HIT Standards Committee

NwHIN Power Team

Transport Standards for Consumer Exchanges: Preliminary

Dixie Baker, Chair

David McCallie, Co-Chair

June 19, 2013

NwHIN Power Team

- Dixie Baker (Martin-Blanck and Associates)
- Tim Cromwell (VA)
- Floyd Eisenberg
- Ollie Gray (DOD)
- David Groves (HealthBridge)
- David Kates (Navinet)
- David McCallie (Cerner)
- Nancy Orvis (DOD)
- Marc Overhage (Siemens)
- Wes Rishel (Gartner)
- Cris Ross (Mayo)
- Arien Malec (Relay Health)

★ Supported by Avinash Shanbhag and Jamie Parker (ONC)

Task Assignment

Topic	HITSC Workgroups	Activities	Next Steps
Additional standards to support transport of data to and from patients	• NwHIN Power Team • Privacy and Security • Consumer team	• Presentation of existing transport standards • Presentation of RHEx pilot • Presentation of ABBI/Blue button • Discussion	• May/June presentation to HITSC

Further guidance from ONC:

- Goal: To recommend whether ONC should consider enhancing the current portfolio of transport standards to support consumer exchanges for Stage 3 (and beyond)
- Consider Automated Blue Button (ABBI), HL7 FHIR, RHEx, etc. to identify industry trends and emerging standards
- Present observations and recommendations to HITSC

(NB: We have interpreted "transport standards" to cover broad capability to exchange data, and not in the narrow sense of an OSI network stack.)

2014 Patient Empowerment Requirements

Certification Criteria	Exchange Standards
Enable patient to view EHR data	None specified
Enable patient to download ambulatory summary, in-patient summary, or transitions-of-care/referral summary	**None specified**
Transmit to 3rd party ambulatory summary, in-patient summary, or transitions-of-care/referral summary	***ONC Applicability Statement for Secure Health Transport*** **(a.k.a. Direct)**
Generate & enable patient to view activity history log	None specified
Create customized clinical summary (ambulatory only)	None specified
Securely send messages to and receive messages from patient (ambulatory only)	• Authentication of patient & EHR technology • FIPS 140-2, Annex A for encryption and integrity protection

Initiatives Asked to Review

- Blue Button Plus (BB+) Initiative
  - S&I Framework Initiative formerly known as Automated Blue Button (ABBI)
  - http://wiki.siframework.org/BlueButton+Plus+Initiative
- HL7 Fast Healthcare Interoperability Resources (FHIR) specification
  - http://www.hl7.org/implement/standards/fhir/
- RESTful Health Exchange (RHEx) Project
  - Federal Health Architecture + S&I Framework sponsored
  - http://wiki.siframework.org/RHEx

Notable Commonalities and Key Differences

Initiative	Purpose/ Scope	Secure Transport	Authenti-cation	Authorization	Healthcare Content
FHIR	Healthcare content standard	HTTPS suggested	Undefined	OAuth2 suggested	FHIR
BB+ Pull	Consumer trans-missions	HTTPS	Undefined	OAuth2 + Registry	FHIR
RHEx	Working prototypes of RESTful health data exchange	HTTPS	OpenID Connect	OAuth2	hData (likely transition to FHIR)

Two Levels of Specifications Emerged

- Lower Level ("building block") Protocols
  - OAuth2
  - OpenID Connect
  - hData
  - FHIR
- Higher Level ("composite") Protocols
  - Blue Button Plus (BB+) "Pull"
  - RESTful Heath Exchange Project (RHEx)

Two Levels of Specifications Emerged

- Lower Level ("building block") Protocols
  - OAuth2
  - OpenID Connect
  - hData
  - FHIR
- Higher Level ("composite") Protocols
  - Blue Button Plus (BB+) "Pull"
  - RESTful Heath Exchange Project (RHEx)

OAuth2

- IETF Standard for remote service & third-party authorization (RFC6749)
  - http://tools.ietf.org/html/rfc6749
- Flexible framework that supports numerous options, and thus needs to be profiled for specific use-cases (e.g., healthcare)
- Closely tied to HTTP, and thus assumes browser user-agents
- Used here by both RHEx and BB+
- Status: Balloted standard widely used by major Internet companies (Google, Facebook, eBay, etc.)

OpenID Connect

- IETF Pre-standard for remote authentication
  - http://openid.net/connect/
- Communicates user information from authenticating service to another service, such as for single sign-on
- Analogous to the use of SAML in traditional SOAP web services stacks
- Designed to replace “OpenID”, which has seen significant uptake among major Internet companies
- Layered on top of OAuth2, and thus can be co-deployed
- Status: Emerging standard in limited, but growing, use for passing user authentication assertions; used here by RHEx

hData

- Predecessor to FHIR
- RESTful exposure of healthcare resources
- Status:
  - HL7 DSTU
  - Likely to be superseded by FHIR

