



# HHS Public Access

Author manuscript

*J Am Pharm Assoc (2003)*. Author manuscript; available in PMC 2019 January 01.

Published in final edited form as:

*J Am Pharm Assoc (2003)*. 2018 ; 58(1): 61–66.e7. doi:10.1016/j.japh.2017.09.059.

## Characterization of Actions Taken During the Delivery of Medication Therapy Management: A Time-and-Motion Approach

**Alice C. Chang, PharmD [Clinical Safety Associate],**

Genentech, South San Francisco, California

Student Pharmacist at College of Pharmacy, Purdue University, West Lafayette, IN

**Jutieh Lincoln, PharmD, MPH [Staff Pharmacist],**

Hendricks Regional Health, Danville, IN

Student Pharmacist at College of Pharmacy, Purdue University, West Lafayette, IN

**Wendy M. Lantaff, PharmD, MS, BCACP [President],**

Eudaemonia Health, LLC and Staff Pharmacist, Walmart Pharmacy

Hook Drug Foundation Fellow in Community Practice Research at College of Pharmacy, Purdue University, Indianapolis, IN

**Stephanie A. Gernant, PharmD, MS [Assistant Professor],**

School of Pharmacy, University of Connecticut, Storrs, CT

**Heather A. Jaynes, RN, MSN [Research Nurse],**

College of Pharmacy, Purdue University, Indianapolis, IN

**William Doucette, PhD [Division Head and Professor], and**

College of Pharmacy, University of Iowa, Iowa City, IA

**Margie E. Snyder, PharmD, MPH [Associate Professor]**

College of Pharmacy, Purdue University, Indianapolis, IN

### Abstract

**Objective**—To characterize actions performed by pharmacists and support staff during provision of medication therapy management (MTM) and compare actions performed by practice characteristics.

**Methods**—A purposeful sample of seven MTM practices (n= 2 call centers and n=5 community practices) was identified and visited by investigators. Pharmacists and support staff were observed during their routine provision of MTM. Investigators characterized “major” (e.g., preparation for a

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**Correspondence:** Margie E. Snyder, PharmD, MPH, Associate Professor of Pharmacy Practice, College of Pharmacy, Purdue University, 640 Eskenazi Avenue, Indianapolis, IN 46202, Tel: 317-880-5429, Fax: 317-880-0568, snyderme@purdue.edu.

**Previous presentations of the work:**

ASHP 2015 Midyear Clinical Meeting, New Orleans, LA, December 8, 2015

**Disclosure of conflicts of interests:**

Dr. Snyder is serving as a paid consultant to Westat, Inc. for an evaluation of the CMS Enhanced MTM program.

comprehensive medication review) and “minor” actions (i.e., specific steps in overarching major action) using a time-and-motion approach.

**Results**—A total of 32 major and 469 minor actions were observed. Practices were characterized as Later Maturity Level or Early Maturity Level based on their self-reported MTM appointment volume, self-assessment of the extent of integration of chronic care model principles, and payer mix. Later Maturity Level practices were more likely to deliver follow-up medication therapy reviews and comprehensive medication reviews (CMRs) as opposed to targeted medication reviews (TMRs), and receive physicians referrals for MTM. Later Maturity Level practices were also more likely to utilize paid interns than pharmacy rotation students. CMR activities observed at Later Maturity Level practices lasted a median of 30.8 minutes vs. 20.3 minutes for CMR activities at Early Maturity Level practices. Similarly, TMR activities observed at Later Maturity Level practices were also longer; a median 31.0 minutes vs. 12.3 minutes. At Later Maturity Level practices, pharmacists spent a greater proportion of time providing patient education while support staff spent a greater proportion of time on tasks such as capturing demographics and introducing/explaining MTM.

**Conclusion**—MTM activities were longer at Later Maturity Level practices and these practices were more likely to utilize paid pharmacy interns and receive physician referrals for MTM. This work provides a foundation for future research.

