



OSEHRA

Open Source Electronic Health Record Alliance

Open Source Technical Support and Working Group Services for VA VistA

**Strengths, Weaknesses, Opportunities
and Threats (SWOT) Analysis**



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1. Introduction

1.1. Executive Summary

For the third quarter (Q3) deliverable cycle, a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was performed for the following open source software (OSS) candidates, with the resulting intake recommendations:

- bbClear – Recommend OSEHRA Certification and consideration for intake.
- Veteran Appointment Notification System (VANS) - Recommend OSEHRA Certification and consideration for intake.
- Maternity Tracker – Recommend OSEHRA Certification and consideration for intake.
- Complex Orders “Then” Conjunction – Hold until code becomes available as open source, then proceed with OSEHRA Certification and consideration for intake.
- Patient Search Tool – Recommend OSEHRA Certification and consideration for intake.
- On-the-Fly Alerts – Recommend OSEHRA Certification and consideration for intake.
- Enhanced Problem List – Hold until VHA confirms which, if any, of the three changes included in this enhancement are currently desired.

Three of the candidates in this document (bbClear, VANS, and Maternity Tracker) were included because they were the highest scoring candidates reviewed during the Q3 OSS and Product Selection Criteria analysis. The remaining four candidates (Complex Orders “Then” Conjunction, Patient Search Tool, On-the-Fly Alerts, and Enhanced Problem List) were identified following completion of the OSS and Product Selection Criteria analysis, but were compelling enough to warrant inclusion in the Q3 analysis cycle.

Next steps include developing the Prioritization Description Document for Q3 OSS candidates, which will incorporate additional candidate detail. The SWOT analysis for these candidates may be updated in subsequent quarters as additional information becomes available.

1.2. Overview

The purpose of this document is to provide a SWOT analysis to assess the strengths, weaknesses, opportunities, and threats to VA of OSS and products to be considered for VA VistA intake. The analysis includes an assessment of the candidates, with the highest functional strengths/opportunities and lowest weaknesses/threats in alignment to VistA 4 required functional Feature Sets.

Several factors are critical to the success of the OSS intake process. The emphasis must be on providing business value by filling functional and technical gaps, identifying

applicable OSS, and working with VA to “lay the pathway” for integration of OSS into VistA to fill identified gaps.

2. Approach

To facilitate the SWOT analysis, evaluation criteria were established to objectively assess the strengths/weaknesses and opportunities/threats associated with each OSS candidate. Candidates are assessed as having either a high or low score within each analysis element, then key decisional elements for each candidate are identified. The SWOT analysis table and summary findings for each candidate product are presented in this document.

OSS candidates are reviewed using the Strengths/Weaknesses Dimension Definitions presented in Table 1.

SWOT Dimension	High Score Strength (1-5 Scale, 5 is High)	Low Score Weakness (1-5 Scale, 1 is Low)
Functional Fit with Requirement	Function fills substantive functionality gap and is of value to users.	Function is not needed or is a duplicate of existing functionality.
Technical Fit - Data	Code is a strong fit with data structures in VistA. Implementation would be low-risk in regards to corrupting existing data.	Code is not a fit with data structures in VistA and would require re-architecting to implement.
Technical Fit - API	Code fits well with VistA API structures. Code would integrate with other VistA modules and would be easily callable.	Code is not a fit with API structures in VistA and would require re-architecting to implement.
Code Quality	Code is safe, compliant, and functional. Code is OSEHRA Level certified, fully tested, and highly reliable in providing function / feature. Test documentation is available for certification.	Code has bugs, limited or no documentation, or potentially unreliable. No test documentation is available.
VistA 4 Product Roadmap - Architectural Fit	Code will fit well into existing Roadmap plans and will continue to fit with anticipated evolution of VistA and the Roadmap.	Code will be quickly obsolete or will not work due to planned changes in the Roadmap.
Time-to-Value	Rapid, low-risk implementation. Use of code may be quicker and more valuable than internal development and implementation by VA.	Use will not improve time-to-value and may actually decrease time-to-value in VA overall due to implementation complexity / risk or other issues.

Table 1. Strengths/Weaknesses Dimension Definitions

OSS candidates are reviewed using the Opportunities/Threats Dimension Definitions presented in Table 2.

SWOT Dimension	High Score Opportunity (1-5 Scale, 5 is High)	Low Score Threat (1-5 Scale, 1 is Low)
Intellectual Property Rights / Copyright, Licensing Obligations	Use of code is free and clear with no IP / legal issue.	Use of code puts VA or open source community at risk of legal action.
Open Source Community Involvement	Use of code viewed as enhancing the value and engagement of the community.	Adoption of code could result in reduction of community involvement. Use of code not viewed as positive for the community.
Veteran Experience	Use of code will greatly enhance Veteran experience.	Use of code may damage Veteran experience.
Quality Risk	Code is high-quality; adoption provides the opportunity to add value from the open source community.	Code is of low or unproven quality, or is not an improvement over existing VA software quality, leaving VA vulnerable.
Political Risk	No political or competing concerns associated with adoption of open source code. If the code is already in limited use by VA, there is no known opposition to expansion of its use.	Political or competing concerns exist related to open source code. Other existing code already in use at VA. Could cause organizational issues for VA if open code is adopted.

Table 2. Opportunities/Threats Dimension Definitions

3. Analysis of bbClear

3.1. OSS Candidate Overview

bbClear is an open-source framework for rendering more user-friendly health records. It allows for the creation of a printed or electronic health record that is more helpful for patients, their families, and caregivers. bbClear creates self-contained HTML documents that can parse and display the contents of common XML-formatted health records. bbClear includes a standard formatting theme which may be customized.

bbClear was created as a result of community submissions to the Health Design Challenge¹, with support from VA and the California HealthCare Foundation. bbClear is built upon Blue Button, which was developed by VA to allow Veterans the ability to view, download, and share their health records. The Blue Button output is a standard text file format, which can be difficult for patients to navigate and understand, especially as the number of health conditions increases. Through the Health Design Challenge, designers used the Blue Button data to create patient-centered reports. The challenge resulted in over 230 submissions. Elements of the winning designs were combined to create bbClear.

