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Code-meshing in clinical settings: The dynamic nature of professional medical discourse

Awad Alshehri
Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia.
Email: Awad.journal@gmail.com

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ABSTRACT

This study questions the long-held assumption that medical English represents a uniform and self-contained discourse. Drawing on a triangulated corpus that includes medical textbooks (2.5 million words), clinical case reports (1.8 million words), and doctor–patient consultations (about 500,000 words), it explores how medical professionals shift between technical and accessible registers a practice referred to here as *linguistic code-meshing*. A mixed-methods approach, combining quantitative corpus evidence with qualitative discourse analysis, is used to trace how such register blending operates across different communicative settings. The analysis identifies five recurrent strategies: terminological scaffolding, register-meshing syntax, strategic metaphor use, authority-accessibility markers, and layered discourse organization. These strategies enable practitioners to maintain technical accuracy while making information more comprehensible to patients and colleagues. Statistical comparisons show notable variation across contexts, with diagnostic and specialist consultations exhibiting the most intricate forms of integration. Qualitative findings further illustrate how these strategies promote understanding without undermining professional identity or institutional authority. Theoretically, the study positions medical discourse as flexible and stratified rather than strictly hierarchical, thereby extending work on register theory and professional communication. Practically, it points to implications for medical training and intercultural clinical communication, suggesting that code-meshing should be regarded as a key professional skill in today's multilingual healthcare settings.

Contribution/ Originality: This study contributes to the existing literature by redefining medical discourse as dynamic rather than uniform, using triangulated corpus and discourse analyses across multiple genres to document systematic code-meshing strategies that integrate technical and accessible language in healthcare communication.

1. INTRODUCTION

1.1. Context and Rationale

Medical English has long served as the principal language of academic publication, clinical documentation, and professional interaction worldwide (Ferguson, 2012). Earlier research often portrayed it as a uniform and highly specialized register, shaped by technical vocabulary, formal conventions, and institutional authority (Gotti, 2008; Salager-Meyer, 2014). More recent work, however, paints a more nuanced picture. Studies now show that medical discourse shifts considerably with context, reflecting the communicative demands of academic, professional, and patient-oriented settings (Candlin & Candlin, 2003; Velásquez et al., 2022).

In practice, healthcare professionals constantly negotiate between precision and clarity. They adjust their language to match the needs of peers, trainees, and patients, often within the same interaction. This adaptability is

not merely stylistic; it is vital for safe and effective healthcare, where a single misunderstanding can affect diagnosis, treatment, or trust (Ali & Watson, 2018; Vermeir et al., 2015).

1.2. Problem and Research Gap

Although scholars increasingly acknowledge that medical communication changes with context, much research still treats medical English as a single, tightly bounded register. Studies on "plain language" initiatives (Castro, Wilson, Wang, & Schillinger, 2007) often portray technical terminology as the main obstacle to understanding, concentrating on simplification rather than on how professionals manage several communicative goals at once. Similarly, register-based analyses have tended to highlight linguistic uniformity within genres such as textbooks or case reports (Biber & Conrad, 2019; Gotti, 2008), leaving aside how practitioners actually combine linguistic resources when addressing different audiences.

This limited focus raises several questions. How do medical professionals balance accuracy with approachability? To what extent do their strategies differ across academic writing, clinical records, and real-time consultations? And which linguistic tools enable them to preserve precision while still engaging patients without reducing complex ideas to overly simple terms?

Another gap exists in the way research often separates professional–patient talk from professional–professional discourse, reinforcing an artificial divide between "expert" and "lay" language (Sarangi & Roberts, 2008). In reality, medical professionals move fluidly across these boundaries, shifting styles as they diagnose, explain, teach, and persuade sometimes within a single conversation.

By overlooking such integrative practices, current models risk underestimating the rhetorical complexity of medical discourse. Focusing mainly on terminology or register switching misses how practitioners weave together multiple linguistic layers to meet diverse communicative demands. The present study takes up this issue by examining *linguistic code-meshing* the deliberate blending of specialized and accessible registers as a core feature of professional medical communication.

1.3. Research Aims and Objectives

This study examines code-meshing practices across three major medical discourse contexts academic, clinical, and consultative using a triangulated corpus approach. The objectives are to:

1. Analyze how medical professionals integrate technical and accessible language resources across genres and contexts.
2. Identify systematic linguistic patterns that signal code-meshing strategies.
3. Compare how these strategies vary across communicative settings and professional roles.
4. Develop a theoretical framework reconceptualizing medical discourse as dynamic, stratified, and context-dependent rather than static or uniform.

1.4. Contribution and Originality

This study rethinks medical discourse as a dynamic and adaptive form of communication rather than a single, uniform register. It proposes *linguistic code-meshing* as a key professional skill one that goes beyond "plain language" or "jargon reduction" by showing how practitioners draw on multiple registers to meet overlapping communicative demands. The analysis combines corpus-based evidence with close discourse examination across textbooks, case reports, and doctor–patient consultations, allowing both quantitative reach and qualitative depth. The findings carry implications at several levels.

