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Knowledge, Attitudes, and Practices Related to Cervical Cancer Screening and Traditional Medicine Use among Indigenous Women in Guyana's Region 9: A Baseline Cross-Sectional Assessment

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Abstract

Cervical cancer is a serious health threat for Indigenous women in Guyana's remote Region 9 (Upper Takutu-Upper Essequibo). To understand why, we spoke with 101 Amerindian women (Makushi and Wapishana), ages 21 to 65, at health centers and community events across the region between November and December 2025. We asked them about their knowledge, attitudes, and practices around cervical cancer screening, HPV, and the use of traditional medicine. Our survey found that the average age of participants was 32.6. While over 60% had an HPV test (with 27.7% testing positive), less than half (44.6%) had ever had a Pap smear. At the same time, traditional medicine plays a major role in their lives. Over 40% of the women consult traditional healers, mostly for women's health issues, and many use both traditional and modern treatments. The biggest hurdles to getting medical care were distance (67.3%), cost (47.5%), and long waits at clinics (41.6%). Our findings point to a critical gap in cervical cancer screening and highlight how central traditional medicine is to healthcare for these communities. This shows an urgent need for health programs that are culturally aware and blend modern and traditional approaches to improve women's health in Region 9.

Keywords: *Cervical Cancer, Guyana, Health Disparities, HPV, Indigenous Health, Knowledge Attitudes Practices, Traditional Medicine, Screening.*

Introduction

Cervical cancer is the fourth most common malignancy among women worldwide, accounting for approximately 604,000 new cases and 342,000 deaths in 2020 [1]. The disease disproportionately affects women in low- and middle-income countries (LMICs), where limited access to screening, early diagnosis, and treatment drives persistently high mortality [2, 3]. In Guyana, the age-standardised incidence rate of cervical cancer is approximately 44.7 per 100,000 women, among the highest in the Americas [4, 5]. This burden is particularly severe among Indigenous populations in remote administrative regions.

Region 9 (Upper Takutu-Upper Essequibo) encompasses some of the most geographically isolated communities in Guyana, predominantly inhabited by the Makushi and Wapishana peoples [6]. These communities face compounding disadvantages including geographic isolation, inadequate health infrastructure, shortages of trained healthcare personnel, linguistic barriers, and deep-rooted reliance on traditional medicine [7, 8]. The interplay between traditional medicine (TM) systems and biomedical healthcare remains poorly understood in this context, yet it critically shapes health-seeking behaviour for reproductive health conditions including cervical cancer [9].

The World Health Organization (WHO) recognized traditional medicine as a key healthcare resource in regions with limited

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access to conventional medical services [10]. Studies across sub-Saharan Africa and South America have documented the widespread integration of plant-based remedies, spiritual healing, and indigenous health practices in the management of gynecological conditions [11, 12]. However, systematic evaluation of TM use alongside formal cervical cancer screening programmes among Indigenous Guyanese women remains absent from the published literature.

Knowledge, attitudes, and practices (KAP) surveys are well-established epidemiological tools for characterizing health behaviour and informing targeted public health interventions [13]. Understanding the KAP of Indigenous women regarding HPV, cervical cancer screening, and traditional medicine is essential for designing culturally acceptable and effective prevention strategies. This study was conducted as part of the baseline assessment of a larger 12-month mixed-methods comparative effectiveness research initiative titled 'Navigating Health: Assessing Knowledge, Attitudes, and Practices among Indigenous Women in Guyana's Regions 1 and 9.' The present paper focuses specifically on Region 9 findings from baseline data collected in November–December 2025.

The objectives of this study were: (i) to describe the sociodemographic and reproductive health profile of Indigenous women in Region 9; (ii) to assess cervical cancer screening uptake and HPV test positivity; (iii) to characterize traditional medicine use and attitudes toward integrated care; and (iv) to identify the principal barriers to accessing reproductive health services.

Materials and Methods

Study Design and Setting. A cross-sectional baseline survey was conducted between November and December 2025 among women attending health centres and community outreach sites in Region 9, Guyana. Region 9 spans the Upper Takutu-Upper Essequibo territory and is characterized by vast geographical distances between communities, limited road access, and reliance on boat or aircraft travel [7].

