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The Impact of AI on Healthcare Operational Efficiency:

Ethical Considerations in Revenue Cycle Management and Supply Chain Management

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Panel Participants:
Dr. Janel Paulk – Georgia State University
Dr. Luwanda Jones – Temple University

Introduction and Background

- AI in Healthcare

- Impact of AI on Healthcare Operational Efficiencies
  - Revenue Cycle Management
  - Supply Chain Management

- Questions and Discussions

AI in Healthcare

- The world of AI is everywhere
- Impacts are visible across all industries
- Capable of changing the fundamental way we do business and frame research

Benefits	Challenges
Enhanced decision making, communication, risk analysis and tools for collaboration	Automation of Biases, lack of data for some demographics
Support for the evolving work force with tools to handle the rapid rate of change	Reduction in force of displacement of skilled labor with increases in automation
Enhanced financial controls, fraud prevention and cyber security	Ethical Considerations in decision structure, overreliance on AI for decisions
Availability of real time data and personalized medicine	Cyber security, Protection of Data and Privacy (HIPAA)

The Impact of AI on Healthcare Operational Efficiency:
Ethical Considerations in Revenue Cycle Management (RCM)

Item	Description
Problem	Implementation of AI in Healthcare Revenue Cycle Management (RCM)
Area of Concern	Ethical Considerations
Research Questions	1. What is the organizational impact of AI on Healthcare RCM? 2. What ethical considerations must an organization consider in Healthcare RCM?
Conceptual Framework	Responsible AI (Johnson, 2023)
Research Method	Review of Literature Case Comparison

The Problem: US Healthcare Spending

The U.S. Has the Lowest Life Expectancy Among Large, Wealthy Countries While Far Outspending Them on Health Care

Life expectancy (2021) and per capita healthcare spending (2021 or nearest year)

Country	Life expectancy	Health spending, per capita
United States	76.1	$12,318
United Kingdom	80.8	$5,387
Germany	80.9	$7,383
Austria	81.3	$6,693
Netherlands	81.5	$6,190
Belgium	81.9	$5,274
Comparable Country Average	82.4	$6,003
France	82.5	$5,468
Sweden	83.2	$6,262
Australia	83.4	$5,627
Switzerland	84.0	$7,179
Japan	84.5	$4,666

REFERENCE:
https://www.kff.org/other/slide/the-u-s-has-the-lowest-life-expectancy-among-large-wealthy-countries-while-far-outspending-them-on-health-care/

