Support can increase use of the AUDIT-C in Australian Aboriginal Community Controlled Health Services: a cluster randomised trial

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Abstract

Background and Aims Unhealthy alcohol consumption is a key concern for Aboriginal and Torres Strait Islander ('Indigenous') communities. It is important to identify and treat at-risk drinkers, to prevent harms to physical or social wellbeing. We aimed to test whether training and support for Aboriginal Community Controlled Health Service (ACCHS) staff would help them to increase rates of alcohol screening and brief intervention. **Design** Cluster randomised trial **Setting** Australia. **Cases** Twenty-two ACCHSs that see at least 1,000 clients a year and use Communicare as practice management software. **Comparator** Wait-list control (equal allocation). **Intervention** Training, regular data feedback, collaborative support, and funding for resources ($9,000). Blinding was not used. **Measurement** AUDIT-C screening and records of brief interventions were extracted from practice management software at two-monthly intervals. Observations described the clinical actions taken for clients over each two-month interval. The Baseline period (August 28 2016 to August 28 2017) was compared to the post-implementation period (August 29 2017 to August 28 2018). We used multi-level logistic regression to test the hypotheses that clients attending a service receiving active support would be more likely to be screened with AUDIT-C (primary outcome), or to receive a brief intervention (secondary outcome). **Findings** The study included data on 70,419 clients. We observed an increase in the odds of screening with AUDIT-C for both groups, but the increase was 5.52 (95% CI 4.31, 7.07) times larger at services receiving support. We found little evidence that the support program increased the odds of a recorded brief intervention relative to control services (OR 2.06; 95% CI 0.90, 4.69). Differences in baseline screening activity between treatment and control reduce the certainty of our findings. **Conclusions** Providing ACCHSs with training and support can improve AUDIT-C screening rates, but targeted approaches which cater to the different needs of services may be required.

Keywords: remote support, alcohol screening, AUDIT-C, training

Word count: 4,209

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Introduction

Indigenous peoples who have been colonised face broad disadvantage and discrimination [1], which contributes to unhealthy alcohol consumption [2]. Australian Aboriginal and Torres Strait Islanders ('Indigenous Australians') describe unhealthy drinking as an area of concern [3]. Australian national guidelines (at the time of writing) recommend that people consume no more than an average of two standard drinks (each 10g of ethanol) per day, and no more than four standard drinks on any occasion [4].. Brief intervention can help people reduce unhealthy drinking [5]. However, most people who drink above national guidelines are not identified by primary health services [6–10]. Providing training and support to Aboriginal and Torres Strait Islander Community Controlled Health Services (ACCHSs) may increase uptake of alcohol screening and brief intervention for Indigenous Australians [11, 12].

ACCHSs are governed by local Indigenous community members and so may be better able to provide culturally-informed and accessible care than other services [13–15]. However, talking to Indigenous clients about their drinking can be difficult, particularly in smaller communities [16]. Drinking that leads to harms (especially to others) can be a source of shame [17], and is likely under-reported [18, 19]. Short structured screening tools like the Alcohol Use Disorders Identification Test consumption questions (AUDIT-C) [20, 21, 22] can help guide conversations about unhealthy drinking [23, 24, 25].

AUDIT-C can be used in Indigenous contexts [26], but clients may need help converting consumption into standard drinks [17, 27]. Training and support for ACCHS staff may increase AUDIT-C screening, and brief intervention rates [12, 28]. Yet, no controlled trial has tested this hypothesis. Many kinds of supports may be needed as clinical practice is varied and influenced by multiple factors (e.g. clinician attitudes, self-efficacy, skill levels,

workplace cultures and systemic mechanisms) [15, 28]. Tailoring support to local service needs is likely important to ensure that interventions are relevant, and responsive to local circumstances [29, 30, 31].

In this paper, we report on the primary outcomes of a cluster randomised trial (CRT) [11] testing if training and support can improve uptake of evidence-based screening and brief intervention for unhealthy alcohol consumption in ACCHSs. We report on whether clients were screened with AUDIT-C (primary outcome) or received a brief intervention (secondary outcome)—other registered outcomes will be reported in future publications. We compare changes in AUDIT-C screening, and brief intervention at 11 services receiving one year of 'active support' ('early support' services), against 11 wait-list control services. We hypothesized that, relative to controls, providing services with training and support would increase the odds of clients being screened with AUDIT-C, and receiving brief intervention.

Methods

Design

This study is a cluster randomised control trial (CRT). ACCHSs were randomly allocated (equal allocation, stratified by remoteness) to training and support ("Early support"), or to a wait-list control group (referred to as 'Late support' in the registered protocol). In cooperation with service staff, we designed a multi-faceted training and support intervention. We tested whether this support program improved the odds of screening (primary outcome), and brief intervention (secondary outcome) using routinely collected data from services' practice management software. To determine the effectiveness of the support program, we calculated the relative increase in the odds of screening, and brief intervention, between the early support and wait-list control groups. The wait-list control group received the support program in a later phase of the trial which will be reported in future manuscripts.

