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Provider-patient Adherence Dialogue in HIV Care: Results of a Multisite Study

M. Barton Laws^{1,*}, Mary Catherine Beach², Yoojin Lee³, William H. Rogers³, Somnath Saha⁴, P. Todd Korthius⁴, Victoria Sharp⁵, and Ira B. Wilson¹

¹Brown University, Department of Health Services Policy and Practice

²Johns Hopkins University School of Medicine

³Tufts Medical Center, Institute for Clinical Research and Health Policy Studies

⁴Oregon Health and Science University

⁵St. Luke's-Roosevelt Hospital

Abstract

Background—Few studies have analyzed physician-patient adherence dialogue about ARV treatment in detail. We comprehensively describe physician-patient visits in HIV care, focusing on ARV-related dialogue, using a system that assigns each utterance both a topic code and a speech act code.

Design—Observational study using audio recordings of routine outpatient visits by people with HIV at specialty clinics.

Participants—Providers were 34 physicians and 11 non-M.D. practitioners. Of 415 patients, 66% were male, 59% African-American. 78% reported currently taking ARVs.

Results—About 10% of utterances concerned ARV treatment. Among those using ARVs, 15% had any adherence problem solving dialogue. ARV problem solving talk included significantly more directives and control parameter utterances by providers than other topics. Providers were verbally dominant, asked 5 times as many questions as patients, and made 21 times as many directive utterances. Providers asked few open questions, and rarely checked patients' understanding.

Conclusions—Physicians respond to the challenges of caring for patients with HIV by adopting a somewhat physician-centered approach which is particularly evident in discussions about ARV adherence.

Keywords

Physician-patient communication; adherence; HIV; pharmaceutical treatment

INTRODUCTION

Pharmaceutical treatment is essential to the management of most chronic diseases, but patients' failure to take medications as prescribed often results in failure to meet treatment goals. A large body of research finds that in various settings, from 30-60% of patients with chronic illness are not adherent to prescribed regimens[1-5]. Even in the case of

*Corresponding Author Info: Department of Health Services Policy and Practice Brown University G-S121-7 Providence, RI 02912 Michael_Barton_Laws@Brown.edu 401-863-6977 .

antiretroviral therapies for HIV, where successful treatment is life-saving[6], many people do not adhere optimally[7-9]. Suboptimal adherence can result not only in progression of HIV disease, but in viral drug resistance, often to multiple classes of antiretrovirals[10]. Improving ART adherence is thus of vital clinical and public health importance.

The World Health Organization described 5 “interacting dimensions” that affect adherence, including social and economic factors, condition-specific factors, therapy-related factors, patient factors, and factors related to the health care team, including provider-patient interactions[11]. Evidence that patient-provider communication is related to medication adherence and treatment outcomes has been found in many conditions. Patient satisfaction has been associated with directly observed provider communication behaviors[12-15], and with patient reports of engagement and autonomy in medical care[12, 16-18]. Patients reporting more engagement and autonomy have in turn been found to be more adherent to therapy[19, 20].

Physicians, however, sometimes fail to provide much information about prescribed medications[21], and it has been observed that provider communication with patients about medication adherence was not effective at promoting better adherence[4]. Descriptive reports of provider-patient communication about medication adherence in glaucoma[22], epilepsy[23], and chronic obstructive pulmonary disease[24] have been published, that use a coding system to identify utterances about medication taking, and classify them into certain speech acts. An important finding from this work is that patients’ needs, as identified by patients in separate interviews, were frequently not discussed. They also describe a consistently “directive” provider communication style characterized by mostly closed questions.

We conducted this study to extend these observations to HIV care. We build on the previous studies, however, by using a new and more extensive coding system that describes interaction for the entire encounter, and characterizes all the subject matter discussed in the visits. In particular, we set out to describe the allocation of communication within the visit to antiretroviral (ARV) treatment, ARV adherence specifically, and problem-solving about ARV adherence. We also analyze and compare the interaction processes and physician-patient roles observed while these adherence topics were discussed, with the processes and roles observed during discussion of other topics.

METHODS

Physician and patient samples

The Enhancing Communication and HIV Outcomes (ECHO) Study was designed to assess racial/ethnic disparities in the patient-provider relationship in HIV care. Study subjects were HIV care providers and their patients at four outpatient care sites in different regions of the United States, in Portland, Oregon; Detroit; Baltimore; and New York City. All were hospital-based HIV specialty clinics. All but the New York site were at academic medical centers. The study received IRB approval from all four sites. Eligible providers were physicians, nurse practitioners, or physician assistants who provided primary care to HIV-infected patients at one of the study sites. Eligible patients were HIV-infected; 19 years or older; English-speaking; identified in the medical record as non-Hispanic black, Hispanic, or non-Hispanic white; and had at least one prior visit with their provider.

There were 55 providers eligible for the study across all sites. Overall, 45 (82%) agreed to participate. Only 2 providers actively refused (one due to discomfort with audio recording and the other due to time constraints). The other 8 were not approached because the enrollment target was reached. Investigators identified 617 eligible patients of these 45

providers. Providers refused to allow 18 patients to be approached for the study, because the provider felt too rushed (n=12), that the patient was too sick (n=5), or because the patient was only returning for lab results and not a complete visit (n=1). Of the remaining 599 patients, 435 (73%) agreed to participate and completed all study procedures. Of the 164 patients who declined to enroll in the study, the most common reasons were that they did not have time to complete the interview (n=106), they were not feeling well (n=22), and they were not interested (n=13). Of the 435 patients who participated, 18 audiotapes could not be analyzed due to technical recording failure. We excluded two other visits in which most of the interaction was with a specialist other than the HIV care provider, yielding a sample of 415 patients.

