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Letter of Transmittal & Cover

Rawlings Regional Medical Center
7500 Bannock Avenue
Rawlings, MT 59211

Date: December 14, 2018
To: Jill Bremerton, M.D.
Chief Executive Officer
Raw

Letter or memo

From: Jere
Eloise Carruthers, Director of Nursing
Rawlings Regional Medical Center
Subject: Recommendation Report for the Tablet Study at RRMC

Attached is the report for our study, "Selecting a Tablet Computer for the Clinical Staff at Rawlings Regional Medical Center: A Recommendation Report." We completed the ta
Purpose
our proposal of October 6, 2018: familiarizing ourselves clinical staff in hospitals across the country, assessing RRMC clinical staff's knowledge of and attitudes toward tablet use, studying different models for administering tablet use, determining the criteria by which we might evaluate tablets, and performing the evaluations.

To carry out these tasks, we performed secondary and primary research. We studied the literature on
Methods
ed a questionnaire to RRMC clinical staff who own ewed Dr. Bremerton. Then, we collected and analyzed our data and wrote the report.

Our main findings are that the clinical staff who already own tablets are very receptive to the idea of using tablets in a clinical setting and slightly prefer having the hospital su
Principal findings
, too, think the hospital-supplied model is preferable own-device (BYOD) model. Although the best ta would be those designed and built for health-care app too expensive for our budget. Because reports on the technical characteristics of computer products are notoriously unreliable, we cannot be sure whether the many

general-purpose tablets can meet our standards for ease of disinfection or durability, and we are not sure whether they have sufficient battery life.

- We recommend one of two courses of action: reconsidering the cost criterion or tes blets for disinfection ar clinical staff try them out.

Recommendation

- We appreciate the trust you have shown in inviting us to participate in this phase of the feasibility study, and we would look forward to working with you on any follow-up activities. If you have any questions or comments, please contact Jeremy Elkins, at jelkins@rrmc.org or at 444-3967, or Eloise Carruthers, at ecarruthers@rrmc.org or at 444-3982.

Front Matter

Title Page & Abstract

Selecting a Tablet Computer for the Clinical Staff at Rawlings Regional Medical Center: A Recommendation Report

Prepared for: Jill Bremerton, M.D.
Chief Executive Officer
Rawlings Regional Medical Center

Prepared by: Jeremy Elkins, Director of Information Technology
Eloise Carruthers, Director of Nursing

December 14, 2018

Rawlings Regional Medical Center
7500 Bannock Avenue
Rawlings, MT 59211

Abstract

"Selecting a Tablet Computer for the Clinical Staff at Rawlings Regional Medical Center: A Recommendation Report"

Prepared by: Jeremy Elkins, Director of Information Technology
Eloise Carruthers, Director of Nursing

On October 8, 2018, Dr. Jill B[remerton], Chief Executive Officer of Rawlings Regional Medical Center (RR[MC]), asked [me], by Jeremy Elkins (Director of Information Tech[nology]) and Eloise Carruthers (Director of Nursing) to carry out a feasib[ility study] of using tablet computers into the RRMC clinical setting and to report their findings. The authors began by performing research [on] how tablets are being used by clinical staff in hospi[tals]. Then, they assessed RRMC clinical staff attitudes toward tablet use, studied two models for administering use of tablets in hospitals, determined the criteria by which tablets might be evaluated, and performed the evaluations. RRMC clinical staff who already own tablets are very receptive to the idea of using tablets in a clinical setting an[d prefer that] the hospital supply the tablets. The best tablets f[or us are] designed and built for health-care applicat[ions, meet] hospital standards for disinfection, are durable, [have] ware and software options, such as barcode scanners, RFID readers, speech input, and smart-card readers. Unfortunately, they are too expensive for our budget. Because there are numerous health-care apps available for not only the iPad but also the ma[ny Android tablets and Windows-based tablets], any of these that meet [our criteria]. However, we are not sure whethe[r they] meet our standards for ease of disinfection or ruggedness, and we are not sure whether they have sufficient battery life. We recommend that, if we cannot reconsider the cost criterion, we test a representative sample of general-purpose tablets for disinfection and the other technical characteristics that would affect their usefulness in the clinical setting.

