



Healthcare Research Essentials

Tools and Techniques in Life Sciences

PHRONESISPARTNERS
simplifygrowth

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Introduction

Advanced technology has transformed research methodologies in Healthcare Research into a dynamic, cross-disciplinary field that is essential to decision-making within Healthcare and Life Sciences. It has broadened the scope for exploring complex Healthcare challenges, and fostered a more inclusive and diverse research ecosystem.

Historically, Healthcare Research was primarily limited to academic institutions and large organizations, but now, small businesses, start-ups, and independent researchers are also conducting research. This has been accompanied by a growth in do-it-yourself (DIY) research methods and more accessible respondent pools, resulting in innovative approaches to research that deliver a broader range of perspectives.

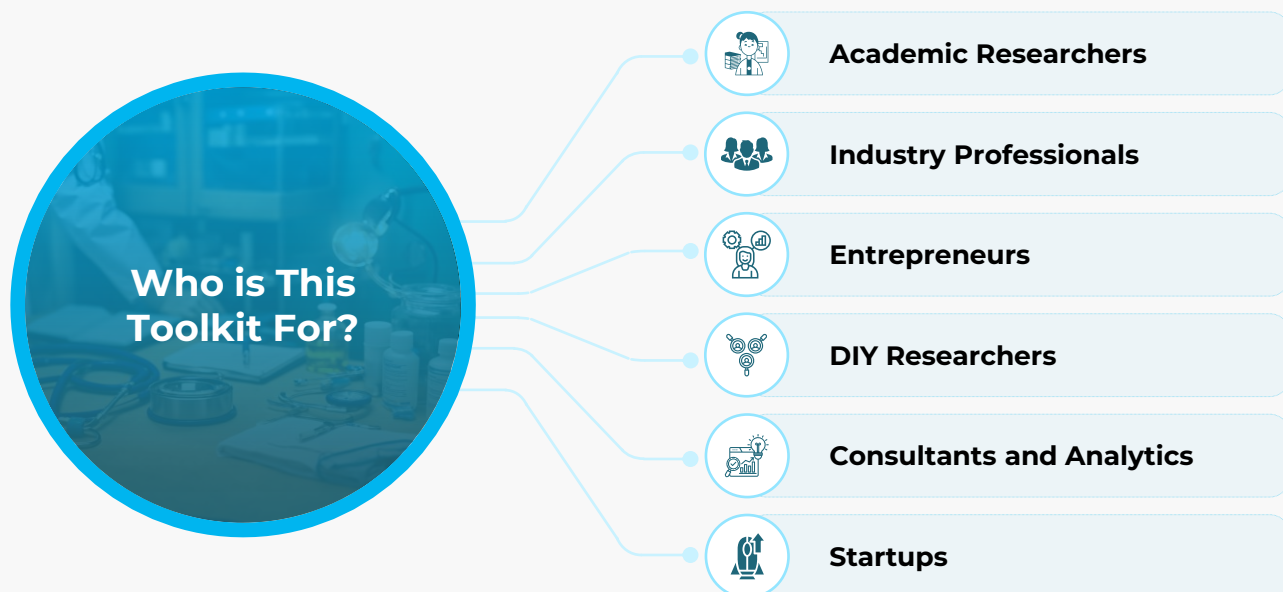
About the Phronesis Healthcare Toolkit

Healthcare Research essentials: Tools and techniques in Life Sciences explores the foundational insights of Healthcare Research and is the first in Phronesis Partners' Healthcare Toolkit series.

This series is a introductory guide to the evolving world of Healthcare and Life Sciences research, designed to shape the future of Healthcare and Life Sciences research by integrating traditional methodologies with cutting-edge approaches both for seasoned researchers and those new to research.

