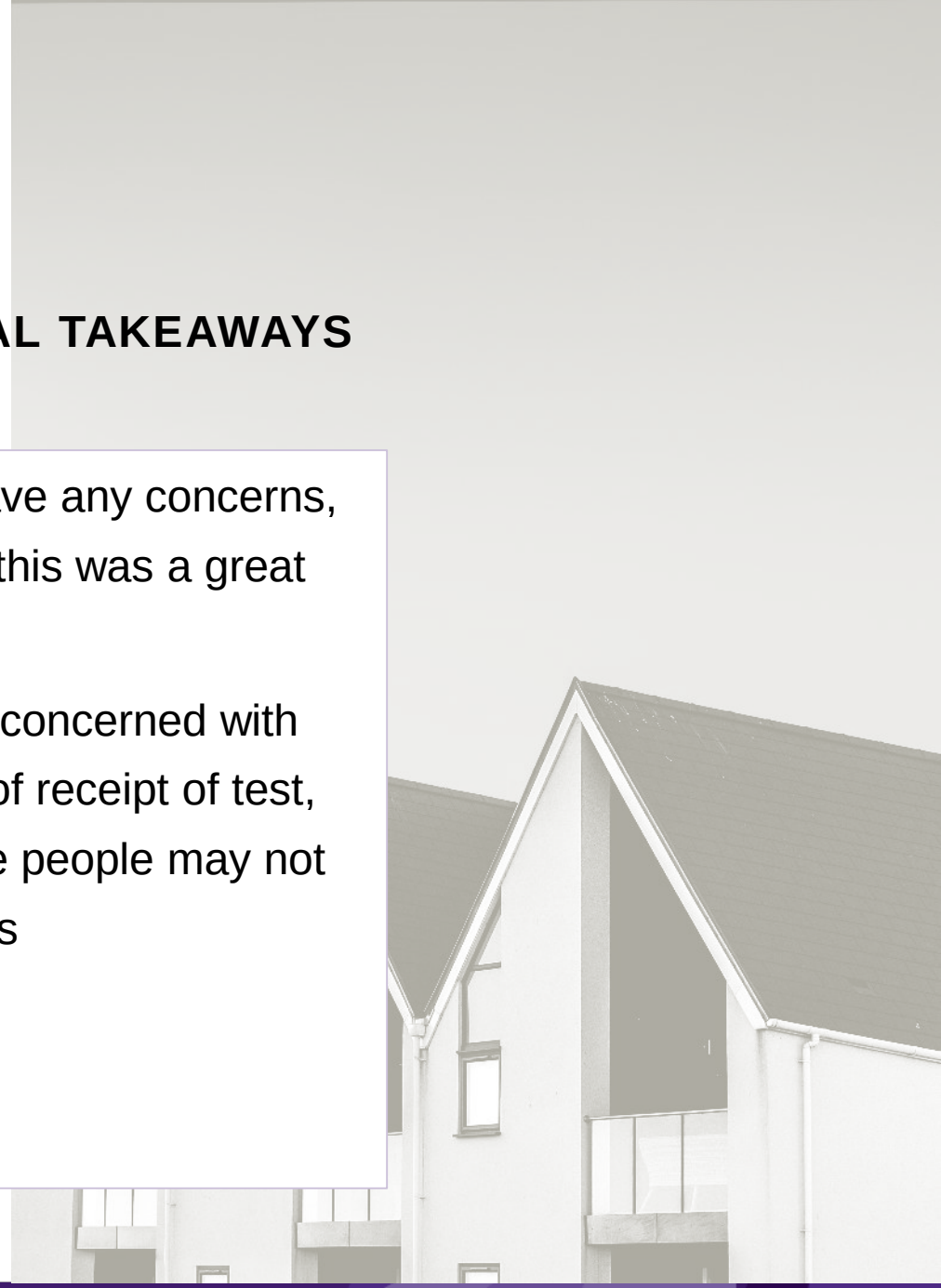
WHY DID THEY PREFER IT?

Driving Factors: Time to result, sample type

- “If you’re sick, you want to know right away, even if it’s a lower accuracy”
- Would be willing to buy 2 tests to make sure the results are correct
- Not worried about cost.

ADDITIONAL TAKEAWAYS TO NOTE:

- Didn’t have any concerns, they felt this was a great product.
- Was not concerned with method of receipt of test, but some people may not have cars



HOME USER 4

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : C (tele-observed)

