Enhancing Dissemination of HIV-HCV-STD Clinical Evidence through Cross Linkages of Multimedia Learning Modules, Interactive Case Simulation Tools, and Clinical Practice Guidelines

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Introduction: The rapid advance of research in HIV, HCV, and other STDs continuously generates new clinical evidence. Leveraging the existing clinical and educational programs and networks can effectively disseminate such latest medical knowledge to clinicians. Typically, a specific clinical or educational program has its own audience and produces particular types of information resources to serve its mission. Creating cross linkages among multiple types of resources from different programs has the potential to break down the silos between networks, to provide a comprehensive set of resources in various formats, and therefore to enhance the dissemination of clinical evidence to a wider audience for multiple purposes. Since 2013, we have initiated a study to create linkages among multimedia learning modules (LMs), interactive case simulation tools (ICSTs) [1-2], and practice guidelines for dissemination of HIV-HCV-STD clinical evidence to healthcare providers through existing New York State (NYS) programs and networks. Here we report the initial findings from this study and discuss the plans for the next stages.

Methods: For the pilot stage, we leveraged two NYS programs, HIV-HCV-STD Clinical Education Initiative (CEI) [3] and HIV clinical guideline program [4]. Resources produced from these programs include: (1) 180 multimedia LMs, (2) 100+ clinical guidelines and quick reference guides, and (3) 20 ICSTs. Here the LMs and ICSTs are posted to the CEI website, and the guidelines are available from their own program site. Both the CEI and clinical guideline programs have their own dedicated audiences, and their online resources have reached out to 40,000 clinicians from 170 countries around the world, 80% of them from NYS. To create the linkages among the different types of resources, we developed an ontology of HIV-HCV-STD clinical topics, and assigned each resource to a topic that best matches its content. With these mappings, we were able to build the cross linkages among the LMs, ICSTs, and source guidelines, such that we could start from any specific resource to identify its related resources under the same topic. These linkages could be further differentiated as: (1) the internal linkages (intro-linkages) among the resources in the same format (i.e., LMs, guidelines, or ICSTs), and (2) the cross-linkages (inter-linkages) among the resources in different formats. Based on these linkages, we developed a prototype system plug-in for the resource websites of each participating program (for example, CEI LM site, CEI ICST site, and clinical guideline program site). When a clinician visits a specific resource on these sites, the system plug-in is triggered to display: (1) the related resources in the same format (LMs, guidelines, or ICSTs) from the current program (through intro-linkages), and (2) the related resources in different formats developed by other participating programs (through inter-linkages).

Results: We have formulated the initial version of the ontology of HIV-HCV-STD clinical topics as a two-level structure, with 8 first-level categories and a total of 45 topics, as shown in Figure 1. Based on this ontology, we have assigned the topics for all of the 180 LMs, all 20 ICSTs, and 20 selected guidelines. Bridged by these topics, we have created 5,560 intro-linkages and 2,664 inter-linkages within and across the three formats of resources, as shown in Table 1. A visualization of these linkages is shown in Figure 2. Using these linkages, we have developed a prototype system plug-in to display the related resources to enhance resource dissemination, as shown in Figure 3. A production version of this plug-in has already been deployed to the CEI LM website (limited to only intro-linkages for LMs). From October 2013 to January 2014, we recorded 374 launches of this system plug-in from CEI website and 1,461 rounds of user interactions. Displaying the related LMs contributed to an 11% increase in resource usage.

Discussion: The initial results have shown that we can successfully create cross linkages among different types of HIV-HCV-STD information resources and build a prototype system plug-in to display the related resources through these linkages. The preliminary data have shown that the system function to present the related resources is actually used by the clinician audience and has contributed to an increase of resource dissemination. Our ongoing work includes: (1) expansion to additional NYS networks, such as the Expanded HIV Testing and HIV Quality of Care programs, for resource dissemination; (2) coverage of additional types of resources, such as NYS HIV care quality indicators and STD clinical guidelines developed by CDC; (3) creating deeper level of mappings among resources leveraging their internal structures rather than just using a single topic as index; (4) deployment of the system plug-in to other participating programs; and (5) full-scale analyses on usage of the system plug-in and use contexts.

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References:


Figure 1. Ontology of HIV-HCV-STD clinical topics.

Figure 2. Visualization of linkages among resources – overall view and partial details.

Figure 3. Screenshots of prototype system plug-in to display related resources on CEI LMs, ICSTs, and clinical guideline websites.

Table 1. Number of intro-linkages and inter-linkages within and across different types of resources

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<th>Guidelines</th>
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