

Looking to improve EHR functionality? Guidance addresses web applications, services

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With the implementation of certified electronic health record (EHR) systems exceeding 90% at acute care hospitals and office-based practices, improving their functionalities and usability — especially for pediatric needs — is front and center.

The 21st Century Cures Act Interoperability Final Rule includes recommendations for the voluntary certification of health information technology to support the health care of children (<https://bit.ly/3f8541S>). One approach to fulfilling these recommendations is through the use and integration of web applications and web services into EHRs.

A new AAP policy statement and technical report from the Council on Clinical Information Technology aim to educate pediatricians by describing the benefits of this approach, along with key issues that developers, vendors integrating these tools, organizations and end users must consider.

The policy *Integrating Web Services/Applications to Improve Pediatric Functionalities in Electronic Health Records* is available at <https://doi.org/10.1542/peds.2021-052047>. The technical report *Web Services and Cloud Computing in Pediatric Care* is available at <https://doi.org/10.1542/peds.2021-052048>. They will be published in the July issue of *Pediatrics*.

Web services are not a new concept. A 2009 *AAP News* article introduced some examples and reasons why these services can be beneficial, reducing the need for every vendor to reinvent the wheel (<https://bit.ly/3hiGbU4>). Earlier articles in the medical literature also described web services for clinical decision support.

How they work

So what is the difference between web applications and web services, and how can their integration improve EHR functionality?

A web application can be accessed through a web browser and has a user interface. Intelligently integrating a web application means being able to launch it in the proper context and simultaneously send relevant data without the user having to re-enter it. A nonmedical example would be the ability to click on a hotel's address on a website to open a map application that displays the location and allows the user to interact with the map. A pediatric example would be the ability to click on a link in a newborn's chart that opens a bilirubin assessment tool with all of the newborn's relevant data pre-populated.

A web service is a piece of software on a remote server that can be accessed by multiple applications using standards that do not depend on the application's platform. It provides functionality that does not involve user interaction. A common nonmedical example is online credit card authorization. When credit card information is provided on a merchant website, it is submitted to a remote authorizing web service. The merchant website then displays whether the transaction was approved. A pediatric web service example is a stand-alone immunization clinical decision support "black box." An immunization record along with pertinent demographics and clinical information are submitted to such a service. The data are evaluated using the latest clinical recommendations, and the immunization status results are returned to the EHR to be displayed.

Another medical example of both a web application and web service is provided by the National Library of Medicine's MedlinePlus Connect (<https://medlineplus.gov/connect/overview.html>). This free resource offers patient educational materials on diagnoses (problems), medications and laboratory tests. It can be integrated in an EHR as a web application by creating a link that includes the code for the desired information. When the link is clicked, a preformatted webpage of information is displayed. The EHR also can access a web service to retrieve the content "under the hood," which the EHR can display as it would like.

Opportunities

Why integrate a web application or web service?

Among the Cures Act recommendations are functionalities to do the following:

- Use biometric-specific norms for growth curves and access growth charts for children.
- Compute weight-based drug dosage.
- Check age- and weight-specific single-dose ranges.
- Track preventive care gaps.

Many AAP clinical practice guidelines include recommendations, algorithms and data sets to be implemented in practice, such as the determination of complex normative relationships involved with pediatric blood pressures.

EHR vendors can and have developed some of these features within their systems, which can result in variability from system to system. It is not necessary for every vendor to reinvent this wheel. Web services can be used to take a set of inputs, act on the inputs and return a result. A standardized web service might already accept height, weight, age and blood pressure data and return data to help diagnose hypertension. Web applications can be pre-populated with relevant EHR data and launched to facilitate additional user interaction.

Addressing the issues

As noted, many issues must be addressed with the integration of web applications and services. The policy describes the importance of dependability, access time, speed, privacy, security, confidentiality, accuracy, testing, versioning, change management, standards and usability.

There is potential to integrate web applications and web services to build smart, pediatric-friendly EHRs. If EHR users are familiar with the concepts and examples in the policy, they can work with their vendor user groups to implement these functionalities.

Dr. Weinberg, a lead author of the policy statement and co-author of the technical report, is former chair of the AAP Council on Clinical Information Technology Executive Committee.

Resource

- [AAP Council on Clinical Information Technology website](#)

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