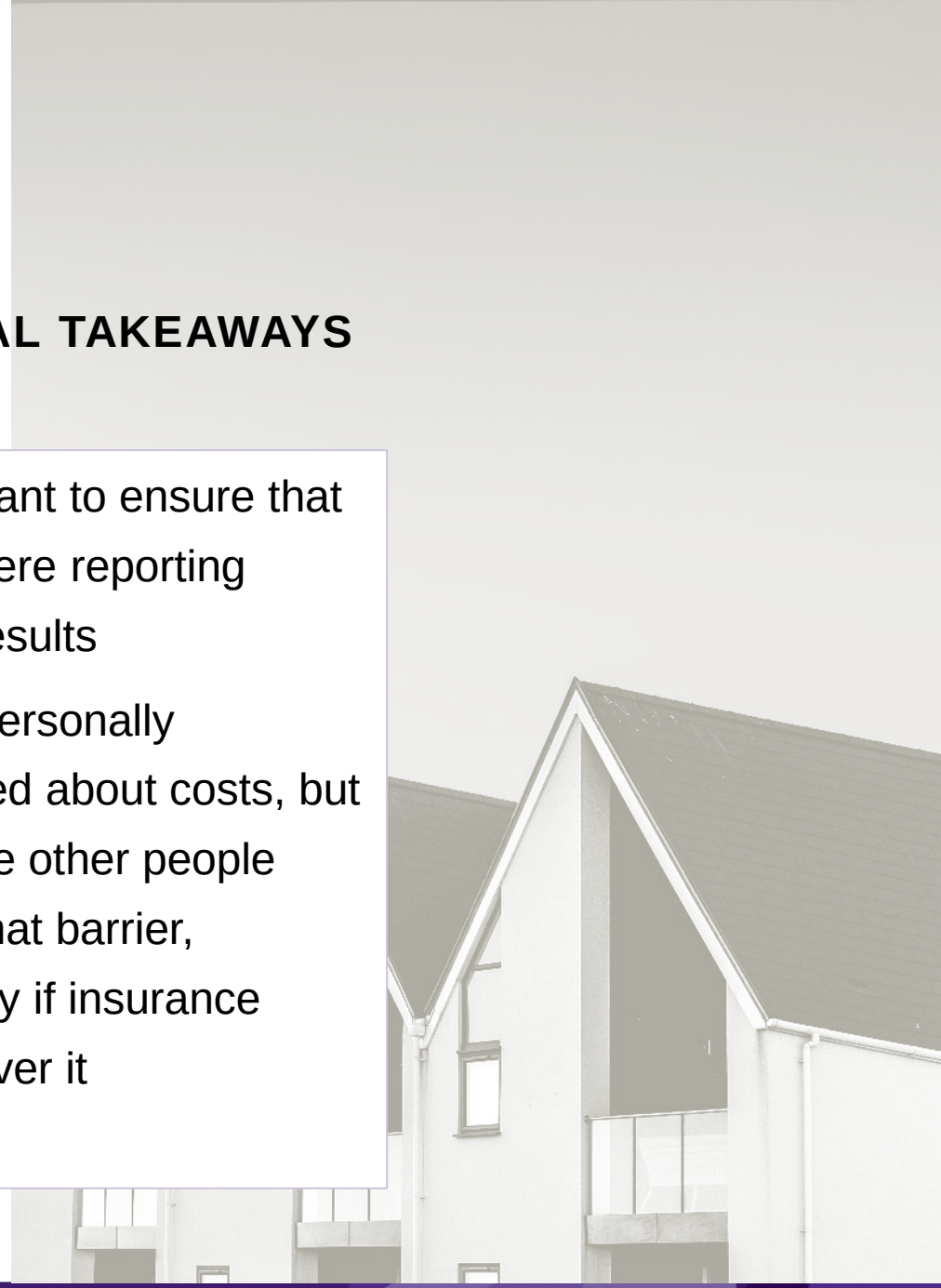
WHY DID THEY PREFER IT?

Driving Factors: Method, Sample Type, Mode

- Enjoyed having a professional watching him to ensure test was being used accurately
- Would trust the other people's results more, too
- Unconcerned about cost or time to receive the test, as he'd order many at once to have on hand

ADDITIONAL TAKEAWAYS TO NOTE:

- Would want to ensure that others were reporting proper results
- Wasn't personally concerned about costs, but could see other people having that barrier, especially if insurance didn't cover it



HOME USER 5

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Patient-Initiated

Product : 2

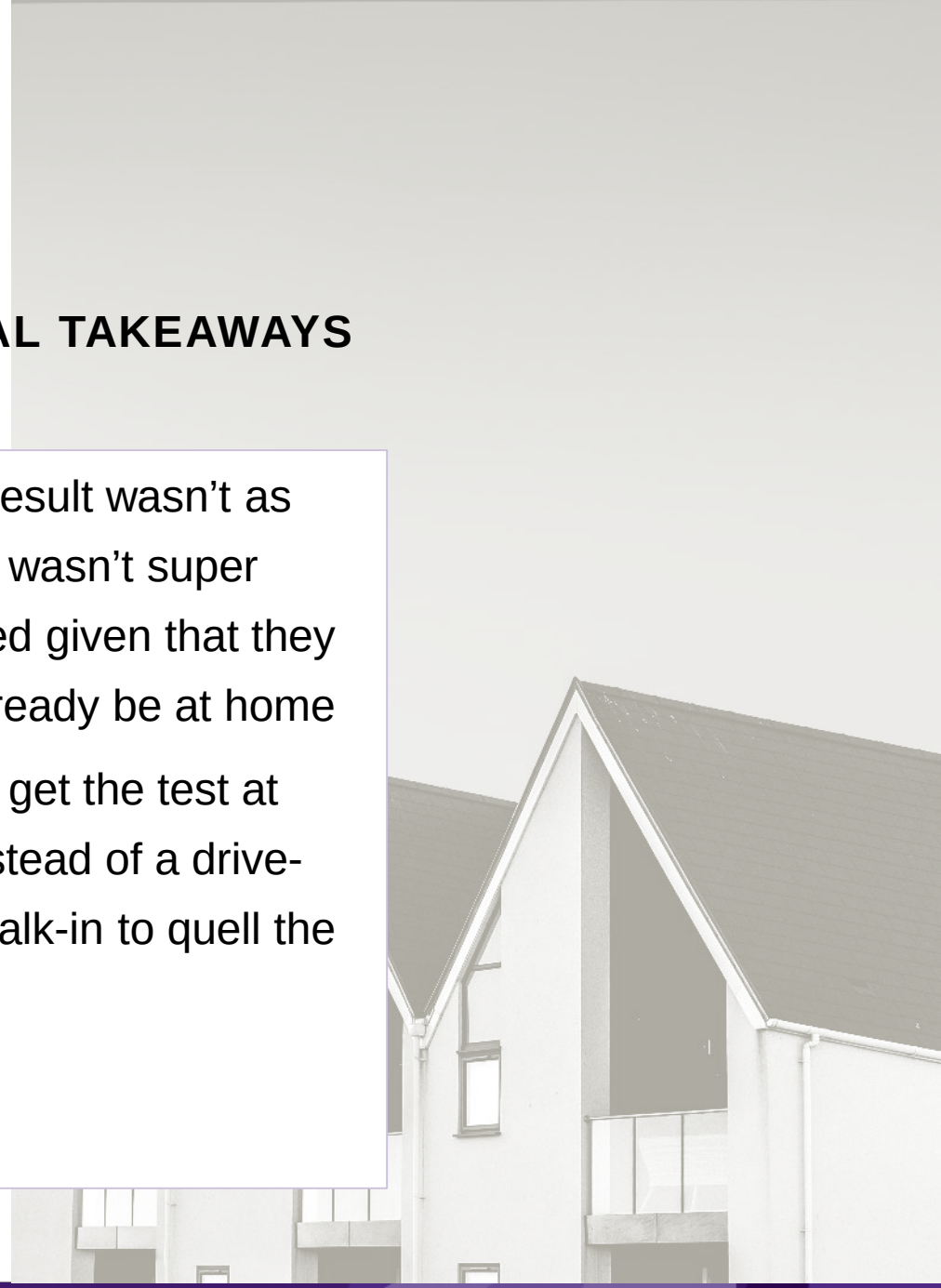
WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Sample Type, Cost

