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How physician electronic health record screen sharing affects patient and doctor non-verbal communication in primary care

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Abstract

Objective—Use of electronic health records (EHRs) in primary-care exam rooms changes the dynamics of patient-physician interaction. This study examines and compares doctor-patient non-verbal communication (eye-gaze patterns) during primary care encounters for three different screen/information sharing groups: 1) active information sharing, 2) passive information sharing, and 3) technology withdrawal.

Methods—Researchers video recorded 100 primary-care visits and coded the direction and duration of doctor and patient gaze. Descriptive statistics compared the length of gaze patterns as a percentage of visit length. Lag sequential analysis determined whether physician eye-gaze influenced patient eye gaze, and vice versa, and examined variations across groups.

Results—Significant differences were found in duration of gaze across groups. Lag sequential analysis found significant associations between several gaze patterns. Some, such as DGP-PGD (“doctor gaze patient” followed by “patient gaze doctor”) were significant for all groups. Others, such as DGT-PGU (“doctor gaze technology” followed by “patient gaze unknown”) were unique to one group.

Conclusion—Some technology use styles (active information sharing) seem to create more patient engagement, while others (passive information sharing) lead to patient disengagement.

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Practice Implications—Doctors can engage patients in communication by using EHRs in the visits. EHR training and design should facilitate this.

Keywords

EHRs; physician-patient communication; physician-EHR interaction; primary care

1. Introduction

Widespread use of electronic health records (EHRs) in primary care exam rooms has changed the dynamics of patient-physician interaction [1,2]. Proponents suggest that the use of EHRs leads to better adherence to guidelines, prevention of medical errors [3], completeness of medical records [2], information exchange [4,5], patient safety, health care quality, decision-making, medication management [6,7], and facilitation of patient access to medical records and communication via electronic messaging [8]. Despite these potential positive effects, the presence of computers in the exam room and physicians' documenting in the EHR during the visit may adversely affect essential elements of physician-patient communication [8-10], such as developing rapport with patients and psychological and emotional talk [3].

Patient-physician communication is considered the backbone of the healthcare visit [11,12] since it affects patient satisfaction [12,13], adherence to treatment [14], clinical outcomes [15], and patient trust [11]. In particular, nonverbal communication such as eye contact is considered to be as important as verbal communication in the visit and has a significant impact on health outcomes [16-18]. Eye gaze shows attentiveness and involvement in the interaction [16-19]. Recent studies examining patient-centered communication have focused on eye contact and mutual gaze [20-21]. Researchers have found that the use of computers during healthcare visits negatively impacts doctor-patient communication, including decreased eye contact [22], and taking a physician's attention away from the patient in the form of gaze and body positioning [23,24].

Recently, researchers have started to explore how to enhance doctor-patient communication in the exam room when EHRs are present [8,25]. The potential pitfalls of EHRs can be avoided if physicians are taught how to communicate effectively with patients when using EHRs in the exam room [9,26]. One suggested approach is to invite patients to view the computer screen (i.e., share information with patients [8,27,28]. Sharing a screen with the patient may help to improve real-time patient-clinician communication [8,29,30], facilitate more accurate documentation [27], aid shared decision making [31], increase shared understanding [30] and patient involvement [28], and reduce patient alienation while a physician looks at the computer screen [8,27]. Indeed, technology has the potential to improve doctor-patient communication; however, more research is needed to understand the potential of technology to improve patient-doctor communication [32]. In particular, more work is needed to understand how different screen sharing behaviors in the exam room might impact doctor-patient communication dynamics, specifically doctor and patient nonverbal communication.

The purpose of this study is to examine and compare patient and physician eye gaze patterns during primary care encounters for three different screen/information sharing groups identified in an earlier study [33]: 1) an active information sharing group (physician turned the screen to the patient, so both patient and physician could see the monitor), 2) a passive information sharing group (physician neither turned the screen toward the patient or blocked their view, so the patient could see the monitor by leaning in if they chose to), and 3) a technology withdrawal group (physician kept screen out of patient's view). From a role theory perspective, the actors in the patient-physician dyad each influence how the other actor's behavior and role evolve during their interaction [34]. Consistent with this perspective, this study also examines whether the direction of patient gaze contributes to the likely direction of doctor gaze and vice versa across the three groups.

