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Standardized Structured Telephone Support Protocol in a Remote Telemonitoring Program

Christine Garrow

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Christine Garrow, RN, BSN, DNP Student

University of Portland School of Nursing

Telemonitoring programs remotely monitor patients with heart failure to help clinicians recognize the signs and symptoms of clinical deterioration to avoid hospital readmissions (Kulshreshtha, Kvedar, Goyal, Halpern & Watson, 2010). These programs include in-home telehealth devices to monitor patient weight and vital signs, as well as Structured Telephone Support (STS) in the form of education provided over the telephone and monitoring of patient self-care activities. STS interventions rely on the registered nurse's (RNs) individual clinical judgment and experience to ask the patient pertinent questions and gather relevant data. Evidence supports the use of standardized communication protocols to reduce communication errors and improve patient outcomes (Vardaman, et al., 2012; Townsend-Gervis, Cornell & Vardaman, 2014).

A review of the telemonitoring program at a Regional Medical Center cardiology clinic revealed lack of a formal STS protocol and a need for standardization of STS delivery. The purpose of this quality improvement project is to implement a standardized protocol for STS delivery, in order to support RN decision making and increase patient engagement in self-care activities.

Background

A translational research study was initiated by State University, Regional Health System and Health Technology Company to assess the effect of remote telemonitoring on patients with heart failure. The study aimed to further substantiate how the use of in-home telehealth devices could be successfully used to remotely monitor Medicaid patients with heart failure (TSAP II, 2018). Remote monitoring of this high utilization population helped clinicians and patients monitor the signs and symptoms of clinical deterioration to avoid hospital readmission and promote patient engagement in at home heart failure self-care. STS was an intervention

imbedded into the research study to monitor and respond to patient data received from the in-home telehealth devices, as well as address patient concerns.

Description of Clinical Problem

The remote monitoring program at the Regional cardiology clinic lacked a standardized protocol for STS delivery. Evidence shows STS as an effective intervention to promote and increase patient engagement in self-care activities related to heart failure (Inglis, Clark, Dierckx, Prieto-Merino & Cleland, 2015). However, STS relies on individual clinical judgment and experience of the RN implementing the telephone support. The use of standardized communication tools in health care has been shown to reduce communication errors and improve patient outcomes (Vardaman, et al., 2012; Townsend-Gervis, Cornell & Vardaman, 2014). Well-developed protocols guide healthcare providers to gather complete data sets, provide thorough education and enhance communication with other providers (Vardaman, et al., 2012). Reliance on individual clinical judgment and experience alone could lead to failure in one of these categories.

STS is loosely defined in the literature as "education provided over the telephone", or "monitoring of self-care management through telephone encounters" (Inglis, Clark, Dierckx, Prieto-Merino & Cleland, 2015). A gap in the literature exists regarding the details of the content of structured telephone interactions. Failure to properly define STS may lead to ineffective or incomplete delivery of telephone support. Clarifying details of STS content are necessary to ensure efficacy of the intervention.

Background and Significance

Heart failure (HF) is a chronic cardiovascular condition characterized by a weakening of myocardial tissue, resulting in ineffective pumping of blood from the heart to vital organs

throughout the body (American Heart Association, 2017). The incident of HF increases with age, with the elderly making up 80% of the population with HF (Díez-Villanueva & Alfonso, 2016). Currently, an estimated 5.7 million people in the United States have HF with an expected increase of up to 8 million by the year 2030 (Díez-Villanueva & Alfonso, 2016). HF is the most common cause of hospitalization in adults aged 65 years and older and the number of HF related hospitalizations is likely to increase as the U.S. population ages (Zavertnik, 2014).

Hospital readmission rates for HF patients continue to be above 20% despite efforts to manage readmission (Ziaeian & Fonarow, 2016). Attempts to reduce readmission rates focus on supporting and promoting self-care behaviors at home, through improving in-hospital and post-discharge care, increasing patient knowledge of condition and providing remote care (Zavertnik, 2014).