Keywords: tablets, health car[e], Android, Windows, rugged, durability

Purpose & context

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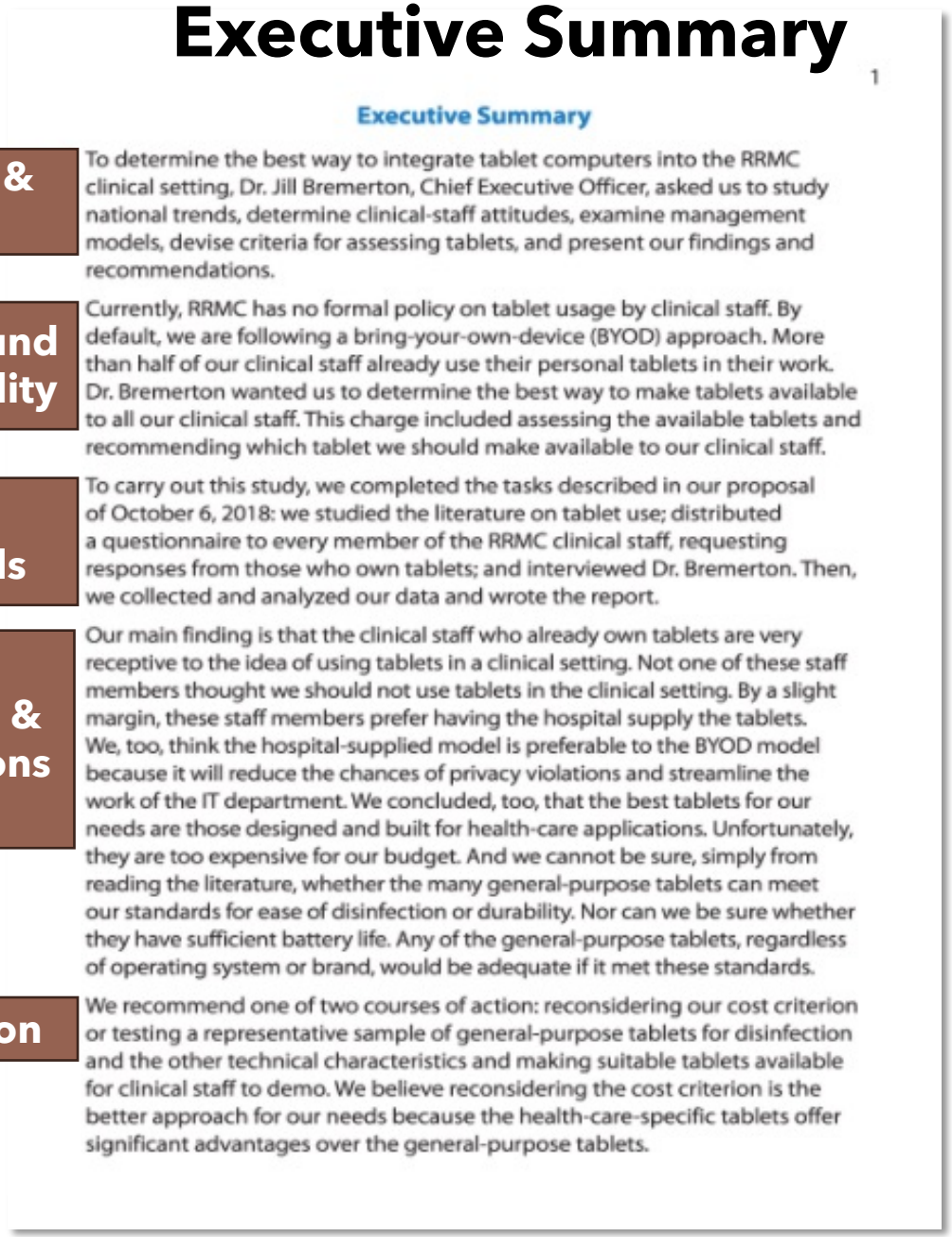

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Executive Summary

Subject & Scope

To determine the best way to integrate tablet computers into the RRMC clinical setting, Dr. Jill Bremerton, Chief Executive Officer, asked us to study national trends, determine clinical-staff attitudes, examine management models, devise criteria for assessing tablets, and present our findings and recommendations.