They inform how medical educators approach language training, how clinicians refine everyday communication, and how researchers study cross-cultural interaction. More broadly, the study underscores the role of language in shaping both professional authority and patient understanding.

2. THEORETICAL FRAMEWORK

2.1. Reconceptualizing Medical Discourse: Beyond Static Registers

Traditional accounts describe medical English as a distinct register defined by specific lexico-grammatical patterns (Gotti, 2008; Salager-Meyer, 2014). Such descriptions have been valuable for mapping recurring linguistic features, yet they leave unanswered questions about how medical professionals actually adjust their language in practice. Recent work offers more flexible ways to model communication showing how choices vary with context, audience, and purpose. This perspective guides our focus on *code-meshing*, viewed here as the process through which practitioners weave together different registers to meet the often-competing demands of clarity, precision, and professional identity.

2.2. Code-Meshing: Theoretical Foundations and Applications to Medical Settings

Emerging from literacy studies and applied linguistics (Canagarajah, 2012; Young, 2009), code-meshing challenges compartmentalized views of language. Unlike code-switching (alternation between varieties), code-meshing foregrounds deliberate blending of resources from multiple varieties within a single event. Michael-Luna and Canagarajah (2015) define it as "a communicative device… in which a multilingual speaker integrates local and academic discourse" for specific rhetorical ends. In medical contexts, code-meshing explains how professionals balance terminological precision with accessible explanation, formal discourse with relational work, and institutional authority with patient engagement (Candlin & Candlin, 2003). This perspective accords with Heritage and Maynard (2006) account of consultations as simultaneously diagnostic, educational, and interpersonal. Conceptualizing code-meshing this way directly underpins our analysis of integrated linguistic strategies across genres and contexts.

2.3. Integrating Multiple Theoretical Perspectives

Systemic Functional Linguistics (SFL) and Register Theory: Systemic Functional Linguistics (SFL; Halliday and Matthiessen (2013)) explains how texts simultaneously construct ideational, interpersonal, and textual meanings, a framework well suited to medical discourse, where knowledge, stance, and organization must operate together. Register theory (Biber & Conrad, 2019) adds an account of how linguistic choices vary with situation, although traditional models often treat these varieties as relatively fixed. To capture greater flexibility, we draw on Martin's (2010) notion of *register hybridization*, which describes how speakers blend linguistic features to accomplish complex communicative goals. This theoretical synthesis underpins our focus on identifying features that mark shifts between specialized and accessible forms of expression.

Genre analysis and professional discourse theory: Swales (2004) and Bhatia (2016) demonstrate how institutional goals shape both the structure and the language of professional texts. Their discussions of *interdiscursivity* help explain why technical terminology and simplified explanations often appear side by side, as clinicians respond to overlapping institutional and interpersonal expectations. This perspective resonates with Sarangi and Roberts (2008) view of professional discourse as inherently hybrid, where boundaries between specialist and everyday communication are constantly negotiated. These frameworks guide our mapping of code-meshing to genre-specific functions across textbooks, case reports, and consultations.

Interactional Sociolinguistics and Authority Negotiation: Work on medical interaction (Cicourel, 2014; Roberts, 2011) details how authority is linguistically constructed and negotiated. As Drew and Heritage (1992) note, institutional talk both reflects and reproduces its context. This informs our analysis of how code-meshing maintains professional authority while supporting patient comprehension and engagement.

Translanguaging and linguistic repertoires: Translanguaging (Li, 2018; Mateus, 2014) draws attention to how speakers utilize their entire linguistic repertoires rather than merely switching between fixed codes. When applied within a single language, this perspective helps explain how clinicians move fluidly between specialized and everyday forms of expression. A related concept, *superdiversity* (Blommaert & Backus, 2013), emphasizes the extensive range of

semiotic and linguistic resources professionals draw upon as they adapt to different contexts. Taken together, these views position *code-meshing* not as a simple form of "jargon reduction," but as an ongoing process of repertoire management that requires awareness, flexibility, and skill.

This integrated theoretical stance offers a stronger basis for examining how medical communication operates in practice. It moves beyond viewing medical English as a narrowly specialized register and instead highlights the complex linguistic competence that allows healthcare professionals to shift meaning, tone, and authority across varied clinical settings.

3. METHODOLOGY

This study adopts a mixed-methods design to explore how code-meshing operates across different types of medical communication. To capture both the structural and interpretive dimensions of language use, the analysis combines corpus-based methods with detailed discourse examination. This combination allows us to identify recurrent linguistic patterns while interpreting how these choices function within specific clinical and professional contexts.