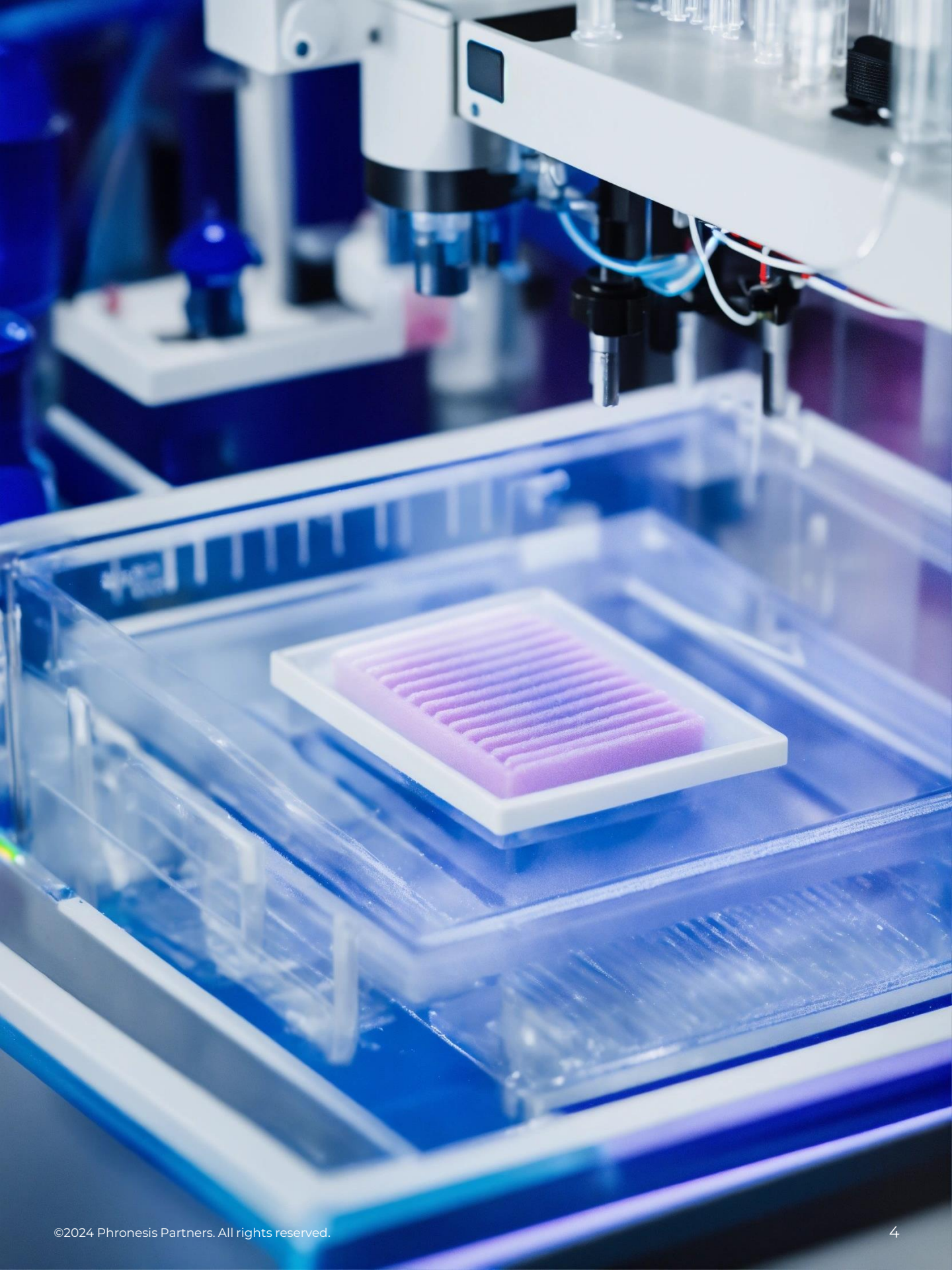
Future sections will cover:

- Audience selection
- Sampling methods
- Global perspectives in Healthcare Research



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1 The research process

The research process flow is crucial for understanding the Healthcare Research journey and typically follows core steps that are fundamental to the integrity and success of any study. These are outlined below.

While there are multiple approaches to conducting Healthcare Research, this Toolkit provides a structured and comprehensive guide to navigating its complexities effectively, and focuses on the essential steps.