Participants. Eligible participants were female, aged 21–65 years, self-identified as Indigenous (Makushi or Wapishana), and residing in Region 9 at the time of data collection. Women who were unable to provide informed consent were excluded. A total of 101 women were enrolled using purposive and convenience sampling at health centres in Quatata, Parishara, Fly Hill, Massara, Hiowa, Aranaputa, Wowetta, Annai, Rupertee, Moco Moco, Kumu, Toka, St. Ignatius, Quarrie, and Lethem as well as community outreach sessions.

Data Collection. Trained interviewers administered a structured questionnaire adapted from six standardized data collection instruments (Forms 8.1–8.6), covering: baseline demographic and socioeconomic characteristics; clinical assessment including gynecological examination and cervical cancer screening (Pap smear, HPV testing, VIA); traditional medicine practice documentation; follow-up assessment; economic evaluation; and adverse events reporting. Where required, interpreters facilitated data collection in Makushi and Wapishana languages.

Clinical Screening. Cervical cancer screening included visual inspection with acetic acid (VIA), HPV testing using cervical swab specimens, and Pap smear collection where feasible. Trained health professionals at designated health centres conducted clinical assessments. Gynecological examination findings were recorded systematically, including cervical appearance, size, mobility, and previous procedures.

Statistical Analysis. Descriptive statistics were computed for all variables. Continuous variables are reported as means with standard deviations. Categorical variables are presented as frequencies and percentages. Chi-square tests were used to assess associations between

categorical variables. A binary logistic regression was also conducted to identify independent predictors of cervical cancer screening uptake. All analyses were conducted using SPSS version 26.0. A p-value of <0.05 was considered statistically significant.

Ethical Considerations. Ethical approval was obtained from the relevant institutional review board of the Ministry of Health, reference no. 113/2025 before study commencement. Informed written consent was obtained from all participants. Community-based participatory research principles guided all engagement activities, with community advisory boards established in each participating community. Indigenous data sovereignty principles (CARE framework) were applied throughout data collection and management.

Results

Sociodemographic Characteristics. A total of 101 women participated in the baseline survey. Table 1 presents the sociodemographic profile. The mean participant age was 32.6 years (SD ±8.4), with the majority (51.5%) aged 21-30 years. Most participants identified as Makushi (81.2%), with 18.8% Wapishana. Common-law unions were the most prevalent marital status (44.6%), followed by marriage (33.7%). Secondary education was the most common educational attainment (42.6%). Monthly household income fell predominantly in the GYD 40,000–80,000 range (56.4%). English and an Amerindian language were spoken by 76.2% of participants.

Table 1. Sociodemographic Characteristics of Study Participants – Region 9 (N=101).

Characteristic	n	%
Age Group (years)		
21–30	52	51.5
31–45	33	32.7
46–65	16	15.8
Mean Age (SD)	32.6 (±8.4)	
Ethnicity		
Makushi	82	81.2
Wapishana	19	18.8
Marital Status		
Common-law	45	44.6
Married	34	33.7
Single	22	21.8
Education Level		
Primary complete or less	38	37.6
Secondary complete	43	42.6
Tertiary	20	19.8
Monthly Household Income (GYD)		
<40,000	22	21.8
40,000–80,000	57	56.4
>80,000	22	21.8
Other Characteristics		
Ever had Pap smear	45	44.6
Use of Traditional Healers	42	41.6

Combines Traditional and Biomedical Treatments	35	34.7
Main Barrier to Care		
Distance/Transportation	68	67.3
Cost	48	47.5
Long waiting times	42	41.6
Primary Language		
English only	24	23.8
English and Amerindian Language	77	76.2

Cervical Cancer Screening Uptake. Table 2 summarizes clinical screening outcomes. Only 44.6% of participants had ever undergone a Pap smear. HPV testing was performed in 61.4% of participants; of these, 27.7% tested positive. VIA was conducted in 46.5% of participants, with 17.8% yielding a positive result. Previous cervical procedures were documented in 7.9% (LEEP), 4.0% (biopsy), and 2.0% (cryotherapy) of participants. Overall, 23.8% of participants reported symptoms at baseline, including abnormal vaginal bleeding, pelvic pain, back pain, vaginal discharge, and weight loss.

Table 2. Clinical Screening Outcomes among Participants – Region 9 (N=101).