### Keywords

Medication therapy management; time and motion; pharmacist services

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### Introduction

Medications are used widely in the United States and use is growing. Among individuals ages 65 and older, 90% have a prescription drug expense<sup>1</sup> and the costs of preventable adverse drug events in the ambulatory setting are estimated at \$887 million annually.<sup>2</sup> The Centers for Medicare and Medicaid Services (CMS) implemented Medicare Part D medication therapy management (MTM) to promote medication adherence and reduce adverse drug events among chronically ill beneficiaries using multiple medications.<sup>3</sup> At minimum, eligible beneficiaries must be offered a comprehensive medication review (CMR) annually and targeted medication reviews (TMRs) quarterly. CMRs must be “person-to-person” and conducted by a pharmacist or other provider and documented using a standardized CMS format.<sup>4</sup>

While some MTM studies have demonstrated cost savings and improved quality of life, outcomes and measures for evaluating MTM have varied considerably.<sup>5–11</sup> This variation in outcomes might be due to MTM implementation challenges pertaining to staffing and time constraints, insufficient compensation models, and limited patient engagement.<sup>12–14</sup> Some MTM models appear to be more effective and/or efficient than others and support staff have been encouraged to take on more active roles in MTM. However, insufficient information currently exists on how this has been operationalized across various practice settings and how time is actually spent during MTM.<sup>15–16</sup> Time-and-motion methods have been widely used in health services research<sup>17–20</sup>. Applying time-and-motion methods to study MTM

can provide insight into how pharmacists and support staff are utilized and may identify potential inefficiencies and areas for future research.

## Objective

To characterize actions performed by pharmacists and support staff during the provision of MTM and compare actions performed by practice characteristics.

## Methods

### Conceptual Framework

As noted above, CMS targeting criteria for MTM focuses on beneficiaries with multiple chronic conditions<sup>4</sup>; over 80% of Part D plans target those with at least three chronic conditions.<sup>21</sup> Given this focus, the Chronic Care Model (CCM) provides a useful framework for examining different approaches by which MTM has been implemented; others have also recently suggested the integration of MTM and CCM concepts to guide research.<sup>22</sup> The CCM elements include: (1) organization of the health care system, (2) delivery of services, (3) decision support, (4) clinical information systems, (5) patient self-management support, and (6) community linkages.<sup>23–24</sup> Previous research has demonstrated that interventions incorporating at least one CCM element result in improvements in clinical outcomes for common chronic diseases.<sup>25</sup>

### Enrollment

To identify a heterogeneous cross-section of MTM practices varying in type (call center vs. community pharmacy), ownership (independent vs. chain), payer mix (solely Medicare Part D MTM vs. a more diverse payer mix) and experience providing MTM, a purposeful sampling approach<sup>26</sup> was applied. Study sites were recruited with assistance of the Medication Safety Research Network of Indiana (Rx-SafeNet)<sup>27</sup> and leadership from the Minnesota Pharmacists Practice-based Research Network (MPBRN),<sup>28</sup> as well as through the investigators' professional networks. After confirmation of willingness to participate, practice contacts helped to identify stakeholders (pharmacists, support staff, prescribers, and patients) to approach for participation. Those eligible were at least 21 years old, proficient in English, able to consent, and either an employee participating in MTM delivery, a patient receiving MTM who reported having at least one chronic medical condition, or a prescriber interfacing with the practice through the delivery of MTM. Pharmacists and support staff at the participating practices, and prescribers, were informed about the study via telephone or email, after which the investigators discussed the study in more detail by telephone. The recruitment of patients took place by telephone prior to their medication therapy review or in the waiting area at the participating practices. Study procedures were approved by the Purdue University Institutional Review Board (IRB).

### Data Collection

Between Fall 2013 and Spring 2015, 2 to 3 investigators (M.E.S., H.A.J., S.A.G.) visited each practice for 2 to 3 days to observe MTM activities and collect data using four

techniques, including: (1) administration of a survey tool, (2) observations and contextual inquiry, (3) semi-structured interviews, and (4) audio-recorded investigator debriefs.

The survey tool consisted of a modified Assessment of Chronic Illness Care (ACIC) instrument (v. 3.5; Appendix A, available on [JAPhA.org](http://JAPhA.org) as supplemental content),<sup>29</sup> which characterizes elements of the CCM. The ACIC was administered to participating pharmacists and support staff to assess their perception of the extent to which CCM elements were incorporated by their practice into MTM delivery. Possible scores range from 0–11 for both the overall score and the individual subscales, with higher scores indicating more comprehensive chronic care delivery.<sup>29</sup> Wording modifications were made with permission to improve relevance to the delivery of MTM; emphasis was placed to ensure each question's intent was preserved. Data for patient MTM appointment volume and percent of MTM appointments provided under Medicare Part D were collected as self-reports from pharmacists and support staff following semi-structured interviews.