Riegal, Dickson and Faulkner (2016) define self-care as "a naturalistic decision-making process that influences actions that maintain physiologic stability, facilitate the perception of symptoms, and direct the management of those symptoms" (p. 226). Majority of the responsibility of managing HF symptoms falls on patients, who must make daily decisions about self-care activities at home. Patients must make dietary choices, take prescribed medications, monitor their weight and vital signs and engage in physical activity as part of their self-care routine. Patient must be able to recognize the signs and symptoms of HF exacerbation and take action to address worsening symptoms in order to avoid a medical emergency. It is understood that poor symptom management or failure to identify worsening HF symptoms results in hospital readmission (Gardetto, 2011).

STS assists patients in at-home HF self-care through direct RN-to-patient communication targeted at correcting behaviors that worsen HF. Through STS, RNs can respond and intervene

when patient data indicates exacerbation. STS increases patient knowledge of HF through RN provided education, which helps engrain cognitive connections linking changes in vital signs or at-home behaviors which lead to worsening HF symptoms.

Aims/Purpose

The purpose of the project was to standardize the delivery of STS to HF patients participating in the remote telemonitoring research study. Implementation of a communication protocol aimed to standardized delivery of RN-to-patient telephone support and engage patients in at-home HF self-care. Use of a communication protocol helped ensure the RN gathered complete data sets, asked pertinent and relevant questions and properly assessed self-care activities. Further, the project aimed to add to the existing literature which lacked detailed descriptions of STS content.

Methodology

This project used a nonexperimental design which aimed to standardize STS delivery among RNs employed by the Regional cardiology clinic. Data collection was based on observation of number of alerts generated by patient data exceeding threshold, RN response to alerts (via RN generated note in online portal), content of RN generated note, and patient engagement in self-care activities (as evidenced by fewer incidences of data exceeding threshold). Protocol design focused on inquiry, assessment and intervention of patient data when data exceeded pre-set thresholds triggered by changes in weight, blood pressure and failure to use at-home devices.

Participants in the remote telemonitoring study are required to use telemonitoring devices such as a scale, blood pressure cuff and medication management device each day. All devices are wirelessly connected to a Bluetooth hub that collected and transmitted data to an

online portal. The data was then accessed and evaluated by the authorized healthcare team. When patient data exceeded predetermined thresholds, an alert message was sent to the online portal to be reviewed by the RN. The RN then contacts the patient via telephone to inquire, assess and intervene using STS. The STS communication protocol was tool to guide RN delivery of STS. Protocol efficacy was dependent on RN willingness to use protocol, RN understanding of reasons why alerts are generated, comprehensiveness of protocol in capturing possible causes for alert generation, and usability of protocol. For the purposes of this project, the protocol was designed to address alerts generated in response to data related to changes in weight, blood pressure and device use only.

Participants

Project participants include the patients enrolled in the remote telemonitoring program and the Regional cardiology clinic staff. The remote telemonitoring participants are a convenience sample, chosen by clinic staff based on inclusion and exclusion criteria. A total of 11 participants were enrolled in the study by May 2019. Inclusion criteria included being members of Regional Health System, must be followed by a cardiologist at Regional cardiology clinic, aged 50 years or older, have a known diagnosis of HF, be capable of using device equipment or in the care of caregiver who can perform duties, weight maximum of 400 pounds, proficiency in English language, working telephone, and must be agreeable to study requirements.

Additional project participants were those whom the communication protocol was designed for, including the Regional cardiology clinic RN and two part-time RNs who responded to alerts when the primary RN was unavailable. The Regional Health System HF coordinator reviewed and endorsed the communication protocol but did not use it directly. The protocol

design encompassed RN scope of practice and was approved by the Regional Health System HF coordinator who managed the remote telemonitoring program.