3.1. Research Design: A Mixed-Methods Approach to Code-Meshing

The methodological framework draws on recent advances in professional discourse analysis (Handford, 2012; Koester, 2010) and healthcare communication research (Adolphs, Brown, Carter, Crawford, & Sahota, 2004; Harvey & Koteyko, 2012). Earlier studies have tended to examine specific elements of medical language in isolation, terminology (Wermuth & Verplaetse, 2019) or the organization of consultations (Ainsworth-Vaughn, 2001) without connecting these features to broader communicative practices. To address this gap, the present study follows what Angouri (2018) describes as a *discourse-ethnographic approach*, integrating corpus-based analysis with contextually informed qualitative interpretation.

This combination of methods enables a systematic search for linguistic patterns while allowing closer insight into how these patterns operate within actual healthcare interactions. It is particularly suited to studying code-meshing, which calls for attention to both the fine-grained detail of linguistic form and the wider social and institutional contexts that shape its use (Canagarajah, 2012; Dressler, 2014).

3.2. Corpus Design and Data Collection

The study draws on a purpose-built corpus representing medical communication across three main contexts, allowing for direct comparison of code-meshing practices. The materials were sourced from publicly accessible datasets rather than collected within specific institutions, yet they mirror those commonly used in leading medical schools and teaching hospitals in the Middle East. Examples include King Saud University in Saudi Arabia, Cairo University in Egypt, and the University of Jordan. Referencing these institutions underscores the dataset's regional relevance and helps ensure that the linguistic patterns examined reflect mainstream educational and professional practices in medical settings.

Medical Textbooks Corpus (MTC): The MTC comprises 2.5 million words from contemporary medical textbooks, offering insights into how authoritative medical knowledge is linguistically structured for pedagogical purposes (see Table 1 for an overview). Following Baker (2018) principles for specialized corpus design, the MTC balances representativeness with specificity to ensure robust analysis. Drawing on Cole, Carlin, and Carson (2015) research on textbooks as discourse, the selection criteria ensure representation of current medical education materials. The corpus includes both electronic and print textbooks, with metadata capturing pedagogical level, audience, and disciplinary focus.

Table 1. Medical textbooks corpus overview.

Category	Details
Corpus size	2.5 million words
Sampling method	Stratified random sampling from 50 contemporary medical textbooks (2015-2024).
Distribution	Basic sciences: 30% (n=15 texts) Clinical medicine: 40% (n=20 texts) Specialized fields: 30% (n=15 texts)
Selection criteria	Minimum circulation of 1,500 copies Used in at least 20 medical schools
Visual analysis	Annotation of typographical elements (e.g., boldface, italicization)

Clinical Case Reports Corpus (CCRC): Representing a key genre of professional-to-professional medical communication, (Taavitsainen & Pahta, 2000) the CCRC comprises 1.8 million words sampled from PubMed Central, ensuring balanced representation across medical specialties (Table 2). The sampling procedure follows Flowerdew (2005) principles for specialized corpus compilation, maintaining size and balance while capturing recent linguistic trends (2020–2024). Metadata includes journal impact factor, author affiliation, and citation patterns.

Table 2. Clinical case reports corpus overview.

Category	Details
Corpus size	1.8 million words
Sampling method	Systematic random sampling from PubMed central
Composition	General medicine: 40% (n=400 reports) Surgery: 30% (n=300 reports) Specialized fields: 30% (n=300 reports)
Temporal range	2020-2024 (Capturing recent linguistic trends)
Selection criteria	English-language reports with complete IMRAD structure
Typographical analysis	Standardized annotation of non-verbal elements

Medical Consultation Transcripts Corpus (MCTC): Capturing authentic doctor–patient interactions, the MCTC follows methodological principles established by Heritage and Maynard (2006) and Sarangi (2011). It comprises 500,000 words from 200 consultation transcripts representing diverse specialties, consultation types, and patient demographics (Table 3). Ethical standards governing the original corpora ensured anonymization and informed consent.

Table 3. Medical Consultation Transcripts Corpus Overview.

Category	Details
Corpus size	500,000 words
Sampling method	Purposive sampling ensures representation across consultation types, medical specialties, and patient demographics.
Composition	200 complete consultation transcripts
Average length	2,500 words per consultation
Transcription protocol	Modified Jefferson system (Jefferson, 2008)
Prosodic features	Documentation of intonation, emphasis, and pauses

3.3. Analytical Framework: Identifying and Analyzing Code-Meshing

The analytical framework integrates quantitative and qualitative methods to identify patterns of code-meshing across corpora and examine their contextual functions. This approach builds on Biber's (1991)'s multi-dimensional analysis while incorporating insights from discourse-pragmatic frameworks (Roberts, 2011).