2. Methods

2.1 Study design and sample

We used a cross-sectional design to examine physician and patient eye gaze patterns during primary care visits. Physicians and patients were recruited from five university-owned primary care clinics in the Midwest in 2011. Physicians and patients were recruited using a convenience sampling strategy. The inclusion criteria for physicians included being a primary care physician and using EHR in the patient exam room. Participating physicians helped to identify eligible patients to solicit for this study. Lists of eligible patients were created at the beginning of the clinic day and given to receptionists, who were asked to invite them to participate in the study. Inclusion criteria for patients included being between 18 and 65 years old, being an established patient of the attending primary care doctor, and being an English speaker. We did not recruit new patients to minimize the potential effect of activities and tasks related to the first encounter. The types of care visits included in this study consisted of follow-up and acute care visits. We also aimed for visits scheduled for 30 minutes. Visits scheduled for more than 30 minutes were not eligible. Also, yearly scheduled physical exams and visits addressing sensitive issues such as psychological problems or drug abuse were excluded.

Research assistants obtained informed consent from patients who agreed to participate in the study. Participants were told that their visit and overall interactions would be video recorded. We did not share any other information about the project with participants (i.e., analysis of eye gaze patterns, or screen sharing behavior). The study protocol was approved by university and clinic Institutional Review Boards and HIPAA (Health Insurance Portability and Accountability Act) regulations were fulfilled. Patients who completed the study received a modest stipend (\$20) for their participation.

We sought to video record 100 visits to achieve necessary statistical power and to create sufficient contingency tables to conduct a sequential analysis [35,36]. This sample size was also based on convenience sampling techniques, for both patients and physicians.

2.2 Video coding and behavior patterns

All visits were video recorded with high-resolution video cameras from three angles: one wide angle and two angles focusing on the patient's and physician's faces, respectively. All

three angles were converted to a single video file with multichannel stream for the analysis. We used a multichannel technique to accurately capture gaze and avoid ambiguity of the gaze direction caused by a single camera angle [2,37].

Video recording started after the nurse left the room; only the patient and the physician were allowed in the exam room during video recording. All exam rooms for video recording had similar settings regarding the location and functionality of EHRs. All of the computer screens were mobile and moved easily by physicians. After each primary care visit, video recordings were obtained and then synched into one single file for video coding. Video coding is the process of reducing complex data into measurable units [38]. In order to quantify video data, we used a coding scheme (Table 1) which was adapted from a previous study [35]. Half the coding categories indicate the direction or target of the patient gaze and half indicate the direction or target of the doctor gaze. The sequence of each person's pattern of gazing was examined across the three groups.

The coding scheme included codes to capture participant eye gaze at the following: 1) the other participant (doctor/patient), 2) technology (computer screen), 3) chart, 4) other artifact, and 5) unknown. *Chart* was defined as documents with information about the patient or notes written by the clinician during the encounter. *Other artifacts* were defined as objects in the room, including chairs, exam table, sink, medical tools, magazines, etc. The *unknown* code was used when the coder could see the subject's eyes but was not able to specify the object of attention (this includes when the subject is looking somewhere else while thinking or talking), or the subject gazed at a part of the patient's body, such as the foot, or back [39]. The behaviors by the same subject (doctor or patient) were mutually exclusive.

Five coders were trained to use the coding scheme for two weeks with practice videos until they achieved a certain degree of reliability (reliability score above Cohen's Kappa value of 0.60). Immediately following the training session, the coders began coding the video recordings. The coders coded each video temporally for the entire visit based on the coding scheme. They annotated start and stop times for each code using software designed for video coding, evaluation, and analysis: Noldus Observer XT version 10.1 (Noldus Information Technology, Leesburg, VA, USA). Coding 15 to 20 minutes of video can take 1 to 1.5 hours to complete. The software provided the start and stop times, duration, and simultaneous occurrence of two or more codes for statistical analysis and contingency tables for sequential analysis. Reliability checks were conducted each week to ensure consistency in coding (reliability score above Cohen's Kappa value of 0.60) [40]. Each coder coded 3 videos every week, one of those videos was the same video for all coders. The reliability check was conducted using the same video across the coders. Reliability scores were calculated conservatively at one second level [35]. The average Cohen's Kappa value ranged between 0.60 and 0.79 for each of the coding categories.

2.3 Information (monitor) sharing groups

Visits were classified into information sharing groups using a previously developed rubric [33]. The classifications were made based on behaviors enacted during the visit; doctors were not a priori allocated to groups. The criteria for the information (monitor) sharing groups are as follows:

1. Active information sharing group: Physician shifted the computer monitor towards the patient, so both patient and clinician could see the monitor, or the patient moved their chair towards the monitor upon the clinician's verbal invitation so the clinician could share the monitor with the patient.
2. Passive information sharing group: Physician did not shift the monitor but did not block the monitor so the patient could see the monitor by leaning in if they chose to.
3. Technology withdrawal group: Physician did not shift the monitor and kept it out of the patient's line of sight so the patient didn't have a chance to see the monitor.