Peterson-KFF
Health System Tracker

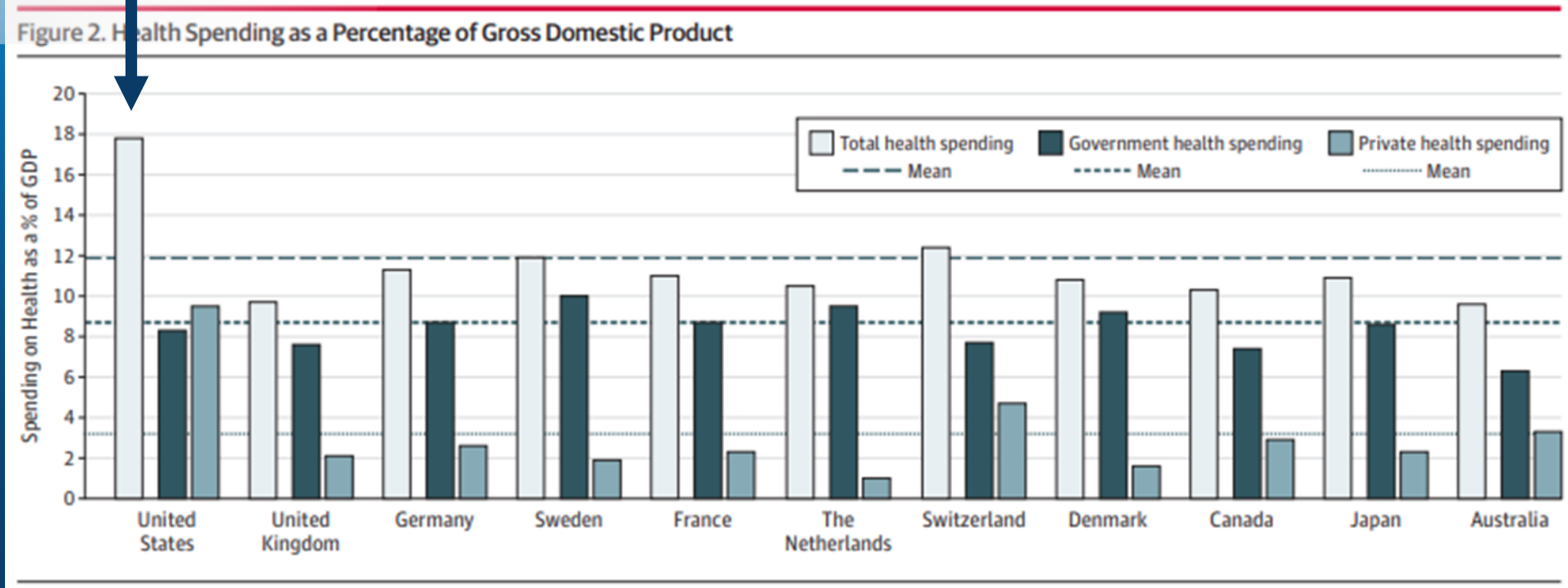
The Problem: US Healthcare Spending

Administrative Tasks[1]

17% of GDP

US RCM Cost Areas[2,3]

- Claim Errors
- Claim Denials
- Administrative Costs
- Staff Shortages
- Long Reimbursement Cycles
- Denied Treatment
- Patient Financial Burden
- Fraud



[1]Papanicolas et al. 2018
[2]Gee and Spiro 2019
[3]State of Claims, 2022

The Potential Impact of AI on RCM[1,2,3]

01 Automate Administrative Tasks

- Streamline Processes
- Review Claim Submissions

02 Improve Medical Coding Accuracy

- Reduce Operational Costs

03 Improve Denial Management

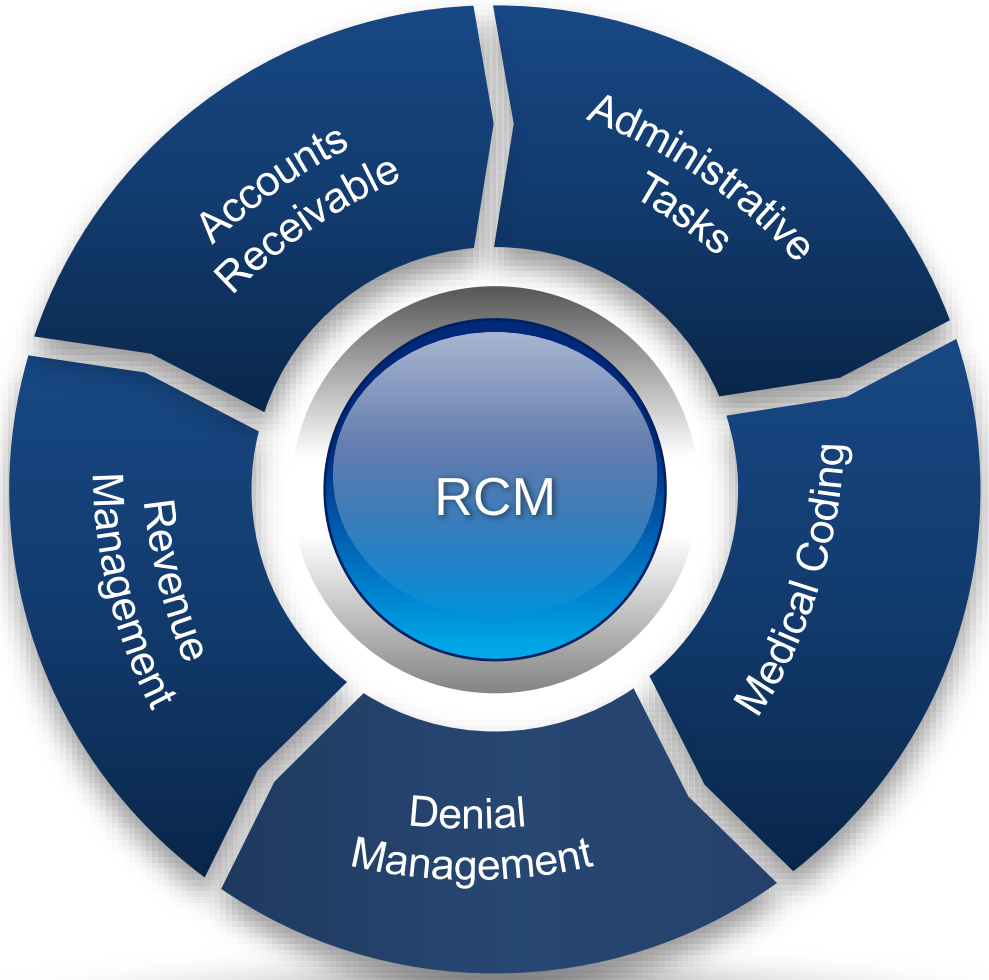
- Conduct Predictive Analysis
- Implement Proactive Denial Analysis