Problem identification	Clearly define the Healthcare issue or question
 Literature review	Conduct an extensive review of existing research.
 Hypothesis formulation	Develop a testable hypothesis based on the problem and literature review.
 Methodology selection	Choose appropriate research methods (qualitative, quantitative, or mixed).
 Data collection	Gather data through surveys, experiments, or other means.
 Data analysis	Employ suitable statistical or analytical techniques.
 Results interpretation	Interpret the findings in the context of the hypothesis and research question.
 Conclusion and recommendations	Draw conclusions and suggest practical applications or further research areas.



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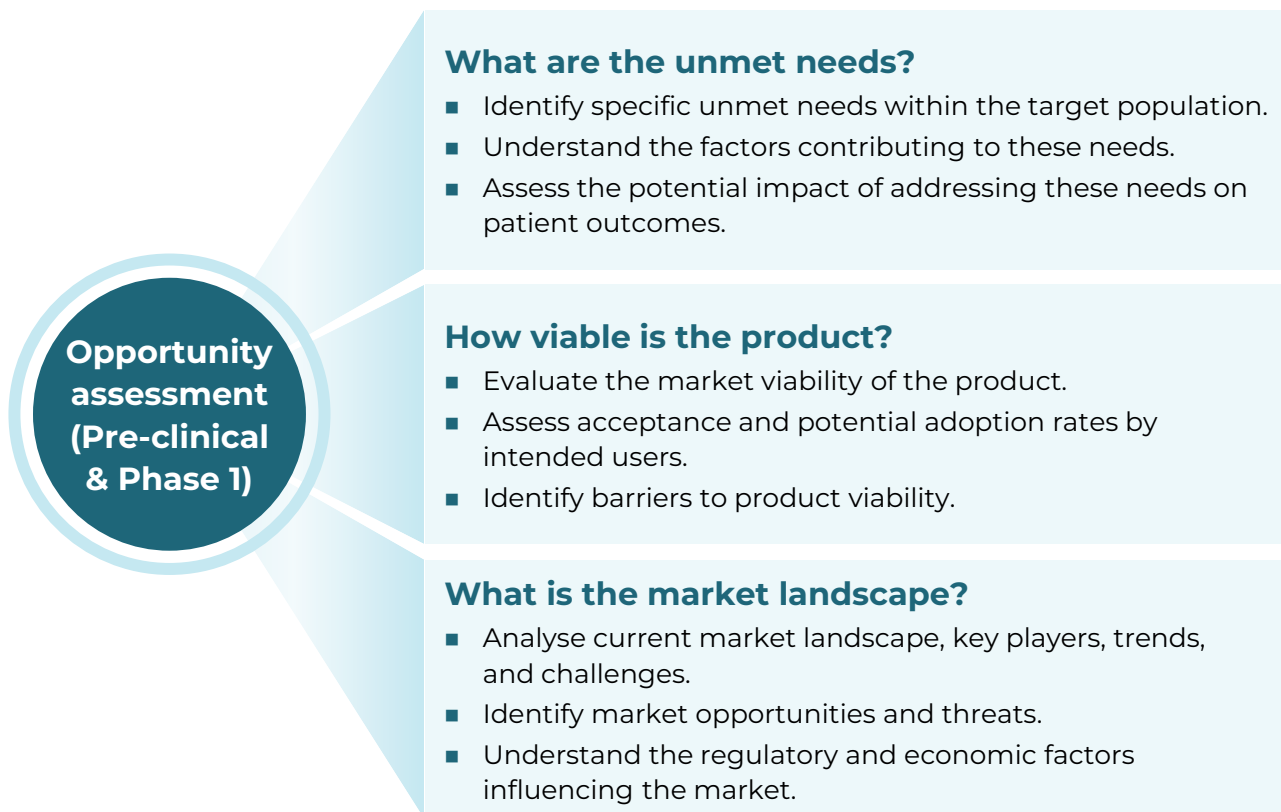
Translating business questions into Research

In Healthcare and Life Sciences market research, translating business questions into defined research objectives is complex. It involves detailed analysis of each aspect of the research, from the early stages of assessment through to the product launch. For example, converting a business query about patient engagement into a research objective could involve exploring patient communication preferences or their use of Healthcare technology. This could lead on to researching the effectiveness of digital communication tools and the impact of patient education on treatment adherence.

Care needs to be taken to ensure that the research objectives directly address the core business question, as misalignment or vague objectives can lead to irrelevant or unusable research outcomes.