2.4 Data analysis

Descriptive statistics were calculated for all eye gaze durations for each behavior in percentage values. We reported percentage values to show the ratio of eye gaze duration to visit length, since visit length might vary per visit. We defined visit length as the total time the physicians and patient spent together during the visit excluding the physical exam period. Finally, a welch two sample t-test was conducted to compare the behaviors across the groups.

We used lag-sequential analysis to examine whether the eye gaze direction of one of the members of the patient-doctor dyad contributes to the likely direction of the eye gaze of the other and how this varies across the three groups. Lag-sequential analysis examines whether one gaze direction event contributes to the likely occurrence of another [41]. It is the most commonly used sequential analysis method, and is based on contingency table analysis [42]. Lag-sequential analysis fits a general log-linear model to the contingency tables and utilizes a likelihood ratio chi-square test to explore dependence of initial and response behaviors, whereas adjusted residuals are used to detect significant behavior sequences [43]. First, contingency tables were generated from coded data based on eye-gaze behavior patterns for each group. Then, an initial likelihood ratio chi-square test was conducted for each generated table to determine whether the cell behavior values were independent or not. The significant value represents the dependency of the sequential behaviors to each other. If the chi square test was significant, the next step was to calculate conditional probability and adjusted residuals for each table cell. This step identified specific behavior pairs that showed a strong association in terms of initial-response sequence and then conditional probabilities were calculated using the observed value [35]. Adjusted residual parameters, which compare the observed value with the expected value, were used to identify whether the sequential behavior was significant or not. An adjusted residual above positive 2.58 ($\alpha = .01$) indicated a significant association between the initial behavior and the response behavior [35].

For lag sequential analysis in this study, we were most interested in doctor-patient-computer interaction, so we specifically analyzed and reported the behavior patterns listed in Table 2.

3. Results

Ten doctors and 101 patients participated in this study. One visit recording was dropped from the sequential analysis sample because of technical problems, so a total of one hundred

visits were analyzed. Six male and four female doctors participated in the study (mean [M] = 47.6 years old), and they had been practicing family medicine for 5 to 37 years. The recruited doctors reported using computers in clinical consultations for 3 to 10 years. Fifty-six male patients participated in the study (mean [M] = 45 years old).

Active information sharing occurred in 52 visits, passive information sharing occurred in 22 visits, technology withdrawal occurred in 26 visits. All of the physicians had at least one visit in the active information sharing group. Eight out of ten physicians had at least one visit in the passive information sharing group and eight of ten physicians also had at least one visit in the technology withdrawal group. There was one physician who only used one unique style -active information sharing style- in all of his visits (10 visits).

The visit length (total time the physician and patient spent together during the visit excluding the physical exam period) varied across the groups; 1229.8 seconds for the active information sharing group, 833.7 for the passive information sharing group, 974.6 seconds for the technology withdrawal group. A mean percent time of visits in which each target behavior occurred was calculated in seconds and reported in percentage values showing the ratio of behavior duration to visit length (See Table 3) and compared across the groups using Welsh t-test results (See table 4). For example, the doctors gazed at the patient during 46.1% of the visits on average in active information sharing visits while the doctors gazed at the patient 53% of the time in technology withdrawal visits. Consistent with this, the physicians gazed at the EHR 34.8% and 26.8% of the time on average in active information sharing visits and technology withdrawal visits, respectively.

The statistical comparisons of behaviors across the three groups are presented in Table 4. The statistical tests utilized percentage values rather than duration (seconds) to reveal more accurate results from each visit. For instance, we compared the mean of “Doctor gaze at EHR” behavior in the visits between the passive information sharing group and technology withdrawal group and found no significant difference ($p=0.148$). Alternatively, we found a significant difference between the same two groups for “Doctor gaze at patient” behavior ($p=0.026$), which shows that doctors gazed at patients significantly more in technology withdrawal visits on average than in passive information sharing visits (See table 4).

Finally, there were no significant differences between “doctor gaze at patient” and “patient gaze at doctor” behaviors within each group (active $p=0.607$; passive $p=0.067$; technology withdrawal $p=0.356$).