Screening Outcome	**n**	**%**
HPV Test Collected	62	61.4
HPV Positive	28	27.7
HPV Negative	34	33.7
HPV Not Performed	39	38.6
VIA Performed	47	46.5
VIA Positive	18	17.8
VIA Negative	29	28.7
Pap Smear Collected	45	44.6
Abnormal Pap Result	12	11.9
Previous LEEP	8	7.9
Previous Cryotherapy	2	2.0
Previous Biopsy	4	4.0
Symptomatic at Baseline	24	23.8

Traditional Medicine Use. Table 3 presents traditional medicine use patterns. Traditional healers were consulted by 41.6% of participants. Community healers were the most common healer type (21.8%), followed by family members (17.8%). Women's health and womb care were the most frequent conditions for which traditional medicine was sought (27.7%). Equal trust in traditional and modern medicine was reported by 37.6% of participants. Among traditional medicine users, 34.7% concurrently used biomedical treatments, though only 15.8% disclosed this dual use to their healthcare provider. Barter and exchange were common payment methods for traditional healers (17.8%).

Table 3. Traditional Medicine Use and Attitudes toward Treatment – Region 9 (N=101).

Variable	n	%
Uses Traditional Healers	42	41.6
Healer Type		
Community Healer	22	21.8
Family Member	18	17.8
Multiple Healers	2	2.0
Conditions Treated Traditionally		
Womb Care/Women's Health	28	27.7
General Illness	14	13.9
Attitudes and Practices		
Trust in Traditional Medicine Equal to or Greater than Modern	38	37.6
Combines Traditional and Biomedical Treatment	35	34.7
Discloses Traditional Use to Doctor	16	15.8
Traditional Treatment for Cervical/Reproductive Concerns	28	27.7
Payment Method		
Barter/Exchange	18	17.8
Free	20	19.8
Cash	4	4.0

Barriers to Care. As shown in Table 4, the most commonly reported barriers to accessing healthcare were distance and transportation (67.3%), cost (47.5%), and long waiting times (41.6%). The mean distance to the nearest health facility was 11.2 miles, with a mean travel time of 94 minutes and mean transport cost of GYD 4,032 per visit. Fear was identified as a barrier by 11.9% of participants, while 7.9% cited lack of professional personnel.

Table 4. Healthcare Access Barriers by Participant Frequency – Region 9 (N=101).

Barrier	n	%
Distance to facility	68	67.3
Transportation cost	48	47.5
Long waiting times	42	41.6
Fear	12	11.9
Lack of professional personnel	8	7.9
No barrier identified	11	10.9
Mean distance to facility (miles)	11.2	-
Mean travel time to facility	94 mins	-
Mean transport cost (GYD)	4,032	-

Reproductive Health and Contraceptive Characteristics. Table 5 details reproductive health characteristics. Over half of participants (55.4%) currently used contraception, with hormonal injection being most prevalent (31.7%), followed by implants (13.9%). The mean age at first pregnancy was 17.8 years, mean parity was 2.9, and mean age at sexual debut was 16.4 years. Comorbidities were present in 41.6% of participants, with hypertension (23.8%) and diabetes (13.9%) being most common.

Table 5. Reproductive Health and Contraceptive Characteristics – Region 9 (N=101).

Characteristic	n	%
Currently uses contraception	56	55.4
Contraceptive Type		
Injection	32	31.7
Implant	14	13.9
Condoms	3	3.0
Other	7	6.9
Reproductive History		
Mean age at first pregnancy (years)	17.8	-
Mean parity	2.9	-
Mean age at first sexual intercourse (years)	16.4	-
Nulliparous	10	9.9
Other Health Characteristics		
History of tobacco use	4	4.0
Alcohol use (occasional or more)	24	23.8
Comorbidities (any)	42	41.6
Hypertension	24	23.8
Diabetes	14	13.9
Other comorbidities	8	7.9

Screening Uptake by Age Group. Table 6 presents the sample characteristics for screening analysis. Of the 101 participants, 46 (45.5%) had ever undergone cervical cancer screening. The mean age of the study sample was 32.7 years. The distribution of screening uptake across age groups is illustrated in Figure 1.

Table 6. Sample Characteristics for Screening Analysis – Region 9 (N=101).

