

Healthcare Research Essentials Tools and Techniques in Life Sciences

FULD & COMPANY Delivering competitive advantage

## 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 Fuld's Healthcare Research Essentials**

Healthcare Research Essentials: Tools and Techniques in Life Sciences is a comprehensive introduction to the foundational insights of healthcare research. This resource bridges traditional methodologies with cutting-edge approaches, offering expert guidance to both seasoned researchers and newcomers in the field. By exploring essential tools and techniques, it aims to shape the future of healthcare and life sciences research, helping professionals stay at the forefront of this rapidly evolving industry.

# CONTENTS



©2024 Fuld & Company. All rights reserved.

## The research process

1

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, Healthcare Research Essentials 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.



## 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)

#### What are the unmet needs?

- 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.

Opportunity assessment (Pre-clinical & Phase 1)

2

#### How viable is the product?

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

#### What is the market landscape?

- Analyze current market landscape, key players, trends, and challenges.
- Identify market opportunities and threats.
- Understand the regulatory and economic factors influencing the market.

Market landscape & analysis (Phase 2 to Phase 3)

Product offering & brand development (Phase 3 to Launch)

# 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.

#### 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.

#### What is the market share?

- Quantify and analyze 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.

Product launch & beyond (Phase 4 to Launch)



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

3



- 3180 1 292.VO

546140 - 130 SU301 - 57

ZONDERD

SIG60 - SP

#### 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.

**Risk factors:** 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.

**Mitigation strategies:** 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 analyze 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.

## 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.

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 gives deep insights into what drives these choices.

**Primary research example:** 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.

5

## Conjoint analysis and MaxDiff in preference studies

#### 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

5

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.



## 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:

6





## Analysis and interpretation

7

# Robust data analysis is a critical part of healthcare research. To ensure this, these 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.

## Analysis and interpretation

7

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 indings	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.



## Conclusion

8

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 groundbreaking 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.

## FULD & COMPANY Delivering competitive advantage

## **About Fuld & Company**

Fuld & Company Is a leading competitive strategy advisory firm dedicated to helping clients anticipate market changes, navigate disruptions, and refine their business strategies. Leveraging over four decades of expertise in research, analytics, and evidence-based analysis, Fuld & Company provides actionable insights to address complex and tactical challenges. Our bespoke services empower clients to make informed strategic decisions to drive growth and competitive advantage in an ever-evolving marketplace.

Serving a diverse clientele that includes Global Fortune 1000 companies, private equity firms, investment banks, asset managers, brokers, and corporate sectors, Fuld & Company has established itself as a pioneer in competitive strategy consulting. With a global presence spanning the United States, Europe, and Asia-Pacific, we have successfully completed over 10,000 strategic engagements. Our high-touch, cohesive teams deliver customized research, analysis, and recommendations, helping clients expand into new markets, develop new products, and form strategic partnerships. Recognized by leading publications such as Fortune, Harvard Business Review, and Fast Company, Fuld & Company continues to be the trusted partner for executive decision-makers worldwide.

For more strategic planning resources, visit <u>www.fuld.com</u>

#### **Contact us:**



**Biraj Ganguly** Executive VP (Global Market Research) of Fuld sister company, Phronesis Partners, <u>biraj.ganguly@phronesispartners.com</u> Reach out through our <u>website</u>.

Register for our <u>newsletter</u>.

Follow us on LinkedIn and X.



## FULD & COMPANY

DELIVERING COMPETITIVE ADVANTAGE

©2024 Fuld & Company. The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavor to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continues to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation. All rights reserved.