During observations, investigators timed a purposeful sample of the MTM activities observed at each practice, attempting to capture both initial and follow-up MTM encounters as well as activities occurring before (e.g., preparatory work), during, and after (e.g., documentation) the medication therapy review. Time observations were recorded as unstructured notes and dictated by investigators during daily debriefs for subsequent professional transcription and coding. These notes included: the MTM action being performed, the type of participant performing each action, and the time spent in minutes and seconds on each action.

Finally, qualitative data were collected through individual semi-structured interviews, investigator debriefs of observations, and contextual inquiry with practice stakeholders to identify themes pertaining to the CCM elements. Qualitative data procedures and findings are described elsewhere.<sup>30</sup>

## Data Analysis

After investigators' notes of timed observations were transcribed, we created a coding scheme to characterize MTM-related activities using the time-and-motion study tool published by the Agency for Healthcare Research and Quality (AHRQ) and the pharmaceutical care process as guiding frameworks.<sup>31–32</sup> This coding scheme included both "Major" and "Minor" actions. Major actions were defined as the overarching MTM activity observed. These were: (1) preparatory work for a medication therapy review; (2) conduct of a medication therapy review; (3) wrap-up work, following a medication therapy review; and (4) contact with a patient regarding a medication therapy review. *Major action codes* included whether the MTM activity was: (1) for an initial or follow-up medication therapy review; (2) for a CMR or TMR; and (3) how the patient was identified for the medication therapy review (e.g., payer assigned patient vs. physician referral).

"Minor" actions were defined as each specific step in the MTM activity (major action) observed. *Minor action codes* included: (1) timing of action (before, during, or after the medication therapy review); (2) time spent; (3) person completing (e.g., pharmacist); (4) location (e.g., telephone); (5) the MTM Core Element being completed<sup>33</sup> (e.g., medication

therapy review, personal medication record); and (6) relation of the action to the CCM elements (e.g., clinical decision support). Finally, if applicable, codes were assigned to categorize the specific component of the medication therapy review observed (e.g., review of allergies).

Descriptive statistics were computed using SPSS v. 23.0 to summarize MTM actions observed across (1) stage of practice development (i.e., maturity levels, described below), and (2) role of person performing observed task (i.e., pharmacist vs. support staff). An overall practice mean was computed from data across all participating pharmacists and support staff at a given practice to obtain a practice-level mean ACIC score. The mean per pharmacist per week number of MTM appointments and percent Part D were calculated for each practice using pharmacist self-report data.

## Results

### Summary of Practice Characteristics

Seven MTM practices participated, representing both call center (n=2) and community pharmacy (n=5) models for MTM delivery. Community pharmacy practices included independent, chain, and health-system outpatient pharmacy teams. Two maturity levels of MTM practice were evident based on the practices' self-reported MTM appointment volume, self-assessment of the extent of integration of chronic care model (CCM) principles (i.e., ACIC scores), and payer mix. These levels align with those described in the Capability Maturity Model.<sup>34</sup> Although originally developed to describe the maturity of information technology within organizations, the levels described by the Capability Maturity Model could have wide applications.<sup>35</sup> In the current study, participating MTM practices appeared to fall along the continuum of maturity presented by Paulk, et al.<sup>34</sup> with a natural break point grouping practices at either Level 1 (Initial) or Level 2 (Repeatable) vs. practices at Level 3 (Defined), Level 4 (Managed) or Level 5 (Optimizing). We will refer to the former group as "Early Maturity Level" MTM practices and the latter as "Later Maturity Level" MTM practices. In general, Later Maturity Level practices were those with larger MTM patient volumes, ACIC scores indicating more comprehensive chronic care, and diversified MTM payer mixes (Table 1.)

### Summary of Major and Minor Actions Observed

A total of 32 major and 469 minor actions were recorded (Table 1). Across all practices, no point of care testing or discussion of social history as part of a medication therapy review was observed.