- Felt accuracy was the most important factor
- Liked the cost, especially when thinking about accessibility
- Preferred at home processing

ADDITIONAL TAKEAWAYS TO NOTE:

- Time to result wasn't as high, but wasn't super concerned given that they would already be at home
- Prefer to get the test at home instead of a drive-thru or walk-in to quell the spread



HOME USER 5

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : A

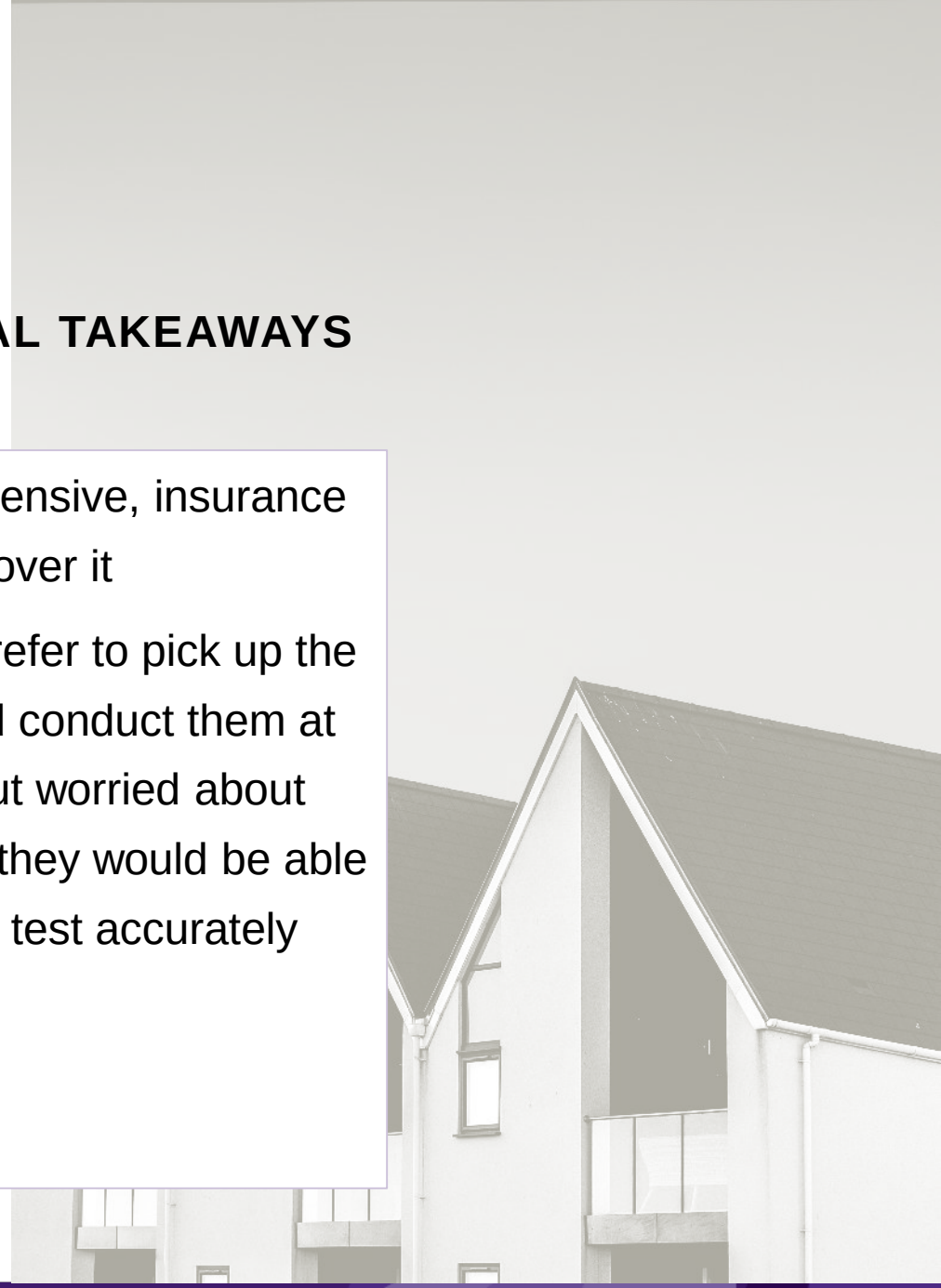
WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Time to result