The CONSORT checklist for CRTs was used to prepare this paper [32]. A full protocol for this project was published [11]. The trial, including the research questions and analysis plan, was retrospectively registered with the Australian New Zealand Clinical Trials Registry prior to the completion of data collection (ACTRN12618001892202).

Ethical approval

Ethical approval was obtained from eight ethics committees across Australia: the Aboriginal Health & Medical Research Council of NSW Ethnics Committee (NSW; project 1217/16), Central Australian Human Research Ethics Committee (project CA-17-2842), Human Research Ethics Committee of Northern Territory Department of Health and Menzies School of Health Research (project 2017-2737), Central Queensland Hospital and Health Service Human Research Ethics Committee (project 17/QCQ/9), Far North Queensland Human Research Ethics Committee (project 17/QCH/45-1143), The Aboriginal Health Research Ethics Committee, South Australia (SA; project 04-16-694), St Vincent's Hospital Melbourne Human Research Ethics Committee (project LRR 036/17) and Western Australian Aboriginal Health Ethics Committee (WA; project 779).

Involvement by Indigenous Australians

To ensure reciprocal benefit and self-determination, Australian ethical guidelines require that Indigenous communities guide how research that uses their resources is conducted [33]. Indigenous Australians, including staff of two state-wide umbrella agencies for ACCHSs (in SA and NSW) were involved in formulating the research question and study design. Staff from participating ACCHSs helped refine the study design and support program. Four authors of this paper identify as Indigenous Australian.

Intervention details

Support was comprised of eight major components: the nomination of service champions, a national workshop, on-site training, resources, practice management software support, regular data feedback, phone conferences, and an online information repository and an online platform [11].

Service champions. We asked services to nominate two representatives ("service champions") to act as advocates for alcohol care. Service champions can help sustain positive outcomes [30]. We encouraged services to nominate at least one clinician and Aboriginal Health professional. Service champions received training at a national face-to-face workshop and shared experiences at teleconferences held every second month.

National workshop. Service champions attended a multi-service, face-to-face, two-day workshop (August 2017). Facilitators encouraged service champions to network and to discuss ways that care for patients at risk from drinking could be improved at their services. The workshop provided training on screening with AUDIT-C, and managing unhealthy alcohol consumption. The training covered the importance of alcohol-related care, detecting risky drinking with the AUDIT-C using national scoring thresholds for ACCHSs (≥ 3 for women, ≥ 4 for men) [34], talking about alcohol problems with clients, performing brief interventions, withdrawal management, relapse prevention medicines, supporting families and carers, and encouraging communities to think about alcohol related harms. The workshop included group work, activities such as pouring standard drinks for various alcohol types (using water), and brief intervention role plays.

Phone conferences. Phone conferences, convened by an addiction medicine specialist (KC) and an Aboriginal researcher with clinical experience (KH), were held every two months with service champions. These conferences allowed service champions to discuss challenges and successes related to AUDIT-C screening, brief intervention, and other actions to prevent or treat unhealthy alcohol consumption.

Onsite training. Each service was visited by an addiction medicine specialist (KC) and an Aboriginal Australian researcher with clinical experience (KH). On-site training covered the same content as the national workshop. The duration of on-site training (typically a half-day) was adapted to fit staff availability. On-site training occurred within five months of the national workshop where possible. This training was necessarily staggered as some services were located thousands of kilometers apart.

Resources and funding. Services were given Australian clinical guidelines [35] and visual resources for use in brief interventions [36]. Each service in the early support phase was provided with $9,000 AUD to purchase agreed resources related to the prevention and treatment of unhealthy alcohol consumption.

Practice management software support. Services recieved support from a remote area nurse with expertise in Communicare (BH). Services were supported to modify their practice management software in ways they felt were useful. For instance, services could be assisted to modify the template for adult health checks to include AUDIT-C (prior to this being made standard by Communicare).

Data feedback. Data feedback is an essential part of continuous quality improvement (CQI) strategies, and may help improve service delivery [37, 38]. Every two months, following submission of routinely collected data, each service received a PDF report (via email) on their clinical activities related to alcohol consumption. These reports were generated using the sweave function in R programming language [39], which combines output from R, with a LaTeX template. Reports included visualisations of AUDIT-C screening rates, the proportion of clients at risk from drinking, and the numbers of clients who had received relapse prevention medicines or brief interventions. Sample figures used in these reports have been published previously [11].

Online platform. A password protected information repository and online forum was created for service champions to communicate with each other and to share resources.