Setting

The STS protocol was implemented at the Regional cardiology clinic which was the primary site of the remote telemonitoring research study. At the time of project implementation, The Regional Health System cardiology clinic was a newly acquired out-patient clinic which focused on cardiovascular health and disease. The office is located on the Regional Health System campus, in the medical office building. The cardiology clinic served patients residing in Vancouver and SW Washington, including Camas, Battle Ground and Ridgefield. The population is primarily white (82.2%), 16.4% Hispanic/Latino, 2.2% black or African American, 5% Asian. A growing portion of Clark County population is foreign born (16.4%) with a small sub-population of "Slavs" (Legacy Salmon Creek Medical Center, 2018).

According to 2017 data, 9.3% of population is living in poverty and over 15% of households received SNAP benefits. 92% of adults in Clark County have at least a high school diploma and 26.9 have at least a four-year college degree (Legacy Salmon Creek Medical Center, 2018).

Intervention

In order to address the lack of standardization of STS delivery in the remote telemonitoring program, we designed a communication protocol to be used when RN responds to alerts generated by patient data that exceeded predetermined thresholds or when data was not received by at-home devices.

Data alerts were categorized as either "yellow", "red", or "no device reading". Yellow alerts were generated when patient weight or blood pressure was only slightly above

predetermined setpoints. Red alerts were generated when weight or blood pressure exceeded threshold. Alerts were also created when the at-home devices did not receive data by a pre-set time each day. The thresholds and timeframes were unique to each study participant.

The STS protocol included a suggested telephone greeting, questions related to proper use of devices, proper attire when using devices, education about traveling with devices, inquiry about other individuals who may have access to devices and troubleshooting device use and malfunctions. Questions related to HF exacerbation symptoms, such as increased shortness of breath, edema, orthopnea, activity tolerance, changes in diet or sodium intake, medication adherence, oliguria or polyuria, chest pain or pressure, fluid intake and daily recordkeeping of vital signs were also included (see appendix A).

The protocol was organized into categories of pre-assessment and assessment questions and interventions. The pre-assessment portion was further divided into clinical and non-clinical sections to help RN organization and thoroughness. These categories mirrored the clinical judgment process and ensured complete information gathering, accurate decision making and appropriate intervention in a step-wise fashion.

Implementation

Implementation began in April 2019 after IRB approval. First recorded RN use of protocol occurred at the end of May 2019. The RNs were provided with copies of the STS protocols for weight and blood pressure, with requests to record each time the protocol was initiated and any feedback regarding efficacy. Weekly check-ins with the RN were attempted to assess use, RN satisfaction and to identify any necessary modifications. After the first month of implementation, it was determined RNs did not need to record each instance of use, as this information could be gathered through retrospective review of notes recorded in response to data

alerts. An updated protocol was created with modifications to more fully capture data alert scenarios. The RNs were invited to use the updated version, however, the initial version remained in use.

Evaluation Plan

Retrospective data collection was used to assess the number of alerts generated, RN response to alerts via notes recorded in the on-line portal message center, note content and patient engagement in self-care activities (as evidenced by fewer incidences of data exceeding threshold). RN fidelity to intervention was assessed based on note content.

Post-project RN satisfaction was assessed during a phone meeting. The meeting discussed attitudes regarding protocol use, RN understanding of standardized STS and satisfaction with protocol. Clinical outcomes were assessed using retrospective data collection looking number of alerts generated post protocol implementation.

Results

Data was collected through retrospective review totaling the number "red" alerts generated each day for BP and weight readings over a 10-week period. "Yellow" alerts were excluded from data collection as they did not consistently trigger protocol use. "No device reading" alerts were included in the total, as these alerts could indicate the patient has failed to use their devices properly. The number of notes recorded by RN and content of the notes were analyzed for evidence of protocol use. Note content was categorized by inclusion of protocol use, no protocol use, or partial use. Partial use was defined as a note generated by RN in which there was no direct patient contact but evidence of electronic medical record review of weight and/or BP trends and acknowledgement of the alert in note content. Example partial use note: "Weight trending down overall, no need to contact patient. Will continue to monitor". Notes

categorized as “no protocol use” reflect situations in which patients were enrolled in remote telemonitoring study but had not yet received the devices (therefore triggering “no device data” alerts) or if a patient was awaiting a replacement device due to damage or malfunction. Example no protocol use note: “Device hub not delivered”.