### Later Maturity Level versus Early Maturity Level Practices

Later Maturity Level practices were more likely to deliver follow-up medication therapy reviews and CMRs as opposed to TMRs. Both CMR and TMR activities observed were longer at Later Maturity Level Practices compared to Early Maturity Level Practices.

We observed physicians referrals for MTM at Later Maturity Level practices only. Later Maturity Level practices were also more likely to utilize paid interns than pharmacy rotation

students. Similarly, technicians were observed in MTM delivery only at Later Maturity Level practices. (Table 2.)

Across all practices, MTM tasks initiated by payers, physicians, and pharmacists in Later Maturity Level practices lasted a median of 31.0 (range: 15.2–61.8), 16.9 (range: 2.1–40.0), and 42.1 (range: 37.0–47.2) minutes, respectively. MTM tasks in Early Maturity Level practices initiated by payers and pharmacists lasted a median of 12.4 (range: 7.7–69.0) and 16.8 (16.1–27.3) minutes.

### Pharmacists versus Support Staff

Across all practices, 13.5% of 238 actions completed by pharmacists were interventions and referrals, compared with 1.9% of 190 actions made by support staff. In contrast, 17.1% of support staff actions were related to documentation/follow-up, compared to 7.1% for pharmacists. As a proportion of activities observed (Table 2, support staff at Later Maturity Level practices also conducted more demographics capturing/reviewing patient profiles/reviewing and responding to clinical alerts than did pharmacists (21.7% vs. 4.9%) whereas it was similar for support staff and pharmacists at Early Stage Maturity practices (18.2% for support staff and 20.3% for pharmacists.) Moreover, support staff introduced/explained MTM more than pharmacists (9.8% vs. 1.6%) at Later Maturity Level practices but not at Early Maturity Level practices (5.0% vs. 4.7%.) At Early Mature Level practices, pharmacists and support staff devoted about the same proportion of time to providing patient education (20.3% vs. 17.4%) but pharmacists at Later Maturity Level practices devoted a much larger proportion of their time compared to support staff (24.6% vs. 10.9%.)

### Discussion

In this descriptive study, we were able to group MTM practices along a maturity continuum based on MTM appointment volume, ACIC scores, and payer mix. While originally designed to describe the maturity of information technology within organizations, applying principles from the Capability Maturity Model to the study of MTM delivery merits further consideration particularly given the more recent development of service-oriented maturity models.<sup>36</sup> We found that MTM tasks at Later Maturity Level practices were completed by more types of support staff, including paid staff, than MTM tasks completed at Early Maturity Level practices. Given their higher service volumes, Later Maturity Level practices likely have the opportunity to develop advanced workflow and scheduling logistics that allow specialized positions to perform specific tasks. In addition, such routinization could improve efficiency and reduce MTM delivery costs, thereby enhancing service sustainability.<sup>34</sup>

Engaging support staff, such as pharmacy technicians, in MTM aligns with contemporary practice recommendations. Prior literature suggests pharmacy technicians can contribute to MTM by contacting and scheduling patients and assisting with documentation and billing.<sup>37–39</sup> In this study, we discovered that support staff at Later Maturity Level practices allocated a larger proportion of their time on tasks such as capturing demographics and introducing/explaining MTM, which may have shifted pharmacists time at these practices to provide more interventions and education. However, additional support staff training might

be required, because only 23% of the Pharmacy Technician Certification Examination addresses pharmacotherapy principles.<sup>40</sup> Additionally, Pattin et al. found that training pharmacy technicians about their role in MTM resulted in more technicians believing that they could help with MTM.<sup>41</sup>

The time dedicated to MTM activities was similar to time data reported by other investigators.<sup>15–16,42</sup> Both CMRs and TMRs were longer at Later Maturity Level practices than at Early Maturity Level practices which may indicate a more robust approach being taken to medication therapy reviews. These findings warrant additional research.

The reason for differences observed in time spent on MTM tasks based on referral source are unclear and warrant further study as the MTM consensus definition endorsed in 2004 by 11 national pharmacy organizations states that MTM payers should include opportunities for pharmacists to identify patients who should receive MTM.<sup>43</sup> However, pharmacist-initiated activities were observed much less commonly than those initiated by payers, and we did not observe every type of referral source at each practice.