Recruitment

Services were eligible for inclusion if they were registered as an ACCHS, used Communicare as their practice management software (to facilitate data extraction), and served at least 1,000 unique clients each year. To determine the minimum number of services to enrol, a power calculation was performed using 'Power Analysis & Sample Size' (PASS) [40]. We expected that 60% of clients would be 16 years or older [41]. An estimated 57% of these are likely to have been screened for alcohol consumption in any 12 month period [42] Assuming an intra-cluster correlation coefficient (ICC) of 0.04 [43, 44], enrolling 10 early support services and 10 wait-list control services allowed for an increase in treatment provision of at least 13% in the early support services to be detected with 80% power and 2-sided significance of 0.05). Allowing for potential attrition, we recruited an additional service into each arm of the study resulting in a total of 22 services (11 in each arm).

We identified and assessed the eligibility of 132 ACCHSs across Australia. Consent was sought from each service's Chief Executive Officer (CEO) and Board of Directors. We (KH, KC, BH) recruited the first 22 eligible services that were willing to participate (Figure 1). Four services were eligible but declined to participate. Five services gave no response to the research team.

[Figure 1]

Randomisation

Services were divided into three strata based on their remoteness (urban and inner regional; outer regional and remote; and very remote) [45]. Services were then randomly allocated into the two trial arms, by stratum. The randomisation process was performed in SAS by a researcher (TD) blinded to service identity. Services were not blinded as to whether or not they were receiving support.

Extraction of routinely collected data

Services extracted de-identified data from their practice management software using SQL commands. These commands ensured a consistent structure, and that only relevant data was received by the research team. Services sent data to the research team every second month; retrospective data was collected for the baseline period (August 28 2016 to August 28 2017). The implementation/follow-up period was August 29 2017 to August 28 2018. Data was merged into a single table using R [39] and the R library 'data.table.' Data was aggregated such that each row summarised one client's attendance over a two-month extraction period.

Missing data

Complete-case analysis was used when demographic data was missing (age or gender). Our data included routinely collected clinical data extracted from practice management software. When clinical data is entered without error, the absence of data (such as AUDIT-C results) indicates that a given test was not performed. Accordingly, it was not possible to identify cases with missing clinical data.

Wait-list control

Following recruitment, wait-list control services received a report announcing that the research project had commenced. Each service in the wait-list control was reimbursed for time staff spent performing data extractions ($100 for each second-monthly extraction). A member of the research team answered queries from wait-list controls related to data extraction, but otherwise, the research team did not interact with the eleven services in the wait-list control (during the early support phase reported in this paper).

Outcome variables

AUDIT-C screening. The primary outcome was whether clients were screened with AUDIT-C [20]. The AUDIT-C is comprised of the first three questions from the 10-item Alcohol Use Disorders Identification Test (AUDIT) [46]. The first item is "How often do you have a drink containing alcohol." Responses are on a five-point scale ranging from "Never" to "4+ times per week." The second item is "How many standard drinks of alcohol do you drink on a typical day when you are drinking?" Responses to the second item are on a five-point scale ranging from "1-2" to "10 or more." The final item is "How often do you have six or more drinks on one occasion." Responses are on a five-point scale and range from "Never" to "Daily or almost daily." Records were classified as containing a valid AUDIT-C screen if a response was recorded for all three questions, or if data from AUDIT-1 indicated that the client was a current non-drinker. We did not monitor or liaise with clinicians about individual clinical decisions.

Brief interventions. The secondary outcome was whether clients received a brief intervention to reduce unhealthy drinking. Staff were instructed to record when they had discussions about alcohol consumption of less than 20 minutes as "advice/education alcohol" using standard clinical items on practice management software. If a client was reported to have been provided with brief advice/education within a data extraction period, they were classified as having received a brief intervention.

Other variables

Demographics. Age, gender

Last visit. The date of the most recent session was used to establish whether a client attended a service during a two-month reference period.

Analysis

All analyses were conducted with the statistical software R [39]. To ensure reproducibility, this paper was prepared using 'R markdown' [47] and 'papaja' [48]. Source code is available in supplementary materials. Analyses were conducted on an intention-to-treat basis (regardless of adherence, all data from services was analysed in the conditions they were randomised to).

Services (rather than individuals) were randomised into the study arms meaning that observations are not independent [49]. Observations (level 1) are nested under clients (clients can attend health services multiple times; level 2). Clients are nested under services (level 3). To control for clustering, multi-level logistic regressions predicted the odds of each outcome occuring using the lme4 package [49]. Outcomes were predicted by two categorical variables and their interaction: 'condition' (early support versus wait-list control), and time (pre- or post-support implementation). The interaction term demonstrates the effect of the support program—the increase in the odds of screening, or brief intervention for early support (the treatment arm), relative to the wait-list control arm. Confidence intervals for fixed effects were calculated using Wald estimation [49]. Adjusted ICCs [50] were calculated using the performance package [51]. We used the delta method as implemented in the car package [52] to estimate the increase in the odds of screening for early support services (a *simple slope*) [53, 54].