The primary benefit associated with intake of bbClear is an improved patient experience by receiving printed health records in a more easily understandable format with little to no additional effort required by the provider.

The recommendation for bbClear is to proceed with OSEHRA Certification and consideration for intake.

¹ d*collab // THE PATIENT RECORD. Retrieved September 20, 2016, from <http://healthdesignchallenge.com/>

3.2. Strengths/Weaknesses

The Strengths and Weaknesses analysis elements for bbClear are presented in Table 3, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Functional Fit with Requirement	3	bbClear enhances the patient experience by making the patient health record more understandable for the patient, which would be of value to Veterans. The added functionality marginally addresses an identified gap (VA's stated desire for an EHR with analytics, cloud, and patient experience capabilities ²).
Technical Fit - Data	5*	Patient data must be in a compatible format (C-CDA or VA-C32 XML). Both C-CDA and C32 are standards-based health summary document formats which are used by VA. bbClear was built upon Blue Button, which was developed by the VA.
Technical Fit - API	5*	bbClear is dependent on the Python programming language, which is approved for use at VA in the Technical Reference Model (TRM). An additional tool, Compass, may optionally be used to customize the appearance of the output file. Compass is also approved for use in the TRM.
Code Quality	2*	This code has not been certified by OSEHRA. Code is posted to GitHub for community input. Six issues have been logged to date; three are reflecting an open status at this time ³ . Supporting documentation and test cases required to conduct OSEHRA certification testing are not currently available on GitHub.
VistA 4 Product Roadmap - Architectural Fit	3	This functionality is not specifically referenced in the Roadmap, but is not in conflict with it. Feature Set 3's "eHMP Development" covers a broad range of requirements that would align most closely with bbClear, including "patient goal management" and "after visit summary/patient education."
Time-to-Value	4	Implementation appears to be simple. Code has the ability to be implemented quickly and offer value, if not already widely in use within VHA.

Legend: *Decisional element

Table 3. Strengths / Weaknesses Associated with bbClear

² Sullivan, T. (2016, April 14). CIO LaVerne Council says VA needs new EHR with analytics, cloud, patient experience capabilities. Retrieved June 07, 2016, from <http://www.healthcareitnews.com/news/cio-laverne-council-says-va-needs-new-ehr-analytics-cloud-patient-experience-capabilities>

³ Blue-button/bbClear. Issues. Retrieved September 21, 2016, from <https://github.com/blue-button/bbClear/issues>

3.3. Opportunities/Threats

The Opportunities and Threats analysis elements for bbClear are presented in Table 4, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Intellectual Property Rights / Copyright, Licensing Obligations	5	No licensing or copyright issues; copyright © 2013 M. Jackson Wilkinson; licensed under the Apache License 2.0.
Open Source Community Involvement	4	Code is posted on GitHub for the open source community and appears to be stable ⁴ . The website encourages suggestions and issues to be logged in GitHub. There have been both issues and suggestions logged, and some community discussion, although frequency has slowed since the initial release in 2013.
Veteran Experience	4*	Allows health care providers to create a printed (paper or electronic) health record that is more easily understandable by the patient. The output is more patient-friendly than the standard text-based output, which may promote patient engagement and improve the Veteran experience.
Quality Risk	4	There is no impact to existing code, and no re-architecting required. Low quality risk anticipated.
Political Risk	4**	Code would improve the patient experience with little to no added effort for the provider. Since this is a printing application, low business/cultural risk anticipated. Additional analysis is needed to confirm if bbClear is already in use within VA.

Legend: *Decisional element, ** Additional analysis needed

Table 4. Opportunities / Threats Associated with bbClear

⁴ Blue-button/bbClear. (2013, June 21). Code. Retrieved September 21, 2016, from <https://github.com/blue-button/bbClear>

3.4. SWOT Analysis Summary

An overall summary of the bbClear SWOT analysis decisional elements are presented in Table 5.

	Helpful to achieving time to value	Harmful to achieving time to value
VA Perspective (VistA Fit, Business Value)	<u>Strengths</u> <ul style="list-style-type: none"> • Code fits well with VistA data structures • Code fits well with VistA APIs 	<u>Weaknesses</u> <ul style="list-style-type: none"> • Some issues posted to GitHub have not been resolved / closed out; documentation required to perform OSEHRA certification testing is lacking
External Impacts (Risks, Upside)	<u>Opportunities</u> <ul style="list-style-type: none"> • Enhances the Veteran experience by providing for a more patient-friendly health record 	<u>Threats</u> <ul style="list-style-type: none"> • No currently identified threats

Table 5. SWOT Analysis Summary of bbClear

4. Analysis of VANS

4.1. OSS Candidate Overview

The Veteran Appointment Notification System (VANS) is a web-based application that enables schedulers to preview, edit, and send appointment letters electronically. With this system, patients receive clear and organized letters with all the information they need to successfully attend appointments via the My HealthVet application.

VANS was developed through the VA Center for Innovation by TriDec Technologies, LLC. The project's objectives were to reduce cost per notification, reduce the patient "no show" rate, increase appointment scheduling efficiency, and increase Veteran satisfaction by improving the notification process. The project was closed out in September 2014 without having completed live testing due to a lack of integration with My HealthVet. Virtual system testing was completed in June 2014 using a cloud application test site and fictional patient data. Veterans Integrated Service Network (VISN) 18 had conveyed an interest in testing the system, initially at the local VA facility followed by deployment to the VISN, with the ultimate goal of deploying nationally. There has been no further activity on VANS since the Innovations project was closed out in 2014.