Quantitative Analysis: The quantitative analysis focuses on identifying linguistic markers that indicate code-meshing in medical discourse. It draws on Biber and Conrad's (2019) framework for register analysis, adapted from Roberts (2011) to fit healthcare communication. The study examines features such as lexical density, type–token ratio, and n-gram patterns, which together offer statistical evidence of how language varies across the three corpora (see Table 4 for a summary of the analytical components). Particular attention is given to markers that reveal shifts between specialized and everyday registers especially reformulation cues like *which means* and *in other words*, elaboration structures, and variation in the use of technical terms.

Table 4. Quantitative analysis components.

Category	Details
Software	AntConc 4.0 for frequency analysis; R 4.2.0 for statistical analysis.
Measures	Lexical density (content words/total words) Type-token ratio (unique words/total words) Keyword analysis (log-likelihood test, $p < 0.01$) N-gram analysis (2-5-word sequences) Code-meshing markers (frequency of reformulation, elaboration, translation)
Statistical procedures	Chi-square tests for distribution patterns Mann-Whitney U tests for cross-corpus comparisons Effect sizes calculated using Cohen's d

Qualitative Analysis: The qualitative phase explores how code-meshing operates within its communicative context, following methodological approaches developed by Sarangi (2011) and Angouri (2018) for the study of professional discourse. The coding framework emerged through several rounds of close analysis of a sample corpus, during which categories were refined through team discussions and cross-checked against existing models (Ainsworth-Vaughn, 2001; Roberts, 2011). The final scheme distinguishes four analytical dimensions structural elements, discourse functions, code-meshing strategies, and contextual factors summarized in Table 5.

Table 5. Qualitative coding scheme.

Category	Details
Framework	Modified grounded theory approach (Charmaz, 2014) with discourse-analytical orientation
Coding levels	Level 1: Structural features (e.g., syntax, morphology) Level 2: Discourse functions (e.g., explanation, instruction) Level 3: Code-meshing strategies (e.g., register blending, professional-lay integration) Level 4: Contextual factors (e.g., audience knowledge, institutional constraints)
Inter-rater reliability	Three trained coders Cohen's κ calculated for each coding level Minimum acceptable $\kappa = 0.80$ Resolution of disagreements: Weighted voting and consensus meetings

3.4. Multi-Dimensional Analysis of Code-Meshing

Building on the outcomes of both the quantitative and qualitative phases, the study carries out a multi-dimensional analysis of code-meshing patterns. This stage draws inspiration from Biber (1991)'s original framework but adapts it to the realities of professional discourse (Koester, 2010). The goal is to uncover clusters of linguistic features that tend to occur together and that signal different forms of code-meshing across communicative settings. The analysis proceeds in four steps:

1. Factor analysis to identify clusters of co-occurring linguistic features.
2. Mapping these dimensions across the three corpora and their sub-corpora.
3. Interpreting the resulting dimensions in light of professional and communicative functions.
4. Selecting prototypical examples for detailed qualitative analysis.

Following the methodological principles outlined by Friginal and Hardy (2013), this approach reveals how distinct configurations of linguistic features correspond to specific communicative goals and professional contexts within medical discourse.

Table 6. Quality assurance procedures.

Category	Details
Corpus verification	Manual verification of 10% random sample Automated error checking using custom Python scripts Documentation of cleaning procedures
Inter-rater reliability	Initial pilot coding (n=50 texts per sub-corpus) Regular reliability checks (every 200 texts) Final reliability assessment
Results	Structural coding: $\kappa = 0.87$ Discourse function coding: $\kappa = 0.83$ Code-meshing strategy coding: $\kappa = 0.81$
Validity checks	Expert panel review (n=5 medical linguists) Member checking with medical professionals Triangulation across data sources

3.5. Reliability and Validity Measures

The study follows established quality-assurance principles drawn from corpus linguistics (McEnery & Hardie, 2011) and healthcare communication research (Sarangi, 2011). Several measures were taken to confirm the reliability of the findings, including inter-rater agreement checks, corpus verification, and triangulation through consultation with field experts (see Table 6 for details). Throughout the process, the team worked to ensure that the code-meshing patterns identified in the corpus genuinely represent how medical professionals communicate in real practice.

3.6. Ethical Considerations

This study drew on pre-existing, de-identified datasets composed of publicly available medical consultation transcripts. All data were anonymized at the source, and no identifying information was retained for either healthcare professionals or patients. Because the study involved only secondary analysis of anonymized materials, it posed no risk to privacy or confidentiality. In line with ethical guidelines for corpus-based linguistic research (Adolphs & Knight, 2020; McEnery, Xiao, & Tono, 2006) the use of these datasets did not require informed consent or additional ethical approval. All analyses were carried out in accordance with institutional policies governing the ethical use of publicly available corpora.

Textbook excerpts were used under fair-use provisions for academic research. Clinical case reports were obtained solely from open-access publications released under Creative Commons licenses that allow academic analysis. Data management followed best practices in corpus linguistics: all files were stored on secure, password-protected research servers. Throughout the process, the researcher remained mindful of potential biases within pre-existing datasets and incorporated methodological safeguards to recognize and address these limitations in both the analysis and the reporting of results.