Random effects specification. To find the models best supported by the data, we compared models using a variety of random intercepts and slopes [55]. We theorised that the odds of screening at baseline, and the change in odds over time would vary by service. Preliminary analyses did not find clustering of observations by client. Accordingly we expected models with a random intercept for service and a random slope for time would be optimal. Model fit was assessed using the Bayesian Information Criteria (BIC; lower values indicate improved fit) [56]. We checked that random slope and intercept models were

superior to simpler models (intercept only) with Likelihood ratio tests [49]. If the fit of the more parsimonious model was not significantly worse ($\alpha >= 0.05$), the simpler model was preferred.

Graphical displays. To visualise model fixed-effects, predicted probabilities were computed using the 'ggeffects' library [57], and plotted using 'ggplot2' [58].

Results

Observations

Data were received for 70,419 unique client IDs (55.20% female), from 22 services. Based on 2016 Australian census figures, this sample constitutes up to 9% of the Australian Indigenous population (if we assume clients did not attend more than one service) [59]. Observations from 286,508 clinical interactions, spanning two years, were used in these analyses. Gender was not recorded for clients in 15 observations. All other demographic data was complete..

Comparison of groups

Across the baseline period, clients attending services in both conditions were of similar age and gender, and had attended their respective clinic a similar number of times. Services in the early support condition, tended to see more clients per year and had a lower baseline screening rate (Table 1). From the baseline period (T1), to post support (T2), screening at early support services increased (from 6.55% to 11.18% of observations), and the percentage of observations containing brief interventions rose (from 0.08% to 0.26%). Screening at waitlist control services also increased (from 10.44% to 13.25% of observations), but the number of brief interventions decreased (from 0.26% to 0.10% of observations).

[Table 1]

Model selection

Multi-level logistic regressions were used to predict the odds of being screened with AUDIT-C, or receiving brief intervention within two-monthly reference points. All models converged. For both outcomes, models with a random slope of time by service (pre vs post implementation of support) and a random intercept of service had superior fit relative to random intercept only models ($p < 0.001$ for both outcomes).

AUDIT-C screening odds

The effect of the support program on the odds of clients being screened with AUDIT-C within two-monthly periods of time is summarised in Table 2 and Figure 2. Findings did not meaningfully change when client age and gender were used as control variables (see supplementary materials).

[Table 2]

At baseline, the odds of screening with AUDIT-C was lower for early support services relative to controls. Following the start of the intervention, the odds of screening increased 29.07 (95% CI 22.98, 36.78) times for early support services (estimated from the model using a delta method transformation) and 5.26 (95% CI 4.34, 6.39) times for controls—the increase for early support services was so large, in part, due to very low odds of screening at baseline. The relative increase in screening was 5.52 (95% CI 4.31, 7.07) times larger for early support services compared with controls (the intervention effect). These findings suggest that the intervention was successful in increasing the odds of screening with AUDIT-C at early support services.

Much variance in screening was attributable to differences between services ($ICC =$ 61%). There was a strong negative correlation between random slopes and intercepts indicating that services with lower baseline screening rates showed the greatest

improvements over time. Figure 3 demonstrates the large variability in service screening rates by condition over time.

[Figure 2]

[Figure 3]

Brief intervention

The effect of the support program on the odds of brief intervention being recorded for clients within two-monthly periods of time is summarised in Table 3 and Figure 4. Findings did not meaningfully change when client age and gender were used as control variables (see supplementary materials).

[Table 3]

Staff from services in both study arms rarely recorded performing brief interventions using the agreed Communicare clinical items. Observations after the start of training and support were not more likely to contain recorded brief interventions. The relative increase in the odds of receiving a brief intervention was not significantly different for early support services and controls (the intervention effect) 2.06 (95% CI 0.90, 4.69). Approximately 62% of variance in brief intervention was explained by differences between services. There was a strong negative correlation between random slopes and intercepts indicating that services with lower baseline brief intervention rates showed greater improvements over time.

[Figure 4]

Discussion

This paper presents the first controlled trial testing whether training and support can increase implementation of alcohol screening and brief intervention in Indigenous Australian community controlled primary health services—a major undertaking across multiple

Australian regions and years, involving large client numbers. The odds of screening with AUDIT-C increased in both study arms; but the improvement was relatively larger for services receiving training and support. We found no evidence that our support program increased the odds of clients receiving brief interventions. Our findings are encouraging but must be interpreted with caution as substantial variations between services were observed at baseline, and in screening activity over time. Questions also remain as to whether benefits from the support program can be maintained; and whether support has positive flow-on effects for Indigenous Australian communities.

Substantial heterogeneity between services meant that our models included more uncertainty than anticipated. Despite enrolling many services, at baseline, early support services had substantially lower screening rates than controls, which may partly explain why they made larger relative improvements over time. Many early support services saw improvements in screening rates directly following initiation of support. But others (especially those with high baseline screening) made no improvement at all. Perhaps support is most likely to benefit services less familiar with the AUDIT-C.