- Loved the idea of a video appointment, but felt it wasn't worth the trade off in accuracy
- Felt the time to result was very important, but that 2 hours was unattainably short
- Confused about frequency

ADDITIONAL TAKEAWAYS TO NOTE:

- If it's expensive, insurance should cover it
- Would prefer to pick up the tests and conduct them at home, but worried about whether they would be able to do the test accurately



HOME USER 6

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Patient-Initiated

Product : 2

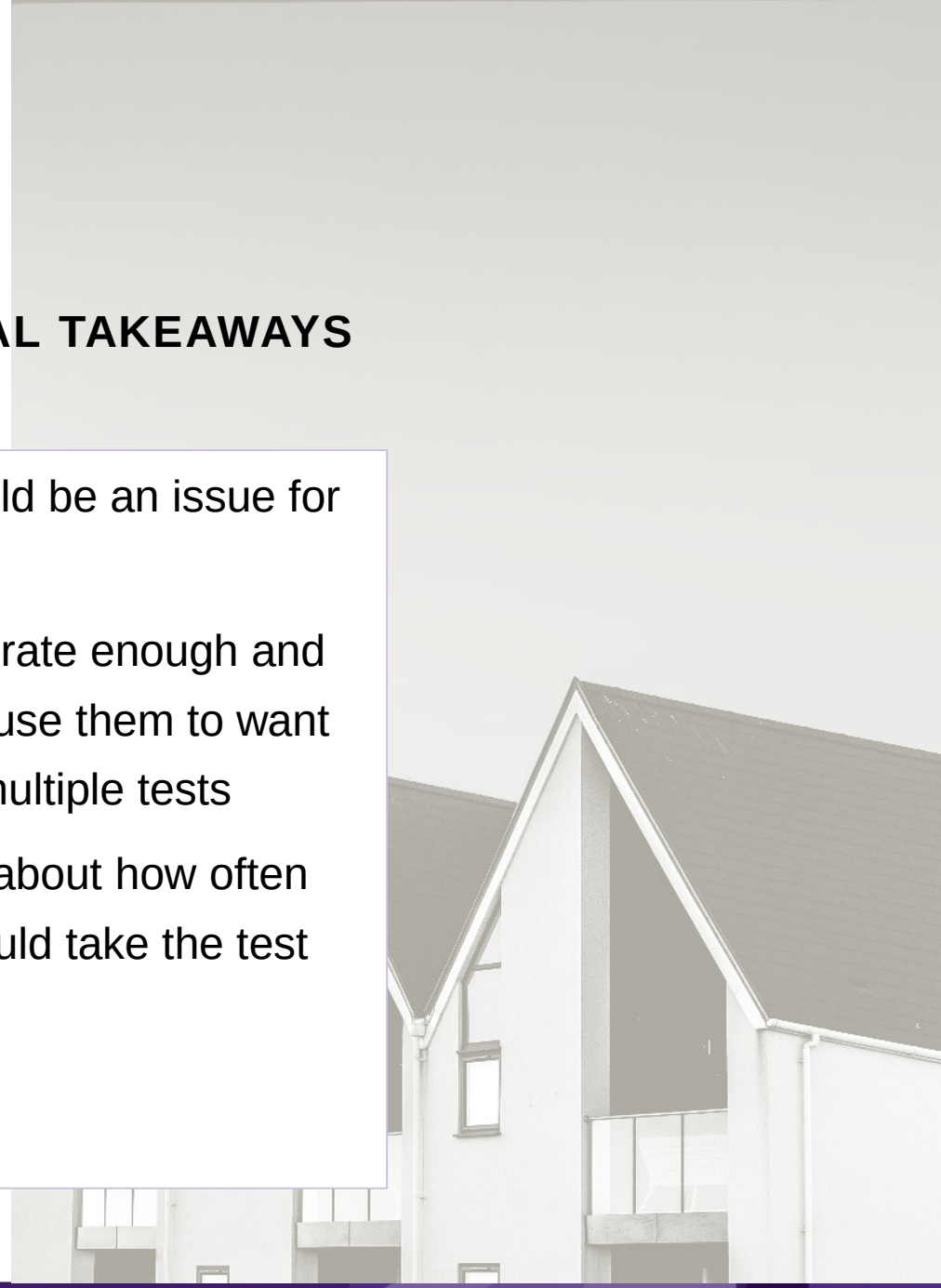
WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Cost, Sample Type

- Has really strong insurance, so wasn't worried about the cost. Also noted that there is no price they wouldn't pay to keep their family safe
- Was strongly against nasopharyngeal, saying they may be able to handle it, but not everyone would

ADDITIONAL TAKEAWAYS TO NOTE:

- Cost could be an issue for some
- Not accurate enough and could cause them to want to take multiple tests
- Unclear about how often they should take the test



HOME USER 6

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : C (tele-observed)