4. ANALYSIS AND FINDINGS

The analysis of medical discourse across textbooks, case reports, and consultations reveals systematic patterns of code-meshing that reflect the dynamic nature of professional medical communication. Rather than employing a single "medical register," healthcare professionals demonstrate sophisticated linguistic flexibility, strategically blending specialized and accessible language to achieve multiple communicative goals simultaneously.

4.1. Patterns of Code-Meshing: Quantitative Findings

Quantitative analysis reveals distinct linguistic profiles across the three corpora, with systematic variations in both lexicogrammatical features and code-meshing markers. Key linguistic differences include lexical density, type-token ratio, and the frequency of reformulation markers, all of which vary significantly across medical textbooks, case reports, and consultations (see Table 7 for a summary of key linguistic features across corpora). These patterns point to contextually responsive language use rather than a single, uniform medical register.

Table 7. Key Linguistic features across corpora.

Feature	Medical textbooks	Clinical case reports	Medical consultations	Statistical significance
Lexical density	0.62	0.67	0.51	$p < 0.001$
Type-token ratio	0.38	0.41	0.32	$p < 0.001$
Passive constructions (Per 1000 words)	19.2	23.6	7.4	$p < 0.001$
Greco-Latin terminology (%)	72.3	78.5	43.8	$p < 0.001$
Reformulation markers (Per 1000 words)	2.1	1.3	5.8	$p < 0.001$
Elaboration markers (Per 1000 words)	3.4	1.7	6.2	$p < 0.001$
Hedging devices (Per 1000 words)	6.7	8.2	4.3	$p < 0.001$

These findings reveal significant differences in linguistic features across contexts, consistent with previous studies of register variation in professional discourse (Biber & Conrad, 2019; Friginal & Hardy, 2013). However, the distinctive pattern in medical consultations featuring both specialized terminology (43.8% Greco-Latin terms) and high frequencies of reformulation (5.8 per 1000 words) and elaboration markers (6.2 per 1000 words) suggests not simply register shifting but active blending of specialized and accessible language resources within the same communicative context.

The most frequent reformulation markers identified in the consultation corpus include:

1. "Which means" (0.87 per 1000 words).
2. "In other words" (0.63 per 1000 words).
3. "What we call" (0.58 per 1000 words).
4. "Or" (as reformulation device) (0.54 per 1000 words).
5. "That is" (0.43 per 1000 words).

These findings align with Roberts (2011) and Pountney and McPhail (2017) research on "translation devices" in medical discourse but reveals more systematic patterns of linguistic integration than previously documented.

4.2. Multi-Dimensional Analysis: Identifying Code-Meshing Dimensions

Factor analysis of co-occurring linguistic features identified four primary dimensions of variation across the corpora.

Dimension 1: Technical Density vs. Accessible Explanation.

- High-loading features for technical density: specialized terminology, nominalizations, complex noun phrases.
- High-loading features for accessible explanation: reformulation markers, concrete examples, second-person pronouns.

Dimension 2: Professional Authority vs. Collaborative Engagement.

- High-loading features for professional authority: passive voice, hedging expressions, citation markers.
- High-loading features for collaborative engagement: first-person plural pronouns, questions, response elicitors.

Dimension 3: Explicit Instruction vs. Informational Description.

- High-loading features for explicit instruction: imperatives, obligation modals, condition markers.
- High-loading features for informational description: stative verbs, third-person pronouns, temporal markers.

Dimension 4: Narrative Immediacy vs. Abstract Conceptualization.

- High-loading features for narrative immediacy: past tense verbs, temporal sequencers, specificity markers.
- High-loading features for abstract conceptualization: present tense verbs, general nouns, classificatory language.

This multi-dimensional approach, building on methodology established by Biber (1991) and developed for healthcare contexts by Atkins and Harvey (2010), reveals how different types of code-meshing operate across medical contexts. Particularly notable is the finding that medical consultations show simultaneous high scores on both technical density and accessible explanation precisely the pattern expected in code-meshing rather than simply scoring low on technical density.

4.3. Code-Meshing Strategies: Qualitative Analysis

Qualitative analysis identified five primary code-meshing strategies employed by medical professionals, each serving distinct communicative functions:

Terminological Scaffolding: This strategy involves embedding specialized terminology within accessible explanatory frameworks. Rather than simply replacing technical terms with everyday equivalents (as suggested by traditional "jargon reduction" approaches), practitioners introduce specialized terminology alongside explanations, effectively building bridges between professional and lay discourse. This pattern occurs most often in diagnostic consultations, averaging about 8.3 instances per encounter:

"You have what we call *hypertension* high blood pressure which means that the pressure in your arteries is higher than it should be. This puts strain on your heart, which has to work harder to pump blood."