04 Analyze Revenue Management

- Perform RCM Analysis
- Forecast and Predict RM

05 Improved Patient Experience

- Reduce AR Tasks
- Increase Patient Financial Engagement



[1] Saeed 2024
[2] Zhu 2024
[3] Khan 2022

Ethical Concerns

Bias and Fairness

- Algorithmic Bias
- Fairness in Decision-Making

Accountability

- Responsibility for Decisions
- Governance and Oversight

Fairness and Equity

- Equitable Resource Allocation
- Avoiding Discrimination

Risk and Liability

- Managing Risks
- Legal Liability

Transparency and Trust

- Explainability
- Building Trust

Privacy and Data Security

- Protecting Patient Data
- Consent and Ethical Data Use

Human Oversight

- Maintaining a Human-in-the-Loop
- Continuous Monitoring

Transparency and Accountability

- Audit Trails
- Stakeholder Involvement

Ethical Framework: Responsible AI (RAI)[1]

Principle of Transparency	Principle of Justice	Principle of Non-Maleficence	Principle of Accountability	Principle of Privacy
• Increase Explainability of AI Designs • Explanations "in non-technical terms"	• Reduce the risk of discrimination • Acquire diverse datasets • Preprocess data with established standards	• Consider harm-prevention guidelines and strategies • Cross-disciplinary • Oversight of stakeholders	• Ethics in Data Collection • Align with human values to benefit humans	• Data Protection and Security • Protect Privacy

AI Stage	Avoid	Increase
Data Collection	• Personal Data (PRIVACY)	• Data protection and Security (PRIVACY)
Design	• Unwanted discrimination (JUSTICE) • Unintentional harm (NON-MALEFICENCE)	• Explainability and Interpretability (TRANSPARENCY)
Usage	• Damage Caused by AI (NON-MALEFICENCE)	• Standards or Normative encoding (JUSTICE) • Active cooperation across disciplines and stakeholders (NON-MALEFICENCE)

[1] Johnson, 2023

Case Studies

	HOSPITAL	RCM AREA	DESCRIPTION	RESULTS
01 **Friedman et al. (2004)**	Columbia University's Medical Language Extraction and Encoding	Clinical Coding	Automatically map clinical document to codes with modifiers and quantitatively evaluate the method.	
02 **Zeng et al. (2006)**	Brigham and Women's Hospital's open-source Health Information Text Extraction	Clinical Coding	Health Information Text Extraction (HITEx) tool to extract findings for airways disease.	
03 **Codametrix Case Study Report (2023)**	University of Colorado Medicine and Codametrix	Autonomous Medical Coding in Radiology	AI-powered coding automation to improve coding quality, reduce manual coding, and shorten reimbursement time.	
04 **Burns et al.(2020)**	ML and NLP Models to develop classification tools for anesthesia CPT codes.	Classification Tools for Anesthesia CPT Codes.	Train/Test 5 supervised ML models to classify anesthesiology CPT codes, with at least 95% accuracy,	

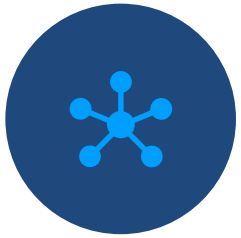
Future Trends and Opportunity for Research

ETHICAL FRAMEWORKS AND GUIDELINES

IMPACT OF AI ON WORKFORCE

REGULATORY COMPLIANCE AND GOVERNANCE

PATIENT-CENTRIC AI APPLICATIONS



INTERDISCIPLINARY APPROACHES

ECONOMIC AND SOCIAL IMPACTS

CASE STUDIES AND BEST PRACTICES

ETHICAL AI DEVELOPMENT LIFECYLE

Dr. Luwanda F. Jones
Temple University

The Impact of AI on Healthcare Operational Efficiency: Ethical Considerations in Supply Chain Management (SCM)

Healthcare Supply Chain Management: AI's Impact and Ethical Considerations

Discussion Questions

What is the organizational impact of AI on healthcare supply chain management?