Study providers contributed a mean of 9.2 patients (range 1-15) to the sample. Each patient is represented by a single visit. Thirty-six encounters included a second provider, usually a nurse practitioner (NP) or fellow, of which 30 were at a single site.

Data Collection

Participating providers gave informed consent and completed a baseline questionnaire. Research assistants approached and consented patients in clinic waiting rooms, with the goal of enrolling equal numbers of white and non-white patients for each provider. Office visits of consenting patients were audiorecorded. Following the medical encounter, research assistants administered a one-hour interview with patients, assessing demographic, social, and behavioral characteristics, as well as their experience of care and ratings of provider communication. Self-reported ARV adherence was assessed using the item “About what percentage of the time would you say you take your ARV medications as prescribed?” with response categories in 10% increments, 0 to 100. HIV viral RNA levels were abstracted from patients’ medical records from blood draws taken on the day of the visit. Audio recordings of visits were transcribed, reviewed for accuracy, and then coded and analyzed using a system called the Generalized Medical Interaction Analysis System (GMIAS).

The Generalized Medical Interaction Analysis System (GMIAS)

The many extant systems for coding and analyzing physician-patient communication have produced a substantial literature[25, 26]. These systems, which are generally based on defining various physician and patient verbal behaviors and counting their frequencies, have produced insight into physician and patient role relationships, and have described relationships between physician and patient characteristics and a variety of relevant outcomes[20, 27, 28]. However, most coding systems lack a guiding theoretical framework[29], and, most importantly for the purposes of this analysis, assign only a single code to each utterance. In contrast, the GMIAS assigns two codes – a speech act code and a topic code – to each utterance, which makes it possible to compare interaction process among various topics[30].

Speech act codes—One GMIAS code captures interaction process based on Speech Act Theory[31, 32], a sociolinguistic approach which identifies the social act embodied in an utterance (Table 1). The essential insight of Speech Act Theory is that language does not only represent reality, but creates it. This was first noticed in the case of so-called “performative utterances” by people endowed with particular powers, such as judges, priests or umpires. A judge who pronounces a defendant guilty is not describing a fact, but creating one. Upon reflection, it is clear that this is true of all natural speech. While a factual statement does purport to represent pre-existing reality, it also creates a new reality in which the speaker has informed the hearer, and the hearer has gained information – or perhaps believes the speaker to be mistaken or lying. Other utterances do not represent intersubjective reality, but rather purport to represent the speaker’s inner state, which may

provoke empathy, resentment, or some other affective response in the hearer. Still others have no representational content at all, but rather accomplish such ends as questioning, instructing, granting permission, or managing turn taking or the topical focus in the conversation.

In Speech Act Theory the actual spoken words are called the “locutionary” component or force of a speech act; the social act performed by the speaker is called the “illocutionary” force; and the effect on the hearer is called the “perlocutionary” force. The GMIAS classifies speech acts according to their illocutionary force. The unit of analysis in the GMIAS is a completed speech act. We call a single speech act, the analytic unit, an “utterance,” but in a given conversational “turn” – contiguous utterances by one speaker – there may be many completed speech acts, or utterances.

The GMIAS classifies questions along two dimensions. The first dimension – “open,” “closed,” and “leading” – is commonly used in other systems. Open questions, such as “What has it been like for you taking your medications?” invite the interlocutor (the other party to the conversation) to define the focus of the response. Closed questions are answerable with a “yes” or “no,” or solicit a narrowly specified fact such as a number or date. Leading questions propose the answer, such as “So we don’t need to talk about safe sex, right?”

The second dimension is not, to our knowledge, used in other coding systems. It defines the kind of information solicited by the question. “Representative” questions solicit facts about the world (representative speech acts), including the interlocutor’s own behavior, for which we code specifically. “Expressive” questions solicit information about the interlocutor’s mental state (expressive speech acts) including goals, desires, intentions, beliefs, preferences, and affect.

A different kind of question is checking for knowledge or understanding. These do not share the classification of open/closed/leading, but rather are divided into simple inquiries called “non-specific form” (“Do you understand?”), and requests to repeat back information.

Other major categories of speech acts include representations about objective reality (“Your blood pressure is normal.”); statements of comprehension (“I see what you mean.”); expressions of the speaker’s inner state such as beliefs, opinions, goals, desires; emotions (“I’m so sad about my mother’s illness.”); utterances intended to manage aspects of the conversation such as turn taking and agenda setting; empathetic statements (“That must have been difficult.”); directive utterances intended to influence the listener’s behavior (“Take this with food.”); and commissives (e.g., promises). Jokes are speech acts intended as humor which would be misleading if coded literally. (“Why did the chicken cross the road?” is not really a question.) “Social ritual” refers to standard tokens of politeness such as greeting and parting rituals, “thank you” and “you’re welcome.” “Conversation management” refers to utterances which serve to control, influence or comment on the interaction process itself, including managing topics and turn taking. Utterances are coded as missing when the transcript quality is poor and definitive coding is not possible.