In this exchange, the clinician first introduces the technical term *hypertension* and immediately pairs it with the everyday phrase *high blood pressure*. The explanation then shifts to a simple, cause-and-effect description of how the condition affects the body. Rather than replacing the specialist term, the clinician keeps it in circulation, inviting the patient into the professional discourse instead of translating it away from it.

Register-Meshing Syntax: The analysis showed consistent patterns where technical terms were embedded within the rhythms of everyday conversation, producing hybrid sentences that balanced precision with approachability.

"So, your *hemoglobin A1c* is a bit high, which is the blood test that tells us how your sugar has been doing over time remember we talked about that last time?"

In this exchange, the clinician weaves the technical term *hemoglobin A1c* into a conversational frame that includes reminders of shared knowledge and informal clarification. The technical accuracy is preserved, but the structure invites participation, turning a potentially abstract concept into something familiar and relational. This kind of blending illustrates how professionals manage both expertise and empathy in real-time talk.

Strategic Metaphor Deployment: Medical professionals often use metaphors to bridge the gap between specialized and everyday language. Unlike the simplified comparisons typically recommended in communication training, these metaphors keep technical details intact while opening up familiar conceptual frames.

"The coronary arteries are like the fuel lines to your heart muscle. Just as a car engine needs fuel, your heart muscle needs blood to work properly. When these arteries develop *atherosclerotic plaques* that's like rust building up in the pipes they cannot deliver enough blood, especially when you are exerting yourself."

In this exchange, the clinician layers technical terminology (*coronary arteries*, *atherosclerotic plaques*) within an accessible metaphor drawn from everyday experience. The imagery of "fuel lines" and "rusty pipes" doesn't simplify the science; rather, it builds a shared mental model that allows technical and lay perspectives to coexist. This kind of metaphor exemplifies how practitioners invite understanding without relinquishing professional precision.

Authority-Accessibility Markers: Practitioners employ specific linguistic markers that simultaneously establish professional authority and create accessibility: "Based on your radiographic findings, that's your X-ray results, I can

see that you have some degenerative changes in your spine basically, some wear and tear on the cushioning discs between your vertebrae." Here, the formal citation of evidence ("based on your radiographic findings") establishes professional authority, immediately followed by an accessibility marker that translates but doesn't replace the technical term. This pattern present in 76% of consultations analyzed suggests a sophisticated balancing of professional identity and communicative effectiveness.

Integrated Discourse Layering: Perhaps the most intricate form of code-meshing occurs when several discourse types are woven together within the same consultation. Instead of alternating between clearly defined "professional" and "lay" registers, practitioners layer these voices in real time:

> We need to start you on a statin medication. *Atorvastatin* is usually my first choice. It's one of the *HMG-CoA reductase inhibitors* a medication that blocks an enzyme your body uses to make cholesterol. It will help lower your LDL cholesterol, which is the bad cholesterol we discussed, and reduce your risk of heart problems.

Here, the clinician moves seamlessly through several overlapping discourses: the prescriptive voice of treatment recommendation, the scientific explanation of mechanism, the everyday translation ("bad cholesterol"), and the interpersonal tone of personalized reassurance. These strands operate simultaneously rather than sequentially, producing a single, coherent narrative that maintains technical accuracy while remaining approachable and relational.

4.4. Contextual Variation in Code-Meshing

A closer look at code-meshing across different types of clinical interaction reveals that these strategies are not random but carefully attuned to context and purpose. Key patterns emerging from the analysis include.

Diagnosis vs. Treatment Discussions: Diagnosis-related consultations showed higher use of *terminological scaffolding* (8.3 vs. 4.7 instances per consultation) and *metaphor deployment* (3.8 vs. 1.9) than treatment discussions. In contrast, treatment interactions featured more *authority–accessibility markers* (7.2 vs. 4.5) and *integrated discourse layering* (5.6 vs. 3.2). This distribution reflects the communicative priorities of each setting: during diagnosis, clinicians focus on building shared understanding of technical conditions, whereas during treatment they balance professional authority with patient engagement and reassurance.

Acute vs. Chronic Condition Management: Discussions of acute conditions showed more *register-meshing syntax* (6.7 vs. 4.3 instances per consultation) and tended to include shorter, more compressed code-meshing sequences. By contrast, conversations about chronic condition management displayed more *extended discourse layering* (5.9 vs. 3.1) and recurring *terminological scaffolding* that accumulated across multiple visits. This difference mirrors the time frame of each clinical scenario: acute cases demand quick understanding and immediate action, whereas chronic cases allow knowledge to build gradually as the patient's familiarity with medical terminology grows.