Are benefits from training and support likely to be maintained?

While some early support services made gains in AUDIT-C screening, others did not. These differences are likely due, in part, to the enthusiasm of individual staff members, and especially, to service champions. Reliance on specific personalities is concerning as high staff turnover is a major challenge for ACCHSs [60]. To increase likely sustainability and transfer of skills within and between services, we created an online resource platform, and held two-monthly phone conferences with service champions. Even if services lost critical staff, the training could be passed on. But, with competing demands on clinicians' time, and with changing priorities, the need to screen for alcohol may become less salient. In future papers we will test whether improvements are maintained following the cessation of support from the research team.

Which part of the support program worked?

Improved screening is a credit to participating ACCHSs and their staff. Providing care to vulnerable groups, while engaging in accurate record-keeping, and professional development, places pressure on staff [61]. While alcohol is a concern for many Indigenous communities, it competes with other health concerns (e.g. smoking, diabetes, kidney disease and hypertension). It is important that any support programs for ACCHSs are adaptable and locally relevant [29]. This support program was designed with ACCHS staff to be multi-faceted and flexible. Some services wanted extra information on medicines for alcohol use disorders; others were interested in help to make changes to practice management software. Future work needs to establish which components are most beneficial. Removing unhelpful aspects of the support program may enable its replication with fewer resources. However, flexibility, in ensuring relevance to varied local conditions [29], may itself be a key component of the support program.

The relationship between screening, brief intervention, and health

We demonstrated that training and support can improve the odds of evidence-based screening. But it is not clear if the increase in screening was appropriate (services could have repetitively screened known non-drinkers), or what the flow-on effects of increased screening were. We hoped that increased screening would result in more brief interventions. But, few brief interventions were reported at baseline, and rates did not increase over time. Performing brief interventions following the detection of risky drinkers may be difficult due to time pressures from high case loads, and the need to treat other presenting conditions. Alcohol can also be a sensitive topic in many Indigenous Australian communities [62] —three services were in dry communities where alcohol cannot be legally purchased. But we suspect that brief interventions occurred more frequently than was recorded in extracted clinical items. Time-pressed clinicians may simply discuss the harms of alcohol with clients rather

than search for specific clinical items. Observational studies could clarify the types and rates of brief interventions performed at ACCHSs. But even if the support program did result in more brief intervention, this does not mean that client outcomes were improved. Future work using objective outcomes (e.g. liver enzymes), could test whether support programs that increase screening, or brief intervention, also improve community health.

Limitations

The Australian Government announced that from July 2017, AUDIT-C screening results would become a national key performance indicator for ACCHSs [34]. This change was implemented about one month before the start of the support program. It is likely that this mandate incentivised all ACCHSs to increase AUDIT-C screening rates. This change is likely to explain why increased screening was observed in both arms of the study. Additionally, services were not blind to study aims. Wait-list control services knew that their AUDIT-C screening rates were being assessed by the research team and had to regularly provide us with screening data. This could have changed wait-list control services' behaviour.

Data quality is dependent on accurate record keeping at participating services. Some errors are unavoidable, for instance, patients could potentially attend multiple clinics which would inflate our numbers of unique clients. It is also possible that clinicians at times used AUDIT-C or performed a brief intervention without noting this in their practice management software. These issues add uncertainty to our results.

Conclusion

Providing training and support to Aboriginal Community Controlled Health Services can increase the odds of screening with AUDIT-C. But differences between services mean that the need for and effectiveness of support programs will vary. Targeted support programs which cater to individual service needs may be required. Future work is needed to

clarify whether any positive effects of the support program can be maintained, which aspects of the program were beneficial, and whether the program is a cost-efficient way to improve Indigenous Australian health.

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Table 1

Service and client characteristics during the baseline period by condition

	Early support	wait-list control
Service characteristics		
N	11	11
Clients 000's (SD)	3.2 (2.0)	1.6 (0.6)
Remoteness		
Urban and Inner regional	5	5
Outer regional and remote	2	3
Very remote	4	3
Client characteristics		
N†	34,829	17,849
Observations per client	2.7 (1.8)	2.7 (1.7)
Age in years (SD)	37.4 (16.0)	37.8 (16.4)
Current drinkers	55.5%	58.8%
Mean AUDIT-C score (SD)	3.1 (3.5)	3.1 (3.4)
AUDIT-C screening rate (%)	6.5%	10.4%
Brief intervention rate* (%)	0.1%	0.3%

Note. Early support = treatment arm; SD = standard deviation; AUDIT-C screening and brief intervention rates (%) calculated over two-monthly reference periods; *According to service staff, services did not reliably record when they performed brief interventions so brief intervention rates are likely underestimated.; † Client sample size estimated from number of unique client IDs. As it is possible that some clients attended more than one service the true number of unique individuals may be lower.