FHIR - Fast Healthcare Interoperability Resources

- New HL7 standard in development – strong support by HL7 leadership & rapidly emerging industry interest
- Focuses on “resources” used for exchange; each resource includes:
  - Defined, simple, structured data (mapped to RIM, but need not be computable)
  - Extensions (formally defined & published)
  - Narrative
- Emphasis on simplicity, implementability, and human readability
  - Single syntax for documents, messages, queries, services, etc.
  - Specification includes RESTful transport, but other transports may be used
- No licensing required

FHIR Status

- Base specification is complete and stable
- Currently defining resources; plans for 25 CCDA resources and 6 IHE and DICOM resources
- Targeting ~150 resource definitions, then will shift to profiles
- Anticipated initial use
  - Web-centric, social-media apps
  - HL7 V2 content exposed with FHIR
  - CDA Release 3 likely to be displaced by FHIR
- Used by BB+
- CommonWell using to build record and encounter record locator service – FHIR chosen for simplicity and implementability

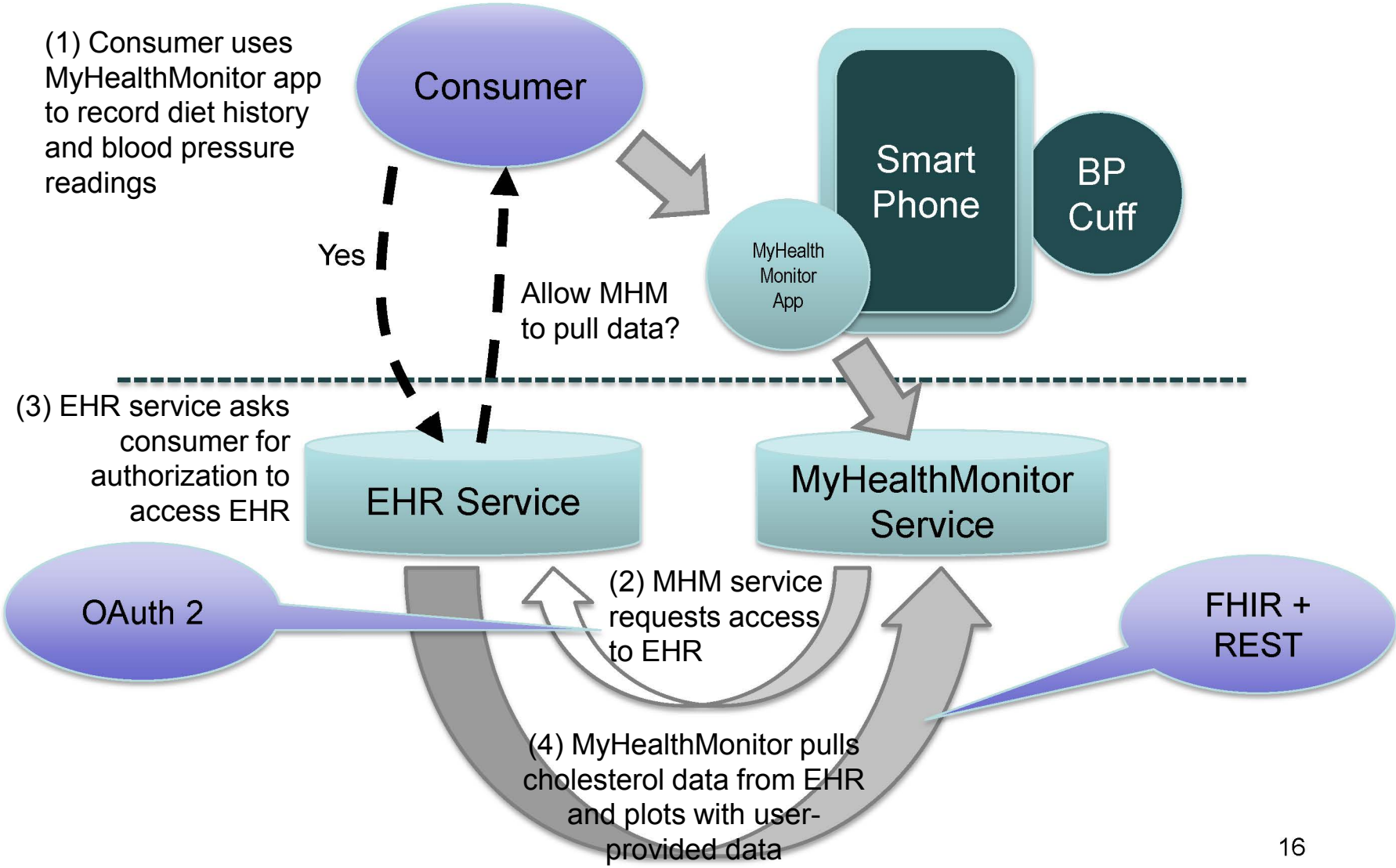
Two Levels of Specifications Emerged

- Lower Level ("building block") Protocols
  - OAuth2
  - OpenID Connect
  - hData
  - FHIR
- Higher Level ("composite") Protocols
  - Blue Button Plus (BB+) "Pull"
  - RESTful Heath Exchange Project (RHEx)