Frequency statistics were used to analyze the total number of patient data alerts over the 10-week period and incidence of protocol use over the same time period. Descriptive statistics were run to analyze factors that impacted alert response and notes recorded. These factors included clinic closure (weekends and holidays) and primary clinic RN day out of clinic (typically Tuesdays).

There was a total of 495 alerts and a total of 146 notes recorded between May 17, 2019 to July 19, 2019. Alerts generated when patient devices were not yet delivered totaled 92, with 33 corresponding notes indicating “device not delivered”. A breakdown of the factors which impacted alert response and notes recorded are depicted in the following table.

Number of notes identified as “device not delivered”	12
Number of days the clinic was closed (weekends & holidays)	19
Number of weekdays primary RN not in clinic (Tuesdays)	9
Number of alerts when clinic closed	134
Number of notes when clinic closed	22
Number of alerts when primary RN not in clinic	87
Number of notes when primary RN not in clinic	26

Of the 495 total alerts generated, 269 of those alerts occurred during regular clinic hours and were generated in response to patient BP or weight exceeding predetermined thresholds (“red” alerts). There were 101 notes recorded in response to red alerts during regular clinic hours, indicating 37.5% fidelity to protocol use. See appendix B for breakdown of alert type.

Discussion

The purpose of the project was to standardize the delivery of STS to HF patients participating in a remote telemonitoring program and engage patients in at-home HF self-care. Development and use of a communication protocol sought to ensure RN collection of complete data sets, asking of pertinent and relevant questions and proper assessment of patient self-care activities. Further, this project added to the existing literature which lacked a detailed descriptions of STS content.

The goal at initiation was 80% fidelity to intervention. Based on the data, actual fidelity to protocol was 37.5%. There were significant factors which contributed to the failure to reach goal, most notably the clinic RN's workload and workflow. Throughout the implementation process, the primary RN encountered competing responsibilities between the telemonitoring program and regular clinic duties. These factors limited the frequency in which the RN responded to alerts and the number of notes recorded. RN clinic work responsibilities had little variation over the 10-week period. This factor may explain why the number of notes remained consistent over the 10-week period despite the number of alerts decreasing in frequency (see appendix C).

The primary clinic RN did report the protocol to be helpful, although she noted that as time progressed, she referenced the protocol less frequently as she became more familiar with protocol elements and as she gained familiarity with patient-specific behaviors which may have triggered the alert. The protocol was designed for instances when patient data *exceeded* predetermined thresholds at the upper limit. However, in certain instances patient data triggered an alert for crossing the lower limit of the threshold. The protocol did not include elements to assess for this situation.

The number of alerts decreased over the 10-week period. This observation may signify evidence of behavior change among study participants. As time progressed it is likely patients gained better understanding of HF self-care activities and modified those behaviors which triggered an alert, thereby contributing to fewer alerts. The decline in alert frequency over time could also indicate fewer device malfunctions and/or complete delivery of device kits to all study participants. Further, fewer alerts could suggest tighter BP and weight control through adapting and adjusting treatment plans throughout the study.

Implications for Practice

Failure to attain the goal 80% fidelity to protocol does not necessarily indicate protocol failure. Rather, the failure to reach goal was influenced by a number of factors, most notably RN engagement in project. RN fidelity to tool was only one measure of protocol success.

There were numerous variables impacting number of patient alerts over time and it was difficult to determine which factors which contributed to the decrease in alert frequency. It can be inferred that RN-provided education delivered via STS contributed to this decrease as STS helps patients learn how to successfully manage HF at home. Acquired knowledge through telephone interactions helps patients avoid behaviors that result in increased BP or weight, thereby resulting in fewer incidences of data triggering alerts over time. Therefore, the inclusion of STS as part of remote telemonitoring programs is recommended to improve patient engagement in at- home HF self-care activities. Additional implications for practice include anticipation of barriers that impede successful implementation. Clinic culture and readiness for change are integral components to ensuring stakeholder buy-in and engagement. A microsystem assessment is recommended to uncover the clinic milieu and aide the project manager in developing an appropriate implementation timeline. If it is determined that the clinic is ready to

participate in the protocol use, it is recommended to interact with key stakeholders early and often to empower stakeholders to use the protocol and provide input regarding usefulness and efficacy.