Background & feasibility

Currently, RRMC has no formal policy on tablet usage by clinical staff. By default, we are following a bring-your-own-device (BYOD) approach. More than half of our clinical staff already use their personal tablets in their work. Dr. Bremerton wanted us to determine the best way to make tablets available to all our clinical staff. This charge included assessing the available tablets and recommending which tablet we should make available to our clinical staff.

Brief methods

To carry out this study, we completed the tasks described in our proposal of October 6, 2018: we studied the literature on tablet use; distributed a questionnaire to every member of the RRMC clinical staff, requesting responses from those who own tablets; and interviewed Dr. Bremerton. Then, we collected and analyzed our data and wrote the report.

Findings & conclusions

Our main finding is that the clinical staff who already own tablets are very receptive to the idea of using tablets in a clinical setting. Not one of these staff members thought we should not use tablets in the clinical setting. By a slight margin, these staff members prefer having the hospital supply the tablets. We, too, think the hospital-supplied model is preferable to the BYOD model because it will reduce the chances of privacy violations and streamline the work of the IT department. We concluded, too, that the best tablets for our needs are those designed and built for health-care applications. Unfortunately, they are too expensive for our budget. And we cannot be sure, simply from reading the literature, whether the many general-purpose tablets can meet our standards for ease of disinfection or durability. Nor can we be sure whether they have sufficient battery life. Any of the general-purpose tablets, regardless of operating system or brand, would be adequate if it met these standards.

Recommendation

We recommend one of two courses of action: reconsidering our cost criterion or testing a representative sample of general-purpose tablets for disinfection and the other technical characteristics and making suitable tablets available for clinical staff to demo. We believe reconsidering the cost criterion is the better approach for our needs because the health-care-specific tablets offer significant advantages over the general-purpose tablets.

- **Background**
- **Backup research**
- **Conclusions & Recommendations**

Introduction

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Context

Your task

Method overview

Principal findings

Introduction

To determine the best course of action for integrating tablet computers into the RRMC clinical setting, Dr. Jill Bremerton, RRMC Chief Executive Officer, asked us to study national trends, determine clinical-staff knowledge of and attitudes toward tablets, examine administrative models for tablet use, devise criteria for assessing tablets, and present our findings and recommendations.

Currently, RRMC has no formal policy on tablet usage by clinical staff. By default, we are following a bring-your-own-device (BYOD) approach. More than half of our clinical staff use their personal tablets in their work. This situation is not ideal because not all clinical staff are taking advantage of the enormous potential for improving patient care and reducing costs by using tablets, and IT is struggling to keep up with the work needed to ensure that all the different tablets are working properly and that any information-security protocols required by HIPAA and the current care laws are not being violated.

Therefore, Dr. Bremerton wanted us to determine the best way tablets available to all our clinical staff. Specifically, Dr. Bremerton asked us to perform five tasks:

- Determine how tablets are being used by clinical staff across th We performed secondary research to complete this task.
- Determine the RRMC clinical staff's current knowledge of and at toward tablet use. To complete this task, we wrote and distribut survey to clinical staff who already own tablets.
- Determine how hospitals administer the use of tablets in a clini setting. We performed secondary research to complete this task
- Establish criteria by which we might evaluate tablets for RRMC. performed secondary research to complete this task. In additio we interviewed Dr. Bremerton for her suggestions about the mo important criterion.
- Assess available tablets based on our criteria. We performed sec research to complete this task.