According to the VHA Issue Brief documenting the close-out of the VANS Innovations project, schedulers are unable to edit existing appointment letters within VistA, and are also unable to send appointment letters via email. Appointment letters must therefore be printed and physically mailed to the Veteran, with any necessary changes annotated manually on the paper document. As stated in the Issue Brief, "Veterans would frequently come from hundreds of miles away to their medical appointments, often to realize that due to the complicated and confusing pen-and-ink changes to their letters they had missed crucial tests and would have to reschedule to have fasting or hard-to-schedule tests completed to receive a complete examination" (refer to Appendix A for the full VHA Issue Brief). The VANS application allows appointment notification letters to be sent electronically via My HealthVet, utilizing the HIPAA-compliant two-way communication portal between the Veteran and their primary care team which is already established within My HealthVet.

The primary benefits associated with intake of VANS are the ability to produce clearer, more professional appointment letters and better communication with the Veteran, resulting in an improved experience for the Veteran.

The recommendation for VANS is to proceed with OSEHRA Certification and consideration for intake, most likely through a funded project. This candidate is likely to be considered too large for intake through EPIP.

4.2. Strengths/Weaknesses

The Strengths and Weaknesses analysis elements for VANS are presented in Table 6, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Functional Fit with Requirement	4*	VANS modestly addresses the patient experience by helping to streamline the access experience. The current process requires schedulers to physically mail paper appointment letters to the Veteran, with any corrections manually written on the document. Confusion around these changes may result in incomplete or missed appointments, exacerbating existing access to care issues. VANS provides the ability to correct appointment letters and communicate electronically with the Veteran, reducing confusion and improving no-show rates. This is a good enhancement to existing functionality which is lacking in VistA. The code fulfills a need, although not a critical need.
Technical Fit - Data	4	This is a utility package further automating a specific process, as well as an Innovations project, so it is likely there are no significant data-oriented constraints.
Technical Fit - API	4	This code integrates with My Health ^e Vet and allows appointment letters to be sent from VistA via My Health ^e Vet Secure Messaging. When the Innovations project was closed out, live testing had not been conducted as the ability to integrate with My Health ^e Vet was not yet in place.
Code Quality	4*	Virtual system testing was completed in June 2014 utilizing a cloud application test site and fictional patient data. Test cases and results are posted to GitHub. Of the 19 test cases posted, 2 returned overall test results of “failed,” although within those cases the conditions which did not pass were limited in both quantity and severity ^{5,6} . Additional documentation (including User Manual and Installation Guide) are also posted to GitHub, which would support the OSEHRA certification process. This code has not been certified by OSEHRA.
VistA 4 Product Roadmap - Architectural Fit	4	This functionality is not specifically referenced in the Roadmap, but is not in conflict with it. Feature Sets 3 and 4 call for improvements in the appointment scheduling process.

⁵ TriDec Technologies. (2014, June 5). Test Results – Page Log (VANS). *GitHub*. Retrieved September 23, 2016, from [https://github.com/VHAINNOVATIONS/VANS/blob/master/Test%20Results/Test%20Results%20-%20Page%20Log%20\(VANS\).docx](https://github.com/VHAINNOVATIONS/VANS/blob/master/Test%20Results/Test%20Results%20-%20Page%20Log%20(VANS).docx)

⁶ TriDec Technologies. (2014, June 5). Test Results – Email Log (VANS). *GitHub*. Retrieved September 23, 2016, from [https://github.com/VHAINNOVATIONS/VANS/blob/master/Test%20Results/Test%20Results%20%E2%80%93%20Email%20Log%20\(VANS\).docx](https://github.com/VHAINNOVATIONS/VANS/blob/master/Test%20Results/Test%20Results%20%E2%80%93%20Email%20Log%20(VANS).docx)

SWOT Dimension	Score	Evaluation Comments
Time-to-Value	3**	Live testing has not been conducted. Additional analysis is needed to identify any potential barriers to integration with My Health eVet. This project would require additional site testing and an Initial Operating Capability (IOC) phase prior to national deployment.

Legend: *Decisional element, ** Additional analysis needed

Table 6. Strengths / Weaknesses Associated with VANS

4.3. Opportunities/Threats

The Opportunities and Threats analysis elements for VANS are presented in Table 7, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Intellectual Property Rights / Copyright, Licensing Obligations	5	No licensing or copyright issues; licensed under the Apache License 2.0.
Open Source Community Involvement	3	Code and documentation is posted to GitHub. The project has not progressed beyond the pilot phase. Although the code is available to the open source community, there has been no additional activity around it.
Veteran Experience	4*	This functionality would enhance the Veteran experience by improving access to care, improving communication, and reducing confusion regarding appointment times.
Quality Risk	3	This is a utility package operating on the periphery of VistA, so likelihood of significant integration quality issues is low. When the Innovations project was closed out, live testing had not been conducted as the ability to integrate with My Health eVet was not yet in place. Additional testing would need to be completed to reduce the quality risk.
Political Risk	4*	This is a utility package further automating a specific process, so the level of business risk is low. An investment in this functionality has already been made through the Innovations program, so implementing the project would allow VA to realize the benefits of that investment.

Legend: *Decisional element

Table 7. Opportunities / Threats Associated with VANS

4.4. SWOT Analysis Summary

An overall summary of the VANS SWOT analysis decisional elements are presented in Table 8.

	Helpful to achieving time to value	Harmful to achieving time to value
VA Perspective (Vista Fit, Business Value)	<u>Strengths</u> <ul style="list-style-type: none"> • Supports improved access to care, which is a significant concern for VA • Documentation to support OSEHRA certification testing available on GitHub 	<u>Weaknesses</u> <ul style="list-style-type: none"> • No currently identified weaknesses
External Impacts (Risks, Upside)	<u>Opportunities</u> <ul style="list-style-type: none"> • Enhances the Veteran experience, reduces need for rescheduling • Low political / business risk 	<u>Threats</u> <ul style="list-style-type: none"> • No currently identified threats

Table 8. SWOT Analysis Summary of VANS

5. Analysis of Maternity Tracker

5.1. OSS Candidate Overview

Maternity Tracker is an enhancement to CPRS/VistA that assists the coordination of maternity care in a seamless fashion between VA and non-VA providers to support optimal care of pregnant Veterans. Although most maternity care is provided by non-VA providers, pregnant Veterans may require care through VA for other non-pregnancy related health conditions, resulting in the need for coordination between providers.