3.1 Findings from lag sequential analysis

Lag sequential analysis indicated how each behavior contributes to the likely occurrence of another behavior in each group. In each group the total number of visits (e.g. 52 visits in active information sharing group) was pooled into one contingency table for doctor-initiated behaviors and one contingency table for patient-initiated behaviors, making six tables in total. Event-based sequential analysis was used to explore significant patterns between the behavior pairs. A full table of lag sequential analysis results for all the combinations of behaviors is listed in Appendix 1.

3.1.1. Doctor initiated eye gaze patterns—In this study, we specifically analyzed the patterns reported in Table 2. We identified significant associations between the patterns of DGP-PGD (doctor gaze at patient followed by patient gaze at doctor) and DGT-PGT (doctor gaze at EHR followed by patient gaze at EHR) in each group. However, we also identified one unique significant pattern in the technology withdrawal group which did not occur in the other two groups **DGT-PGU** (doctor gaze technology followed by patient gaze unknown), which shows “Doctor gaze at EHR” contributes to the likely occurrence of patient gaze at unknown (Table 5).

3.1.2. Patient-initiated eye gaze patterns—In the active information sharing group, the PGT-DGP (patient gaze at EHR followed by doctor gaze at patient) and PGD-DGT (patient gaze at doctor followed by doctor gaze at EHR) were significantly more likely patterns compared to the other sequences. This was not true in the other two groups (passive and technology withdrawal). None of the patterns in the passive information sharing group were significant from each other. Finally, the PGU-DGT (patient gaze unknown followed by doctor gaze at EHR) and PGD-DGP (patient gaze doctor followed by doctor gaze at patient) were significant patterns in the technology withdrawal group.

4. Discussion and Conclusion

4.1 Discussion

The healthcare system in the US is moving from a paternalistic model to a more egalitarian approach that focuses on patients' preferences, needs, and values (i.e., patient-centered care) to optimize outcomes [16]. The presence of computers in the consultation room has created a triad of interaction which influences traditional physician-patient communication [19], and research is now starting to explore how the use of computers impacts patient-centered care and communication [9,19,44,45]. This study was one of the first to examine how physician EHR screen sharing with patients is related to patient and doctor non-verbal communication (eye gaze patterns) using both a static and dynamic approach. Eye contact is considered an important component of patient-centered care and communication [20].

The results showed differences in the durations of gaze across each screen sharing group. The visits in passive information sharing group has the lowest proportion of time of “physician looking at patient” (42.6 %) and the highest proportion of time of “physician looking at EHR”. Interestingly, this group also has the highest amount of “patient gaze unknown” (35.6%), which might indicate patient disengagement from communication. Studies reported that when physicians spend more time interacting with the computer without involving patients in the interaction, it may create disruptions in communication and less attentive physicians [8,23]. The active information sharing group potentially offers opportunities for more patient involvement and engagement with EHRs, since it has the highest amount of “patient looking at the EHR” (12.7%). Sharing the screen with patients and pointing to relevant areas might improve the feeling of collaboration [9] and minimize the negative impact of the computer on doctor-patient communication [8,28].

The exploration of sequential eye gaze patterns in addition to identifying eye gaze durations offers a more complete picture [39]. Consistent with Role Theory which posits the

importance of gestures in an interaction[34], the two actors in the patient physician dyad did seem to influence each other's gaze behavior. First, lag sequential analysis of doctor initiated gaze showed that “doctor gaze at patient” is followed by “patient gaze at doctor” significantly, and “doctor gaze at EHR” is also followed by “patient gaze at EHR” significantly in each group. This might have important implications for physician training and design suggestions for future EHRs. For example, physician EHR training could incorporate strategies to use screen sharing as a means of patient education. EHR designs could be simplified for both physicians and patients. Physicians need to access key patient information quickly so designing transparency and easy access to key patient information is critical. Second, structuring the screens to enhance the dyadic communication and patient education with clear screen layouts patients can understand would be helpful. We observed a unique significant pattern where “doctor gaze at EHR” was followed by “patient gaze unknown” in the technology withdrawal group visits. When doctors use the EHR, and patients cannot see the EHR screen, then patients seem to disengage from the interaction during that period. However, it is reported that inviting patients to view the computer screen may avoid EHR-related uncomfortable periods of idle silence or disengagement and enhance patient activation in the consultation[8].