“Control parameter” utterances—A subset of speech acts called the “Control Parameter” by Kaplan, et al[20] corresponds to the GMIAS categories of questions, topic introductions and closures, directives, and commissives. (Questions are ordinarily considered a type of directive because they control the subject matter of the discourse and oblige the other party to respond.) The ratio of patient to provider control parameter utterances was viewed by them as a measure of patient engagement. In previous research using the GMIAS this ratio has been found to be associated with longer visits, along with

other indicators of patient-centered interaction[33]. Accordingly, we calculated the number and proportion of control parameter utterances for providers and patients.

Topic Codes—The other GMIAS code labels the topic or subject matter of the utterance (Table 1). Topic codes were originally chosen to be consistent with the most widely used system, the Roter Interactional Analysis System[34], but we developed many more specific sub-categories to provide a more precise description of visits. Because we originally developed the system for a study of communication about ARV adherence, we included many detailed topic codes in the area of ARV treatment including ARV adherence, side effects unrelated to adherence, and prescribing. Discussion of specific strategies to achieve better ARV adherence is coded to a separate topic called “Adherence problem-solving.” General discussion of ARV adherence/non-adherence includes sub-codes denoting various specific reasons for non-adherence. “Prescribing” includes discussion of possible initiation of ARVs in the future, whether or not the patient agrees to it, and change in regimens. Other, non ARV-related topics in the biomedical domain include diagnoses, symptoms, tests, risk behavior and other treatments.

The psychosocial domain includes such issues as substance abuse, recovery, emotions (not pertaining to a psychiatric diagnosis), personal relationships, health of significant others, social services, and housing. “Logistics” is dialogue concerning the business of providing medical care such as appointments, referrals, record retrieval, prescription refills unrelated to adherence, and studies and trials. The business of conducting the physical examination is usually separated out for analysis. It consists largely of physician directives such as “take a deep breath.” Clinical observations and diagnostic conclusions made in the course of the physical examination are coded to the appropriate biomedical topics. Socializing refers to casual conversation not directly related to the health or well-being of the patient, and to social rituals, particularly the greeting and parting ritual.

Both topic and speech act codes can have several levels of hierarchy. For example, topic code 6.x is “HIV antiretrovirals,” and within that 6.3 is “Prescribing” and with that 6.31 is “Change in or recommendation for change in regimen.” An example of coded conversation is shown in Table 2

Reliability and validity—Evidence for the reliability and validity of the GMIAS has been previously described in abstracts[35, 36], and is available at <https://sites.google.com/a/brown.edu/m-barton-laws/home/gmias>. Interrater reliability was good, with Kappas for topic codes between the developer of the GMIAS (MBL) and 3 other coders of 0.80, and for speech acts 0.71. Agreement was even higher at the top (integer) level. The GMIAS has been used in to characterize interaction process in physician-patient communication about antiretroviral adherence in the context of an intervention trial[4], to analyze communication about sexual risk behavior[37], and to elucidate the association of visit length with constructs of patient-centeredness[38]. In the latter study, using other, very comparable data, we found that the utterance count is highly correlated with clock time ($R=.84$). We believe the utterance count is a more valid and specific measure of the content of encounters than is clock time, however, because clock time includes silences and interruptions, and is affected by the varying rapidity with which people speak and other extraneous factors.

Analyses

The unit of analysis was the individual speech act. We calculated descriptive statistics to characterize the dialogue in general terms, including allocation of dialogue to various topics, and to various speech acts. For speech acts, we also examined role asymmetry by showing the number and fraction of each of the speech act categories by topic code, for physicians

and patients. For patients who reported taking ARVs, due to non-normality of the data, we present the median number of utterances in various speech act categories, by provider and patient, in the totality of the visit and for the topic domains of ARV adherence, ARV problem solving, other biomedical subjects, and the psychosocial domain. We calculated p values by comparing the adjusted mean number (or percentage) of utterances in each speech act across the 4 topic domains with the generalized linear mixed model using topic domain as a fixed factor and random intercepts at both physician and patient-within-physician levels. To better understand how adherence dialogue varied according to likely need for such discussion we examined subgroups of patients with self-reported adherence problems and those with detectable HIV viral RNA. For comparison of these sub-groups, we determined p-values using the chi square test.

RESULTS

Provider and patient characteristics

Enrollment began in May, 2006 and ended in November, 2007. Of the 45 index providers, 26 (57.8%) were female. Thirty four were physicians, 7 were nurse practitioners, 3 were physician assistants, and one was a Registered Nurse. Thirty (66.7%) were white, non-Hispanic, 2 (4.4%) were African American, 1 (2%) was Latino, and 11 (24%) were Asian. All were experienced HIV care providers. Seventy-five percent reported spending 6 hours or more per week providing care for people with HIV.

Of the 415 patients, 274 (66%) were male. The mean age was 45.3 years and did not differ significantly by gender. Ninety-two percent were born in the U.S. Female patients were on average less educated than male patients (41% vs. 21% lacking high school education, $p<0.02$). Forty-nine percent reported being disabled; 26% said they were working full or part time. Two hundred forty five patients (59%) were African-American; 100 patients (24%) were white, non-Hispanic; 59 (17%) Latino; 9 individuals (3.3%) were classified as Other -- Native American, Pacific Islander, or mixed ethnicity. Race/ethnicity was missing for two patients. Fifty four percent of respondents reported having at least one of diabetes, hypertension, or hepatitis; 27% reported current illicit drug use; and while most did not currently use alcohol, 49% reported alcohol abuse history.