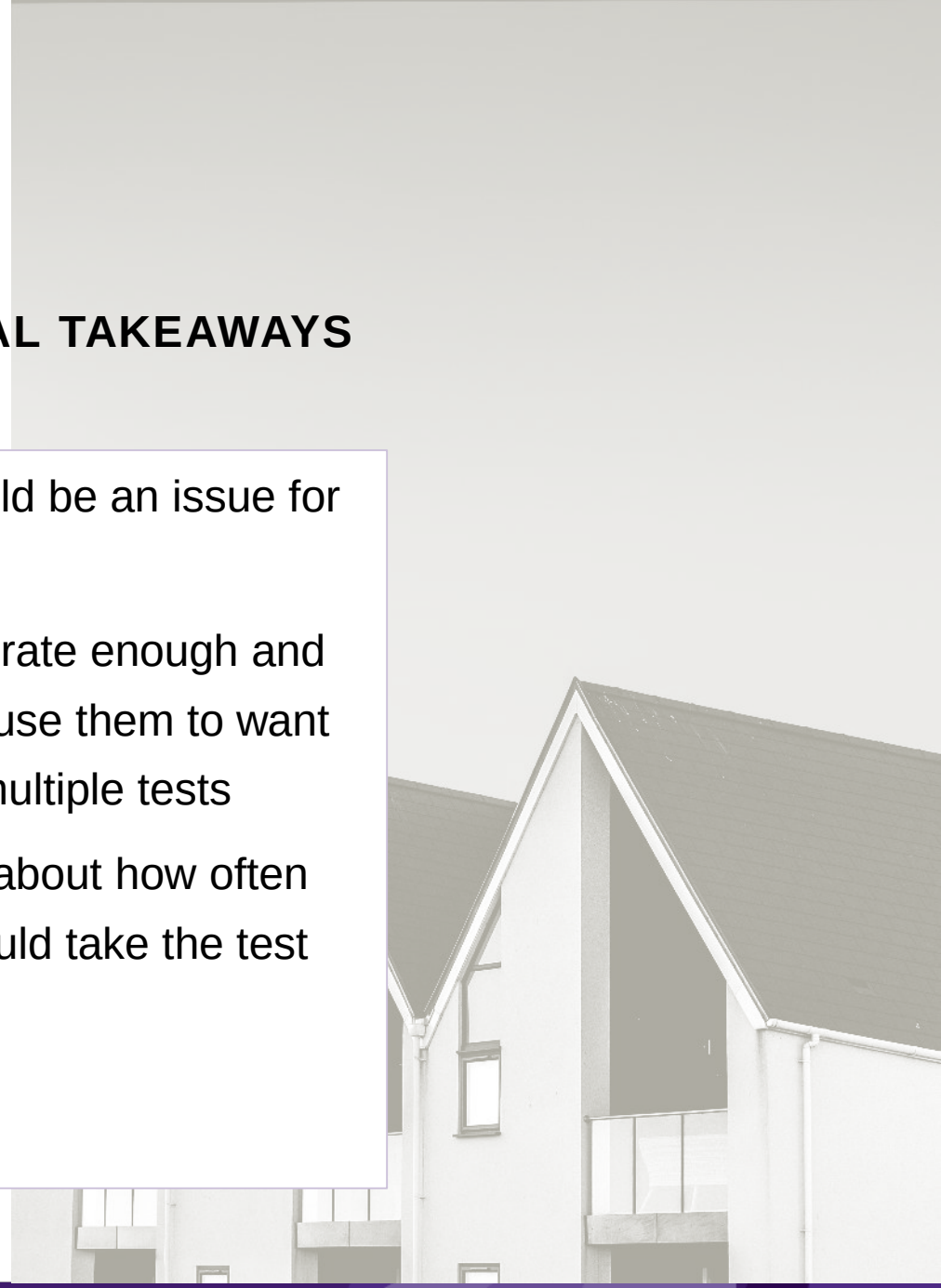
WHY DID THEY PREFER IT?

Driving Factors: Method, Accuracy, Time to Result

- Wanted to stock many of them in their house
- Wanted the doctor to be the only person able to interpret the results as a way to ensure community accountability
- Loved the doctor to ensure correct usage

ADDITIONAL TAKEAWAYS TO NOTE:

- Cost could be an issue for some
- Not accurate enough and could cause them to want to take multiple tests
- Unclear about how often they should take the test