To avoid this, it is essential to maintain clear, consistent communication with stakeholders, and to validate each step of the translation process to ensure alignment with the overall business goals.

Mapping of business questions to research objectives across healthcare research phases *(illustrative)*



**Market
landscape
& analysis
(Phase 2 to
Phase 3)**

What are the areas for growth in developed and emerging markets

- Identify specific unmet needs within the target population.
- Understand the factors contributing to these needs.
- Assess the potential impact of addressing these needs on patient outcomes.

What licensing opportunities are available?

- Evaluate the market viability of the product.
- Assess acceptance and potential adoption rates by intended users.
- Identify barriers to product viability.

**Product
offering & brand
development
(Phase 3 to
Launch)**

How to best design clinical trials?

- Evaluate existing clinical trial designs.
- Identify innovative and efficient approaches to clinical trials.
- Assess the feasibility and potential success factors of a range of clinical trial designs.

What could be the optimum ideal product profile?

- Explore key features and attributes for an optimal product profile.
- Assess consumer preferences and expectations.
- Identify the critical elements contributing to an ideal product profile.

**Product
launch &
beyond
(Phase 4 to
Launch)**

What is the market share?

- Quantify and analyse the current market share of the product.
- Compare market share with industry competitors.
- Identify the factors influencing market share and areas for improvement.

How is the advertising campaign performing?

- Evaluate the effectiveness of current advertising campaigns.
- Measure brand awareness and recall generated by advertising efforts.
- Assess the impact of advertising on consumer perception and behavior.



3

Selecting the Right Analytical Techniques

It's crucial to align advanced analytical methods with specific Healthcare Research goals. This is essential when exploring areas such as understanding patient communication preferences or examining the use of healthcare technology.

This section details analytical techniques, their applications, associated risks, and strategies for mitigation, within the specific context of Healthcare and Life Sciences. Ensuring that the method selected aligns precisely with research goals helps avoid the pitfalls of misalignment, and maintains the integrity of the results.

Technique	Application in research phase	Primary research example	Risks	Mitigation strategies
Factor analysis	■ Opportunity assessment	■ Analysing patterns in patient medication adherence	■ Misidentification of latent variables ■ Overfitting	■ Adequate sample size ■ Validate findings ■ Involve experts
Cluster analysis	■ Market landscape ■ Market analysis	■ Segmenting patient populations in market analysis	■ Arbitrary clusters ■ Outliers	■ Multiple methods ■ Standardize data
Perceptual mapping	■ Product offering ■ Brand development	■ Mapping product perceptions for optimizing product profile	■ Bias in data ■ Missing nuances	■ Test different axes ■ Cross-verify data
Regression analysis	■ Product launch ■ Post-product launch	■ Predicting market share changes or advertising impact	■ Overfitting ■ Multicollinearity	■ Train-test splits ■ Domain knowledge
Discriminant analysis	■ Product offering ■ Brand development	■ Classifying patient risk for targeted clinical trials	■ Assumption violations ■ Misclassification	■ Check for linearity ■ Check for Regularization
Logistic regression	■ Product launch ■ Post-product launch	■ Assessing likelihood of vaccine side effects	■ Overfitting ■ Non-linearity in predictors	■ Predictor transformation ■ Regularization
Conjoint analysis	■ Product offering ■ Brand development	■ Evaluating valued features in medical imaging devices	■ Cognitive overload ■ Misinterpretation	■ Limit attributes ■ Involve experts



4

An in-depth view of analytical techniques

Factor analysis in Healthcare research

Factor Analysis is a sophisticated tool widely used in Healthcare Research to uncover hidden relationships within large sets of variables. Its effectiveness lies in revealing latent variables that influence patient behaviors, such as medication adherence, treatment compliance, or patient satisfaction.

Risk factors: This technique runs the risk of misidentifying latent variables and overfitting the data.

Mitigation strategies: It is essential to employ validation techniques to ensure the validity and reliability of the findings. This involves using separate, independent data sets to confirm that the factors uncovered are not just artifacts of a specific sample, but are generalizable and representative of the broader patient population.