We found that tablet use in clinical settings is increasing quickly, a clinical staff are finding many ways to use tablets to improve care save time and money. Among the clinical staff at RRMC who alrea

tablets, nearly half own an iPad and nearly half an Android tablet, most consider themselves expert users of their tablets, and more than two-thirds already use them in the clinical setting; by a slim margin, they would prefer a hospital-supplied model for tablet use to a BYOD model. Our research on the two models for making tablets available also found more advantages and fewer disadvantages to the hospital-supplied model.

Our principal finding regarding tablets themselves is that the best tablets for our use would be those designed and built for health-care applications. These tablets are rugged and easy to disinfect, and they offer a wealth of hardware and software options that would streamline our daily tasks without introducing any risks either to patient care or to data privacy. Unfortunately, purchasing enough of these tablets for all clinical staff would exceed our budget. To determine whether any of the general-purpose tablets meet all our needs, we would need to conduct hands-on testing regarding disinfection, battery life, durability, and several other technical criteria.

We recommend, first, that we reassess whether the budget will p consideration of any of the health-care-specific tablets. If that is possible, we recommend that we ask manufacturers of a small set of general-purpose tablets to let us test their products and invite our clinical staff to demo them. This option would yield data that would help us decide how to proceed.

In the following sections, we provide additional details about our research methods, the results we obtained, the conclusions we drew from results, and our recommendation.

Recommendation

Organizer

Methods

Body

Research Methods

We began our research by interviewing Dr. Bremerton, who emphasize that we need to maintain our focus on our priorities—patient care and service to the community—and not let technical questions about the tablets distract us from the needs of our clinical staff. "We're not going do anything without the approval of the doctors and nurses," she said.

Early on in our research, we discovered an article that corroborated what Dr. Bremerton had told us (Narisi, 2013). Two keys to doing the research were to focus on security features—data-privacy issues mandated in HIPAA and in current health care laws—and to get the clinical staff's input.

To perform the analysis requested by Dr. Bremerton, we broke the project into six tasks:

1. acquire a basic understanding of tablet use by clinical staff across the nation
2. determine the RRMC clinical staff's knowledge of and attitudes tow tablet use
3. assess the BYOD and hospital-owned tablet models
4. establish criteria for evaluating tablets
5. assess available tablets based on our criteria
6. analyze our data and prepare this recommendation report

In the following discussion of how we performed each task, we explain reasoning that guided our research.

Task 1. Acquire a basic understanding of tablet use by clinical staff across the nation

Dr. Bremerton pointed us to a number of resources on tablet use in clinical settings. In addition, we conducted our own literature review. Most of the research we studied fell into one of four categories:

- general introductions to tablet use in trade magazines and general-interest periodicals
- more-focused articles about tablets used in health care
- technical specifications of tablets provided in trade magazines and o manufacturers' websites
- trade-magazine articles about best practices for managing the use o tablets in clinical settings

Proposal's tasks organization

Logic of the methods

Back matter reference

s we expected, the information we acquired was a mix of user opinions, enchmark-test results, and marketing. We relied most heavily on case tudies from hospital administrators and technical specialists in health IT. ecause of the unreliability of information on manufacturers' websites, we ere hesitant to rely on claims about product performance.

Task 2. Determine the RRMC clinical staff's knowledge of and attitudes toward tablet use

On October 14, 2018, we sent all 147 clinical staff members an email linking to a four-question Qualtrics survey. The email indicated that we were seeking opinions about tablet use by clinical-staff members who already own tablets and made clear that the survey would take less than two minutes to complete.

itially, we considered collecting data from all 147 clinical staff members. owever, as we constructed that survey, we realized that it would be umbersome to gather and track information from three different opulations: those who didn't own a tablet, those who owned one but idn't use it in the clinic, and those who owned one and did use it in the linic. Eliciting information from these different groups would require a ong, complex questionnaire and some statistical analysis to separate out he attitudes.

or this reason, we decided to address only the tablet owners, since we assumed that this group would constitute approximately two-thirds of the clinical staff (Drinkwater, 2013). With this streamlined focus, we were able to create a very brief survey, one that would likely yield a high return rate. We assumed, too, that the opinions expressed by current tablet owners would likely be of more value in helping us plan a formal program of tablet use than those of clinicians who were less likely to be experienced tablet users.