Total Participants	Screening Uptake	Ever Screened	Mean Age (yrs)
101	45.5%	46	32.7

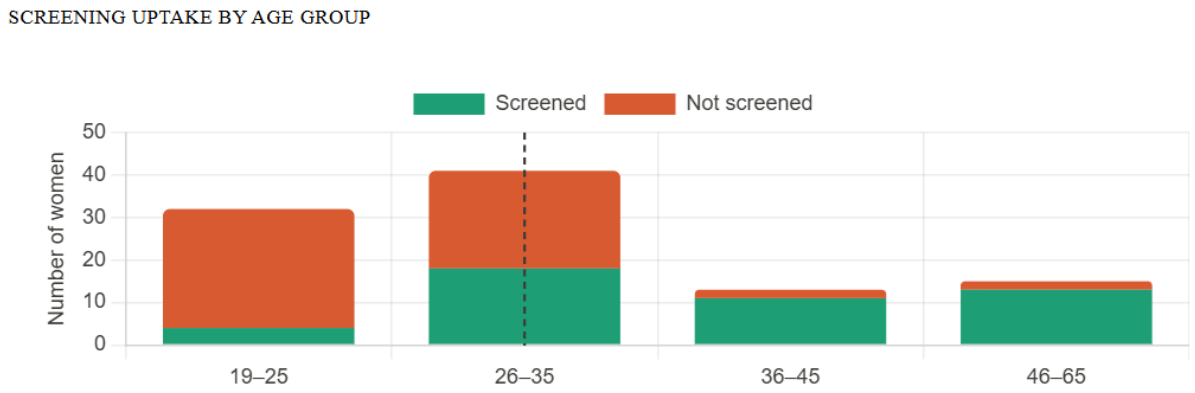

Figure 1. Screening Uptake by Age Group – Region 9 (N=101).

Logistic Regression Analysis. Table 7 presents the univariate logistic regression results. Age (OR = 1.186; 95% CI: 1.107–1.270; p <0.001), education level (OR = 0.492; 95% CI: 0.289–0.838; p = 0.008), and total pregnancies (OR = 1.386; 95% CI: 1.127–1.705; p = 0.002) were statistically significant predictors of screening uptake at univariate level. Household size met the p <0.25 criterion (p = 0.164) and was also advanced to multivariate analysis. Literacy and electricity access were excluded due to near-perfect separation.

Table 7. Univariate Logistic Regression (All Candidates) – Region 9 (n=101).

Variable	n	OR	95% CI	p-value	Selected
Age (years)	101	1.186	1.107–1.270	<0.001	Yes ***
Education level	101	0.492	0.289–0.838	0.008	Yes **
Total pregnancies	100	1.386	1.127–1.705	0.002	Yes **
Household size	101	1.178	0.940–1.476	0.164	Yes (p<0.25)
Marital status	101	1.859	0.635–5.420	0.256	No
Contraception use	100	0.631	0.282–1.413	0.261	No
Smoking	101	3.766	0.380–37.49	0.258	No
Motorized transport	101	0.686	0.307–1.535	0.359	No
Monthly HH income	73	0.781	0.476–1.281	0.324	No
Self healthcare decision	101	0.704	0.316–1.565	0.389	No
Traditional healer use	90	1.354	0.566–3.240	0.496	No
Electricity access	101	0.005	0.00–493,422	0.568	No*
Literacy	101	0.001	-	0.834	No*

*Note: Literacy and electricity were dropped due to near-perfect separation — all literate women shared the same outcome category in this sample, making OR estimates unstable. Variables with p < 0.25 advanced to multivariate analysis: age, education, total pregnancies, household size.

Multivariate Binary Logistic Regression. Table 8 presents the multivariate model results. After mutual adjustment, age was the only statistically significant independent predictor of cervical cancer screening uptake (OR = 1.210; 95% CI: 1.10–1.33; p <0.001). Education level, household size, and total pregnancies did not retain statistical significance in the multivariate model, suggesting their univariate associations were confounded by age.

Table 8. Multivariate Binary Logistic Regression – Region 9 (n=101).