Dialogue characteristics

Visit length—Visits with patients not on ARVs were longer than visits for those on ARVs (median of 562 utterances/visit vs. 497, $p=0.02$, Table 3). The main explanation for this is that there were more non ARV-related biomedical utterances in those not using vs. using ARVs (mean of 267 vs. 221, $p=0.03$). In addition, discussion related to the possibility of starting ARVs in those not yet on them was often lengthy.

Not surprisingly, there was more discussion specifically about ARV adherence with people who did report taking ARVs. The comparatively rare discussions of adherence with the remainder concerned past adherence or adherence to hypothetical future prescriptions. Nevertheless, discussion of ARV adherence even with people on ARVs was often minimal – a median of just 22 utterances, and a mean of 31.8, by both provider and patient, or a mean of 5.7% of the total visit, in cases where it did occur.

Topic codes—Fifty-eight percent of all utterances (by both physician and patient) were devoted to biomedical subjects (Table 3). Logistics, including physical examination, accounted for 24% of utterances, on average, with the physical examination accounting for 2.7%. Psychosocial topics accounted for 11% of visits, on average; and socializing, which includes greeting and parting rituals as well as casual conversation, for 7.4%. Note that

biomedical topics other than ARV treatment, and psychosocial topics, both accounted for a higher percentage of these visits than did ARV treatment.

Some discussion of ARV adherence occurred with 282 out of 317 patients who said they were on ARVs. In 3 cases, only the provider spoke about the topic; there were no patient utterances. Adherence problem solving, however, occurred in only 46 cases, in 4 of which only the provider spoke.

Speech acts: interaction process among those taking ARVs—This portion of the analysis is limited to those patients (n=317) who reported they were taking ARVs. Results for topics other than ARV treatment and adherence were qualitatively similar for all participants. Analysis of speech acts reveals strong asymmetry between providers and patients. These can be seen in Table 4, which shows the median number of speech acts per visit, and within selected topics. Excluding the physical exam topic, which consists almost entirely of provider directives (e.g., “Take a deep breath.”) providers made 55.9% of all utterances, a measure sometimes called “verbal dominance.” (Based on means, not shown in table.) Overall, still excluding the physical examination topic, the ratio of the median number of provider questions to the median number of patient questions per visit was 5.0 (55/11), and the ratio of the median number of provider directive utterances to the median number of patient directive utterances per visit was 22 (22/1). Patients made more representative utterances than did providers, i.e. they provided more information (median 114 utterances per visit vs. 90 utterances per visit). Providers made a median of 89 control parameter utterances compared with 17 for patients (the sum of questions, topic introductions and closures, directives, and commissives, data not shown in tables.)

The nature and degree of these asymmetries, however, varied among topics. The socializing topic, perhaps not surprisingly, was the least asymmetrical. Nevertheless, even in social chat, providers asked 2.4 times as many questions, made 3 times as many control parameter utterances, and were verbally dominant (54%, data not shown in tables).

Within the topic of ARV adherence, when adherence was discussed (286/371, 90%), providers asked a median of 35 questions, whereas more than half of patients asked no questions. Of these, a median of 30 were closed or leading questions; the remainder were open questions. Within the adherence problem solving topic, providers asked a median of 2.7 questions, of which 2.1 (78%), were closed or leading; and patients asked a mean of 0.7 questions. (Means not shown in table.)

Speech act patterns were different for the ARV adherence topic, and even more markedly for the adherence problem solving topic, than they were for other portions of the visit. Table 5 shows the median percentage of various speech acts within topics, as opposed to counts, making it easier to see how the interaction process differed among topic categories. Most strikingly, directives constituted a median of 20% of provider speech acts within the adherence problem solving topic, compared with, for example, 8% within the broad biomedical domain and 0 within the psychosocial domain ($p<.0001$). “Control parameter” utterances constituted more than half of all provider utterances within the general ARV adherence and problem solving topics, compared with 36.7% in the remainder of the biomedical domain ($p=.0001$, data not shown in Tables). Patient control parameter utterances constituted 14% of speech acts in the problem-solving topic, and 5.3% in the ARV adherence topic, but patient control parameter utterances were a low percentage in all topic areas. Providers asked relatively few open questions, few questions that elicited patient opinions, values or preferences, and only rarely checked patients’ understanding. This pattern was even more pronounced in adherence problem-solving.

Adherence dialogue among patients with self-reported adherence problems and those with detectable HIV viral RNA

Of the 317 patients taking ARVs, 311 (98%) responded to the adherence self-report item. Of the 311, 168 (54%) reported perfect adherence, and 155/317 (49%) had undetectable plasma HIV viral RNA based on blood drawn on the day of the visit (Table 6). (The providers did not have access to this information during the recorded encounters.) Some discussion about ARV treatment was found in about 90% of visits. As might be expected, problem solving dialogue was uncommon (8% of cases) in those reporting 100% adherence. However, it was seen in only 23% of those with non-perfect adherence ($p=0.0003$ for the difference). Similarly, problem solving dialogue was seen in 10% of those with undetectable HIV viral RNA (< 75 copies/ μ) compared with 20% in those with detectable viral RNA ($p=0.03$).