Table 2

The effect of training and support on the odds of being screened

Predictors	$logOR$	SE	OR 95% CI	p
Intercept	-5.37	0.11	0.00 [0.00, 0.01]	< 0.001
Early support	-3.74	0.13	0.02 [0.02, 0.03]	< 0.001
Time	1.66	0.10	5.26 [4.34, 6.39]	< 0.001
Intervention	1.71	0.13	5.52 [4.31, 7.07]	< 0.001
Random Effects				
$\tau_{00\ service}$	35.89			
$\tau_{11\ time\|service}$	8.46			
$\rho_{01\ service}$	-0.99			
ICC	0.61			

Note. p < 0.05; Early support = The effect of attending a service enrolled in the treatment group rather than a service enrolled in the wait-list control group; Time = The effect of observations occurring after the start of the intervention; **Intervention = The effect of attending an early support service, following the start of the intervention (this is an interaction: Early support * time)**; τ_{00} = Random intercept variance; τ_{11} = Random slope variance; ρ_{01} = Random intercept and slope correlation; ICC = Adjusted Intraclass Correlation Coefficient; n = 286,508; Each observation is a two-monthly reference period.

Table 3

The effect of training and support on the odds of brief intervention being recorded

Predictors	$logOR$	SE	OR 95% CI	p
Intercept	-8.45	0.55	0.00 [0.00, 0.00]	< 0.001
Early support	-0.80	0.63	0.45 [0.13, 1.54]	0.20
Time	-0.16	0.37	0.85 [0.41, 1.74]	0.65
Intervention	0.72	0.42	2.06 [0.90, 4.69]	0.087
Random Effects				
$\tau_{00\ service}$	7.97			
$\tau_{11\ time\|service}$	1.44			
$\rho_{01\ service}$	-0.60			
ICC	0.62			

Note. p < 0.05; Early support = The effect of attending a service enrolled in the treatment group rather than a service enrolled in the wait-list control group; Time = The effect of an observation occuring after treatment services began recieving support; **Intervention = The effect of attending an early support service, following the start of the intervention (this is an interaction: Early support * time)**; τ_{00} = Random intercept variance; ICC = Adjusted Intraclass Correlation Coefficient; n = 286,508; Each observation is a two-monthly reference period.

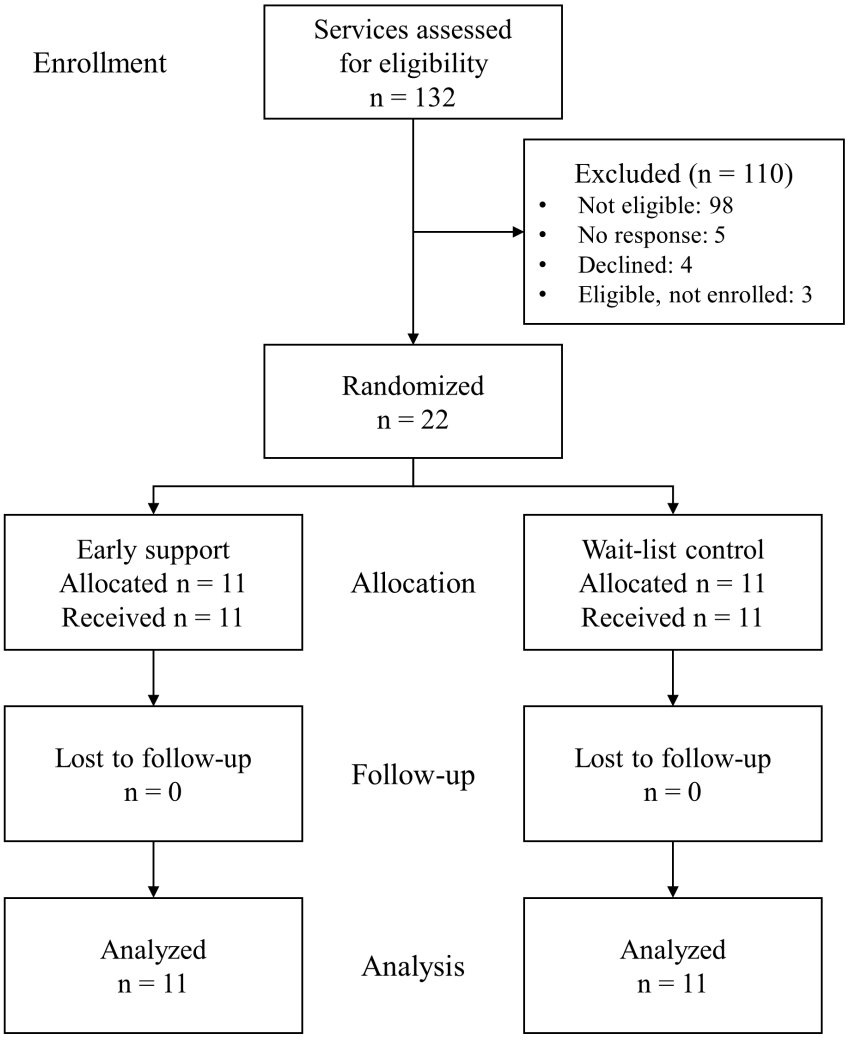

Figure 1. CONSORT flow diagram. The three services who were eligible but not enrolled only agreed to take part in the program after the full quota was reached.

