

Evaluating artificial intelligence ambient voice technology as a documentation assistant in psychiatry: proof-of-concept study

Noah Stanton,¹ Aadam Aziz,¹ Salim Jakhra,¹ Solomon Wong,¹ Louise Morganstein,¹ Paul Bassett,² Mark Brewerton,¹ Sirous Golchinheydari,¹ Declan Brogan,¹ Denusha Pushparajah¹

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¹Central and North West London NHS Foundation Trust, London, UK;

²Statsconsultancy Ltd, Amersham, UK

Correspondence to Noah Stanton (noah.stanton3@nhs.net)

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Aims and method Artificial intelligence ambient voice technology (AI AVT), which uses a large language model to summarise clinical dialogue into electronic notes and GP letters, has emerged. We conducted a mixed-methods, pre-post (manual versus AVT-assisted documentation) service development pilot to evaluate its use in a child and adolescent out-patient clinic.

Results The median administration time per clinical encounter reduced from 27 min (manual) to 10 min (AVT) ($P < 0.001$). On average, AVT-assisted documentation required only 45% of the time for manual documentation ($P < 0.001$). Clinician-rated accuracy, quality and efficiency were significantly higher for AVT-assisted documentation. Patient acceptance was high, with 97% reporting that clinicians were not distracted by note-taking. Thematic analysis from focus groups identified positive effects derived from AVT (improved productivity and clinician well-being), but was balanced by barriers (technological limitations).

Clinical implications Integration of AVT into clinical workflows can significantly alleviate documentation burden, reduce cognitive strain and free up clinical capacity.

Keywords Service development; qualitative research; attention-deficit hyperactivity disorders; child and adolescent psychiatry; artificial intelligence.

Generative artificial intelligence in the form of ambient voice technology (AI AVT) extracts relevant dialogue between the clinician and patient, automatically summarising it into outputs including GP letters and clinical notes. This reduces the need for manual documentation and alleviates administrative burden.^{1–3}

This burden is prominent in child and adolescent mental health services (CAMHS), where neurodevelopmental teams are facing significant clinical pressures due to increasing referrals for assessment and growing patient case-loads.⁴ Neurodevelopmental clinicians are required to document clinical notes in the electronic health record (EHR), and also GP letters that are detailed to include pertinent psychiatric information such as clinical history, mental state examination, risk assessment and mental capacity assessment.

Documenting such information is time-consuming and it has significant implications for clinicians, including reduced morale and burnout, employment turnover and musculoskeletal injuries.⁵ Indeed, the relationship between documentation burden and clinician burnout in psychiatry is well supported, with concerning implications for both clinician well-being and healthcare provision.^{6,7}

Implementation of AI AVT to automate documentation could substantially ease administration burden and reduce

burnout.^{8,9} In addition, automation could enhance clinicians' engagement during consultations and improve the experience of children and young people (CYP), enhancing the therapeutic relationship. Ultimately, an initiative involving AVT has the potential to dramatically improve efficiencies in clinical workflow, allowing more time for the delivery of patient-centred care while improving staff well-being.

Previous research has focused mostly on the use of AVT in primary care.^{10–12} The current study addresses this gap by evaluating the implementation of AI AVT in psychiatric practice.

Objectives

In this proof-of-concept (PoC) study, we sought to apply Anathem version 1 for Windows (Anathem Ltd, London, UK; <https://anathem.ai/>), an AI AVT tool, into clinical practice for a limited duration.

The specific objectives were to:

- assess the functionality and suitability of AVT in a CAMHS out-patient clinic for the selected use cases;
- identify whether AVT reduces documentation burden during and after clinical consultations, and whether it improves clinician work satisfaction;