The numbers of utterances in the adherence talk and adherence problem solving categories for those who had any such utterances are shown in Table 7. Among those with $<100\%$ adherence the median number of total utterances (physician and patient) was 17, and among those with detectable HIV viral RNA the median number was 16.

DISCUSSION

There were three main findings from this research. First, about 10% of utterances were devoted to ARV treatment, and among those using but reporting non-adherence to ARVs, only about 23% had any ARV problem solving dialogue. Second, interaction processes were different for ARV problem solving dialogue than for other topics, with significantly more directives and control parameter utterances by providers. Third, overall providers asked relatively few open questions, few questions that elicited patient opinions, values or preferences, and only rarely checked patients' understanding.

Our findings on the amount and nature of adherence dialogue build on and extend the generalizability of our previous work[4]. We analyzed adherence dialogue as part of a trial of a physician-focused intervention to improve adherence with HIV ARVs, and found that while the intervention increased the amount of adherence dialogue it did not improve adherence. Analyses of interaction processes in the trial, which took place in Massachusetts, found patterns very similar to those described in this observational study of large practices in 4 other major US cities – there was relatively little problem solving talk, and the problem solving talk that we did observe had a high proportion of directives.

We do not know how much adherence dialogue as a fraction of the total number of utterances in a visit is optimal, and these data cannot directly address that question, but the data from the trial cited above suggest that the quality of the dialogue is at least as important as the quantity. In the current study, in all topic areas, including ARV adherence, providers spoke more than patients (were “verbally dominant”); used far more closed or leading questions than open ones; made relatively few solicitations of patients' goals, wishes or values; and made most of the directive and conversation management utterances. When ARV problem-solving did occur, these tendencies were even more pronounced. Problem solving consisted largely of physicians asking closed questions soliciting facts, such as patient behaviors; and giving instructions or recommendations.

These speech act patterns may not be consistent with the concepts of patient-centeredness[39, 40] and shared decision making[41]. It is noteworthy that no ARV problem solving utterances were noted in nearly 80% of cases in which self-reported adherence was $<100\%$ or HIV viral RNA was detectable.

This patterns of interaction observed may also not be aligned with theories of effective communication to promote desirable behaviors such as Motivational Interviewing (MI)[42]. MI is an evidence based behavior change consultation style that was originally developed in the 1980's to increase the effectiveness of alcoholism and drug abuse treatment and has since been adopted in the fields of general and specialist medicine[43]. Based upon the hypothesis that what patients say during consultations is the best predictor of subsequent behavior change, the technical component of MI refers to the identification, elicitation, and reinforcement of "change talk", patients' utterances that indicate preparation for, and commitment to behavior change. Practitioner verbal behavior either elicits and reinforces patient change talk, countermands it, or extinguishes it. Change talk can be countermanded in two manners: Practitioners may overuse direct persuasion as a motivational technique, which tends to elicit "sustain talk" (commitment to the status quo) from the normatively ambivalent patient; or may undermine rapport by over-directing the consultation and otherwise limiting patient-perceived choice. The pattern of provider verbal dominance and directiveness observed here, then, may be inconsistent with effectively motivating positive behavioral change.

This work has several limitations. One limitation is that our analysis is not longitudinal. Physician-patient relationships develop and evolve over time. It is possible, for example, that that more and different ARV-related dialogue, and in particular ARV problem-solving dialogue, occurred at earlier visits, and that neither physicians nor patients felt that it would be helpful to revisit previously discussed adherence issues. That adherence problem solving dialogue was usually not present even when there was objective evidence of adherence problems argues against this. But beyond these ARV-specific issues, we believe that this analysis of visits from 4 HIV care sites in different regions of the US probably accurately captures important aspects of interaction process that would be unlikely to be different in a longitudinal study, such as the relative infrequency of open questions, expressive questions, and checking for understanding.

Another limitation is that the GMIAS, as a new method to characterize physician-patient communication, is descriptive in nature. While we do speculate that some of the patterns observed may not be ideal, we do not assert that there is any particular distribution of topic codes or pattern of speech acts that we know to be desirable or optimal. Future work that uses the GMIAS to link visit characteristics to specific clinical outcomes will be necessary before it will be possible to make normative statements. This caveat notwithstanding, we believe that our use of GMIAS to analyze the results of a clinical trial, in which we observed very similar patterns of interaction, is a good indication that they are not effective in promoting better adherence[4].

In summary, we used a new method, the GMIAS, to analyze physician-patient visits from 4 diverse US HIV care sites. Problem solving utterances were relatively uncommon, and speech act patterns observed during problem solving dialogue included a relatively high proportion of directives. Because patients with HIV often have a variety of social and clinical problems – including homelessness, active drug use, interactions with the criminal justice system, financial problems, Hepatitis C, mental disorders, and diabetes – the care of patients with HIV is a tremendous challenge for physicians and other providers. It is perhaps not surprising that in this context physicians speak more than patients, tend to ask relatively few open or expressive questions, and rarely check patients' understanding. But more effective dialogue would likely result in better treatment outcomes. Interventions that improve physician-patient communication about medication adherence could improve patients' adherence outcomes, and other clinical outcomes as well.