Lessons Learned

1. Assess clinic culture and readiness for change prior to implementation. The remote monitoring program was initiated at the Regional Health System cardiology clinic at a time when the clinic was undergoing an institutional affiliation change. The affiliation change resulted in an increased patient panel, which lead to the hiring of new providers and staff to accommodate the increase. The clinic culture reflected the uncertainty and pressure associated with a large increase in patient load and unfamiliar coworkers. This significant change in workflow and workload made implementation of the remote monitoring program difficult as staff felt they did not have the time take on additional responsibilities. The staff's resistance to take on the additional work associated with the remote monitoring program carried over created challenges during the STS protocol implementation process.
2. Top-down initiation of practice change creates resistance. Top-down project management is based on hierarchical structure in which decisions come from administrators in upper management and staff are expected to comply with the decisions. This approach fails to consider the limitations of staff involved in project carry-out. The decision to implement the remote telemonitoring program was made without seeking input from the cardiology clinic staff. Including all team members in decisions which affect their workload and workflow helps to reduce resistance to change.

3. Confirm stakeholder engagement and buy-in prior to implementation. The primary stakeholder in STS protocol DNP project was the primary clinic RN. RN engagement and buy-in was necessary for effectiveness of the intervention. The protocol was designed to *reduce* the workload and *improve workflow* for the clinic RN. However, because the RN felt overwhelmed by the responsibility of managing patient alerts, incorporating the protocol into practice was seen as an additional commitment and therefore initially disregarded.
4. Personal leadership style impacts stakeholder engagement. In developing a leadership style that best suits one's individual personality, it is important to remain flexible. Leadership style should align with project goals while simultaneously meeting the needs of stakeholders. Adapting leadership style to the unique requirements of the project team helps ensure successful implementation.
5. Patient needs will drive telephone communication and engagement in self-care activities. STS is an evidenced based intervention in the form of remote patient management provided through structured telephone contact between patients and health-care providers and a reporting of symptoms and/or physiological data. Telephone encounters range from attempts to engage and motivate patients in self-care activities to early intervention of worsening symptoms. Variation in individual patient situations inevitably leads to unexpected and unpredictable telephone encounters. STS offers a unique type of compassionate healthcare in which patients feel supported by the individual attention of a telephone call, while presenting an opportunity for providers to manage health remotely. When patients are contacted regarding concerning vital signs or symptoms, they often express gratitude for the personal attention to their care.

Limitations

Due to the presence of numerous variables with the potential to affect alert patterns and note generation, it is impossible to determine the true cause of the decline in alert frequency over time. One strategy to eliminate this uncertainty would be to compare the number of alerts of a control group against an intervention group. The comparison would offer insight into the effect of the protocol assuming all other variables were controlled for.

The remote telemonitoring study was initiated by upper management at the Regional Health System medical center. The study timeline was developed without input from the cardiology clinic staff, yet expectations to carry out study requirements remained unchanged after clinic staff expressed concerns about workload and competing responsibilities. The necessity to move forward with project implementation despite the clinic RNs resistance to participate, created barriers to successful implementation. If the implementation timeline had been better suited to clinic needs, it is likely that fidelity to protocol use have been closer to the desired goal.

Research supporting the efficacy of STS fails to include recommended content of telephone interactions. Without standardization of STS content, it is difficult to determine exactly what language is most effective in influencing patient behavior. Due to the lack of evidence-based recommendations for STS content, conclusions cannot be made regarding the true efficacy of the protocol.