We also identified several patient-initiated significant patterns in the active information sharing group and the technology withdrawal group. In the active information sharing group, “patient gaze at EHR” followed by “doctor gaze at patient” and “patient gaze at doctor” followed by “doctor gaze at EHR” were significant patterns. These two patterns might indicate triadic interactions between patient, computer screen, and doctor, since the screen is actively shared and can be seen by the patient easily throughout the visit. It might also be the standard sequence we observe when there is continuous screen sharing. When there is continuous screen sharing, potentially the patient might look at the screen while a physician gazes at the patient, or vice versa. Empowered and self-motivated patients might also appreciate being able to see their charts and perceive that as a way of higher collaboration with their physicians.

This study had several limitations. The sample of physicians was small and restricted to experienced family medicine physicians. In addition, the same EHR system was used in each visit. So these findings may not be representative of all physicians and EHR systems. More research with other physician specialties in different locations, with different room layouts and different EHR software, is needed to confirm generalizability of our results. Next, this study lacks measurement of patient outcomes related to each information sharing group and inclusion of verbal behavior. Future studies assessing comprehensive patient-centered communication should include verbal communication in these encounters and study the correlation with eye gaze sequences. Future studies also should longitudinally evaluate the impact of various uses of EHRs and information shared from EHRs during the conversation on larger outcomes such as patient satisfaction, adherence, and health status. Finally, more research is needed to understand the factors influencing the differences in EHR use, since even one physician might have different styles from visit to visit.

4.2 Conclusion

Patient-physician communication is an essential element of patient-centered care. Integrating EHRs into communication as a bridge rather than divider might contribute to patient-centered care and foster patient activation. Given that people behave in different and predictable ways depending on the behaviors of the other actor in a dyad, more research is needed to understand how providers can engage patients verbally and nonverbally while using EHRs in the consultation.

4.3 Practice Implication

This study's findings have important implications for clinician training and future patient centric technology (such as EHR) designs for consultation rooms. Consistent with Role Theory, physicians need to understand that their own EHR sharing and gaze behavior may influence their patients' behavior as well. The findings from this study can be used to help demonstrate to physicians how they can strategically involve patients with the EHR. Physicians may seek to maximize the benefits of EHR use in the consultation while maintaining patient centered communication, and maintaining their ability to be more attentive and informative in the visit. Simplified screens and program transparency is needed to help physicians find key information quickly. Simplified screen layouts would also aid using EHR as a tool to educate patients in the visits. More research should be conducted to help design future EHR systems in a way that can enhance doctor-patient communication and create optimal eye gaze patterns with improved patient outcomes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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- Significant differences were found in eye gaze patterns across the groups
- Some technology use styles can engage patient more in the visit than others
- This study has implication for future EHRs which can enhance the communication
- This study has training implications for physicians for more efficient use of EHRs

Coding scheme**Table 1**

Code	Behavior
PGD	Patient gaze doctor
PGT	Patient gaze technology (computer screen)
PGC	Patient gaze chart
PGO	Patient gaze other artifact
PGU	Patient gaze unknown
DGP	Doctor gaze patient
DGT	Doctor gaze technology (computer screen)
DGC	Doctor gaze chart
DGO	Doctor gaze other artifact
DGU	Doctor gaze unknown

Table 2
Behavior patterns investigated with sequential analysis in this study

Pattern	Sequential behavior pair	
	<u>Initial Behavior</u>	<u>Response Behavior</u>
Doctor initiated patterns	Doctor gaze patient (DGP)	Patient gaze doctor (PGD)
	Doctor gaze technology (DGT)	Patient gaze technology (PGT)
	Doctor gaze technology (DGT)	Patient gaze doctor (PGD)
	Doctor gaze technology (DGT)	Patient gaze unknown (PGU)
	Patient gaze doctor (PGD)	Doctor gaze patient (DGP)
	Patient gaze doctor (PGD)	Doctor gaze technology (DGT)
Patient initiated patterns	Patient gaze technology (PGT)	Doctor gaze technology (DGT)
	Patient gaze technology (PGT)	Doctor gaze patient (DGP)
	Patient gaze unknown (PGU)	Doctor gaze technology (DGT)