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Table 1**GMIAS coding categories ***

General Classification	Examples of specific sub-categories
<u>Speech Act Codes and Sub-codes</u>	
Questions	
Representative	Representative questions can be open, closed, leading
Expressive	Expressive questions can be open, closed, leading
Check understanding/knowledge	"Do you understand?"
Representatives	Statements about inter-subjective reality: General, own behavior, deduction, prediction
Comprehension	Statements of understanding or lack of understanding
Expressives	Values, opinions, desires, goals
Emotions	Affect, e.g. "I'm so sad about my mother's illness"
Conversation Management	Management of turn taking or visit agenda
Empathy	Expression of emotional rapport, support or reassurance("That must have been difficult")
Directives	Recommend, mandate, encourage
Commissives	Promises, offers, permissions ("Okay, I'll set a quit date.")
Jokes	Intended humor that can be misleading if coded literally
Social rituals	E.g., ritual greeting and parting statements, "Excuse me," "Thank you."
Missing	Poor transcript quality prevents definitive coding
<u>Topic Codes and Sub-codes</u>	
Biomedical	
ARV-related	All topics related to ARVs
ARV adherence	Adherence barriers, adherence problems
ARV side effects	Specific side effects, concern about side effects
ARV prescribing	Initiation of treatment or change in regimen
ARV problem solving	Solving problems, overcoming barriers
Non ARV-related	Diagnosis, symptoms, tests, risk behaviors, and treatments
Psychosocial	Substance abuse, recovery, emotions, relationships, health of others, social services, housing
Logistics	
Non physical exam	Appointments, referrals, record retrieval
Physical Exam	E.g., "Take a deep breath"
Socializing	E.g., "Did you see the ball game?" or "Is it still raining?"

* This is not an exhaustive list, but presents categories most essential to this report.

Table 2

Example of coded transcript

Speaker	Topic	Speech Act	Text
D	5.1 ARV adhrc.	Expressive open q	Now how do you feel about your medications?
D	5.1 ARV adhrc	Expressive closed q	Are you ready to start taking them or not?
P	5.1 ARV adhrc	Intention	Yeah.
P	5.11 ARV non-adhrc	Desire/In- tention	See, I'm trying to, it ain't like I haven't been tryin.
P	5.11 ARV non-adhrc	False start	It's just, I don't know, it's just
D	5.11 ARV non adhrc	Opinion	If you're feeling super depressed, it's kind of hard to take
P	5.118 Non- adhrc/oth er reason	Self-report	Yeah, sometimes I don't get up.
P	5.118 Non- adhrc/oth er reason	Desire/In- tention	I feel like I just can't get up.

Table 3

Distribution of topic codes (mean (median)) in all patients and in those using and not using ARVs.

	All (n=415) #		Using ARVs (n=317)		Not using ARVs (n=90)		P-Value *
Biomedical	316.4	(285)	303	(277)	361.9	(322.5)	0.024
ARV-related	56.1	(30)	53.9	(32)	60.9	(17.5)	0.08
ARV adherence	25.6	(16)	28.7	(20)	14.8	(0)	<0.0001
ARV side effects	6.2	(0)	6.5	(0)	3.5	(0)	<0.0001
ARV prescribing	17.4	(0)	12.3	(0)	34.1	(2)	<0.0001
ARV prob solving	3.8	(0)	3.9	(0)	2.6	(0)	0.0218
Non ARV-related	260.3	(230)	249.1	(221)	301	(267)	0.0252
Psychosocial	65	(34)	59.6	(28)	82.8	(51)	0.0088
Logistics	123.8	1(07)	123.9	(108)	122.4	(103.5)	0.78
Physical Exam	13.8	(9)	13.4	(9)	14.9	(9)	0.83
Non physical exam	110	(98)	110.5	(100)	107.5	(87)	0.58
Socializing	38.6	(21)	40.2	(22)	32.5	(17)	0.31
Totals	543.8	(514)	526.7	(497)	599.6	(562)	0.0152

There were 8 pts who are missing for ARV use.

* P-values were calculated from Wilcoxon two-sample test.

Median (P25, P75) per-visit distribution of speech act counts, for providers and patients in all topic codes biomedical codes, psychosocial codes, for cases in whom there was some ARV adherence talk, and for cases in which there was some ARV problem solving talk. This table only uses cases (n=317) in which ARV's were in use.