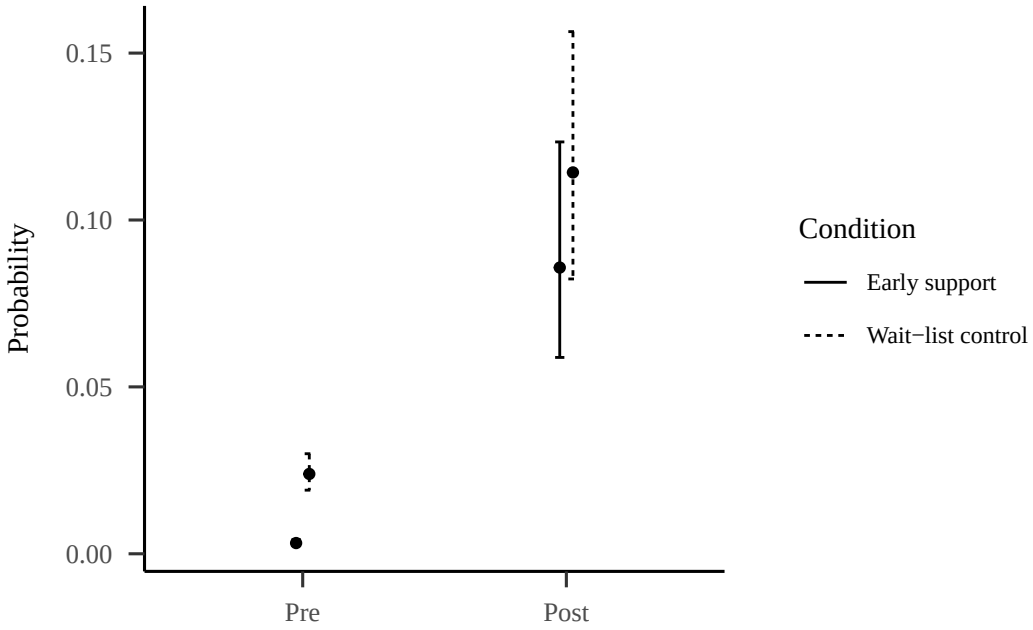

Figure 2. Predicted probabilities and 95% confidence intervals of screening with AUDIT-C by condition. These values are estimated from the multi-level model fixed-effects which control for clustering within services. Accordingly the baseline for each group are not the same as the unadjusted values found in Table 1.

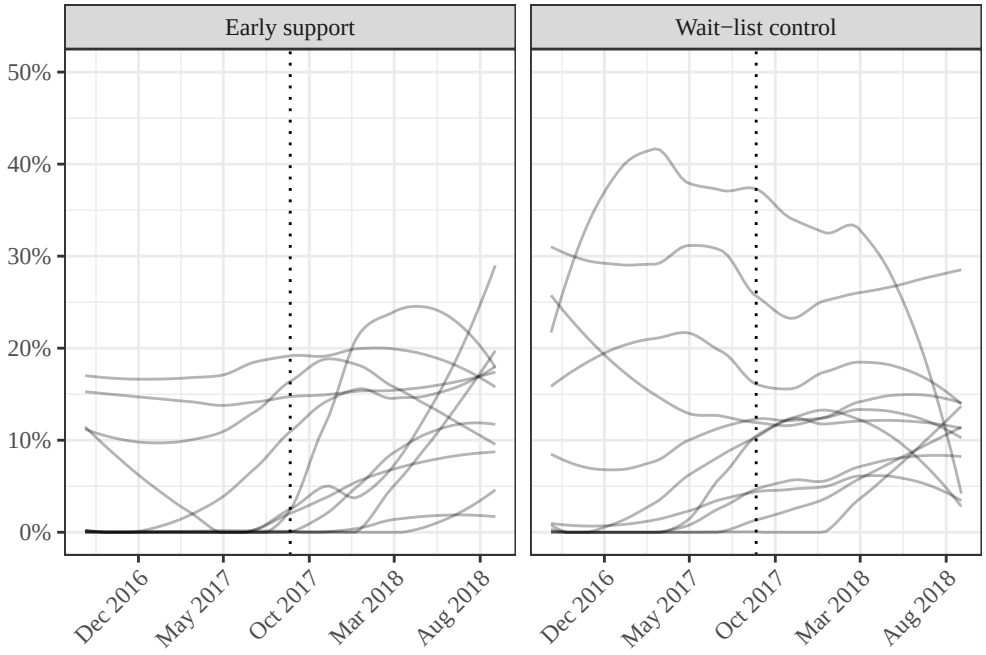

Figure 3. Smoothed AUDIT-C screening rates by service and condition over time. Early support was the treatment group. Each line represents one service. This figure demonstrates the high variability in service trajectories. The dotted line indicates the start of training and support for early support services.