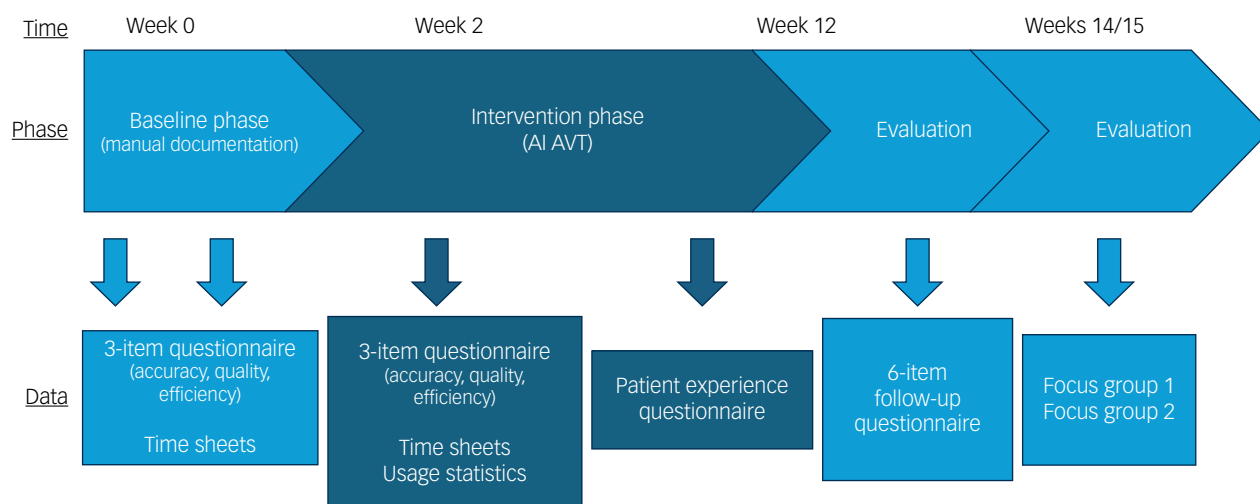


Fig. 1 Study process map.

AI AVT, artificial intelligence ambient voice technology.

- (c) identify whether AVT is acceptable to patients;
- (d) identify potential challenges and issues from a clinician, organisational and patient perspective, and make recommendations for refinements.

The study hypothesis was that, by introducing AVT within the existing clinical workflow, documentation burden would be reduced, ultimately enhancing the experience of clinicians at work.

Method

Design

This PoC was designed as a mixed-methods, pre-post service development pilot, running from July to October 2024.

Ethical standards

Ethical approval was not required because this study fulfilled criteria for a service improvement pilot. Clinicians did not need to provide informed consent for the assessment to be recorded and transcribed, as per General Data Protection Regulation (GDPR) Article 6: 6.1(e): Public task: the processing is necessary for you to perform a task in the public interest or for your official functions, and the task or function has a clear basis in law. Nonetheless, clinicians sought verbal consent from both patients and families to ensure comprehension, protect autonomous decision-making and maintain clinical standards.

Setting and participants

The study was conducted in a CAMHS out-patient clinic in north-west London. Ten clinicians participated: four consultant child psychiatrists, one specialty grade doctor, two resident doctors, one clinical specialist nurse and two assistant psychologists.

Use cases

The investigators included the following use cases:

- (a) attention-deficit hyperactivity disorder medication review: due to current clinical demand and given that this follows a standardised format that facilitated the formation of templates;
- (b) general medical review: given that this also follows a standardised format and is a common type of assessment that increases its clinical utility;
- (c) developmental history assessment: comprehensive assessment of a CYP's social, emotional, behavioural and physical development. Due to insufficient consultations during the data collection period, these data were not included in the results.

The output generated for all use cases is a clinical note recorded on the EHR, with an additional letter to the GP and family. The clinical note is aimed at clinicians and uses technical medical language. In contrast, the GP letter, which is also read by the patient, aims to communicate information using lay terminology to ensure patient comprehension.

Training

Clinician participants received a 15–30 min training session in the use of Anathem. Additionally, regular in-person, drop-in sessions were provided at the base site for technological support.

Evaluation

We assessed usage statistics (capturing how many times participants used Anathem, use case and duration of use) and clinician and patient experiences to determine Anathem's feasibility. Usage statistics were collected by the Anathem team. Figure 1 illustrates the study process.

Baseline

The baseline stage involved clinicians documenting the clinical use cases manually (which is normal practice) for 2 weeks.