Variable	β	SE	Wald z	OR	95% CI	p-value	Sig
Age (years)	0.190	0.049	3.884	1.210	1.10–1.33	<0.001	***
Education level	0.025	0.364	0.069	1.025	0.50–2.09	0.945	ns
Household size	0.236	0.207	1.139	1.266	0.84–1.90	0.255	ns
Total pregnancies	−0.188	0.203	−0.927	0.829	0.56–1.23	0.354	ns

Model Fit Statistics. Table 9 presents the model fit statistics. The overall model was statistically significant ($\chi^2(4) = 42.96$; $p < 0.001$). The Nagelkerke R^2 of 0.467 indicates the model explains approximately 47% of variance in screening uptake. The AUC of 0.854 indicates excellent discriminative ability. Overall accuracy was 81.0%, with sensitivity of 69.6% and specificity of 90.7%.

Table 9. Model Fit Statistics – Region 9 (n=101).

Statistic	Value	Interpretation
LR Chi-square test	$\chi^2(4) = 42.96$; $p < 0.001$	Model significant
Nagelkerke R^2	0.467	~47% variance explained
AUC (C-statistic)	0.854	Excellent discrimination
Overall accuracy	81.0%	Sensitivity 69.6% / Specificity 90.7%
−2 Log-likelihood (null)	137.99	Intercept-only model
−2 Log-likelihood (model)	95.03	Reduction of 42.96 points
AIC	105.03	Lower = better fit
Cox & Snell R^2	0.349	Pseudo R-squared

Univariate vs. Multivariate Comparison. Table 10 presents a comparison of univariate and multivariate odds ratios. Age remained an independent predictor in the multivariate model (OR = 1.21; 95% CI: 1.10–1.33; $p < 0.001$). Education, household size, and total pregnancies lost significance after mutual adjustment, suggesting their univariate associations were confounded by age.

Table 10. Odds Ratios – Univariate vs. Multivariate Comparison – Region 9 (n=101).

Variable	Univariate OR (95% CI)	p	Multivariate OR (95% CI)	p	Change
Age	1.19 (1.11–1.27)	<0.001	1.21 (1.10–1.33)	<0.001	Independent
Education	0.49 (0.29–0.84)	0.008	1.03 (0.50–2.09)	0.945	Confounded

Pregnancies	1.39 (1.13–1.71)	0.002	0.83 (0.56–1.23)	0.354	Confounded
Household size	1.18 (0.94–1.48)	0.164	1.27 (0.84–1.90)	0.255	Not sig.

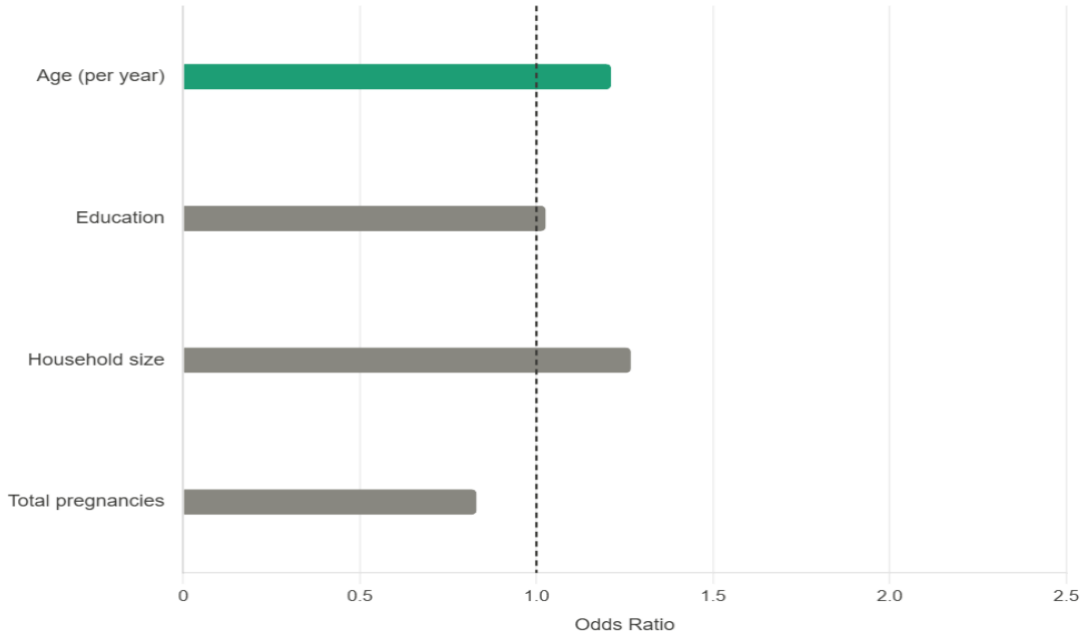

Figure 2. Forest Plot – Multivariate Odds Ratios (with 95% CI) for Region 9 (n=101).