HOME USER 7

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Patient-Initiated

Product : 2

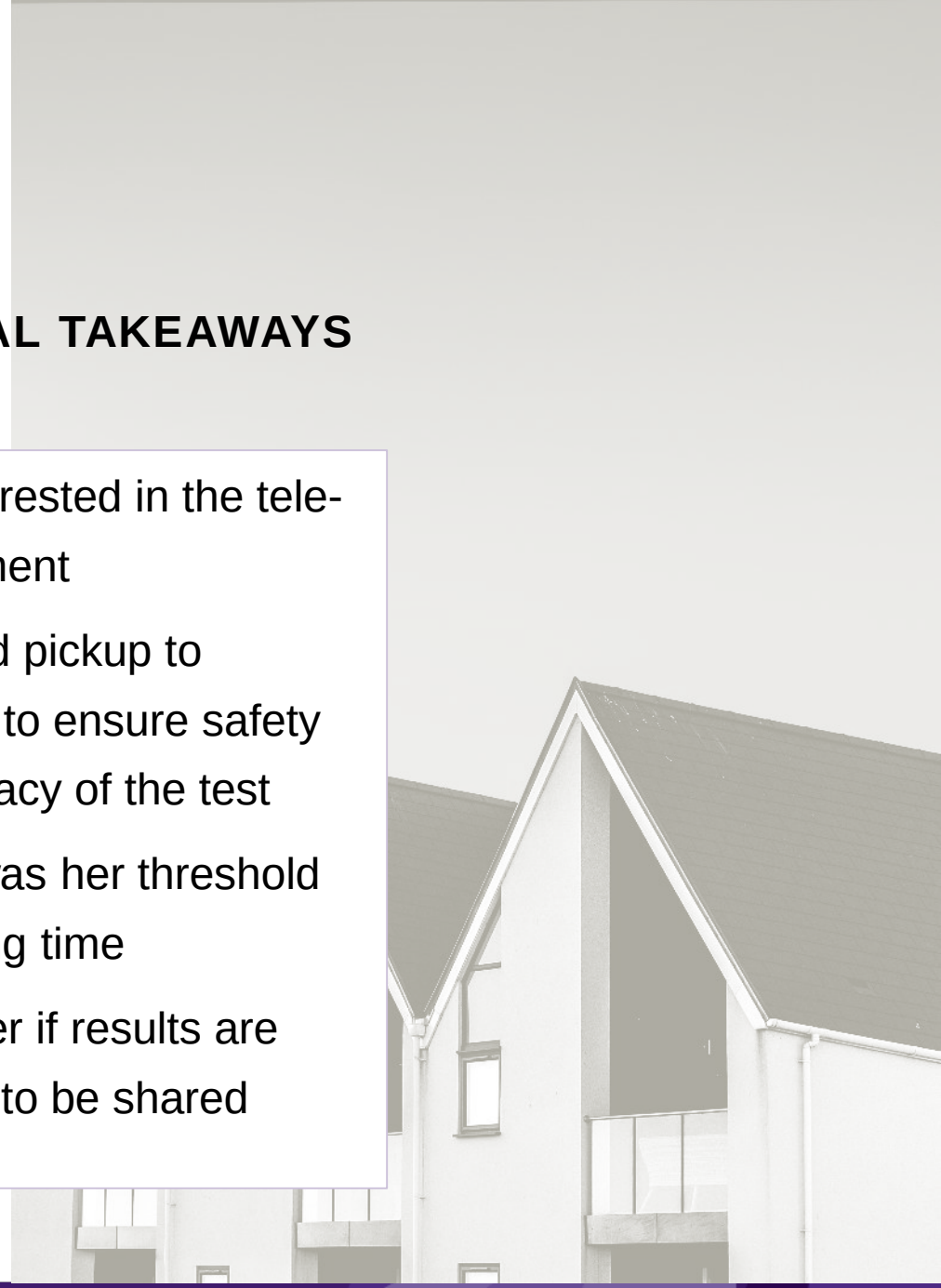
WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Time to Result, Sample Collection Site

- Comes into contact with many people at work, so wanted to ensure accuracy for their own safety as well as colleagues
- Wants someone else to do the test to ensure accuracy for laypeople

ADDITIONAL TAKEAWAYS TO NOTE:

- Very interested in the tele-appointment
- Preferred pickup to shipping to ensure safety and efficacy of the test
- 2 days was her threshold for waiting time
- Feel safer if results are required to be shared



HOME USER 8

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : C

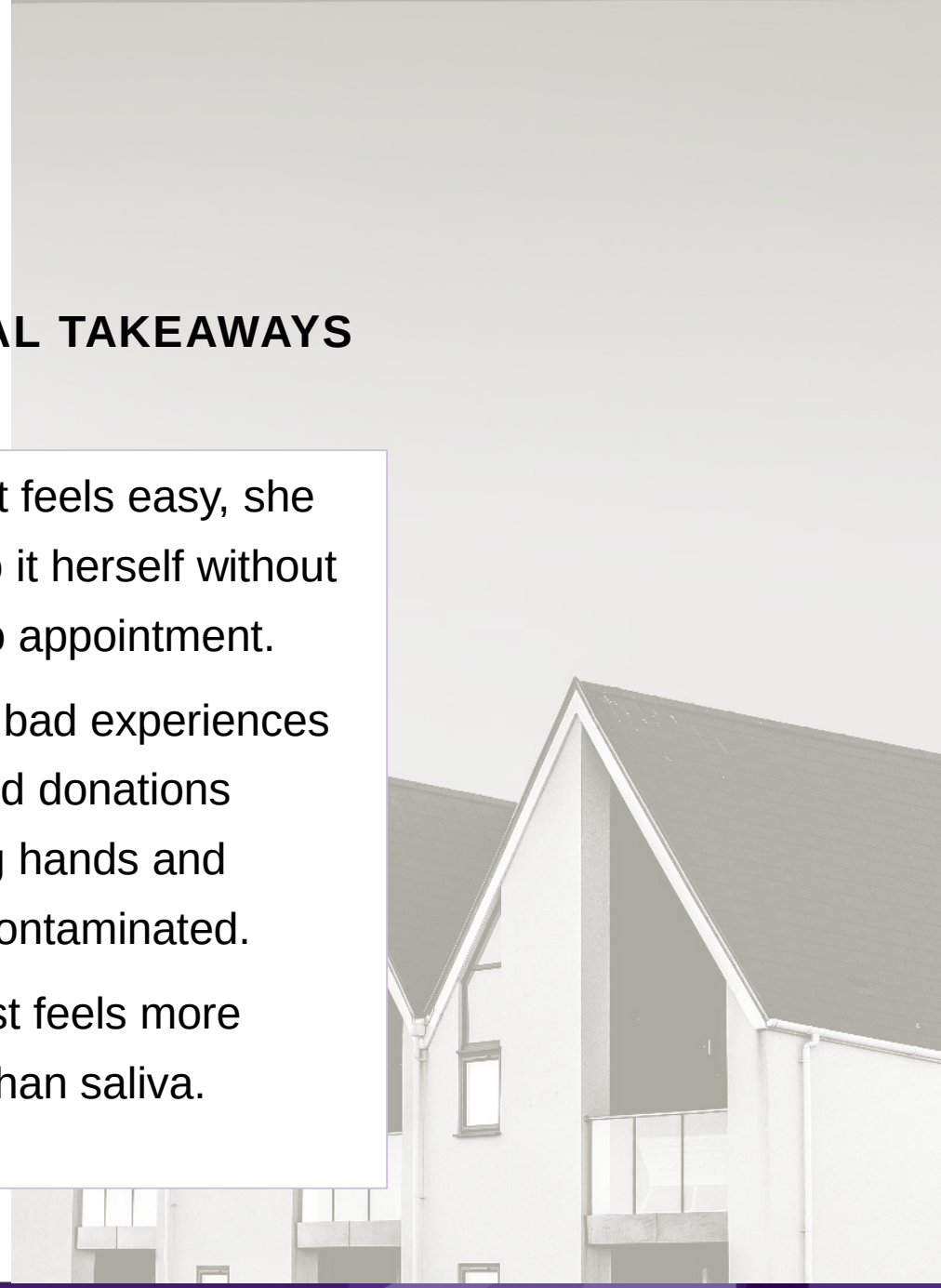
WHY DID THEY PREFER IT?