Specialist vs. Primary Care Settings: Specialist consultations showed higher overall frequencies of all code-meshing strategies (23.6 vs. 17.8 instances per consultation) and displayed more intricate patterns of integration. This suggests that specialists do more than rely on technical vocabulary they actively weave specialized and everyday language to bridge wider knowledge gaps with patients. As one cardiologist explained during member checking,

> *"The bigger the knowledge gap, the more important it is to build bridges rather than simplify."*

His comment captures the central insight of these findings: effective expertise often involves connection, not reduction.

4.4.1. Cross-Professional Variation

Analysis of code-meshing practices across different professional groups reveals distinct patterns that reflect disciplinary cultures and communication training:

1. Physicians tend to employ more terminological scaffolding (6.9 vs. 4.2 instances per consultation) and integrated discourse layering (5.2 vs. 3.1 instances) compared to other healthcare professionals.

2. Nurses demonstrate higher frequencies of register-meshing syntax (7.3 vs. 5.1 instances) and strategic metaphor deployment (4.7 vs. 3.3 instances).
3. Early-career professionals show lower overall frequencies of code-meshing strategies (15.3 vs. 24.7 instances per consultation) but higher rates of explicit reformulation markers ("which means," "in other words"), suggesting that more integrated forms of code-meshing may develop with professional experience.

These findings align with Candlin (2006)'s research on professional socialization in healthcare but suggest more structured patterns of linguistic development than previously recognized.

4.5. Professional Perceptions of Code-Meshing

Member checking with healthcare professionals revealed a subtle but consistent awareness of code-meshing in their daily communication, even though few used that specific term. One physician explained,

> *"I'm not just translating medical terms into everyday language I'm trying to bring patients into our world while still meeting them in theirs."* Another reflected, *"Using only simple terms feels condescending. Using only technical terms feels alienating. The art is in blending them effectively."*

These reflections challenge the deficit-based assumption that effective medical communication simply involves removing jargon (Castro et al., 2007). Instead, they underscore a more sophisticated reality: clinicians actively manage overlapping registers to maintain both expertise and empathy a skill that lies at the heart of effective healthcare discourse.

4.6. Summary of Key Findings

The analysis shows that medical professionals systematically employ *code-meshing* strategies that blend specialized and accessible language resources, rather than merely switching between distinct registers. These strategies operate on several levels at once preserving technical precision, reinforcing professional authority, supporting patient comprehension, and fostering rapport within the therapeutic relationship. Patterns of code-meshing vary consistently across clinical contexts, professional roles, and communicative goals, revealing how practitioners adapt their linguistic choices to situational demands. Evidence also suggests that effective code-meshing develops with experience, marking it as an advanced communicative competence rather than a basic skill acquired early in training. Consequently, traditional models of medical communication that prioritize "jargon reduction" or "plain language" overlook the sophistication of these linguistic practices. Medical discourse should therefore be reconceptualized not as a fixed register defined by terminology, but as a dynamic, context-sensitive practice in which clinicians strategically integrate diverse linguistic resources to achieve complex communicative outcomes.

5. CONCLUSION

This study examined the dynamic nature of medical discourse through the lens of *code-meshing*, showing how linguistic integration operates as a defining feature rather than an exception. Across textbooks, clinical case reports, and doctor–patient consultations, the analysis revealed that healthcare professionals do not simply alternate between technical and everyday registers. Instead, they weave specialized and accessible language together in deliberate ways to meet several communicative aims at once maintaining accuracy, expressing authority, and ensuring understanding. These patterns challenge the long-standing view of medical English as a single, uniform register and position it instead as a flexible, adaptive system shaped by the interactional demands of real medical practice.

5.1. Reconceptualizing Medical Discourse

Our findings call for a fundamental rethinking of medical discourse. Rather than treating medical English as a fixed register defined mainly by specialized terminology and formal structures, the evidence here portrays it as a fluid communicative practice marked by a high degree of linguistic flexibility. The five strategies identified in this study

terminological scaffolding, *register-meshing syntax*, *strategic metaphor use*, *authority–accessibility markers*, and *integrated discourse layering* illustrate how clinicians negotiate the simultaneous demands of precision, authority, and accessibility in their everyday work.

This reframing moves beyond the traditional divide between "professional" and "lay" language that has shaped much prior research (Ferguson, 2012; Gotti, 2008). It resonates with Canagarajah (2012)'s conception of code-meshing as a rhetorically skilled practice, reflecting the complex communicative competence of professional discourse communities. Medical professionals, therefore, do not simply switch between technical and everyday speech; they integrate elements of both in purposeful ways to meet the communicative and relational needs of each clinical encounter.

5.2. Theoretical Implications

The patterns documented in this study carry important implications across several theoretical domains. For register theory, the findings question the long-standing view of registers as stable and discrete varieties (Biber & Conrad, 2019). Instead, they support what Blommaert and Rampton (2011) describe as the *superdiversity* of professional linguistic repertoires, revealing medical discourse not as a single register but as a complex practice of register integration that shifts systematically with context and communicative purpose.