Clinicians completed a three-item Likert-style questionnaire that explored self-perceptions about the quality, accuracy and efficiency of their clinical documentation (Supplementary Material 1 available at <https://doi.org/10.1192/bjb.2025.10186>). The study investigators developed the survey, which was refined until consensus was reached. The manual documentation questionnaire was completed once per clinician as an assessment of pre-established, normal practice.

Clinicians completed a data sheet every day on which they had patient consultations on site. The data sheet asked participants to document the total time taken to complete administrative tasks per patient (Supplementary Material 2). Administrative tasks included writing the progress note and GP letter, and making referrals.

Intervention

Developed in the UK and launched in 2023, Anathem was specifically developed to use AI AVT in mental health and neurodiversity settings. In 2023, Anathem was tested in Berkshire Healthcare NHS Foundation Trust, where clinicians reported favourable impressions of its capabilities.¹³ Importantly, it provides a transcription of the clinical dialogue and, to improve potential inaccuracies, the written outputs are supported by quoted evidence that can be traced back to the clinical dialogue. It is GDPR and National Health Service Data Security and Protection Toolkit compliant. In addition, its servers are UK-based. Its use in this study was approved by the Trust's chief clinical information officer, and a Data Protection Impact Assessment (DPIA) was completed prior to initiation.

The intervention stage involved clinicians documenting the clinical use cases utilising Anathem for 10 weeks. During the intervention stage, clinicians completed an identical three-item questionnaire to the control stage, which was embedded into Anathem, after each application.

Data sheets continued to be completed on each day that clinicians had patient consultations on site, to document the total time taken to complete administrative tasks per patient.

A follow-up, 6-item, Likert-style questionnaire was issued to clinicians at the end of the intervention stage (week 12) (Supplementary Material 3). This questionnaire explored users' qualitative perceptions about AVT. Clinicians were permitted to document consultations manually, if they preferred; this was indicated on the data collection sheet.

Clinicians' experiences were assessed in two 60 min, face-to-face focus groups. The first focus group had five participants and the second had four. Both focus groups were moderated by two study investigators (N.S., A.A. and M.B., S.G., respectively) and were audio-recorded and transcribed verbatim.

Field notes

Regular virtual meetings were held every 1–2 weeks with the Anathem team, clinician participants and investigators, in

addition to having an instant messaging application, to gather usability feedback and highlight and address technical issues.

Outcomes

Primary outcome measure

The primary outcome measure was change between baseline and intervention total time taken to complete administrative tasks per patient. The time taken to complete administrative tasks per patient for each clinician was derived from time sheets. Using time as a measure has been employed in other trials.^{3,14} This measure minimises response burden on clinicians because of its brevity, a key consideration for this study given its real-world application and the existing workload burden upon clinicians.

Secondary outcome measures

- qualitative clinician experience of manual versus AVT-assisted documentation (measured using baseline three-item questionnaire, follow-up six-item questionnaire and focus groups);
- patient and carer experience, perception and acceptability of AI AVT in a clinical consultation setting (measured using a patient experience questionnaire: Supplementary Material 4).

Process measure

Clinician engagement with Anathem was assessed in terms of the number of uses of Anathem (recorded using Anathem's built-in usage statistics).