Table 3
Average estimates of physician and patient gazing behavior in each group

Behaviors	Active information sharing group (52 visits)		Passive information sharing group (22 visits)		Technology withdrawal group (26 visits)	
	Time(sec.)	Mean % (SD)%	Time(sec.)	Mean % (SD)%	Time(sec.)	Mean % (SD)%
Doctor gaze at Patient	567.9	46.1 (15.3)	388.3	42.6 (17.8)	539.4	53.2 (19.6)
Patient gaze at Doctor	604.5	47.6 (15.7)	468.2	53.5 (18.5)	573.4	58.7 (24.3)
Mutual gaze	405.3	32.8 (13.1)	305.2	33.2 (16.2)	375.2	37.9 (17.1)
Doctor gaze at Unknown	90.3	8.7 (11.5)	70.8	9.4 (8.7)	63.9	7.5 (6.3)
Patient gaze at Unknown	293.5	23.9 (15.7)	303.2	35.6 (19.1)	302.2	31.6 (21.3)
Typing	102.8	7.3 (6.1)	93.75	12.2 (14.2)	101.6	9.3 (11.4)
Doctor gaze at technology (EHR)	451.8	34.8 (14.6)	324.2	37.5 (19.2)	265.8	26.8 (18.9)
Patient gaze at technology (EHR)	217.3	18.2 (12.7)	97.6	11.2 (6.4)	5.99	0.5 (1.4)
Shared gaze at technology (EHR)	167.7	13.8 (9.8)	78.4	9.2 (7.0)	3.7	0.4
Mutual gaze +Shared gaze at EHR	573.4	46.2 (15.3)	360.7	41.3 (19.7)	378.9	38.3 (16.9)

Note: We also report standard deviation values for percentages in the parenthesis. The last item is simply the sum of mutual gaze and shared gaze at technology behaviors.

Table 4
Welch t-test results across the groups

Behaviors	Active versus Passive	Active versus Withdrawal	Passive versus Withdrawal
Doctor gaze at EHR	p=0.664	p=0.148	p=0.148
Patient gaze at EHR	p<0.001*	NA	NA
Shared gaze at EHR	p=0.001*	NA	NA
Doctor gaze at Patient	p=0.102	p=0.271	p=0.026*
Patient gaze at Doctor	p=0.583	p=0.029*	p= 0.216
Mutual gaze	p= 0.656	P=0.304	P=0.256
Patient gaze unknown	p=0.013*	p=0.073	p=0.472

Notes: Bold values with stars represent significance. NA – the analysis could not be conducted due to a minimal amount of patient gaze at EHR in the technology withdrawal group.

Table 5
Lag-sequential analysis results for doctor initiated patterns of point of interest behaviors

Behavior patterns		Active information sharing group	Passive Information sharing group	Technology withdrawal group
DGP-PGD	Obsrvd Freq.	1081	248	298
	Cond. Prob.	59.14%	53.68%	50.16%
	Adj. Res.	(20.880)	(6.690)	(6.455)
DGT-PGT	Obsrvd Freq.	633	71	23
	Cond. Prob.	43.27%	18.68%	4.07%
	Adj. Res.	(31.272)	(10.313)	(5.045)
DGT-PGD	Obsrvd Freq.	348	112	169
	Cond. Prob.	23.79%	29.47%	29.96%
	Adj. Res.	(-16.403)	(-6.047)	(-2.123)
DGT-PGU	Obsrvd Freq.	391	174	230
	Cond. Prob.	26.73%	45.79%	40.78%
	Adj. Res.	(-2.365)	(1.578)	(2.606)

Note: Highlighted cells show significant values, Observed Freq is Observed Frequency, Cond. Prob. is Conditional Probability, Adj. Res. is Adjusted residuals

Table 6
Lag-sequential analysis results for patient initiated patterns of point of interest behaviors

Behavior patterns		Active information sharing group	Passive Information sharing group	Technology withdrawal group
PGD-DGP	Obsrvd Freq.	740	247	335
	Cond. Prob.	37.54%	44.67%	48.62%
	Adj. Res.	(-7.937)	(1.171)	(2.715)
PGD-DGT	Obsrvd Freq.	695	156	182
	Cond. Prob.	35.26%	28.21%	26.41%
	Adj. Res.	(7.482)	(-0.171)	(-2.619)
PGT-DGT	Obsrvd Freq.	157	16	8
	Cond. Prob.	21.33%	35.55%	34.78%
	Adj. Res.	(-5.453)	(1.081)	(0.552)
PGT-DGP	Obsrvd Freq.	482	20	10
	Cond. Prob.	65.49%	44.44%	43.47%
	Adj. Res.	(12.942)	(0.209)	(-0.152)
PGU-DGT	Obsrvd Freq.	288	123	172
	Cond. Prob.	28.60%	29.78%	36.75%
	Adj. Res.	(-0.849)	(0.767)	(4.221)

Note: Highlighted cells show significant values, Observed Freq is Observed Frequency, Cond. Prob. is Conditional Probability, Adj. Res. is Adjusted residuals