Primary research example: Researchers can identify underlying factors that impact patient outcomes by applying factor analysis to survey data on different aspects of patient care, such as medication dosage and side effects, lifestyle choices and personal health experiences.

Cluster Analysis for patient segmentation

Cluster Analysis is particularly valuable in healthcare for segmenting patient populations into meaningful groups based on shared characteristics. This method provides a detailed understanding of patient needs and responses, enabling Healthcare providers to tailor their approaches effectively.

Risk factors: This is a powerful technique, but care must be taken to ensure that the resulting clusters are statistically sound, clinically meaningful, and actionable.

Mitigation strategies: Researchers should aim for clusters that offer insights into patient care and treatment, and align with practical Healthcare objectives, to provide clear direction for medical interventions

Primary research example: Cluster Analysis could be used in a study of diabetic patients to create patient segments based on factors like genetic markers, lifestyle habits, or responses to different treatment regimes.

4

An in-depth view of analytical techniques

Perceptual Mapping in product development

Perceptual Mapping is a strategic tool in healthcare market research, particularly useful for product development and brand positioning. It graphically represents how consumers perceive different products or services, providing insights into areas like product attributes, quality, and overall satisfaction.

Risk factors: This technique requires careful consideration of potential biases in data collection and analysis.

Mitigation strategies: Researchers need to ensure that the data accurately reflects the diversity of patient experiences and preferences, avoiding overgeneralization and capturing the nuances of patient perceptions.

Primary research example: Researchers could use perceptual mapping in a study on prosthetic devices to illustrate how different brands are perceived in terms of functionality, comfort, and aesthetics. This visual representation helps companies understand their competitive position and identify areas for product improvement.

Regression analysis in Healthcare forecasting

Regression analysis is a cornerstone of predictive analytics in Healthcare Research, and encompasses a range of forms including linear, logistic, and multiple regression. It is used to establish relationships between variables and predict outcomes. The choice of regression model depends on the nature of the dependent variable and the specific research question.

A key risk of regression analysis is overfitting, where the model is too closely fitted to the sample data and may not perform well on new data. Techniques such as cross-validation can help ensure the model's applicability to broader patient populations.

Primary research example: Linear regression can be used to model the relationship between treatment methods and patient recovery rates. Logistic regression can be employed to predict the probability of disease occurrence based on patient demographics and health history.

4

An in-depth view of analytical techniques

Discriminant analysis versus other classification methods

Discriminant analysis is a valuable classification tool in Healthcare Research, often used in conjunction with, or as an alternative to, other methods like logistic regression or decision trees. Each method has its strengths and is chosen based on the specific requirements of the research.

Researchers need to carefully consider the assumptions underlying each method and the nature of the data to choose the most appropriate technique for their specific research question. Logistic regression is typically used for binary classification problems, such as diagnosing a disease as present or absent.

Primary research example: Discriminant analysis is particularly useful for classifying individuals into multiple categories, making it ideal for situations where patients need to be categorized into various risk groups or treatment categories based on a combination of clinical and demographic factors.

Logistic regression in Healthcare studies

Logistic regression handles binary outcomes and provides probabilities, offering a nuanced understanding of risk factors.

Primary research example: In studying hospital readmission rates, researchers might analyse a range of variables, including patient age, prior health conditions, length of hospital stay, and the nature of the treatment received, to predict the likelihood of a patient being readmitted. Such a model could help Healthcare providers identify patients at high risk of readmission and develop targeted interventions to improve patient outcomes and reduce readmission rates.

5

Conjoint analysis and MaxDiff in preference studies

Conjoint and maximum difference (MaxDiff) analysis can cause confusion because of their overlapping function of identifying preferences. It is essential to address this overlap, as these Techniques can profoundly influence the effectiveness and efficiency of research initiatives in the Healthcare and Life Sciences sector. Here we outline the unique characteristics and applications for each, and provide examples of where to use each method.

Conjoint analysis: Unravelling Complex Preferences

Conjoint analysis is a robust method for evaluating the relative importance of various attributes of Healthcare products or services. It simulates real- world decision-making by asking respondents to rank or rate different combinations of attributes presented in product profiles.

This method is particularly useful when detailed insights into attribute interactions and preferences are essential. It provides a nuanced perspective of how different attributes are valued in relation to each other.