Table 4

	All (n=317)		Biomedical Non ARV related (n=317)		ARV Adherence (n=286)		ARV problem solving talk (n=48)		Psychosocial (n=268)		Other (n=317)		p-value ***
	Provider	Patient	Provider	Patient	Provider	Patient	Provider	Patient	Provider	Patient	Provider	Patient	
Questions (all types) *	55 (36, 78)	11 (5, 18)	27 (16, 46)	5 (2, 9)	4 (2, 8)	0 (0, 1)	1 (0, 4)	0 (0, 1)	6 (3, 11)	0 (0, 1)	4 (1, 8)	<.0001	<.0001
Closed/leading	45 (29, 64)	9 (4, 16)	22 (12, 38)	4 (2, 7)	4 (2, 6)	0 (0, 1)	0.5 (0, 3)	0 (0, 1)	5 (2, 9)	0 (0, 1)	10 (6, 17)	<.0001	-
Open	8 (3, 12)	1 (0, 2)	4 (2, 6)	0 (0, 1)	0 (0, 1)	0 (0, 0)	0 (0, 1)	0 (0, 0)	1 (0, 2)	0 (0, 0)	0 (0, 1)	<.0001	<.0001
Representative	49 (32, 71)	10 (5, 17)	25 (14, 40)	5 (2, 8)	4 (2, 7)	0 (0, 1)	1 (0, 3)	0 (0, 1)	5 (2, 9)	0 (0, 1)	10 (6, 18)	<.0001	<.0001
Expressive	4 (1, 7)	0 (0, 1)	1 (0, 3)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 1)	0 (0, 0)	1 (0, 2)	<.0001	-
Check understanding	0 (0, 1)	0 (0, 0)	0 (0, 1)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	<.0001	-
Representatives	90 (60, 135)	114 (74, 172)	44 (26, 71)	55 (31, 88)	2 (0, 6)	7 (3, 14)	1 (0, 6)	2 (1, 8)	2 (0, 5)	15 (6, 36)	34 (19, 55)	<.0001	<.0001
Comprehension	4 (2, 7)	7 (4, 11)	1 (0, 3)	3 (1, 6)	0 (0, 0)	0 (0, 1)	0 (0, 0)	0 (0, 0)	0 (0, 1)	0 (0, 1)	1 (0, 3)	<.0001	<.0001
Expressives	14 (7, 24)	20 (10, 34)	5 (2, 9)	7 (3, 14)	0 (0, 1)	0 (0, 2)	0 (0, 1)	1 (0, 2)	1 (0, 3)	4 (1, 9)	5 (2, 11)	<.0001	-
Emotions	9 (5, 16)	10 (5, 18)	4 (2, 6)	4 (2, 8)	0 (0, 1)	0 (0, 1)	0 (0, 1)	0 (0, 0)	1 (0, 3)	1 (0, 4)	3 (1, 6)	<.0001	-
Conv. Management	33 (21, 47)	12 (7, 21)	15 (9, 22)	5 (3, 9)	1.5 (0, 3)	0 (0, 1)	1 (0, 3)	0 (0, 1)	3 (1, 6)	1 (0, 3)	11 (6, 17)	<.0001	<.0001
Empathy	1 (0, 3)	0 (0, 0)	0 (0, 2)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 1)	0 (0, 0)	0 (0, 0)	<.0001	-
Directives	22 (13, 37)	1 (0, 3)	11 (5, 19)	0 (0, 1)	1 (0, 3)	0 (0, 0)	2 (0, 5)	0 (0, 0)	0 (0, 3)	0 (0, 0)	7 (3, 12)	<.0001	<.0001
Commisives	4 (2, 8)	2 (1, 4)	1 (0, 3)	0 (0, 2)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 1)	0 (0, 0)	0 (0, 0)	3 (1, 5)	-	-
Jokes	0 (0, 1)	0 (0, 1)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 1)	-	-
Social rituals	2 (1, 4)	2 (0, 3)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	2 (1, 4)	-	-
Missing	10 (6, 17)	11 (6, 20)	4 (2, 8)	5 (2, 9)	0 (0, 1)	0 (0, 1)	0 (0, 0)	0 (0, 1)	0 (0, 1)	1 (0, 3)	4 (2, 7)	<.0001	<.0001
Totals	267 (190, 354)	207 (136, 294)	130 (79, 183)	91 (55, 149)	12.5 (6, 23)	9 (4, 22)	7.5 (3, 22)	5 (2, 15)	17 (7, 36)	25 (9, 60)	93 (58, 134)	60 (34, 91)	

* The two question subtypes (closed/leading vs. open, and representative vs. check understanding) are different exhaustive methods of characterizing question asking.

*** P-values are global p-values calculated using the generalized linear mixed models for nonnormal data with random effect (provider and patient level) to compare across 4 topic domains for providers and patients. '-' means because two few counts for the speech act, p-value could not be calculated.

Median (P25, P75) percentage of all speech acts by the speaker in all topic codes biomedical codes, psychosocial codes, for cases in whom there was some ARV adherence talk, and for cases in which there was some ARV problem solving talk. This table only uses cases (n=317) in which ARV's were in use.