Maternity Tracker was developed through the VA Center for Innovation. Women Veterans are the fastest growing group of new users of VA health services, and the number of women seeking VA healthcare services has more than doubled since 2000⁷. Maternity Tracker has been live at the Salt Lake City (SLC) Health Care System since May 12, 2015, and will soon be entering a multi-site pilot phase.

The primary benefit associated with intake of Maternity Tracker is improved delivery of maternity care for women Veterans, which directly supports a requirement in the VistA 4 Product Roadmap. The VistA 4 Product Roadmap describes national dissemination of Maternity Tracker as a Feature Set 4 requirement in the Specialty Clinical Applications / Women's Health area. Maternity Tracker also supports the procedures described in the Maternity Healthcare and Coordination Handbook (VA Handbook 1330.03).

The overall recommendation for Maternity Tracker is to proceed OSEHRA Certification and consideration for intake, most likely through a funded project. This candidate is likely to be considered too large for intake through EPIP.

⁷ Zephyrin, L. (2012, April 10). Maternity Tracker: Tracking and Coordinating Maternity Care. Webinar. Retrieved September 29, 2016, from http://www.innovation.va.gov/docs/VAi2webinar2012_Maternity.pdf

5.2. Strengths/Weaknesses

The Strengths and Weaknesses analysis elements for Maternity Tracker are presented in Table 9, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Functional Fit with Requirement	5*	This is an Innovations project and it fulfills a Roadmap requirement. It also supports procedures described in VHA's Maternity Health Care and Coordination Handbook, including how "coordination of care and information sharing between all providers, including non-VA and VA providers, is critical to patient safety," and that "each facility must ensure seamless coordination of non-VA maternity care with VA care." ⁸
Technical Fit - Data	4	This code was developed for VistA. There are likely no significant data-oriented constraints.
Technical Fit - API	4	This code was developed for VistA, and occupies the VistA namespace DSIO. There are likely no significant technological constraints.
Code Quality	3	Maternity Tracker has been in production at the Salt Lake City (SLC) Health Care System since May 12, 2015. The Project Manager for this effort reports that user feedback from the pilot site has been very positive. This code has not been certified by OSEHRA. Some technical documentation is posted to GitHub, but artifacts such as User Manuals and Test Cases are not available, which may hinder the ability of OSEHRA to conduct certification testing. Installation instructions are available on GitHub.
VistA 4 Product Roadmap - Architectural Fit	5*	National dissemination of the Maternity Tracker is a requirement in the VistA 4 Product Roadmap Feature Set 4 (Specialty Clinical Applications / Women's Health area).
Time-to-Value	4	Since the code was developed as an Innovations project, it should speed time to value for functionality in this area. Maternity Tracker has been live in the SLC VAMC for over a year, and will soon be entering a 7-month multi-site pilot phase (SLC plus Sacramento and Loma Linda).

Legend: *Decisional element

Table 9. Strengths / Weaknesses Associated with Maternity Tracker

⁸ Veterans Health Administration, Office of Women's Health Services. (2012, October 5). VHA Handbook 1330.03, Maternity Health Care and Coordination. Retrieved September 26, 2016, from http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=2803

5.3. Opportunities/Threats

The Opportunities and Threats analysis elements for Maternity Tracker are presented in Table 10, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Intellectual Property Rights / Copyright, Licensing Obligations	5	No licensing or copyright issues; licensed under the Apache License 2.0.
Open Source Community Involvement	3	Code and documentation is posted to GitHub. The project is currently in the pilot phase. Although the code is available to the open source community, there has been no additional activity around it.
Veteran Experience	4*	This code improves delivery of healthcare specific to pregnant women. Although women Veterans represent a small segment of the total VA patient population, they are the fastest growing group of new users of VA health services, with a significant percentage of these women Veterans being of child-bearing age. ⁹
Quality Risk	3**	This is a normal Kernel Installation and Distribution System (KIDS) install, so could be low risk but additional analysis is needed to verify this statement. User feedback received to date from the pilot site has been very positive.
Political Risk	5*	The limited scope / impact associated with this code provides for a low process and change risk. The Project Manager for this effort reports that the business owner of the test site, as well as feedback from the users, have been positive.

Legend: *Decisional element, ** Additional analysis needed

Table 10. Opportunities / Threats Associated with Maternity Tracker

⁹ Veterans Health Administration, Office of Women's Health Services. (2012, October 5). VHA Handbook 1330.03, Maternity Health Care and Coordination. Retrieved September 26, 2016, from http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=2803

5.4. SWOT Analysis Summary

An overall summary of the Maternity Tracker SWOT analysis decisional elements are presented in Table 11.

	Helpful to achieving time to value	Harmful to achieving time to value
VA Perspective (VistA Fit, Business Value)	<p><u>Strengths</u></p> <ul style="list-style-type: none"> • National dissemination is a requirement in the VistA 4 Product Roadmap • Supports procedures for maternity care outlined in VHA's Maternity Health Care and Coordination Handbook 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • No currently identified weaknesses
External Impacts (Risks, Upside)	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> • Improves delivery of healthcare to women Veterans • Well received by business owner and test users 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • No currently identified threats

Table 11. SWOT Analysis Summary of Maternity Tracker

6. Analysis of Complex Orders “Then” Conjunction

6.1. OSS Candidate Overview

Within the existing VistA system, a known issue exists related to complex pharmacy orders. When an order is entered with an “and” conjunction, followed by a “then” conjunction, the start dates calculate correctly for the “and” portion, but calculate incorrectly for the “then” portion of the order. There is no opportunity for the prescribing doctor to adjust or correct the dates when entering the order, so pharmacists must manually correct the dates. The Complex Orders “Then” Conjunction code corrects this known error.