What ethical considerations must an organization consider when implementing AI capabilities in healthcare supply chain management?

Ethical Considerations

Impact of Artificial Intelligence on Healthcare Supply Chain Management (SCM)

AI’s impact

Large unstructured data to structured actionable data

Predictive analytics models

End-to-end supply chain visibility

Uses of AI in SCM

Management and distribution of healthcare resources

- Inventory Management
- Demand Forecasting
- Customer Support
- Supply Chain risk management
- Supplier optimization

Ethical Considerations

Privacy and Data Security

Transparency

- Implementing transparent data models

Access

- Bias and Fairness
- Accuracy

Regulatory challenges

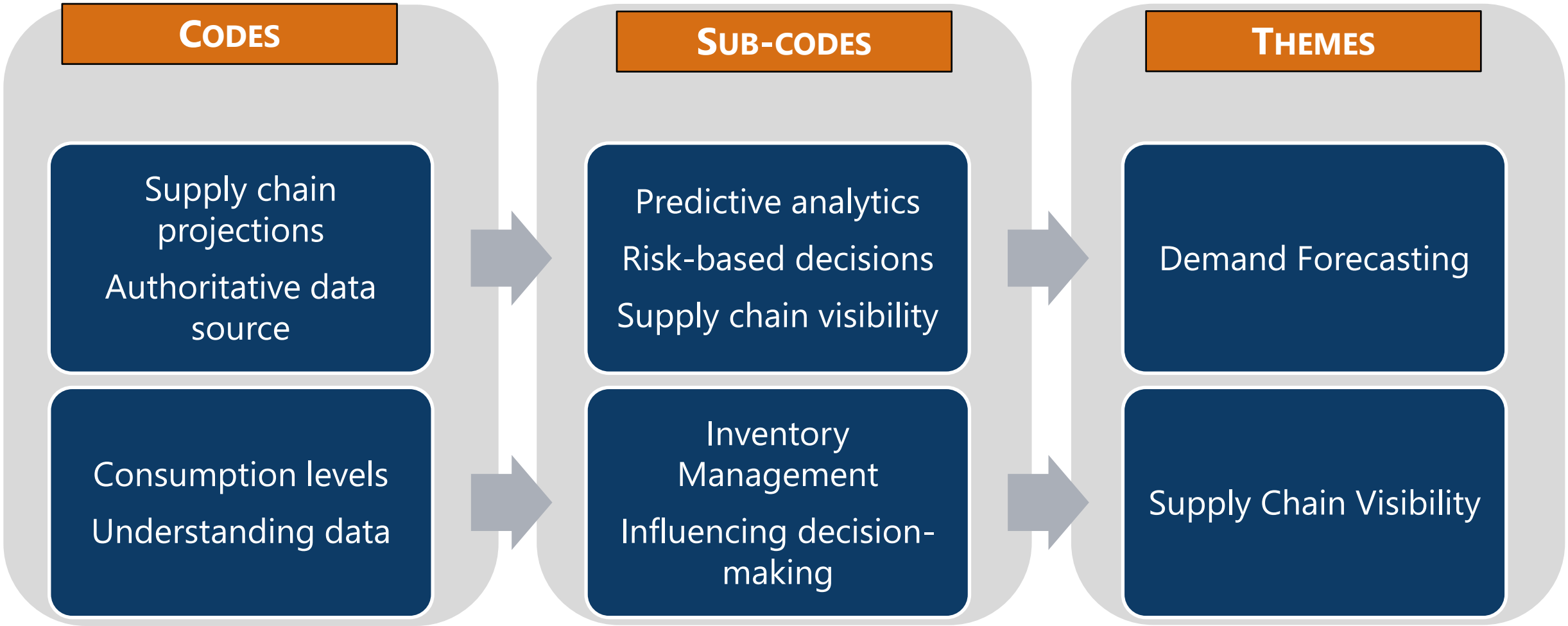
Conducting regular audits

Using diverse data sets

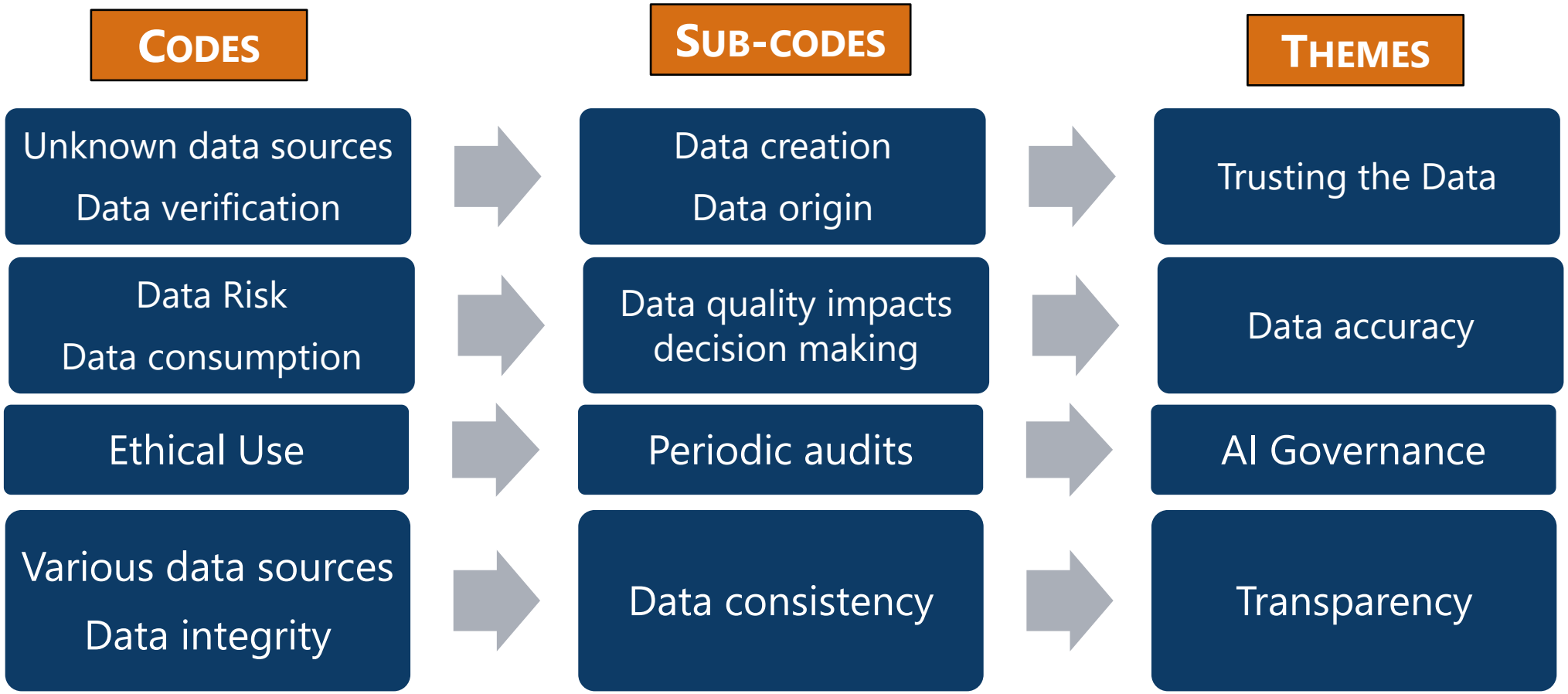
Human-AI collaboration

Environmental Impacts

Participants Results of Impact on AI in Supply Chain Management



Participants Results of Ethical Considerations of AI on Healthcare Supply Chain Management



Conclusion

AI is Revolutionizing Healthcare SCM and Logistics

- Streamlining processes
- Boosting the effectiveness of the supply chain
- Enabling data-informed decision-making