Conclusion

An STS protocol is recommended as part of remote telemonitoring program. RN- patient telephone interactions are an essential component of at-home HF self-management. Standardized delivery of STS provides assurance that each telephone interaction includes

education, encouragement and intervention as appropriate. Initiating the implementation process at time that best aligns with the needs of the clinic is recommended to ensure stakeholder engagement. Inclusion and consideration of staff input can help the project manager develop an implementation plan that best supports project goals. Suggestions for future development and implementation of STS protocols include ensuring stakeholder buy-in prior to implementation thorough maintaining an active presence throughout the project and developing strong relationships with key project participants.

References

Díez-Villanueva, P., & Alfonso, F. (2016). Heart failure in the elderly. *Journal of geriatric cardiology: JGC*, *13*(2), 115–117. doi:10.11909/j.issn.1671-5411.2016.02.009

Gardetto N. J. (2011). Self-management in heart failure: where have we been and where should we go?. *Journal of multidisciplinary healthcare*, *4*, 39–51. doi:10.2147/JMDH.S8174

Inglis, S.C., Clark, R.A., Dierckx, R., Prieto-Merino, D. & Cleland, J.GF. (2015). Structured telephone support or non-invasive telemonitoring for patients with heart failure. *Cochrane Database of Systematic Reviews*, *2015*(10). 1-185. doi: 10.1002/14651858.CD007228.pub3.

Kulshreshtha, A., Kvedar, J.C., Goyal, A., Halpern, E.F. & Watson, A.J. (2010). Use of remote monitoring to improve outcomes in patients with heart failure: A pilot trial. *International Journal of Telemedicine and Applications*, *2010*, 870959. doi:10.1155/2010/870959

Riegal, B., Dickson, V.V. & Faulkner, K.M. (2016). The situation-specific theory of heart failure self-care: Revised and updated. *The Journal of Cardiovascular Nursing, 31*(3). 226-235. doi:10.1097/JCN.0000000000000244

Townsend-Gervis, M., Cornell, P. & Vardaman, J.M. (2014). Interdisciplinary rounds and structured communication reduce re-admission and improve patient outcomes. *Western Journal of Nursing Research, 36*(7). 917-928. doi: 10.1177/0193945914527521

Vardaman, J.M., Cornell, P., Gondo, M.B., Amis, J.M., Townsend-Gervis, M. & Thetford, C. (2012). Beyond communication: The role of standardized protocols in a changing health care environment. *Health Care Management Review, 37*(1). 88-97. doi: 10.1097/HMR.0b013e3182fa503.

Zavertnik, J.E. (2014). Self-care in older adults with heart failure: An integrative review. *Clinical Nurse Specialist, 28*(1). 19-32. doi: 10.1097/NUR.0000000000000021

Ziaeian, B. & Fonarow, G.C. (2016). The prevention of hospital readmissions in heat failure. *Progressive Cardiovascular Diseases, 58*(4). 379-385. doi: 10.1016/j.pcad.2015.09.004.

Appendix A

Structured Telephone Support Protocol related to changes in Blood Pressure (BP)

Preassessment

Think about possible reasons for breaks in threshold (non-clinical):

- Did not take BP
- Did not take BP by predetermined time
- Wearing thick clothing on upper extremities
- Took BP too soon after activity
- Unauthorized person used BP cuff
- Inaccurate baseline BP
- BP cuff malfunction
- On vacation/away from home (did not take BP cuff)
- Failure to sync device with hub
- Other: fill in reason

Possible reasons for breaks in threshold (clinical):

- Missed dose or incorrect dose antihypertensive medication
- High sodium intake
- Dehydration
- ETOH intake
- Tobacco use prior to using BP cuff
- Worsening cardiac function
- Other illness

Structured Telephone Support Protocol related to changes in Blood Pressure (BP)

Greeting: Hello, my name is _____ and I am health care provider calling from Legacy Medical Group Cardiology. I'm calling to see how you are doing because [some information is missing on our dashboard] and/or [I noticed your BP was out of range]. Is now a good time to talk?