We field-tested the questionnaire with six clinical staff members, revised one of the questions, and then, with the authorization of Dr. Bremerton, uploaded the questionnaire to Qualtrics and sent an email to the clinical staff.

The questionnaire (including the responses) appears in the Appendix, page 19.

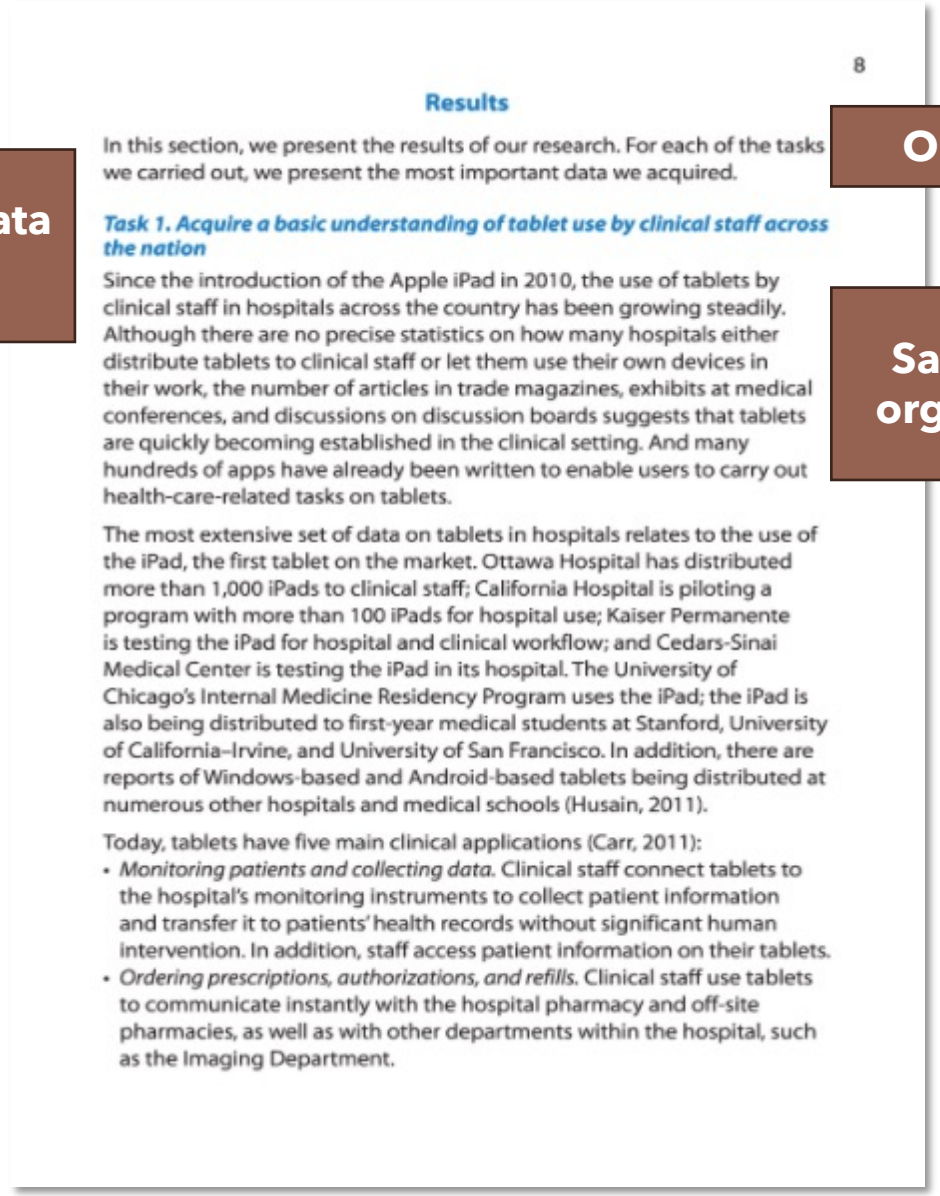
Results

Body

Objective data reporting

Organizer

Same tasks organization



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Results

In this section, we present the results of our research. For each of the tasks we carried out, we present the most important data we acquired.