## Limitations

Investigator training and pilot testing focused on other components of the study visits (e.g., qualitative interviewing) rather than on how time notes should be recorded. Therefore, time was not captured for every observed task, and there were inconsistencies in noting time stamps at the same granularity or precision. Moreover, our coding scheme was developed after observations were recorded, creating inherent limitations. For example, distinguishing MTR from “Intervention/Referral” was difficult, because pharmacists routinely make interventions throughout the conduct of the MTR. This was managed through ongoing refinements to our coding scheme. Future studies of time spent in MTM are warranted and should consider a priori creation of the coding scheme, potentially based on our findings, with further training of observers. Given the nature of the study, we did not observe the same number and type of actions at every practice. We do not know the number of unique patients or unique MTM encounters, because not all CMRs and TMRs were observed from start to finish. In some instances, one investigator observed MTR preparatory work while another investigator observed wrap up/documentation. We do not know the percent of MTM appointments that were CMRs vs. TMRs as the item asked only for an approximate number of MTM appointments conducted per week. One practice did not provide MTM through Medicare Part D but this was not known until our visit. Finally, while we were successful in recruiting a heterogeneous national sample of MTM practices, our findings may have differed had we observed MTM elsewhere.

## Conclusions

Patterns of MTM activities vary by stage of practice maturity and person performing the task, with Later Maturity Level practices more likely than Early Maturity Level practices to utilize paid pharmacy interns and receive physician referrals for MTM. TMR and CMR activities were also longer at Later Maturity Level practices and follow-up MTM activities

were only observed at Later Maturity Level practices. This work provides a strong foundation for future time-and-motion and comparative effectiveness MTM research.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

To other members of Dr. Snyder's K08 mentoring panel: Drs. Brad Doebbeling, Mick Murray, Karen Hudmon, and Susan Perkins. To the Medication Safety Research Network of Indiana (Rx-SafeNet) and leadership from the Minnesota Pharmacists Practice-based Research Network (MPBRN) for assistance in identifying study sites and to all participating study sites.

### Funding:

This study and a portion of Dr. Snyder's effort was funded by the Agency for Healthcare Research and Quality grant number K08HS022119. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality.

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**Table 1**

## Practice Characteristics by Maturity Level

	Overall	Practice Level of Maturity	
	n=7	“Early Maturity Level” (n=3)	“Later Maturity Level” (n=4)
<b>Type of practice, n (%)</b>			
Call center	2 (28.6%)	1 (33.3%)	1 (25%)
Community	5 (71.4%)	2(66.7%)	3 (75%)
<b>Number of staff observed per practice, median (range)</b>	4.0 (1.0–7.0)	2.3 (1.0–4.0)	6.0 (5.0–7.0)
Pharmacists	2.0 (1.0–9.0)	1.7 (1.0–2.0)	5.0 (2.0–9.0)
Support staff			
<b>MTM appointments conducted/involved in per week per practice, median (range)</b>	2.5 (0–300)	2.4 (0–10.0)	10 (0–300)
Pharmacist	2.4 (0–100)	1.2 (0–10.0)	7.5 (0–100)
Support Staff	4.0 (3–300)	4.0 (3.0–5.0)	19 (0–300)
<b>Percent of appointments Medicare Part D per practice</b>	69.4 (0–100)	66.7 (0–100)	62.0 (0–100)
<b>Overall ACIC score per practice, average (SD)</b>	7.7 (2.0)	6.4 (2.3)	8.2 (1.7)
Pharmacist	7.2 (1.8)	6.3 (1.8)	7.6 (1.7)
Support staff	7.6 (2.1)	7.0(2.6)	8.4 (1.6)