Analysis

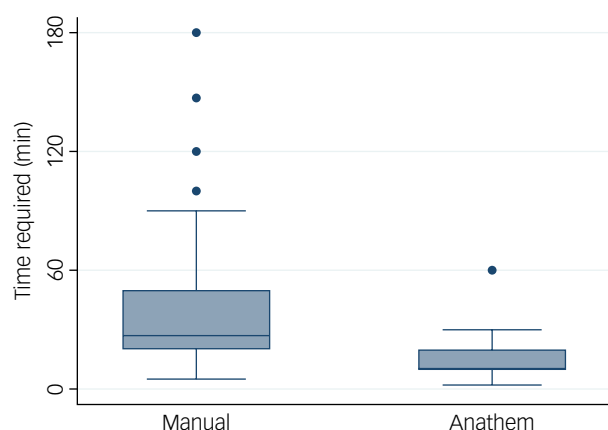
Outcome measures were analysed and reported using descriptive statistics, with results reported as mean $\pm$ standard deviation. An analysis was performed to compare the time taken for sessions in which Anathem was used and where the standard manual method was used. A feature of the data was that each clinician provided data from several sessions. Mixed linear regression was used to account for the fact that it is likely that the time taken in session from the same clinician is more similar than from sessions by different clinicians. The clinician was treated as a random factor in the model. An examination of the distribution of time measurements indicated that these were positively skewed. To meet the assumptions of the statistical methods, the analysis was performed with measurements on the log scale. Feedback questions from the three-item questionnaire completed by clinicians during baseline and intervention stages were measured on five-point, Likert-style scales. As a result of the ordinal natures of these scales, the Mann-Whitney test was used to assist with comparison. The remaining data were summarised descriptively. All analyses were conducted in Stata (version 18.5).

Authors N.S., A.A., M.B. and S.G. examined the focus group transcripts by thematic content analysis using ATLAS.ti 24 qualitative data analysis software for

Table 1 Time taken for use cases (manual versus Anathem-assisted documentation)

Documentation method	N	Time (min), median (IQR)	Ratio (95% CI)	P-value
Manual	80	27 (20–50)	1	<0.001
Anathem	171	10 (10–20)	0.45 (0.40–0.52)	

IQR, interquartile range.

**Fig. 2** Boxplot of time taken for use cases (manual versus Anathem-assisted documentation).

Windows (Lumivero, Denver, CO, USA; ATLAS.ti Scientific Software Development GmbH, Berlin, Germany; <https://atlasti.com/>).

Results

Eight clinicians provided data for the total time taken to complete administrative tasks per patient. For manual and Anathem documentation, time sheets for a total of 251 clinical encounters were recorded (AVT, $n = 171$; Table 1). In total, Anathem was used for 354 consultations and thus the clinicians' compliance for completing a time sheet after each application of Anathem was approximately 50%. The mean number of sessions per clinician was 44; this number was skewed upwards by one clinician who contributed 135 sessions (38% of the total).

Primary outcome

The results of the time sheet data are summarised in Table 1. Due to log transformation of the outcome, differences between groups are expressed as a ratio and are presented with a corresponding confidence interval. This indicates the time taken for AVT relative to that for the manual method. The P value was <0.001, indicating a statistically significant difference in the time taken between AVT and manual documentation. The median time per clinical encounter was 27 min for the manual method, which reduced to a median of 10 min with AVT. On average, documentation with AVT required only 45% of the time for manual documentation. A graphical illustration of the results is shown in Fig. 2.

Secondary outcome

For the secondary outcome measurement of clinician satisfaction with the accuracy, quality and efficiency of manual versus Anathem-assisted documentation, the results indicated a statistically significant difference between phases for all three questions. A summary of the responses is shown in Supplementary Material 5. Only 13% of responses were happy or very happy with the accuracy of manual documentation, increasing to 92% with Anathem ($P < 0.001$); 50% of responses were happy or very happy with the quality of manual documentation, increasing to 90% with Anathem ($P = 0.04$); and 13% of responses rated manual documentation as efficient or very efficient, increasing to 93% with Anathem ($P < 0.001$).

A summary of clinician responses to the follow-up questionnaire is shown in Supplementary Material 6. All clinicians agreed, or strongly agreed, that Anathem had effectively captured the key points of their clinical encounters; and 75% agreed, or strongly agreed, that Anathem had improved their satisfaction at work. All clinicians agreed, or strongly agreed, that they would recommend Anathem to a colleague.

A summary of the responses to the patient experience questionnaire is shown in Supplementary Material 7 ($n = 25$). Patients' feedback was generally positive, demonstrating a high level of acceptance towards AVT, with only three recorded encounters of a patient or carer opting out of its utilization: 96% of patients/carers felt comfortable in exploring their issues with the clinician, and 88% did not feel restricted in what content they could express. Additionally, there was evidence of improved clinician–patient engagement: 97% felt that clinicians were not distracted by taking notes. One free-text response read: 'I found this better as no notes were taken in the session, so there were no distractions'.