Driving Factors: Method, Obtaining Test

- Extremely interested in having a home test.
- Web purchase is untrustworthy, prefers CVS.
- Don’t want sample changing hands so much.
- Accuracy important but all these are fine.

ADDITIONAL TAKEAWAYS TO NOTE:

- If the test feels easy, she would do it herself without the video appointment.
- Has had bad experiences with blood donations changing hands and getting contaminated.
- Nasal just feels more reliable than saliva.



HOME USER 9

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : C (tele-observed)

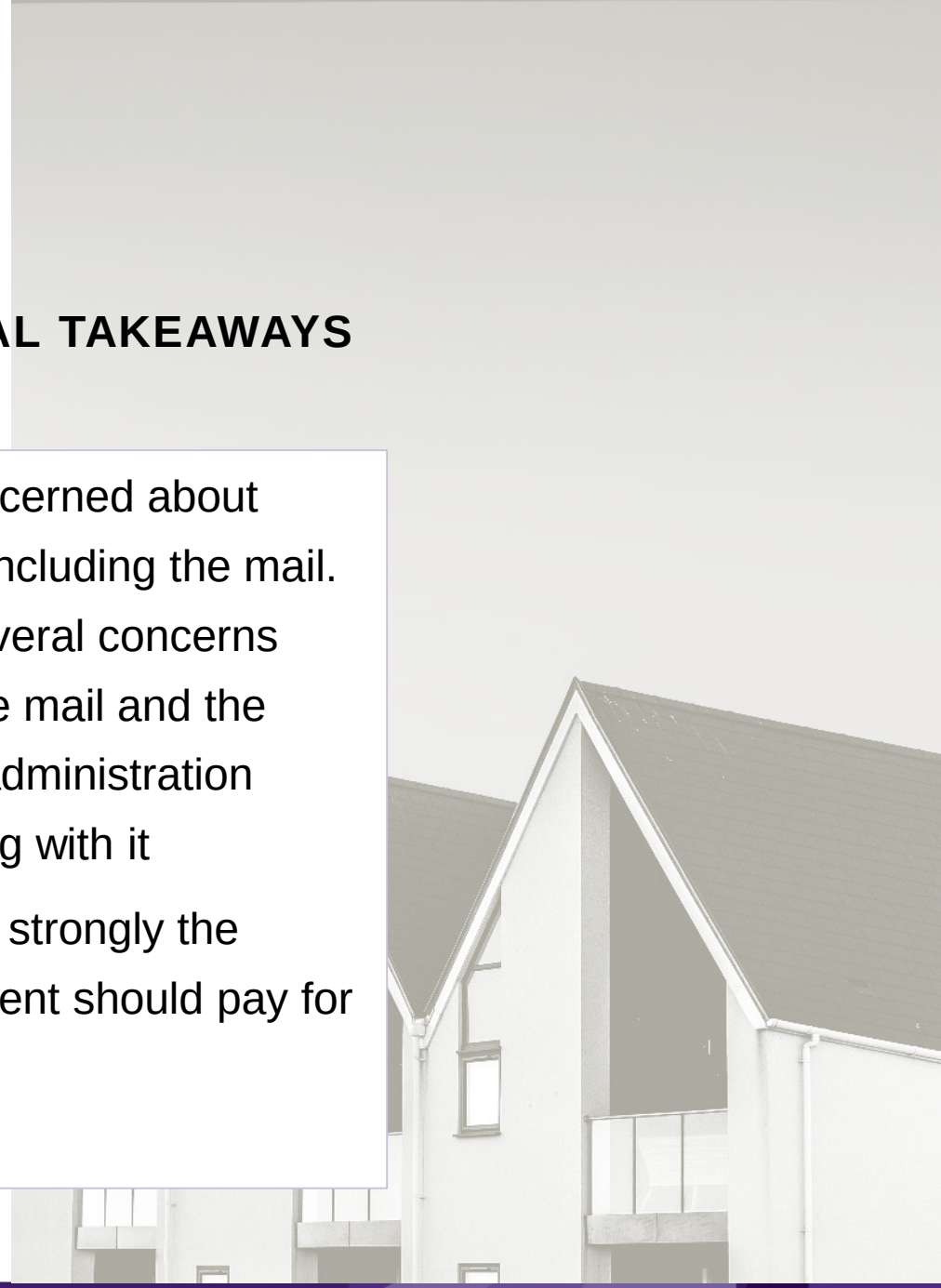
WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Method