Complex Orders “Then” Conjunction was developed by Document Storage Systems (DSS), Inc. to support the vxVistA EHR. vxVistA is an open source EHR based upon VistA. A full distribution of vxVistA is released on an annual basis through OSEHRA. The Complex Orders “Then” Conjunction was completed within the past year, so it has not yet been released to the open source community. It will be incorporated into the next annual release of vxVistA to OSEHRA.

The primary benefits associated with intake of the Complex Orders “Then” Conjunction are improved patient safety by eliminating a potential cause for errors in prescription dosage and improved efficiency on the part of the pharmacists by removing the need for a manual work-around.

The recommendation is to put Complex Orders “Then” Conjunction on hold until code becomes available as open source, then proceed with OSEHRA Certification and consideration for intake. This code is likely to be a strong candidate for intake through EPIP when the code is submitted as open source.

6.2. Strengths/Weaknesses

The Strengths and Weaknesses analysis elements for the Complex Orders “Then” Conjunction are presented in Table 12, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Functional Fit with Requirement	5*	This code corrects a known issue in VistA related to the calculation of start dates in complex pharmacy orders. The issue currently requires a manual work-around to correct.
Technical Fit - Data	5	No data issues anticipated; this fix has been developed specifically to address a known calculation issue within VistA. Code does not impact existing data structures; no re-architecting required.
Technical Fit - API	5*	No technical issues anticipated with APIs; this fix has been developed specifically to address a known issue within VistA. There are no changes to CPRS; changes only impact VistA. Dependencies would need to be identified and a patch created to support VistA national release process.
Code Quality	3	This code has not been certified by OSEHRA. This has been developed within the past year, and has not yet been released to the open source community through a vxVistA release. Documentation and test cases may need to be developed to support the OSEHRA certification process.
VistA 4 Product Roadmap - Architectural Fit	3	This functionality is not specifically referenced in the Roadmap, but is also not in conflict with it. Enhancements to pharmacy are included in both Feature Sets 3 and 4.
Time-to-Value	5*	This code addresses a known issue within the VistA system. As the fix has already been developed, incorporation will rapidly bring value to VA. This code is likely to be a strong candidate for intake through EPIP.

Legend: *Decisional element

Table 12. Strengths / Weaknesses Associated with Complex Orders “Then” Conjunction

6.3. Opportunities/Threats

The Opportunities and Threats analysis elements for the Complex Orders “Then” Conjunction are presented in Table 13, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Intellectual Property Rights / Copyright, Licensing Obligations	5	No licensing or copyright issues; licensed under the Apache License 2.0. Code will be included in the next full vxVistA distribution released to OSEHRA.
Open Source Community Involvement	5	This code was developed after the 2015 release of vxVistA, therefore it has not yet been released to the open source community. It will be included in the next full vxVistA release, at which time it will be available to the open source community. The fix can be made available as a separate package prior to the next full vxVistA release. Since this fix is simple to incorporate it would rapidly bring value for the open source community.
Veteran Experience	4	Incorporation of this code removes the need for pharmacists to perform a manual work-around to correct dates. As a patient safety risk exists if the dates are not manually corrected, intake of this code reduces the potential for a negative Veteran experience.
Quality Risk	5*	VistA currently has a known issue related to the calculation of start dates when a complex conjunction is used in pharmacy orders, leading to a potential patient safety issue. This code corrects that issue, removing the patient safety issue and the need for a manual work-around on the part of the pharmacist.
Political Risk	5*	This issue is a known issue within VA, and is an issue VA intends to correct, so there should be little political risk in incorporating this fix.

Legend: *Decisional element

Table 13. Opportunities / Threats Associated with Complex Orders “Then” Conjunction

6.4. SWOT Analysis Summary

An overall summary of the Complex Orders “Then” Conjunction SWOT analysis decisional elements are presented in Table 14.

	Helpful to achieving time to value	Harmful to achieving time to value
VA Perspective (VistA Fit, Business Value)	<u>Strengths</u> <ul style="list-style-type: none"> • Removes the need for pharmacists to perform a manual work-around • Reduces possibility of errors • Code was developed specifically for VistA; no technical integration concerns • Potential EPIP candidate 	<u>Weaknesses</u> <ul style="list-style-type: none"> • No currently identified weaknesses
External Impacts (Risks, Upside)	<u>Opportunities</u> <ul style="list-style-type: none"> • Addresses a potential patient safety concern • Addresses a known issue which VA will need to correct 	<u>Threats</u> <ul style="list-style-type: none"> • No currently identified threats

Table 14. SWOT Analysis Summary of Complex Orders “Then” Conjunction

7. Analysis of Patient Search Tool

7.1. OSS Candidate Overview

Patient Search Tool is an enhancement to VistA which allows users to search any field, including free text, within a patient's chart. Current search capabilities within VistA are fairly limited. The enhancement adds a "Search" menu item to CPRS, and allows users to search for specific terms within notes, problem text, consults, orders, and reports. The search is performed at the individual patient level.

Patient Search Tool was developed by DSS, Inc. through the VHA Innovations program approximately 5 years ago, and was well received by users at the VA test site. Testing was conducted at the North Florida/South Georgia Veterans Healthcare System in Gainesville, FL, with additional limited testing completed in North Carolina. Although not released to production within VA, this enhancement has been available to the open source community for several years through the vxVistA release to OSEHRA.

The primary benefit associated with intake of Patient Search Tool is the improved ability for clinicians to search within a patient's record, which enhances both the Veteran and provider experience.

The recommendation for Patient Search Tool is to proceed with OSEHRA Certification and consideration for intake.