Primary research example: When evaluating a new medical device, Conjoint Analysis can present a combination of attributes such as cost, ease of use, and durability for respondents to rank. This process helps researchers understand the trade- offs that Healthcare professionals or patients are willing to make, and give deep insights into what drives these choices.

A practical application of Conjoint Analysis in Healthcare involves evaluating preferences for a new digital health tool. Researchers can present features including user interface design, functionality, data security, and integration capabilities, to determine which are most valued by healthcare providers or patients.

MaxDiff Analysis: Simplifying the complexity of choice

MaxDiff Analysis is appropriate for determining the relative importance of a broad range of items or attributes, and where directly ranking them would be complex or overwhelming for respondents.

In a MaxDiff survey, participants are shown sets of items and asked to indicate the most and least important items in each set. This simplifies the task for respondents, particularly when dealing with a large number of attributes, and produces more reliable data.

Primary research example: In Healthcare Research, MaxDiff can be employed to understand patient priorities in a hospital setting. Patients are presented with a range of aspects of their hospital experience, such as service efficiency, and quality of medical care, facilities and communication with Healthcare providers. By identifying the most and least important aspects in each set, researchers can gain clear insights into what matters most to patients. This information can be used to guide improvements in patient care and hospital management.

Choosing between Conjoint Analysis and MaxDiff

The choice between Conjoint Analysis and MaxDiff should be based on your research objectives and the decision-making process being studied.

Conjoint Analysis is more suitable when you need a detailed understanding of how individual attributes impact overall preference, especially when you're interested in attribute interactions. It is ideal for scenarios where the number of attributes is relatively manageable and you want to understand complex preference structures.

When to use Conjoint Analysis

When evaluating a new pharmaceutical product, where understanding the nuanced preferences for efficacy, side effects, dosage frequency, and price is critical.

When to use MaxDiff

When the research deals with many attributes, and the main goal is to identify the most and least important, this method minimizes cognitive load. It is particularly effective in providing clear, actionable insights for prioritizing features or aspects in Healthcare services or products.

Choose MaxDiff for studies like evaluating patient satisfaction across a wide range of service elements in a Healthcare facility. This is especially suitable when there are many attributes, making a detailed conjoint study impractical.



6

Ethical Considerations

A commitment to established ethical guidelines and close collaboration with ethics committees are essential to research design. This ensures that Healthcare data is collected and used in a way that meets the highest ethical standards.

These ethical considerations are fundamental to responsible Healthcare Research. Careful implementation maintains the ethical integrity of studies and builds trust between researchers and participants. This ultimately contributes to advancing knowledge in the Healthcare and Life Sciences sector.

The key ethical considerations are:

Informed consent

1

Securing informed consent from study participants is an ethical imperative. Researchers must ensure that participants have a comprehensive understanding of the research's purpose, procedures, potential risks, benefits, and the voluntary nature of their involvement. It is also essential to administer informed consent in a way that is culturally sensitive and language-appropriate to ensure that participants are able to make informed decisions about their participation.

Confidentiality and privacy

2

Safeguarding the confidentiality and privacy of participants' personal information and data is a non-negotiable ethical principle. Researchers should implement robust, anonymization techniques, employ secure data storage methods, and strictly adhere to data protection regulations. To uphold participants' privacy rights and prevent data breaches it is essential to comply with legal frameworks such as the General Data Protection Regulation (GDPR).