Task 1. Acquire a basic understanding of tablet use by clinical staff across the nation

Since the introduction of the Apple iPad in 2010, the use of tablets by clinical staff in hospitals across the country has been growing steadily. Although there are no precise statistics on how many hospitals either distribute tablets to clinical staff or let them use their own devices in their work, the number of articles in trade magazines, exhibits at medical conferences, and discussions on discussion boards suggests that tablets are quickly becoming established in the clinical setting. And many hundreds of apps have already been written to enable users to carry out health-care-related tasks on tablets.

The most extensive set of data on tablets in hospitals relates to the use of the iPad, the first tablet on the market. Ottawa Hospital has distributed more than 1,000 iPads to clinical staff; California Hospital is piloting a program with more than 100 iPads for hospital use; Kaiser Permanente is testing the iPad for hospital and clinical workflow; and Cedars-Sinai Medical Center is testing the iPad in its hospital. The University of Chicago's Internal Medicine Residency Program uses the iPad; the iPad is also being distributed to first-year medical students at Stanford, University of California–Irvine, and University of San Francisco. In addition, there are reports of Windows-based and Android-based tablets being distributed at numerous other hospitals and medical schools (Husain, 2011).

Today, tablets have five main clinical applications (Carr, 2011):

- *Monitoring patients and collecting data.* Clinical staff connect tablets to the hospital's monitoring instruments to collect patient information and transfer it to patients' health records without significant human intervention. In addition, staff access patient information on their tablets.
- *Ordering prescriptions, authorizations, and refills.* Clinical staff use tablets to communicate instantly with the hospital pharmacy and off-site pharmacies, as well as with other departments within the hospital, such as the Imaging Department.

Conclusions

Body

Organizer

Change of structure

Conclusions

In this section, we present our conclusions based on our research related to the four questions we were asked to answer.

Tablet use by clinical staff

On the basis of our research, we conclude that increasing numbers of our clinical staff will begin to use tablets for more applications in a clinical setting. This increase will spur the creation of more health-care apps for all tablets.

The RRMC clinical staff's knowledge of and attitudes toward tablet use

On the basis of our survey of clinical staff who already own tablets, we conclude that they consider themselves proficient in using the tablets, and most already use them for at least one clinical application. Because they prefer the hospital-supplied model for tablet use, we conclude that they would welcome a formal plan to supply tablets.

The BYOD and hospital-owned tablet models

We conclude that the hospital-owned tablet model offers more advantages and fewer disadvantages than the BYOD model. Having all clinical staff use the same model of tablet saves money by streamlining the process of loading software and installing updates and upgrades. The medical center IT department can even create hospital-specific apps.

Criteria for evaluating tablets

Our first necessary criterion, cost, eliminated all the health-care-specific tablets from consideration, leaving us with only the general-purpose tablets. All the general-purpose tablets we evaluated met our HIPAA and health care law compliance and other security criteria. Unfortunately, because the general-purpose tablets are not designed for clinical settings, we could not determine from our research whether any of them are easy to disinfect. We would need to conduct our own tests to answer that question.

We would need to conduct our own testing to determine whether battery life and durability of any of the general-purpose tablets are acceptable.

Assessing available tablets based on our criteria

We drew two main conclusions from our study of available tablets:

- The best tablets for our use—the ones designed and intended for health-care settings—are out of our price range. Because they meet all our criteria, we should reassess whether our budget will permit us to assess them more carefully.
- Any one of the available general-purpose tablets is potentially acceptable (provided it meets the disinfection criterion). We see no compelling reason to favor one operating system over another. Apple iPads, Android tablets, and Windows tablets all come with acceptable power, and there are plenty of health-care apps available for each type. As Android machines establish their dominance over the iPad, health-care apps for Android devices will surpass those for the iPad in variety and number.