Questions to Ask	Patient Response
How are you feeling today?	
Are you taking you BP each day?	
Tell me about how you are taking your BP?	
What are you wearing when you check your BP?	
What time are you using the BP cuff?	
Does anybody else in your house use the cuff?	
Where is the hub when you are using your cuff?	
Have you been on vacation or away from home when checking your BP?	
Have you been recording your BP in a log?	

Ask About...	Patient Response
Symptoms related to BP status (headache, blurred vision, dizziness, lightheadedness)	
If they are experiencing chest pain or pressure	
Does the patient take medication for thyroid function? If yes, ask about last thyroid function check and medication use.	
Tobacco use. BP is transiently elevated after ingestion of tobacco/nicotine	
Activity tolerance	
Presence of edema	
Sodium intake	
Fluid intake/Urinary Output	
Medication adherence	
Recent or current illness	

Structured Telephone Support Protocol related to changes in Weight

Preassessment

Think about possible reasons for breaks in threshold (non-clinical):

- Did not use scale
- Did not use scale before predetermined time
- Wearing too many/different clothes
- Unauthorized person used scale
- Inaccurate baseline weight
- Scale malfunction
- On vacation/away from home (did not take scale)
- Failure to sync device with hub

Possible reasons for breaks in threshold (clinical):

- Missed dose or incorrect dose of diuretic
- High sodium intake
- High fluid or ETOH intake
- Worsening cardiac function
- Other illness

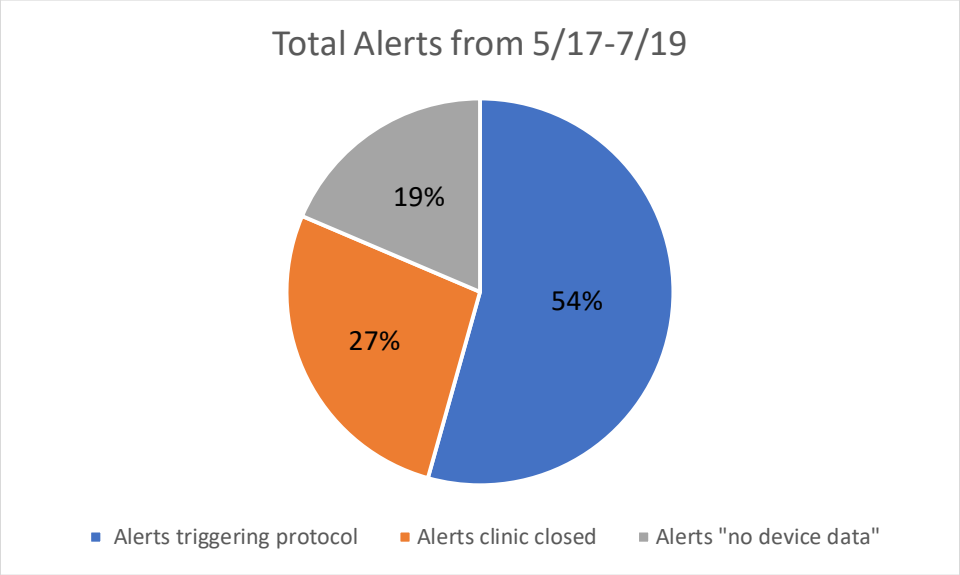
Structured Telephone Support Protocol related to changes in Weight

Greeting: Hello, my name is _____ and I am health care provider calling from Legacy Medical Group Cardiology. I'm calling to see how you are doing because [some information is missing on our dashboard] and/or [I noticed your weight was out of range]. Is now a good time to talk?

Questions to Ask	Patient Response
Are you weighing yourself every day?	
What are you wearing when you weigh yourself?	
What time are you weighing yourself?	
Is anyone other than you using scale?	
How close is the scale to the hub?	
Did you go on vacation? If yes, did you take your scale?	
Are you writing your weight on the weight log?	
Have you been ill lately?	

