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Concise Communication

Method to the madness: Impact of method of contact on intervention acceptance rates for antimicrobial stewardship interventions

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Abstract

We retrospectively evaluated antimicrobial stewardship program (ASP) interventions over a 63-month period. We compared acceptance rates for those interventions communicated telephonically versus those communicated with a temporary note left in the electronic medical record. Telephonic communication produced superior acceptance rates overall and when analyzed by intervention type and provider.

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Antimicrobial stewardship programs (ASPs) play an important role in avoiding unintended consequences of antimicrobial use.[1–3] Determining the optimal method of provider contact for delivering ASP recommendations is challenging. Face-to-face communication, recently termed "handshake stewardship," has shown positive impacts on acceptance rates and antimicrobial use.[4–6] For those unable to perform "handshake stewardship," understanding the impact of more indirect methods of contact is important to optimizing ASP activity. The primary objective of this retrospective study was to evaluate the acceptance rates for all interventions provided telephonically versus those communicated by an electronic medical record (EMR) note. The secondary objective was to evaluate the impact of method of contact for specific intervention subtypes and across providers from a single medical specialty.

Methods

This study was conducted at a 401-bed facility with an ASP utilizing primary ASP strategy of prospective audit. A full-time pharmacist and a part-time physician lead the program. Patients included for prospective audit include those with positive blood or cerebrospinal fluid cultures, positive *C. difficile* testing, or those receiving program-targeted antimicrobials. A record of recommendations provided and associated acceptance rates is maintained by the ASP. Given a high daily prospective audit census, the strategy of "handshake stewardship" is only performed in the intensive care unit 1 day per week. Most recommendations are provided either telephonically or through a temporary note left in the patient's EMR.

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All interventions performed between August 2013 and October 2018 were evaluated for inclusion in the primary outcome of pooled acceptance rates for interventions provided by telephone versus EMR note. Interventions were excluded from evaluation if they were performed as the result of a locally approved protocol (ie, switch from intravenous to oral administration, renal adjustment, pharmacokinetic dose adjustment, therapeutic interchange, or addition of probiotics for high risk anti-infective patients) or if they were performed at the request of a provider. EMR note interventions consisted of a passive, temporary note on the home screen of a patient's EMR (Epic Software, Verona, WI). Telephonic recommendations were communicated by either telephone call or through a Health Insurance Portability and Accountability Act (HIPAA)–compliant text-messaging application. Interventions were evaluated by recommendation type, receiving provider, and outcome (ie, accepted or rejected), and interventions were considered "accepted" if the proposed change to therapy was made within 48 hours of communication. This duration was used to allow physicians sufficient time to receive EMR note interventions and to make associated changes if they agreed. Secondary outcomes included evaluation of method of contact by intervention subtype and by provider for hospitalists who received ≥100 recommendations.

Statistical methods

Minitab 19 software (Minitab, State College, PA) was used to compare acceptance rates for the 2 interventions. We tested the following hypotheses:

H_o: Acceptance rates are equivalent for the 2 interventions.
H_1: Acceptance rates differ for the 2 interventions.

The z test was used for both primary and secondary analyses, with its accompanying P value, to compare the 2 population proportions when overall sample sizes were large enough. For a few subtypes and providers demonstrating smaller sample sizes, P values

Table 1. Interventions Evaluated by Intervention Subtype

Intervention Subtype	No. of Telephonic Communications (%)	No. of Notes (%)	Telephonic Communication Acceptance, %	Note Acceptance, %	*P* Value
De-escalation/ Discontinuation[b]	4,192 (82.6)	886 (17.4)	87.6	81.9	<.001
Duration of therapy	1,220 (75.7)	391 (24.3)	90.2	88.8	.420
Dose optimization	875 (86.1)	141 (13.9)	94.2	85.8	<.001
IV to PO change	229 (79.8)	58 (20.2)	92.6	87.9	.254
Duplication of therapy	149 (81.9)	33 (18.1)	85.9	78.8	.305
Escalation of therapy[c]	962 (93.4)	68 (6.6)	88.1	64.7	<.001
Lab/Drug level order completed	581 (94.9)	31 (5.1)	91.9	74.2	.001
Drug–pathogen mismatch[d]	454 (93.6)	31 (6.4)	94.1	93.6	.707[a]
Drug information given	686 (98.7)	9 (1.3)	98.1	88.9	.168[a]
ID consult recommended	538 (99.3)	4 (0.7)	93.3	75.0	.247[a]

Note. IV, intravenous; PO, oral; ID, infectious disease.
[a]Fisher's exact test performed for small samples.
[b]De-escalation or discontinuation was defined as either a narrowing of antimicrobial spectrum based upon available culture results or discontinuation of all anti-infectives if found to be unnecessary.
[c]Escalation of therapy was defined as an escalation in empiric antimicrobial spectrum based on host factors or due to clinical deterioration of the patient.
[d]Drug–pathogen mismatch was defined as a change in the antimicrobial regimen as a result of cultures revealing that the current regimen was inactive against isolated pathogens.