Recommendation

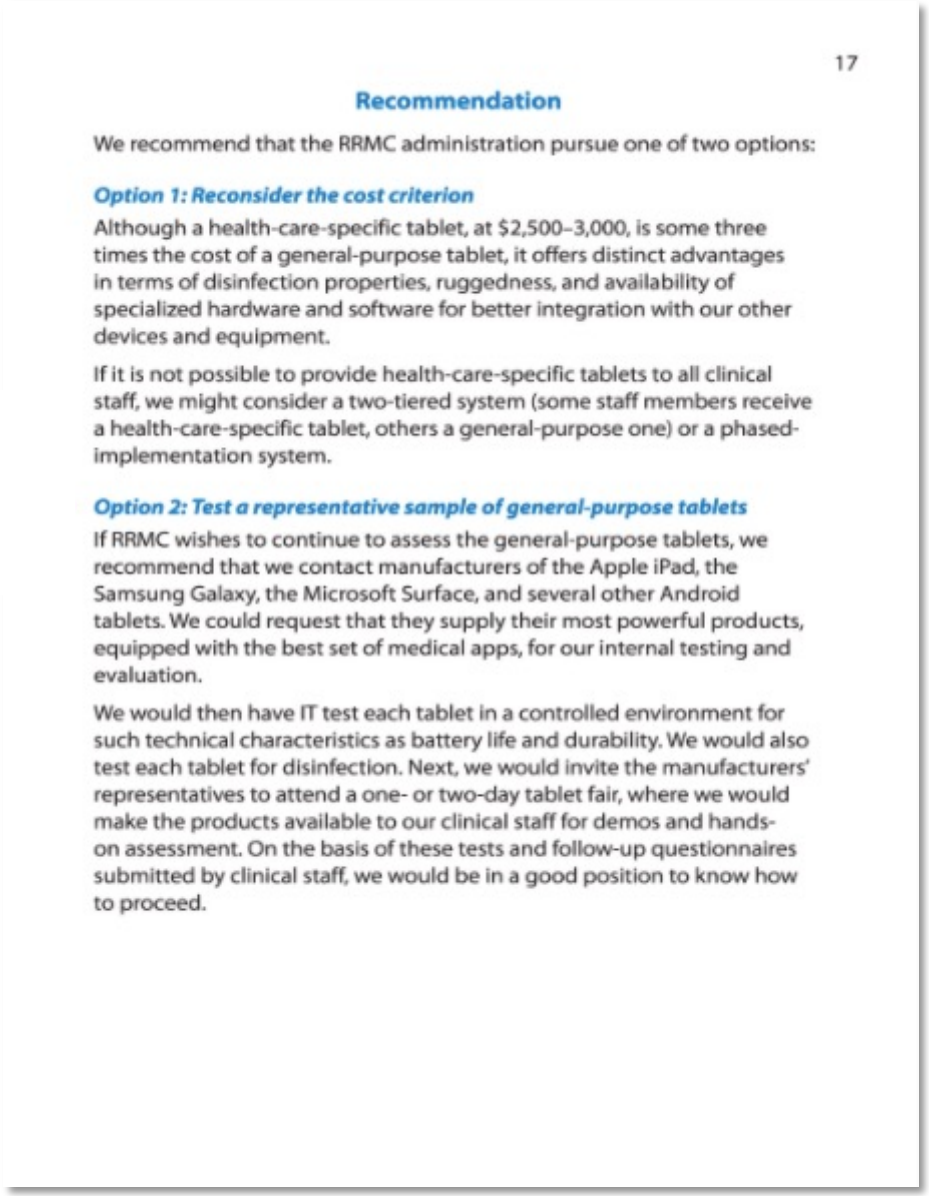
Body

1

Clearly state your recommendations

2

"offer great promise for success"



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Recommendation

We recommend that the RRMC administration pursue one of two options:

Option 1: Reconsider the cost criterion

Although a health-care-specific tablet, at $2,500–3,000, is some three times the cost of a general-purpose tablet, it offers distinct advantages in terms of disinfection properties, ruggedness, and availability of specialized hardware and software for better integration with our other devices and equipment.