- Loved the accuracy and the video appointment aspect for both their self as well as others. Thought it could help drive accuracy higher.
- Cited that the sample type was preferred to saliva especially for children and teens

ADDITIONAL TAKEAWAYS TO NOTE:

- Very concerned about options including the mail. Cited several concerns about the mail and the current administration tampering with it
- Felt very strongly the government should pay for al tests



HOME USER 10

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : C (tele-observed)

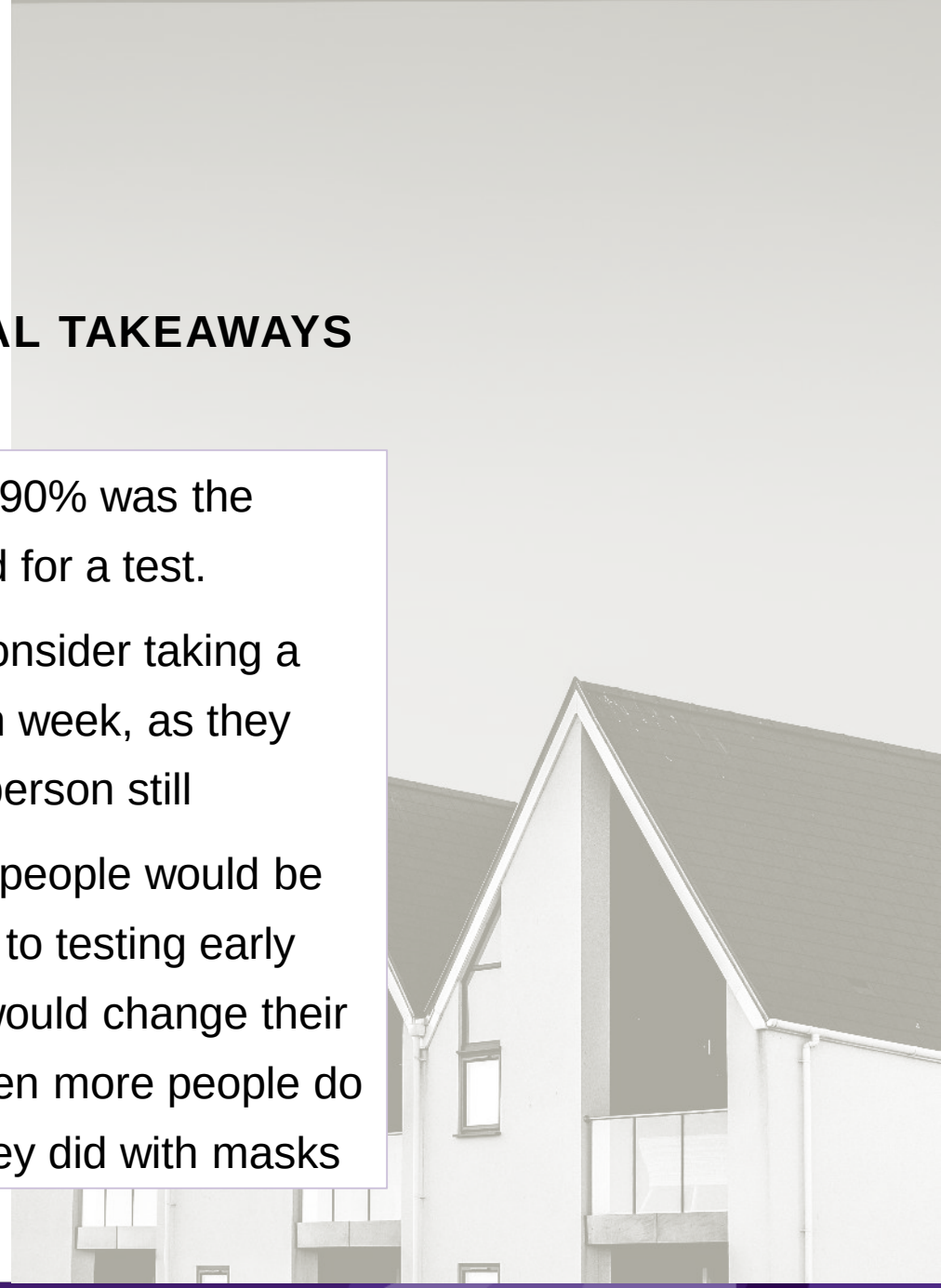
WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Time to Result

- Love to order many tests in advance for their family
- Very attracted to the idea of the video interview, as it would make him more confident in results
- 2 hour time to result was preferred

ADDITIONAL TAKEAWAYS TO NOTE:

- Felt that 90% was the threshold for a test.
- Would consider taking a test each week, as they work in person still
- Felt that people would be resistant to testing early on, but would change their mind when more people do it, like they did with masks



HOME USER 11

Home User

WHAT PRODUCT DID THEY PREFER?

Testing type: Home

Product : A (Mail-In)

WHY DID THEY PREFER IT?

Driving Factors: Accuracy, Method

- Wanted the highest accuracy test (95%), the others (80%, 90%) felt too low.
- Mail-in to a trustworthy lab more trustworthy than doing it all yourself.
- None of the other attributes were really factors.

ADDITIONAL TAKEAWAYS TO NOTE:

- Concerned about doing the test right if it's a saliva test. "Can I eat, drink? Do I have to cough?"
- Wanted video instructions with an actual user, not just graphics or diagrams.
- Would want the lab results in a text message or email format.