Within professional discourse studies, the results extend Sarangi (2011)'s notion of *interactional expertise* as a defining feature of professional competence. They offer concrete linguistic evidence of how this expertise materializes in practice: through the flexible orchestration of specialized and accessible language to achieve different interactional goals. The consistent variation in code-meshing strategies across clinical settings and professional roles indicates that communicative effectiveness in medicine depends less on memorizing terminology than on cultivating nuanced repertoires for linguistic integration.

For healthcare communication research, these findings challenge deficit-oriented perspectives that reduce effective practice to "jargon removal" or "plain language translation"(Castro et al., 2007). A more productive approach would recognize the rhetorical sophistication of expert medical talk and its alignment with multiple, sometimes competing, communicative aims precision, empathy, and trust. Together, these implications point to a need for models of medical communication that capture the complexity and adaptability of real professional language use.

5.3. Practical Applications

The insights gained here can directly inform medical education and clinical communication. Training programs should emphasize not just clarity or accuracy, but the flexible use of language that allows practitioners to connect with patients while preserving professional authority:

Medical Education: Traditional approaches to medical language training have tended to prioritize terminology acquisition, treating communication skills as a separate component of professional development (Lu & Corbett, 2012). The findings of this study point to the need for more integrated pedagogical models that cultivate students' ability to manage linguistic resources strategically, rather than simply "translating" technical terms for patients. In practice, this means incorporating explicit instruction in *code-meshing* strategies alongside traditional communication training, developing teaching materials that model how experts blend professional and everyday language, and designing assessment tasks that value sophisticated linguistic integration as much as clarity and accuracy. Such approaches would prepare future clinicians to navigate the communicative complexity of real medical encounters with greater adaptability and confidence.

Clinical Practice: The systematic patterns of code-meshing documented in this study can also inform more effective approaches to clinical communication. Communication frameworks should acknowledge that technical precision and accessibility are not opposing goals but interdependent ones, both essential for high-quality patient interaction. Clinical documentation systems can likewise be designed to support, rather than restrict, the integration

of multiple discourse types allowing practitioners to convey complex information clearly without losing nuance. Finally, quality metrics for patient communication need to move beyond simplistic readability scores to account for the rhetorical and relational sophistication involved in real medical encounters. Together, these changes would align institutional practices more closely with the linguistic realities of modern healthcare.

Cross-Cultural and Multilingual Healthcare: The code-meshing framework also provides valuable insight into the complexities of cross-cultural and multilingual healthcare communication. It underscores that effective interaction involves more than straightforward translation between languages; it requires the integration of distinct discourse systems, each shaped by its own cultural assumptions and communicative norms. Training for medical interpreters should therefore focus on developing the ability to manage this discursive integration, not merely perform word-for-word translation. In addition, instructional and institutional resources should be designed to address the particular challenges that arise when code-meshing occurs across both linguistic and cultural boundaries. Approaching multilingual communication through this lens encourages a richer understanding of how meaning, empathy, and expertise are jointly constructed in diverse healthcare settings.

6. LIMITATIONS AND FUTURE DIRECTIONS

While this study provides robust evidence for reconceptualizing medical discourse, several limitations suggest directions for future research. This study focused exclusively on English-language medical discourse; however, future research should explore how code-meshing operates in other language contexts, particularly in languages with different relationships between specialized and everyday lexicons, as structural differences may shape how integration strategies manifest and evolve.

The finding that early-career professionals demonstrate less sophisticated code-meshing patterns also points to the need for longitudinal studies examining how these communicative competencies develop over time and how such insights could inform more effective training in medical education.

Moreover, because this study centered on traditional spoken and written medical discourse, further research should investigate code-meshing in emerging digital settings such as telehealth consultations, patient portals, and social media health communication, including the interaction between verbal code-meshing and visual or multimodal resources. Finally, while this study documented linguistic patterns among healthcare professionals, future work should also examine patient responses to different integration strategies and their effects on comprehension, satisfaction, and health outcomes.

7. FINAL REFLECTIONS

This research contributes to the growing view of medical discourse as a dynamic, adaptive practice rather than a fixed linguistic variety. By documenting the complex integration strategies that healthcare professionals employ, it challenges reductionist accounts of medical communication and offers concrete directions for improving training and practice. As healthcare becomes increasingly globalized and interaction more often mediated through digital technologies, the capacity to move fluidly across discourse types is no longer optional it is essential.

Understanding *code-meshing* as a central professional competency, rather than as a compensatory tool for simplifying language, provides a foundation for developing communicative models that preserve both technical precision and human connection two aims that are often perceived as conflicting but need not be. From this perspective, the linguistic fabric of medical English appears not as a fixed pattern but as a living weave in which practitioners integrate specialized and accessible threads to meet both professional and human needs. Recognizing this dynamic interplay opens new directions for research, education, and clinical practice that foreground the sophisticated linguistic competencies underpinning effective healthcare communication.

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