7.2. Strengths/Weaknesses

The Strengths and Weaknesses analysis elements for the Patient Search Tool are presented in Table 15, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Functional Fit with Requirement	5*	The current search functionality within VistA is limited. The Patient Search enhancement allows users the ability to search for specific terms within notes, problem text, consults, orders, and reports at the individual patient level.
Technical Fit - Data	4	No data issues anticipated; this code has been developed specifically to enhance the VistA user experience.
Technical Fit - API	5*	No technical issues anticipated with APIs; this code has been developed specifically to enhance the VistA user experience. The code involves a CPRS modification to add the search menu and the ability to invoke from within CPRS, as well as a KIDS file to install on the VistA side. There are no custom Remote Procedure Calls (RPC) used and no dependencies on non-standard or commercial RPCs. The search is potentially CPU intensive, but performance has not been an issue, and users have the ability to specify if the search receives CPU priority. There are no substantive support requirements.
Code Quality	3	This code has not been certified by OSEHRA but it has been in use for several years outside the VA. Documentation and test cases may need to be developed to support the OSEHRA certification process.
VistA 4 Product Roadmap - Architectural Fit	5*	This functionality is described in the VistA 4 Product Roadmap. The Feature Set 4 Enterprise-wide Deployment of eHMP element calls for “free text search (finding entries in patient records based on user entered criteria).”
Time-to-Value	4	This functionality is desired by VA and is described in the VistA 4 Product Roadmap. Code was developed through the Innovations program; deploying nationally would allow VA to benefit from this previous investment. As both CPRS and VistA are impacted, intake would likely require additional testing and Initial Operating Capability (IOC) phases prior to national release. The code was previously tested at the Gainesville site, with additional limited testing performed at the North Carolina site.

Legend: *Decisional element

Table 15. Strengths / Weaknesses Associated with Patient Search Tool

7.3. Opportunities/Threats

The Opportunities and Threats analysis elements for the Patient Search Tool are presented in Table 16, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Intellectual Property Rights / Copyright, Licensing Obligations	5	No licensing or copyright issues; licensed under the Apache License 2.0. Code is included in the full vxVistA distribution released to OSEHRA.
Open Source Community Involvement	4	Code is included in the full vxVistA distribution released to OSEHRA. It was additionally individually released to the open source community through OSEHRA in 2012 ¹⁰ .
Veteran Experience	4*	The Patient Search Tool allows clinicians to identify and isolate text data within a patient's record in real time. By spending less time focused on the EHR, the clinician can spend more time focused on the patient, providing an enhanced Veteran experience.
Quality Risk	4	As this code was developed specifically for VistA and has been in use for several years outside the VA, there is low quality risk associated with intake.
Political Risk	5*	This functionality is desired by VA, was originally developed through the Innovations Program, and is described in the VistA 4 Product Roadmap, so there is low business or cultural risk associated with intake of this enhancement. Feedback from VA users at the Gainesville test site was positive; users would be excited to have this functionality available.

Legend: *Decisional element

Table 16. Opportunities / Threats Associated with Patient Search Tool

¹⁰ DSS Inc. (2012, July-December). Patient Search Tool: CPRS Extension. OSEHRA Technical Journal. doi:<http://hdl.handle.net/10909/50>

7.4. SWOT Analysis Summary

An overall summary of the Patient Search Tool SWOT analysis decisional elements are presented in Table 17.

	Helpful to achieving time to value	Harmful to achieving time to value
VA Perspective (VistA Fit, Business Value)	<p><u>Strengths</u></p> <ul style="list-style-type: none"> • Code developed specifically for CPRS / VistA, so strong technical fit • Addresses functionality included in VistA 4 Product Roadmap • Provides a highly useful clinician-facing function for VistA 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • No currently identified weaknesses
External Impacts (Risks, Upside)	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> • Low political risk; positive feedback from VA users involved in testing effort • Increased clinician efficiency can improve the Veteran experience 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • No currently identified threats

Table 17. SWOT Analysis Summary of Patient Search Tool

8. Analysis of On-the-Fly Alerts

8.1. OSS Candidate Overview

On-the-Fly Alerts is an enhancement to CPRS / VistA which allows users to generate message-based alerts to improve staff communication and task management. These alerts are view-only, and they provide a way to communicate informally among staff. (The messages are separate from the patient record.) Alerts can be sent to an individual or to a group, and follow standard VistA alert rules and options.

On-the-Fly Alerts was developed by DSS, Inc. approximately 8 years ago, and has been available to the open source community for several years through the vxVistA release to OSEHRA.

The primary benefit associated with intake of On-the-Fly Alerts is improved staff communication and efficiency of patient care.

The recommendation for On-the-Fly Alerts is to proceed with OSEHRA Certification and consideration for intake. This candidate is likely to require a small funded project for implementation.

8.2. Strengths/Weaknesses

The Strengths and Weaknesses analysis elements for On-the-Fly Alerts are presented in Table 18, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Functional Fit with Requirement	3	On-the-Fly alerts allow for informal messages to be sent among staff members to increase communication and coordination. This functionality currently does not exist in CPRS / VistA. This enhancement can be seen as adding value, but does not fill a significant gap.
Technical Fit - Data	5	No data issues anticipated as these alerts are text-based and do not need to integrate with the patient record. The code has been developed specifically to enhance the CPRS / VistA user experience. This enhancement introduces a new alert type to CPRS. The contact list is pre-populated based on information in VistA.
Technical Fit - API	5*	No technical issues anticipated with APIs; this code has been developed specifically to enhance the CPRS / VistA user experience. On-the-Fly alerts are created and viewed within CPRS. This enhancement introduces a new alert type to CPRS, and adds a new “send alert” option to the Tools menu in CPRS. Implementation involves a KIDS file plus user interface work in CPRS. Use of these alerts does not impact performance of CPRS. There are no substantive support requirements.
Code Quality	3	This code has not been certified by OSEHRA. It is included as part of a fully open source vxVistA functional system, and has been in use for several years outside the VA. There have been no reported bug issues or maintenance concerns. Documentation and test cases may need to be developed to support the OSEHRA certification process.
VistA 4 Product Roadmap - Architectural Fit	3	This functionality is not specifically referenced in the Roadmap, but is also not in conflict with it. It generally aligns with the Feature Set 3 “eHMP Development” element.
Time-to-Value	4*	Intake of this enhancement has the potential to quickly add value. Estimated effort and complexity to implement is relatively small.