If it is not possible to provide health-care-specific tablets to all clinical staff, we might consider a two-tiered system (some staff members receive a health-care-specific tablet, others a general-purpose one) or a phased-implementation system.

Option 2: Test a representative sample of general-purpose tablets

If RRMC wishes to continue to assess the general-purpose tablets, we recommend that we contact manufacturers of the Apple iPad, the Samsung Galaxy, the Microsoft Surface, and several other Android tablets. We could request that they supply their most powerful products, equipped with the best set of medical apps, for our internal testing and evaluation.

We would then have IT test each tablet in a controlled environment for such technical characteristics as battery life and durability. We would also test each tablet for disinfection. Next, we would invite the manufacturers' representatives to attend a one- or two-day tablet fair, where we would make the products available to our clinical staff for demos and hands-on assessment. On the basis of these tests and follow-up questionnaires submitted by clinical staff, we would be in a good position to know how to proceed.

3

Paragraphs or lists

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Recommendation summary also in the executive summary and/or intro

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References

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References

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APA style

You can use a different citation style, but if you do, be consistent throughout the entire document (both in-text citations and references)

Glossary & List of Symbols

Back Matter

Glossary

Applicant: A state agency, local government, or eligible private nonprofit organization that submits a request to the grantee for disaster assistance under the state's grant.

Case Management: A systems approach to providing equitable and fast service to applicants for disaster assistance. Organized around the needs of the applicant, the system consists of a single point of coordination, a team of on-site specialists, and a centralized, automated filing system.

Cost Estimating Format (CEF): A method for estimating the total cost of repair for large, permanent projects by use of construction industry standards. The format uses a base cost estimate and design and construction contingency factors, applied as a percentage of the base cost.

Declaration: The President's decision that a major disaster qualifies for federal assistance under the Stafford Act.

Hazard Mitigation: Any cost-effective measure that will reduce the potential for damage to a facility from a disaster event.

List of Symbols

β	beta
CRT	cathode-ray tube
γ	gamma
Hz	hertz
rcvr	receiver
SNR	signal-to-noise ratio
uhf	ultra-high frequency
vhf	very high frequency

Back Matter

Appendixes

Appendix: Clinical-Staff Questionnaire

This is the questionnaire we distributed to the 147 RRMC clinical staff members. We received 96 responses. The numbers in boldface below represent the percentage of respondents who chose each response.

Questionnaire on Tablet Use at RRMC

Directions: As you may know, Dr. Bremerton is conducting a study to determine whether to institute a formal policy on tablet use by clinical staff.

If you own a tablet device, please respond to the following four questions. Your opinions can help us decide whether and how to develop a policy for tablet use at RRMC. We greatly appreciate your answering the following four questions.

1. Which brand of tablet do you own?
   - **47%** Apple iPad
   - **28%** Samsung Galaxy
   - **9%** Amazon Kindle Fire
   - **6%** Microsoft Surface
   - **10%** Other (please name the brand) **(Respondents named the Asus, Google Nexus, and a Toshiba model.)**

2. "I consider myself an expert user of my tablet."
   Strongly disagree ____ **8%** **2%** **13%** **19%** **58%** Strongly agree

3. Do you currently use your tablet for a clinical application, such as monitoring patients or ordering procedures?
   - **63%** Yes
   - **37%** No

4. If RRMC were to adopt a policy of using tablets for clinical applications (and to supply the appropriate software and training), which response best describes your attitude?
   - **27%** I would prefer to use my own tablet.
   - **38%** I would prefer to use a hospital-supplied tablet.
   - **35%** I don't have strong feelings either way about using my own or a hospital-supplied tablet.
   - **0%** I would prefer not to use any tablet at all for clinical applications.

Thank you!