Discussion

This study is the first to really map out how Indigenous women in Guyana's Region 9 approach cervical cancer prevention, revealing a complex picture shaped by geography, culture, and a strained healthcare system. The HPV positivity rate of 27.7% is alarmingly high, well above the global average of about 11.7% [14] and reflects the heavy burden of cervical cancer in Guyana [4]. At the same time, Pap smear uptake is very low (44.6%), a pattern seen in other Indigenous and remote communities in Latin America where similar barriers prevent women from getting screened [15, 16]. What's particularly striking is the widespread use of traditional medicine. That over 40% of women consult traditional healers—and that many use both traditional and modern treatments without telling their doctor—raises a serious concern for patient safety, as some herbal remedies can interfere with prescribed medications [17, 18]. This finding highlights a disconnect between the two systems of care. It's not surprising that distance, cost, and long wait times were the biggest barriers to care. A 94-minute journey and a significant transportation cost are major hurdles for women in households earning as little as GYD 40,000 a month. These are well-known factors that lead to women being diagnosed with late-stage cancer [19, 20]. Our findings also show that women are starting families young, with an average age of sexual debut at 16.4 and first pregnancy at 17.8. These are known risk factors for HPV and cervical cancer [21, 22], and they point to the need for health education that combines cervical cancer prevention with sexual and reproductive health. The findings are consistent with published data from Indigenous communities in the Guyana Shield region [6, 23]. In our analysis, age was the only independent factor predicting who gets screened. Simply put, older women were more likely to have had a Pap smear. This suggests that outreach efforts need to be intensified for younger women, regardless of their education level or how many children they have. The fact

that nearly 40% of women trust traditional and modern medicine equally isn't a problem to be solved, but an opportunity. It points toward a path for creating integrated, culturally safe health programs that respect Indigenous knowledge while ensuring access to life-saving modern medicine [24, 25]. The multivariate odds ratios for predictors of cervical cancer screening uptake are presented in Figure 2. Our study has some limitations. Because it's a snapshot in time, we can't draw conclusions about cause and effect. Our sampling method might also mean that the women we spoke to at health centers are different from those who don't seek care at all. We are still collecting follow-up data, which will give us a more complete picture over time. Finally, this study was focused on one region, so the findings may not apply to other Indigenous communities.

Conclusion

Our research shows that preventing cervical cancer in Guyana's Region 9 is a complex challenge, caught at the intersection of a high HPV burden, low screening rates, a deep reliance on traditional medicine, and major structural barriers to care. These factors create serious gaps in early detection and consistent care for Indigenous women.

To make a real difference, we need culturally sensitive health programs that are easy to access, are offered in local languages, and respect local healing practices. Building trust and open communication between communities and healthcare providers by integrating traditional and modern care will be key to getting more women screened and improving their health.

Future research should focus on tracking the long-term effectiveness of such integrated models. We need to better understand how culturally grounded programs can create lasting change in cervical cancer prevention for remote and Indigenous peoples. These efforts are essential if we are to achieve equitable health outcomes and reduce preventable deaths among Indigenous women in Guyana.

Conflict of Interest

The author declares no conflict of interest.

Ethical Approval

Ethical approval for the study was obtained from the Texila American University Institutional Review Board and the Ministry of Health, Guyana (reference no. 113/2025). All participants provided informed written consent prior to enrolment. The study was conducted in accordance with the Declaration of Helsinki and the CARE principles of Indigenous data sovereignty.

Author Contributions

Seraiah Arliana Dimple Validum: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – Original Draft.

Michael Olabode Tomori: Supervision, Project Administration, Writing – Review & Editing.

Data Availability

The dataset supporting the findings of this study is available from the corresponding author upon reasonable request and subject to ethical approval and institutional data governance agreements.

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