MTM: Medication Therapy Management

Table 2

Major and minor actions observed by type of practice site and level of maturity

	Overall	Practice Level of Maturity	
		“Early Maturity Level” (n=3) (median, 1.2 appointment/RPh/week)	“Later Maturity Level” (n=4) (median: 7.5 appointments/RPh/week)
<b>Total major actions observed (n)</b>	32	9	23
Time spent (minutes), median, (range)	26.9 (1.7–69.0)	16.5(11.5–27.3)	28.1 (1.7–61.8)
CMR	25.58 (7.7–61.8)	20.3 (7.7–69.0)	30.8 (11.0–61.8)
TMR	22.5 (1.7–69.0)	12.3 (9.4–69.0)	31.0 (1.7–47.0)
Type of consultation, n (%)			
Initial	27 (84.3%)	9 (100.0%)	18 (78.3%)
Follow-up	5 (15.6%)	0 (0.0%)	5 (21.7%)
Type of MTR, n (%)			
CMR	24 (75.0%)	4 (44.4%)	20 (87.0%)
TMR	8 (25.0%)	5 (55.6%)	3 (13.0%)
Party initiating MTM, n (%)			
Payer/insurance company	20 (62.5%)	6 (66.7%)	14 (60.9%)
Pharmacist	7 (21.9%)	3 (33.3%)	4 (17.4%)
Physician	5 (15.6%)	0 (0.0%)	5 (21.3%)
<b>Total minor actions observed (n)</b>	469	155	314
Time spent (minutes), median, range	1.0 (0.3–21.1)	1.0 (0.1–18.0)	2.0 (0.03–13.6)
Action Timing, n (%)			
Before consultation	41 (8.7%)	16 (10.3%)	25 (8.0%)
During consultation	406 (86.6%)	132 (85.1%)	274 (87.3%)
After consultation	22 (4.7%)	7 (4.5%)	15 (4.8%)
Actor, n (%)			
Pharmacist	239 (51.0%)	71 (45.8%)	170 (54.1%)

	Overall	Practice Level of Maturity	
		"Early Maturity Level" (n=3) (median, 1.2 appointment/RPh/week)	"Later Maturity Level" (n=4) (median: 7.5 appointments/RPh/week)
Technician	56 (12.0%)	0 (0.0%)	56 (17.8%)
Intern	38 (8.1%)	4 (2.6%)	34 (10.8%)
Patient	42 (9.0%)	166 (10.3%)	26 (8.3%)
Resident	28 (6.0%)	0 (0.0%)	28 (8.9%)
Student	64 (13.7%)	64 (41.3%)	0 (0.0%)
<b>MTM Core Element, n (%)</b>			
MTR	370 (78.9%)	123 (79.4%)	247 (78.7%)
MAP/PMR	10 (2.1%)	5 (3.2%)	5 (1.6%)
Intervention/referral	43 (9.2%)	13 (8.4%)	30 (9.6%)
Documentation/Follow-up	46 (7.7%)	14 (9.0%)	32 (10.2%)
<b>Components of MTR by actor, n (%) *</b>			
	<b>428</b>	<b>Pharmacists (n=111)</b>	<b>Pharmacists (n=127)</b>
		<b>Support Staff (n=69)</b>	<b>Support Staff (n=121)</b>
Work-up/review of clinical data	65 (15.1%)	22 (20.3%)	6 (4.9%)
Introduce/Explain MTM	24 (5.5%)	5 (4.7%)	3 (1.6%)
Patient engagement	11 (2.6%)	3 (1.6%)	4 (3.3%)
Medication reconciliation	89 (20.9%)	14 (12.5%)	32 (24.8%)
Assessment	89 (20.9%)	23 (20.3%)	33 (26.2%)
Education	77 (18.1%)	23 (20.3%)	31 (24.6%)
Wrap-up	46 (10.7%)	15 (14.1%)	12 (9.8%)
Other	27 (6.2%)	6 (6.3%)	6 (4.9%)

MTR: Medication Therapy Review

CMR: Comprehensive Medication Review

TMR: Targeted Medication Review

MTM: Medication Therapy Management

MAP: Medication-related Action Plan

PMR: Personal Medication Record

\* Components of MTR: specific action codes included in categories:

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- Work-up: Review patient profile, collecting demographics, review/respond to clinical flag/alert
- Introduce/explain MTM: Introduce/explain MTM
- Patient Engagement: Patient engagement
- Medication reconciliation: medication reconciliation
- Assessment: Review of systems, medication experience, immunization, laboratory data, past medical history, allergies, chief complaint
- Patient education: general education, asking/answering questions, nutrition/exercise
- Wrap-up: wrap-up
- Other: otherwise not categorized