Focus groups

Thematic analysis of the focus groups generated four overarching themes: (a) perceived barriers of AVT, (b) perceived facilitators of AVT, (c) perceived positive effects of AVT and (d) perceived negative effects of AVT (Table 2). Themes, subthemes and illustrative quotes from study participants are summarised in Supplementary Material 8.

Theme 1: perceived barriers of AVT

Participants required assistance in optimising their use of Anathem due to uncertainty about specific features. Despite its limitations, there was consensus that the technology improved throughout the trial, promoting greater acceptance. Conversely, participants needed to adapt behaviourally to integrate Anathem into their clinical workflow, especially given varying levels of technological ability. Concerns arose around patient and/or carer reluctance to accept Anathem, although patient feedback did not support this. Others were concerned about automation complacency, emphasising the need for clinician oversight to ensure professional accountability.

Table 2 Perception of AI AVT

Theme 1: perceived barriers of AI AVT		
Subthemes	1.1 Technological limitations	The technological limitations associated with Anathem that require further development
	1.2 Technological assistance required	Clinicians requiring technological assistance to optimise their use of Anathem
	1.3 Clinician behaviour adaptation	Clinicians' adaptation to integrating Anathem into their clinical workflow
	1.4 Patient reluctance	Concerns about patients' reluctance to use Anathem, based on real or perceived experience
	1.5 Automation complacency	Concerns about insufficient review of the automated output by the clinician and its implications
	1.6 Accuracy: negative experiences	Concerns about accuracy errors in the output
Theme 2: perceived facilitators of AI AVT		
Subthemes	2.1 Rapid and tailored technical support	Technological support from Anathem was prompt and personalised to the use case and clinical team
	2.2 Ease of use	Perceived ease about navigating the Anathem platform
	2.3 Easy onboarding process	Perceived ease about the onboarding process prior to using Anathem
	2.4 Accuracy: positive experiences	Reassurance about accuracy in the output
	2.5 Patient acceptability	Reassurance that patients were accepting of Anathem
Theme 3: perceived positive effects of AI AVT		
Subthemes	3.1 Time-saving	Perception that Anathem reduced the total time taken to complete administrative tasks per patient
	3.2 Improved workflow	Improved workflow
	3.3 Improved efficiency and productivity	Improved efficiency and productivity
	3.4 Reduced administrative burden	Reduced administrative burden
	3.5 Reduced cognitive strain aiding recall	Anathem can serve as a recall aid
	3.6 Improved clinician-patient interaction	Improved clinician-patient interaction
	3.7 Physical health benefits	Physical health benefits for clinicians
	3.8 Exceeded expectations	Anathem exceeded clinicians' expectations
Theme 4: perceived negative effects of AI AVT		
Subthemes	4.1 Clinical de-skilling	Automation of clinical tasks resulting in clinical de-skilling

AI AVT, artificial intelligence ambient voice technology.

Theme 2: perceived facilitators of AVT

Efficient communication and prompt, personalised technical support instilled end-user confidence. Consequently, participants felt enfranchised to provide feedback about Anathem's performance. The intuitive functionality, useful onboarding and involvement in co-designing of templates further encouraged support. Patients and carers were mostly accepting of Anathem.

Theme 3: perceived positive effects of AVT

The most significant benefit identified was time saved per clinical encounter, which increased with continued use. This reduced administrative burden and improved workflow, efficiency and productivity. Clinicians were able to engage more with patients, enhancing the clinician-patient interaction. Additionally, participants described physical health benefits for clinicians, including mitigating the impacts of a hand injury and back pain from prolonged typing and sitting respectively.

Theme 4: perceived negative effects of AVT

Anathem reduced the dependence on memory in clinical settings. Most participants viewed reduced cognitive burden as beneficial, given that it generates clinical capacity. However, one participant viewed recalling and integrating information without technological assistance as a valuable skill. Another participant questioned whether reliance on Anathem could result in clinical de-skilling, particularly in regard to writing clinical documents and psychiatric formulations.