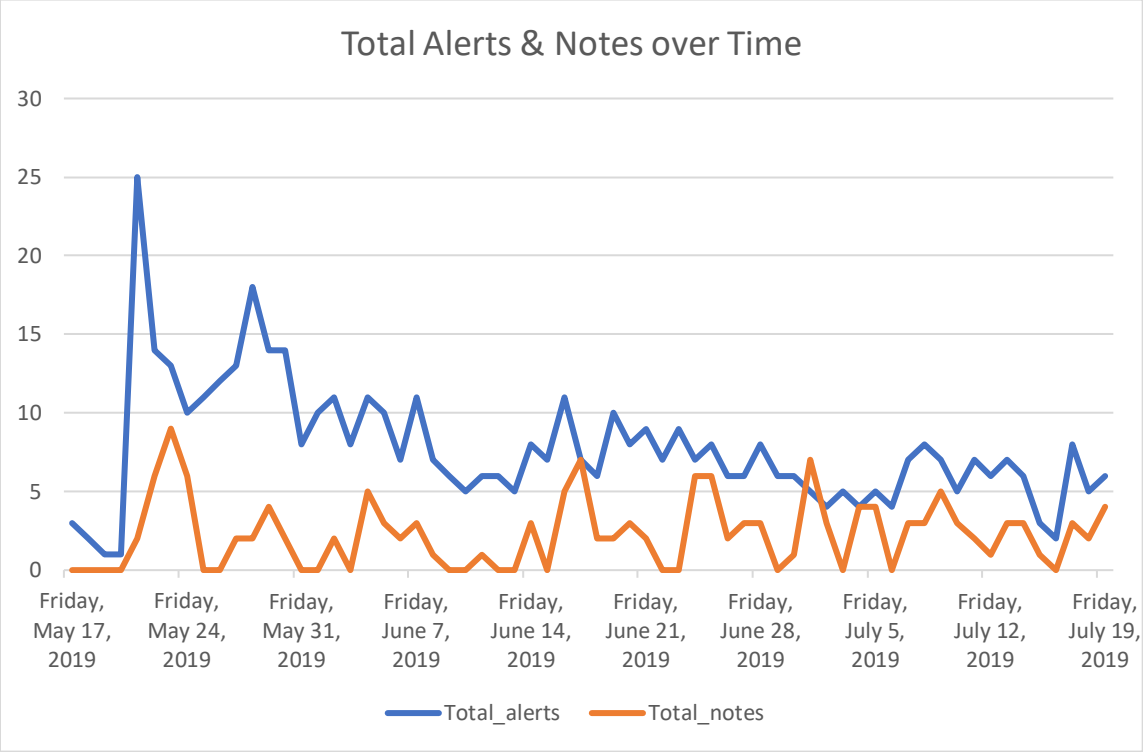
Ask About...	Patient Response
Respiratory status (increased SOB, change in use of home O2, cough/wheeze)	
Increase edema (lower extremities, abdominal, scrotal)	
Chest pain or pressure	
Orthopnea	
Activity tolerance	
Dizziness/lightheadedness	
Sodium intake	
Fluid intake/ Urinary Output	
Medication adherence	
Recent or current illness	

Appendix B



Total alerts between May 17, 2019 to July19, 2019: 495 alerts
Total notes recorded between May 17, 2019 to July19, 2019: 146
Factors impacting alert response / notes recorded:
Number of times identified as 'device not delivered': 12
Number of days the clinic was closed (weekends & holidays): 19
Number of days primary RN not in clinic (Tuesdays): 9
Clinic Closed:
Number of alerts when clinic closed: 134
Number of notes when clinic closed: 22
Primary RN not in Clinic:
Number of alerts when pRN not in clinic: 87
Number of notes when pRN not in clinic: 26
Device not delivered:
Number of alerts when 'device not delivered': 92
Number of notes when 'device not delivered': 33

Appendix C


Total Alerts & Notes over Time
30
25
20
15
10
5
0
Friday, May 17, 2019
Friday, May 24, 2019
Friday, May 31, 2019
Friday, June 7, 2019
Friday, June 14, 2019
Friday, June 21, 2019
Friday, June 28, 2019
Friday, July 5, 2019
Friday, July 12, 2019
Friday, July 19, 2019
Total_alerts
Total_notes