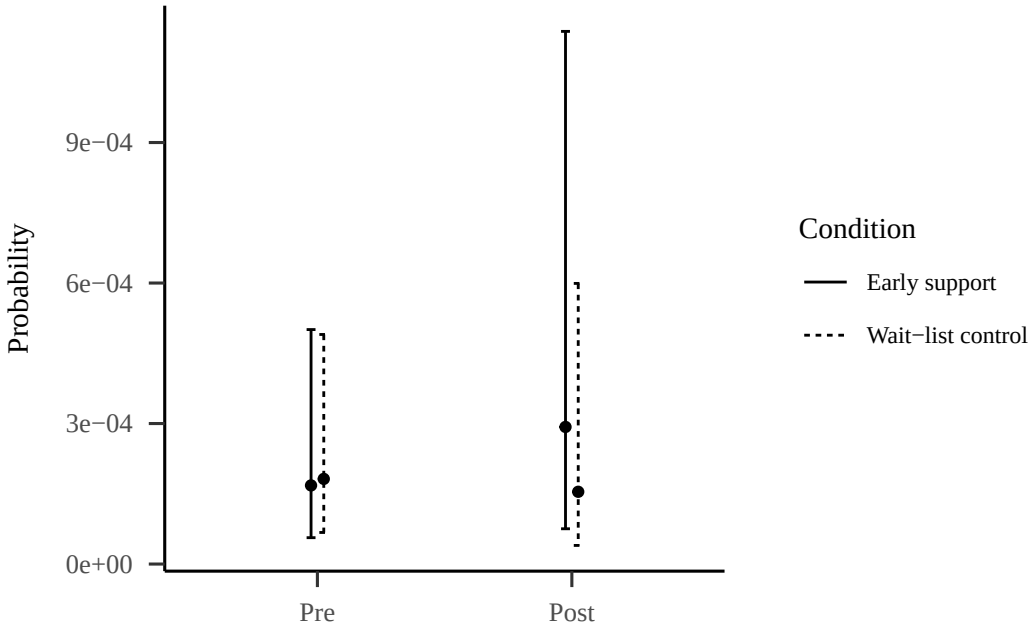

Figure 4. Predicted probabilities and 95% confidence intervals of a brief intervention being recorded by condition.

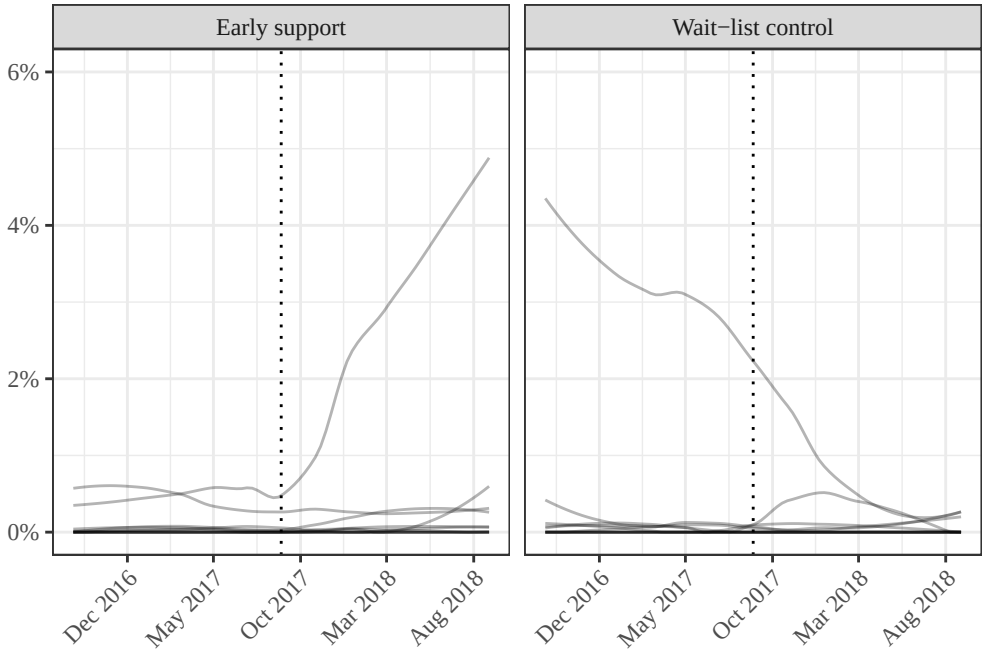

Figure 5. Smoothed brief intervention rates by service and condition over time. Early support was the treatment group. Each line represents one service. The dotted line indicates the start of training and support for early support services.