Discussion

Principal findings

To the author's knowledge, this represents the first study to explore AI AVT in a psychiatric service in the UK. We have demonstrated preliminary evidence that implementation is feasible in a CAMHS out-patient clinic, and that AVT is faster than manual documentation and significantly reduces documentation burden. Clinicians reported a high degree

of satisfaction, and the tool was readily accepted by both patients and carers. Technological limitations necessitate that clinicians thoroughly check outputs for accuracy. We collaborated with Anathem and clinician participants to co-design output templates and facilitate refinements.

Other research

Although the role of artificial intelligence in psychiatry is in its infancy, research is ongoing into its potential role in diagnosis and treatment.¹⁵ While AVT has been envisioned for use in psychiatry, this is the first study to pilot its implementation and publish the findings.¹⁵ Our observed improvement in documentation burden aligns with prior research into AVT in general practice, medical and surgical settings.

A non-randomised clinical trial evaluating AVT as a documentation assistant in general practice and medical specialties identified time savings.¹⁴ Another study in the USA, involving over 3000 clinicians, observed that AVT improved clinician workflow, workplace satisfaction and clinician–patient interaction, which resulted in favourable patient feedback. The authors agreed with our conclusion that further development of the technology is needed, and that integration in the EHR would be beneficial.³ A study evaluating ChatGPT, a conversational artificial intelligence model, identified that it could reduce the time taken to complete discharge summaries while maintaining clinical quality.⁹ A recent randomised control trial showed that ChatGPT has the potential to improve clinical documentation by generating more comprehensive documents.¹⁶ However, a comparative study demonstrated that outputs generated by ChatGPT vary substantially in regard to errors, accuracy and note quality.¹⁷

Strengths

In general, there was good engagement from clinicians: participants used Anathem a mean average of 44 times. The study investigators maintained regular contact with the Anathem team and clinicians, which provided usability feedback and prompt responses to technical issues. We included a broad range of clinician roles (consultant psychiatrists, resident, specialty-grade doctors, a clinical specialist nurse and assistant psychologists), which increased the generalisability of our results.

Limitations

Because the sample of clinicians used for this study, including the focus groups, was relatively small, the perceptions and concerns arising might not be representative of other psychiatric clinicians. Furthermore, we recruited clinician participants by convenience sampling, which may have introduced selection bias because clinicians already interested in artificial intelligence or technological solutions may have been more likely to volunteer themselves. There was a marked difference in the number of time sheets collected from participants in the control ($n = 80$) versus intervention stage ($n = 171$). Additionally, time sheet compliance during the intervention stage was only 50%.

Due to capability limitations in the usage statistics, we were unable to quantify the edits to the outputs made by clinicians; however, the Anathem team and investigators maintained a log of fabrications in content and other inaccuracies.

Due to practical reasons, we did not stratify consultation types and therefore we were not able to differentiate time savings.

Because the Likert patient and clinician questionnaires were developed by the study investigators and were not analysed for reliability or validity, the results need to be interpreted with caution.

Although we have demonstrated how AVT reduced documentation time, we were not able directly to quantify any productivity gains. Finally, although most patients expressed favourable views about AVT, qualitative analysis of patient perspectives with interviews or focus groups is needed to establish its disadvantages.

Implications for practice

The NHS 10 Year Health Plan for England, published in July 2025, highlighted two major challenges that the NHS faced: growing waiting lists for community care and staff becoming ‘demoralised and demotivated’. The report calls for transformable technologies, including artificial intelligence, to be integrated into clinical pathways to address these issues. This study demonstrated AVT’s potential in healthcare¹⁸: clinicians performed their administrative tasks substantially faster, increasing clinician capacity for other clinical and non-clinical tasks. Improved workplace satisfaction might reduce the risk of burnout, and improved physical health could reduce absenteeism from staff injury. Improved clinician–patient interaction may improve patient-centred care and patient engagement, optimising treatment outcomes.

Potential challenges for AVT

Although artificial intelligence documentation assistants such as Anathem offer significant promise, deployment in clinical practice will require multiple barriers to be overcome.