Minimizing harm and maximizing benefits

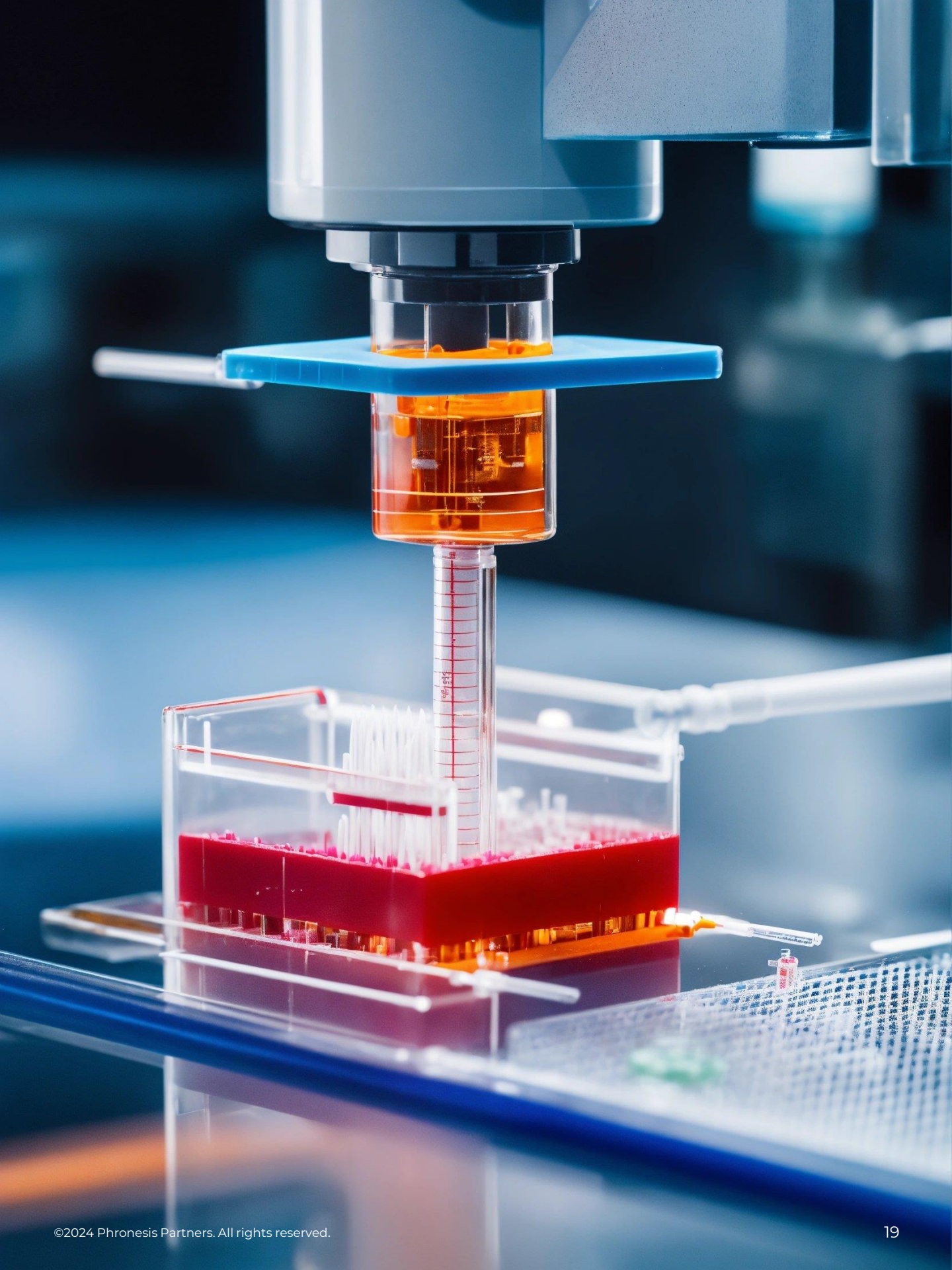
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Researchers are responsible for ensuring that the potential benefits of participating in a study outweigh any potential harm or discomfort, with robust risk assessment procedures in place. It is essential that a participant's well-being is monitored throughout the study, to identify any adverse effects immediately. Researchers should also be prepared to provide appropriate support or referrals to a participant if needed, to mitigate any further potential harm.

Fair participant selection

4

Fair participant selection requires an ethical foundation to prevent discrimination or bias within Healthcare Research. Researchers must establish clear and transparent criteria for participant inclusion or exclusion. To ensure the integrity of the participant selection processes, all eligible individuals should have an equal opportunity, with any potential conflicts of interest diligently identified and addressed.



7

Analysis and Interpretation

Robust data analysis is a critical part of Healthcare Research. To ensure robust and reliable data analysis in Healthcare Research, the following best practices should be followed:



Data cleaning and preparation

Check for outliers, missing values, and inconsistencies to thoroughly clean and prepare the data. Apply appropriate data transformations and normalization techniques as needed.