Table 2. Interventions Evaluated by Provider

Provider	No. of Telephonic Commnications (%)	No. of Notes (%)	Telephonic Commnication Acceptance, %	Note Acceptance, %	*P* Value
A	290 (81.2)	67 (18.8)	95.5	92.5	.315
B	302 (93.5)	21 (6.5)	95.7	81.0	.018[a]
C	272 (81.7)	61 (18.3)	89.0	73.8	.002
D	228 (75.7)	73 (24.3)	93.9	91.8	.535
E	176 (64.2)	98 (35.8)	93.8	86.7	.049
F	137 (52.1)	126 (47.9)	95.6	88.1	.025
G	214 (92.2)	18 (7.8)	96.3	88.9	.176[a]
H	174 (80.6)	42 (19.4)	92.5	81.0	.023
I	105 (48.6)	111 (51.4)	86.7	82.9	.440
J	148 (67.3)	72 (32.7)	96.0	98.6	.431[a]
K	114 (64.8)	62 (35.2)	95.6	85.5	.018
L	75 (58.1)	54 (41.9)	94.7	96.3	1.000[a]
M	91 (78.4)	25 (21.6)	97.8	96.0	.521[a]
Total of Top 13 (>100)	2,326 (73.7)	830 (26.3)	94.0	87.8	<.001

[a]Fisher exact test was performed for small samples.

were obtained using the Fisher exact test. A priori, the level of significance was set at 0.05.

Results

In total, 11,539 interventions were evaluated, and 8,174 met the inclusion criteria for our analysis of the primary outcome. We excluded 2,995 because they were performed as a result of an approved protocol, and we excluded 370 because they resulted from a request for advice. The overall acceptance rate for all interventions was 88.19%. In total, 6,665 interventions (81.5%) were provided telephonically compared to the 1,509 EMR note interventions (18.5%). The observed acceptance rate for telephonic interventions (89.09%) was higher than that observed for EMR notes (84.23%; $P < .0001$).

The intervention subtypes demonstrating a significant difference in acceptance rates by method of contact, favoring telephonic communication, include de-escalation or discontinuation of therapy, dose optimization, escalation of therapy, and laboratory test completion (Table 1). None of the intervention subtypes we analyzed showed acceptance rates that favored communication by EMR note.

When evaluating intervention outcomes among hospitalist providers, the pooled acceptance rates for telephonic and EMR note interventions were similar to that of the primary outcome: 94.02% acceptance of telephonically versus 87.83% acceptance of

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EMR note ($P < .0001$). Of the 13 providers evaluated, 6 showed a significant difference in acceptance rates between methods of contact favoring telephonic communication (Table 2). None of the providers showed acceptance rates statistically favoring contact by EMR note.

Discussion

Telephonic communication resulted in higher acceptance rates than EMR notes, but this trend did not hold true across all intervention subtypes or providers. Considering method of contact for ASP interventions, this analysis supports the superiority of direct communication over passive EMR notes. Some intervention subtypes clearly warrant direct contact with the provider given the temporal or relational sensitivity of the recommendation. Conversely, some interventions may be provided by either method with equal success.

Similarly, we demonstrated that telephonic communication was superior to EMR note for some providers; however, for others an EMR note produced equivalent acceptance rates. Hence, ASPs may benefit from understanding individual provider communication preferences when possible. Understanding and incorporating individual provider data into intervention communication methods may optimize acceptance, protect ASP–provider relationships, minimize interruption, and conserve time. Our ASP has now implemented a practice of annually evaluating acceptance rates for certain frequently contacted specialties and providers to attempt to identify optimal communication methods, and new providers have been asked to notify the ASP regarding their communication preferences.

Other studies have evaluated communication methods in ASP interventions. Morton et al. evaluated face-to-face communication versus EMR note over a 1-year period. The verbal acceptance rate was higher than that for EMR notes, with rates of 86.2% versus 68.0%, respectively.[6] Hurst et al[4,5] evaluated ASP acceptance rates after implementation of a "handshake stewardship" strategy over a 19-month period. In total, 3,078 interventions were performed with an overall acceptance rate of 86%. Acceptance rates by intervention subtype varied depending on the type and whether it was considered active versus educational. They also identified that the presence of an ASP physician on rounds was associated with a higher intervention rate without difference in acceptance.[4]

Our study has several limitations. First, it was conducted retrospectively over a 63-month period during which maturation of the program may have impacted the pharmacist's selection of method of contact. This study design may have contributed to the observation that more interventions were communicated telephonically than with EMR note overall, by intervention subtype, and by provider. Second, many factors within each individual intervention (eg, patient acuity, infection type and severity, current antimicrobial regimen, etc) could not be assessed. Also, a single pharmacist independently determined the appropriate method of contact for each intervention at the time it was provided, which may have introduced bias. This "human element" behind method of contact choice likely impacted the data but would be difficult to control given the study design. Finally, this review may have limited external validity; it was performed at a single institution in a retrospective format. However, we believe that our findings could encourage other ASPs to systematically review their acceptance rates according to the method of contact.

Optimization of method of contact may contribute to the ongoing success of an ASP's prospective audit and feedback services, thereby allowing even a mature ASP to achieve new heights.

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