A robust digital infrastructure must form the foundation of AVT’s implementation. Locally, clinicians experienced intermittent Wi-Fi connectivity issues that sometimes impeded Anathem’s functionality. Accuracy of the output document remains a significant challenge. For assurance, auditable output summaries provide transparency of origin so that clinicians can visually obtain direct evidence from the source. It remains essential that clinicians are aware of the technological limitations and ensure that output is accurate without becoming complacent. Further fine-tuning of the algorithms in test environments could increase accuracy, resulting in improved consistency and reliability.

Algorithmic bias may arise from technological variations or limited representation from minority groups in data-sets, and any bias in the source will be reflected in the outputted text.¹ Consequently, biased artificial intelligence models might be disproportionately harmful to vulnerable demographics. Therefore, it is crucial to ensure that artificial intelligence models are trained with diverse data that capture linguistic, cultural and societal distinctions. We recruited a

wide range of personnel in the multidisciplinary team to reduce data bias from a user perspective. Finally, integration of AVT with EHRs may prove prohibitively expensive and therefore unattainable, resulting in less efficient workflow. The guidance provided by NHS England in April 2025 to chief clinical information officers sets a foundation for discussing the benefits and challenges of implementing AVT in healthcare settings. However, it does not account for the unique documentation needs faced in mental health and neurodevelopmental settings, which require further research.¹⁹

In conclusion, this study provides preliminary evidence that AI AVT as a documentation assistant can significantly reduce documentation burden and improve clinician satisfaction, while remaining acceptable for both patients and their carers. Due to technological limitations, clinician supervision is essential. Future research should focus on using AI AVT in other use cases, and on the potential benefits of integration in EHRs.

About the authors

Noah Stanton is a psychiatry resident, Central and North West London NHS Foundation Trust, London, UK. **Aadam Aziz** is a psychiatry resident, Central and North West London NHS Foundation Trust, London, UK. **Salim Jakhra** is a consultant child psychiatrist, Central and North West London NHS Foundation Trust, London, UK. **Solomon Wong** is a consultant psychiatrist and associate chief clinical information officer, Central and North West London NHS Foundation Trust, London, UK. **Louise Morganstein** is a consultant child psychiatrist, Central and North West London NHS Foundation Trust, London, UK. **Paul Bassett** is a freelance statistician for Statsconsultancy Ltd, Amersham, UK. **Mark Brewerton** is a psychiatry resident, Central and North West London NHS Foundation Trust, London, UK. **Sirous Golchinheydari** is a psychiatry resident, Central and North West London NHS Foundation Trust, London, UK. **Declan Brogan** is a psychiatry resident, Central and North West London NHS Foundation Trust, London, UK. **Denusha Pushparajah** is a foundation resident, Central and North West London NHS Foundation Trust, London, UK.

Supplementary material

The supplementary material is available online at <https://doi.org/10.1192/bjb.2025.10186>.

Data availability

The data that support the findings of this study are available on request from the corresponding author, N.S.

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Author contributions

All authors met International Committee of Medical Journal Editors criteria for authorship. N.S., A.A., S.J. and S.W. developed the concept for the project, project design and project administration. M.B. and S.G. conducted the focus groups and performed thematic analysis. N.S. and A.A. wrote the final version of the manuscript. P.B. performed and wrote the statistical analysis. S.J., L.M.

and supervisor S.W. reviewed the thematic analysis and provided critical feedback and edits that shaped the final version of the manuscript.

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Declaration of interest

Since 11 August 2025, N.S. has been employed by Anathem Ltd in a part time role as a clinical prompt engineer, in addition to his clinical work as a psychiatric resident with Central and North West London NHS Foundation Trust. The ambient voice technology that was tested during the pilot (which ran from July to October 2024) was provided by Anathem Ltd. There are no other potential conflicts of interest to disclose from any of the other authors.

Ethical standards

Ethical approval was not required because this study fulfilled criteria for a service improvement pilot. Participants provided verbal consent prior to their involvement, and patients verbally consented prior to the use of Anathem in clinical encounters.

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