Table 5

	All (n=317)		Biomedical Non ARV related (n=317)		ARV Adherence (n=286)		ARV problem solving talk (n=48)		Psychosocial (n=268)		Other (n=317)		p-value
	Provider	Patient	Provider	Patient	Provider	Patient	Provider	Patient	Provider	Patient	Provider	Patient	
Questions (all types) *	21 (16, 28)	5 (3, 8)	24 (16, 32)	5 (3, 9)	36 (21, 56)	0 (0, 5)	12 (0, 32)	0 (0, 3)	36 (20, 50)	0 (0, 1)	15 (10, 20)	7 (3, 11)	<.0001
Closed/leading	17 (13, 23)	4 (3, 7)	18 (12, 27)	4 (2, 7)	30 (16, 50)	0 (0, 4)	1 (0, 19)	0 (0, 1)	26 (14, 40)	0 (0, 0)	12 (8, 17)	6 (2, 10)	<.0001
Open	3 (1, 5)	1 (0, 1)	3 (1, 5)	0 (0, 1)	0 (0, 7)	0 (0, 0)	0 (0, 4)	0 (0, 0)	5 (0, 12)	0 (0, 0)	1 (0, 3)	0 (0, 1)	<.0001
Representative	19 (14, 25)	5 (3, 8)	21 (15, 29)	5 (3, 8)	33 (20, 50)	0 (0, 5)	10 (0, 25)	0 (0, 3)	31 (15, 46)	0 (0, 1)	12 (8, 18)	6 (3, 11)	<.0001
Expressive	1 (1, 3)	0 (0, 0)	1 (0, 2)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 5)	0 (0, 0)	1 (0, 2)	0 (0, 0)	0.5024
Check understanding	0 (0, 1)	0 (0, 0)	0 (0, 1)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.9006
Representatives	35 (28, 42)	56 (49, 64)	38(29, 46)	61 (51, 69)	20 (0, 33)	75 (58, 90)	24 (0, 44)	47 (20, 67)	8 (0, 19)	64 (48, 75)	38 (30, 46)	48 (37, 57)	<.0001
Comprehension	2 (1, 2)	3 (2, 5)	1 (0, 2)	3 (1, 6)	0 (0, 0)	0 (0, 4)	0 (0, 0)	0 (0, 0)	0 (0, 3)	0 (0, 3)	2 (0, 3)	3 (1, 6)	0.0004
Expressives	6 (3, 8)	9 (7, 14)	4 (2, 7)	8 (5, 12)	0 (0, 7)	0 (0, 13)	0 (0, 8)	7.5 (0, 20)	4 (0, 12)	12 (1, 24)	5 (3, 9)	9 (5, 14)	<.0001
Emotions	4 (2, 5)	5 (3, 8)	3 (2, 5)	4 (3, 8)	0 (0, 5)	0 (0, 3)	0 (0, 3)	0 (0, 0)	3 (0, 13)	4 (0, 10)	3 (1, 6)	5 (2, 8)	<.0001
Conv. Management	12 (10, 15)	6 (4, 9)	12 (9, 15)	6 (3, 9)	12 (0, 20)	0 (0, 8)	10 (0, 20)	0 (0, 20)	15 (6, 24)	2 (0, 6)	12 (9 16)	7 (5, 12)	<.0001
Empathy	0 (0, 1)	0 (0, 0)	0 (0, 1)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 3)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.5815
Directives	9 (6, 12)	1 (0, 1)	8 (5, 12)	0 (0, 1)	6 (0, 17)	0 (0, 0)	20 (0, 42)	0 (0, 0)	0 (0, 10)	0 (0, 0)	8 (4, 12)	1 (0, 3)	0.0005
Commissives	2 (1, 3)	1 (0, 2)	1 (0, 2)	0 (0, 2)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 8)	0 (0, 0)	0 (0, 0)	3 (1, 5)	2 (0, 4)	<.0001
Jokes	0 (0, 1)	0 (0, 1)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 1)	0 (0, 1)	0.0642
Social rituals	1 (0, 2)	1 (0, 1)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	2 (1, 4)	2 (0, 4)	0.9349
Missing	4 (2, 6)	5 (3, 8)	3 (2, 6)	5 (3, 8)	0 (0, 3)	0 (0, 6)	0 (0, 0)	0 (0, 10)	0 (0, 5)	4 (0, 9)	4 (2, 7)	5 (3, 9)	<.0001
Totals	100	100	100	100	100	100	100	100	100	100	100	100	

* The two question subtypes (closed/leading vs. open, and representative vs. check understanding) are different exhaustive methods of characterizing question asking.

** P-values are global p-values calculated using the linear mixed models with random effect (provider and patient level) to compare across 4 topic domains for providers and patients.

Table 6

The presence or absence of ARV adherence talk or ARV problem solving talk by level of self-reported adherence and by level of plasma HIV viral RNA.

	ARV Adherence Talk		P-Value	ARV Problem Solving Talk		P-Value
	Yes (n=286)	No (n=31)		Yes (n=48)	No (n=269)	
Adherence (n (%))			0.30			0.0003
100% (n=168)	155 (92.3)	13 (7.7)		14 (8.3)	154 (91.7)	
<100% (n=143)	127 (88.8)	16 (11.2)		33 (23.1)	110 (76.9)	
Plasma HIV viral RNA (n (%))			0.94			0.018
<75/ul (n=155)	140 (90.3)	15 (9.7)		16 (10.3)	139 (89.7)	
75/ul (n=161)	145 (90.1)	16 (9.9)		32 (19.9)	129 (80.1)	

*
p-values were calculated from Chi-square test.

Table 7

The number of utterances (median (25th, 75th percentile)) in those who do have ARV adherence talk or ARV problem solving talk by level of self-reported adherence and by viral load.

	ARV Adherence Talk (n=286)	P-Value	ARV Problem Solving Talk (n=48)	P-Value
Adherence		0.07		0.0328
100%	20 (9, 41)		5 (3, 9)	
<100%	24 (13, 47)		17 (6, 46)	
Viral load		0.0423		0.11
<75/ul	20 (9, 38)		6 (3, 19.5)	
75/ul	25 (12, 51)		15.5 (6, 43.5)	

*
p-values were calculated from Wilcoxon two-sample test.