Challenges and Barriers to Implementation

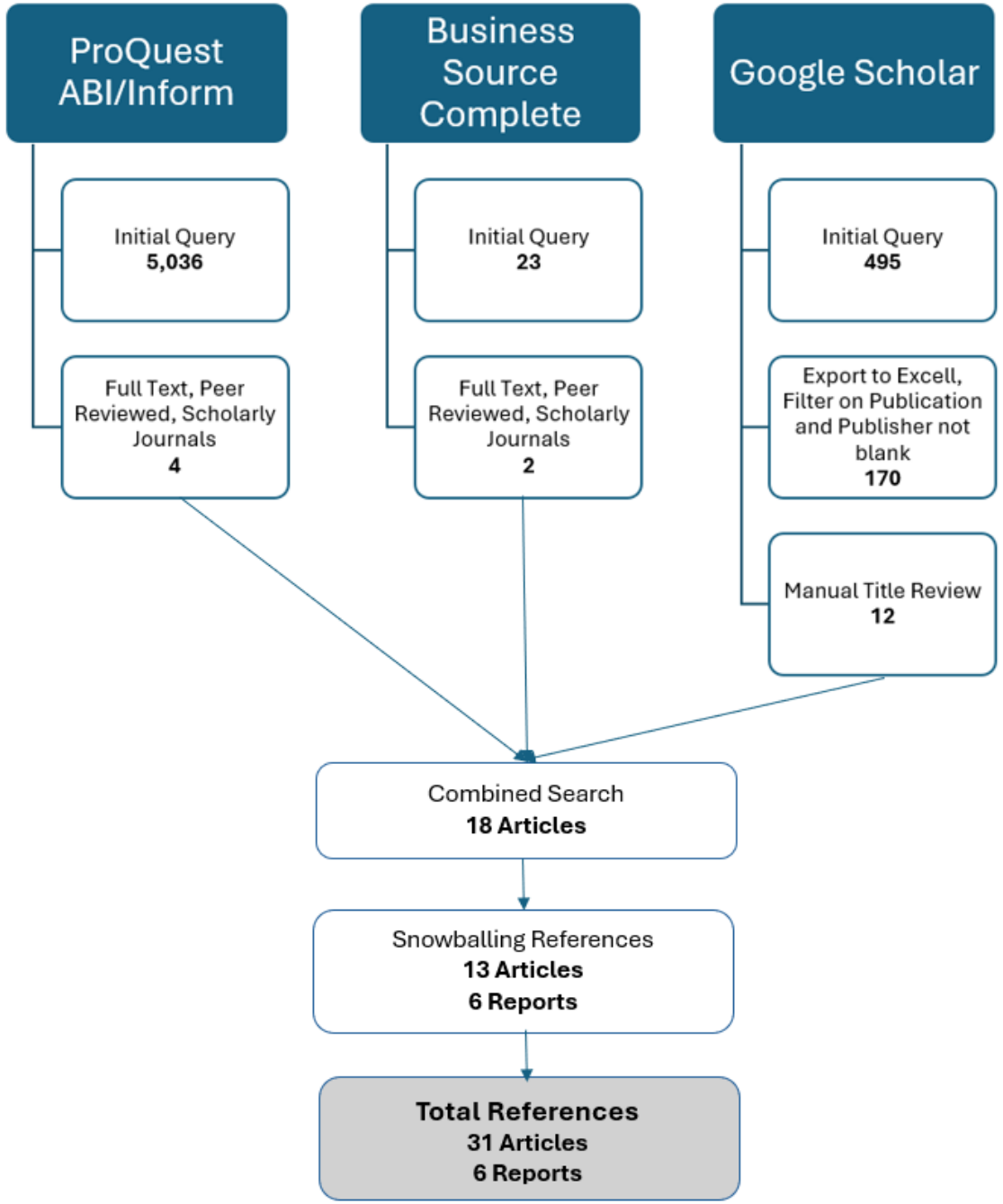
- Effectiveness constrained by data source, availability and quality
- Data inconsistency limits AI's potential
- Security
- AI Governance

Questions and Discussion

Thank You

AI and Healthcare RCM: Review of Literature

Search String:
"artificial intelligence" and
"healthcare" and
"revenue cycle management"



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AI and Healthcare SCM Methodology:

Qualitative Research-Interpretative Approach

Data Technique

- Semi-structured interview sessions
  - 7 interview sessions of which 2 sessions with multiple participants: 1 session with 6 participants; 1 session with 2 participants
  - 13 Participants: 7 government executives and 6 industry AI professionals
    - Expertise: Healthcare Supply Chain, Procurement, Information Technology, AI
  - Type of Organization: 1- US Government Federal Healthcare Network and 1- Industry Consultant
- Documentary Sources
  - Scholarly Journal Articles
  - Websites on Supply chain management, artificial intelligence, and other factors associated to AI impact on healthcare supply chains
  - U.S. Federal Government Regulations, Presidential Orders, Other Public Documents

Data Analysis

- Braun & Clark (2022) Reflexive Thematic Analysis Process
- Transcription tools: Zoom, Otter.AI, MS Word, MS Excel

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