Appropriate analytical techniques

Select analytical techniques that align with the research objectives and nature of the data collected. This may include descriptive statistics, inferential statistics, regression analysis, survival analysis, or qualitative data analysis methods.



Use of validated tools and software

Use validated tools, scales, and measurement instruments when applicable. Leverage statistical software packages and qualitative analysis software to streamline the analysis process and ensure accuracy.



Robust statistical methods

Employ appropriate statistical tests and methods to analyze the data. This may involve hypothesis testing, correlation analysis, regression modeling, or advanced techniques such as machine learning or data mining, depending on the research questions and data characteristics.



Interpretation within context

Interpret the findings within the broader context of the research objectives, relevant literature, and industry-specific knowledge. Consider the limitations, assumptions, and potential biases associated with the analysis.



Validation and peer review

Seek validation and feedback from peers, subject matter experts, and colleagues to ensure the validity and reliability of the data analysis. Peer review enhances the credibility and rigor of the research outcomes.

7

Analysis and Interpretation

The ultimate goal of Healthcare Research is to inform and guide business decisions. Translating research findings into actionable insights involves the following steps:



Identify key findings

Identify the most relevant and significant findings from the research analysis. Focus on insights that have direct implications for business strategies, operational improvements, or policy decisions.



Contextualize findings

Place the research findings within the broader business context, taking into account market dynamics, industry trends, competitive landscape, and stakeholder perspectives. Consider how the findings align with the client firm's goals and priorities.



Business impact assessment

Evaluate the potential impact of the research findings on key business outcomes, such as revenue growth, cost optimization, customer satisfaction, or market positioning. Assess the feasibility and practicality of implementing changes based on the research findings.



Collaboration and decision-making

Engage stakeholders, including decision-makers, executives, and subject matter experts, in collaborative discussions to review the research findings and jointly make informed business decisions. Foster a multidisciplinary approach that incorporates diverse perspectives.



Implementation planning

Develop a comprehensive implementation plan that outlines the specific actions, timelines, responsibilities, and resource requirements needed to execute the recommended strategies based on the research findings.



Conducting effective Healthcare Research is a complex and dynamic process that demands rigorous planning, meticulous execution, and steadfast commitment to ethical principles. The journey begins with the critical step of translating business inquiries into defined research objectives. This sets the stage for the subsequent tasks of data collection, analysis, and interpretation. Each phase is integral, contributing significantly to the overarching goal of guiding pivotal decisions in the Healthcare and Life Sciences industry.

The landscape of Healthcare Research is one of continual transformation, propelled by ground-breaking technologies, ever-changing patient needs, and an increasing focus on data-centric decision-making. By fostering collaboration, nurturing dedication, and upholding a staunch dedication to ethical research practices, we can all contribute to shaping a healthier and more informed future for everyone.

Future insights on selecting the appropriate audience and sampling methods in Healthcare Research will also explore the crucial considerations for global research initiatives in Healthcare and Life Sciences.

Explore our services and access additional resources through [Phronesis Partners' Health and Life Sciences Research](#) which provides expert guidance and comprehensive insights in this field.

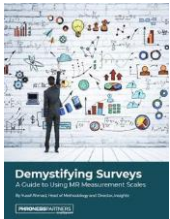
About Phronesis Partners

Phronesis Partners, including our group companies, Simplify Growth and Fuld & Company, is a global research and analytics firm. We deliver high-quality, best-in-class corporate, industry and market research to many of the world's largest research and consulting firms, private equity firms, financial institutions, and publishers.

Our research is both diverse and impactful, helping clients address many of their most complex problems. Be it understanding performance improvement areas in a global management consultancy, building a complex financial models for a Silicon Valley unicorn, or developing a comprehensive Brand index for the world's top brands, our clients rely on us for some of the most complicated research questions across industries.

More about Market Research techniques

Demystifying Surveys:



A Guide to Using B2B Market Research Measurement Scales

[This guide](#) dives deep into the nuances of measurement scales – from the common Likert-type and Semantic Differential Scales to the unique Stapel's Scale. It explores important considerations such as the balance, nature, and types of scales and their implications for analysis when creating market research.

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