Legend: *Decisional element

Table 18. Strengths / Weaknesses Associated with On-the-Fly Alerts

8.3. Opportunities/Threats

The Opportunities and Threats analysis elements for On-the-Fly Alerts are presented in Table 19, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Intellectual Property Rights / Copyright, Licensing Obligations	5	No licensing or copyright issues; licensed under the Apache License 2.0. Code is included in the full vxVistA distribution released to OSEHRA.
Open Source Community Involvement	4	Code is included in the full vxVistA distribution released to OSEHRA. The extracted components have not been individually released to the open source community through OSEHRA.
Veteran Experience	3	The primary benefit of On-the-Fly Alerts is improved staff communication. While the Veteran may have an indirect positive impact resulting from better staff communication, it is unlikely there will be a noticeable change in the Veteran experience.
Quality Risk	4*	As this code was developed specifically for VistA and has been in use for several years outside the VA, there is low quality risk associated with intake.
Political Risk	4*	This code improves the clinician experience in CPRS and adds functionality that is not currently available. There is likely low business and cultural risk associated with intake of this code. A DSS employee who previously worked for the VA reported that this particular enhancement would have been very desirable during her time with the VA.

Legend: *Decisional element

Table 19. Opportunities / Threats Associated with On-the-Fly Alerts

8.4. SWOT Analysis Summary

An overall summary of the On-the-Fly Alerts SWOT analysis decisional elements are presented in Table 20.

	Helpful to achieving time to value	Harmful to achieving time to value
VA Perspective (VistA Fit, Business Value)	<u>Strengths</u> <ul style="list-style-type: none"> Code developed specifically for CPRS / VistA, so strong technical fit Low complexity and effort to implement 	<u>Weaknesses</u> <ul style="list-style-type: none"> No currently identified weaknesses
External Impacts (Risks, Upside)	<u>Opportunities</u> <ul style="list-style-type: none"> Low quality risk; enhancement has been in use for several years outside the VA Improved clinician experience 	<u>Threats</u> <ul style="list-style-type: none"> No currently identified threats

Table 20. SWOT Analysis Summary of On-the-Fly Alerts

9. Analysis of Enhanced Problem List

9.1. OSS Candidate Overview

The Enhanced Problem List implements three changes to CPRS / VistA:

- Introduces problem list categories, including Medical/Surgical, Family, Social, and Unassigned.
- Adds the ability to mark a problem as “resolved,” in addition to the two existing options of “active” and “inactive.”
- Adds an additional prompt to enter the ICD-10 problem code, following completion of the existing prompt to enter SNOMED code.

These enhancements were developed by DSS, Inc. and have been available to the open source community through the vxVistA release to OSEHRA. Problem list categories were introduced to vxVistA approximately ten years ago to support CMS audits on non-VA VistA installations. The “resolved” option was implemented approximately five years ago to support Meaningful Use requirements. The ICD-10 problem code prompt was released as part of the 2015 vxVistA release.

The primary benefit associated with intake of Enhanced Problem List is added user functionality within CPRS to improve charting, documentation, and coding.

The recommendation is to place Enhanced Problem List on hold until VHA confirms which, if any, of the three changes included in this enhancement are currently desired. This candidate is likely to require a funded project for implementation.

9.2. Strengths/Weaknesses

The Strengths and Weaknesses analysis elements for Enhanced Problem List are presented in Table 21, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Functional Fit with Requirement	3	This enhancement introduces three changes to the problem list in CPRS: problem list categories, “resolved” problem status, and ICD-10 problem code. This functionality currently does not exist in CPRS / VistA. Code can be seen as adding value, but does not fill a significant gap.
Technical Fit - Data	5*	No technical issues anticipated; this code has been developed specifically to enhance the CPRS / VistA user experience. The changes included in this code are not large from a technical perspective. Estimated implementation complexity is moderate. The enhancement involves a change to the user interface. Implementation will require a file change, call change, and extra lookup. “Resolved” is a new clinical meaning and will require some business / cultural work to implement. For the ICD-10 portion of the code, data is coming from the Lexicon which is already maintained by VA, so there would be no additional maintenance required.
Technical Fit - API	5	No technical issues anticipated; this code has been developed specifically to enhance the CPRS / VistA user experience. There is no anticipated impact on performance. There are limited support requirements and no files to maintain.
Code Quality	4	It is included as part of a fully open source vxVistA functional system. The problem list categories and “resolved” option have been in use for several years outside the VA, and the ICD-10 problem code prompt was introduced with the 2015 vxVistA release. There have been no reported bug issues or maintenance concerns. This code has not been certified by OSEHRA.
VistA 4 Product Roadmap - Architectural Fit	3	This functionality is not specifically referenced in the Roadmap, but is also not in conflict with it. It generally aligns with the Feature Set 3 “eHMP Development” element.
Time-to-Value	2*	Although changes are not massive, implementation complexity is estimated to be moderate in effort. Some upfront training would be required.

Legend: *Decisional element

Table 21. Strengths / Weaknesses Associated with Enhanced Problem List

9.3. Opportunities/Threats

The Opportunities and Threats analysis elements for the Enhanced Problem List are presented in Table 22, along with a score, evaluation comments, and decisional element indicator for each dimension.

SWOT Dimension	Score	Evaluation Comments
Intellectual Property Rights / Copyright, Licensing Obligations	5	No licensing or copyright issues; licensed under the Apache License 2.0. Code is included in the full vxVistA distribution released to OSEHRA.
Open Source Community Involvement	4*	Code is included in the full vxVistA distribution released to OSEHRA. The extracted components have not been individually released to the open source community through OSEHRA.
Veteran Experience	3	The primary benefit of the Enhanced Problem List is added user functionality within CPRS to improve charting, documentation, and coding. It is unlikely there will be a noticeable change in the Veteran experience.
Quality Risk	4*	As this code was developed specifically for VistA and has been in use for several years outside the VA, there is low quality risk associated with intake.
Political Risk	3	This code improves the user experience in CPRS and adds functionality that is not currently available. VA would need to provide direction to users regarding how to use the new “resolved” option, so there could be business / cultural implications related to intake of that portion of the code. Depending on the decisions previously made regarding ICD-10, VA might choose not to implement the change prompting the entry of the ICD-10 code. If VA does choose to implement the ICD-10 prompt, users would have the ability to exit out of the prompt without entering a selection.

Legend: *Decisional element

Table 22. Opportunities / Threats Associated with Enhanced Problem List

9.4. SWOT Analysis Summary

An overall summary of the Enhanced Problem List SWOT analysis decisional elements are presented in Table 23.

	Helpful to achieving time to value	Harmful to achieving time to value
VA Perspective (VistA Fit, Business Value)	<u>Strengths</u> <ul style="list-style-type: none"> Code developed specifically for CPRS / VistA, so strong technical fit 	<u>Weaknesses</u> <ul style="list-style-type: none"> Moderate level of implementation complexity; upfront training required
External Impacts (Risks, Upside)	<u>Opportunities</u> <ul style="list-style-type: none"> Low quality risk; enhancement has been in use for several years outside the VA Code is included in the full vxVistA distribution released to OSEHRA. 	<u>Threats</u> <ul style="list-style-type: none"> No currently identified threats

Legend: *Decisional element

Table 23. SWOT Analysis Summary of Enhanced Problem List

10. Next Steps

The OSS candidates reviewed in this SWOT analysis will be included in the Q3 Prioritization Description Document, along with additional detail. Additionally, these candidates will be reviewed during the Q3 In-Progress Review (IPR).

This SWOT analysis may be updated in subsequent quarters as additional information becomes available.

Appendix A – VHA Issue Brief Regarding VANS

While researching the VANS candidate, a representative of the Innovations program was contacted for additional information. The following VHA Issue Brief was provided via email. As the document provides a thorough summary of the background and current status of the candidate, and is not available as a linked reference, it is included in its entirety as an Appendix item.

VHA ISSUE BRIEF

Issue Title: VHA Innovation Program Good News Story, #734, Enable Schedulers to Preview, Edit, and Send Appointment Letters Electronically. Lead Innovator: Julie Vedda, PA-C.

Date of Report: September 22, 2014

Brief Statement of Program Issues and Status:

The Enable Schedulers to Preview, Edit, and Send Appointment Letters Electronically lead found that schedulers were unable to edit existing appointment letters in Veterans Health Information Systems and Technology Architecture (VistA). Additionally, the schedulers were not able to send the letters via email. Their only option was to print the existing letter and send it to the Veteran via United States Postal Service (USPS). If any changes to the letter were required, which is often the case, the scheduler was forced to utilize pen-and-ink changes, thus creating a confusing and unprofessional letter. Although My Health^eVet has an email option, it is not integrated with VistA. Therefore, letters would not be emailed efficiently. Home emails were deemed inappropriate for this use due to HIPPA considerations. My Health^eVet was already in compliance with HIPPA and allowed Veterans a two-way communication portal with their primary care teams. This two-way communication is superior to USPS as the message can be received instantly and the sender can receive notification that the letter was read. These items can be tracked electronically and imported into Computerized Patient Record System (CPRS) as a clinic note. The purpose of this Issue Brief is to communicate the successful closeout and future deployment plans for this innovation project.

Background:

Veterans would frequently come from hundreds of miles away to their medical appointments, often to realize that due to the complicated and confusing pen-and-ink changes to their letters they had missed crucial tests and would have to reschedule to have fasting or hard-to-schedule tests completed to receive a complete examination. This issue created hardships for both the Veterans and the medical providers who would be unable to complete their examination reports for the Veteran in a timely manner. It was causing the Department to exceed the allowed 30-day time requirement for examination completion. In addition, allowing 10 to 14 days between scheduling and actual appointments to accommodate for mail time used up one third to one half of the allowed time. If the Veteran was out of town, he or she likely would not have timely access to his or her mail, but would have access to his or her email. It would allow them to contact VA if the appointment time was not feasible and the appointment slot could be given to

another Veteran, which would increase access to care. As VA pays Veterans mileage to travel to medical appointments these repeat visits created additional expense to VA for these examinations. Those funds would be better used for care of Veterans.

Actions, Progress, and Resolutions to Date:

VISN 18 has conveyed an interest in deploying this system to support improved access to care for Veterans. First with an initial release for testing at the local VA Facility, then to the entire VISN with the ultimate goal to release nation-wide. The VA has contracted with TriDec Technologies, LLC to provide integrated scheduling software and user manuals. The time-frame or possibility for MHV interface is unclear which has prevented any live testing.

Virtual system testing was completed in June 2014 utilizing a cloud application test site and fictional patient data. Due to the lack of My HealtheVet integration, this innovation was not permitted to be loaded into the live accounts. Failure to utilize the My HealtheVet portal prevented full integration and testing of this innovation.

Recommendation:

Recommend opening the Medical Domain Web Services (MDWS) portal in My HealtheVet and allow this innovation to move forward to the live testing phase.

Contact for Further Information:

Chuck Brown, Director, VHA Innovation Program, Connected Health, Office of Informatics and Analytics (OIA) (10P2D) at 727-667-1259.