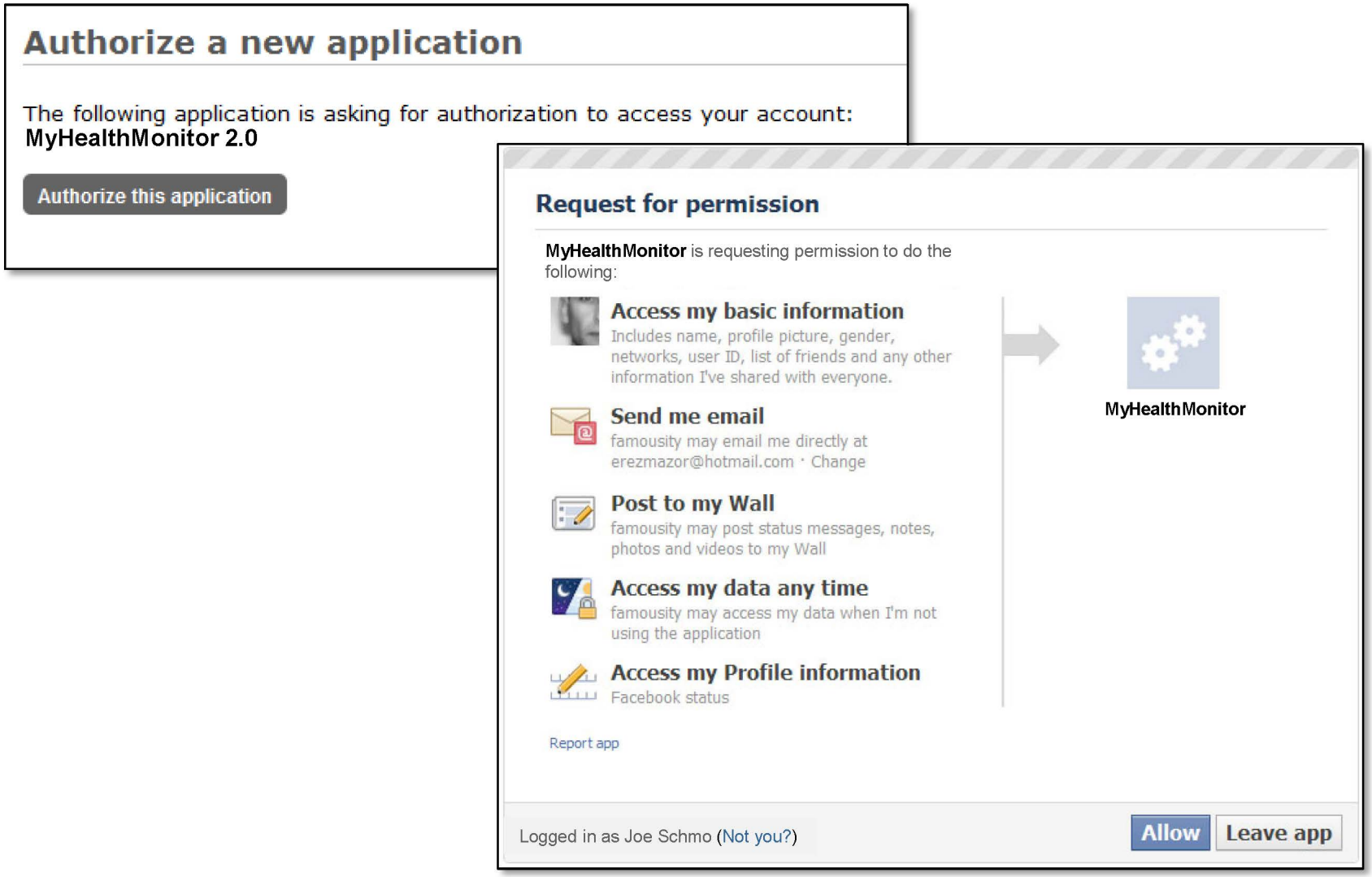
Blue Button Plus (BB+)

- For structured and secure transmission of personal health data on behalf of an individual consumer
  - BB+ “Push” uses Direct email transport (MU 2 VDT) – implementation guide available at bluebuttonplus.org
  - BB+ current efforts focus on “Pull”
- BB+ “Pull” is an application programming interface (API) that enables an application to “Pull” EHR data on behalf of the consumer
  - Application uses *OAuth2* to register with a provider
    - App name, location, permissions it might ask patients for, and how to display an authorization screen to patients
    - OAuth2 Dynamic Client Registration allows “open” registration (no pre-negotiated vetting)
    - “Trusted” registration requires use of BB+ registry (vetted)
  - *FHIR* for content search and retrieval
  - *HTTPS* (HTTP + TLS) secure RESTful transport

BB+ "Pull" Example



BB+ “Pull” Example – user experience



BB+ “Pull” Status

- Draft specification available online at https://github.com/blue-button/blue-button-plus-pull
- Responds to well-defined Internet use-case where consumers control who to expose their data to
  - Especially appealing for mHealth “apps”
- Ongoing debate about the need to “certify” or otherwise control which apps can use the service
- EHR vendors currently underrepresented – very few have committed to implementing
- Server-side tools being developed

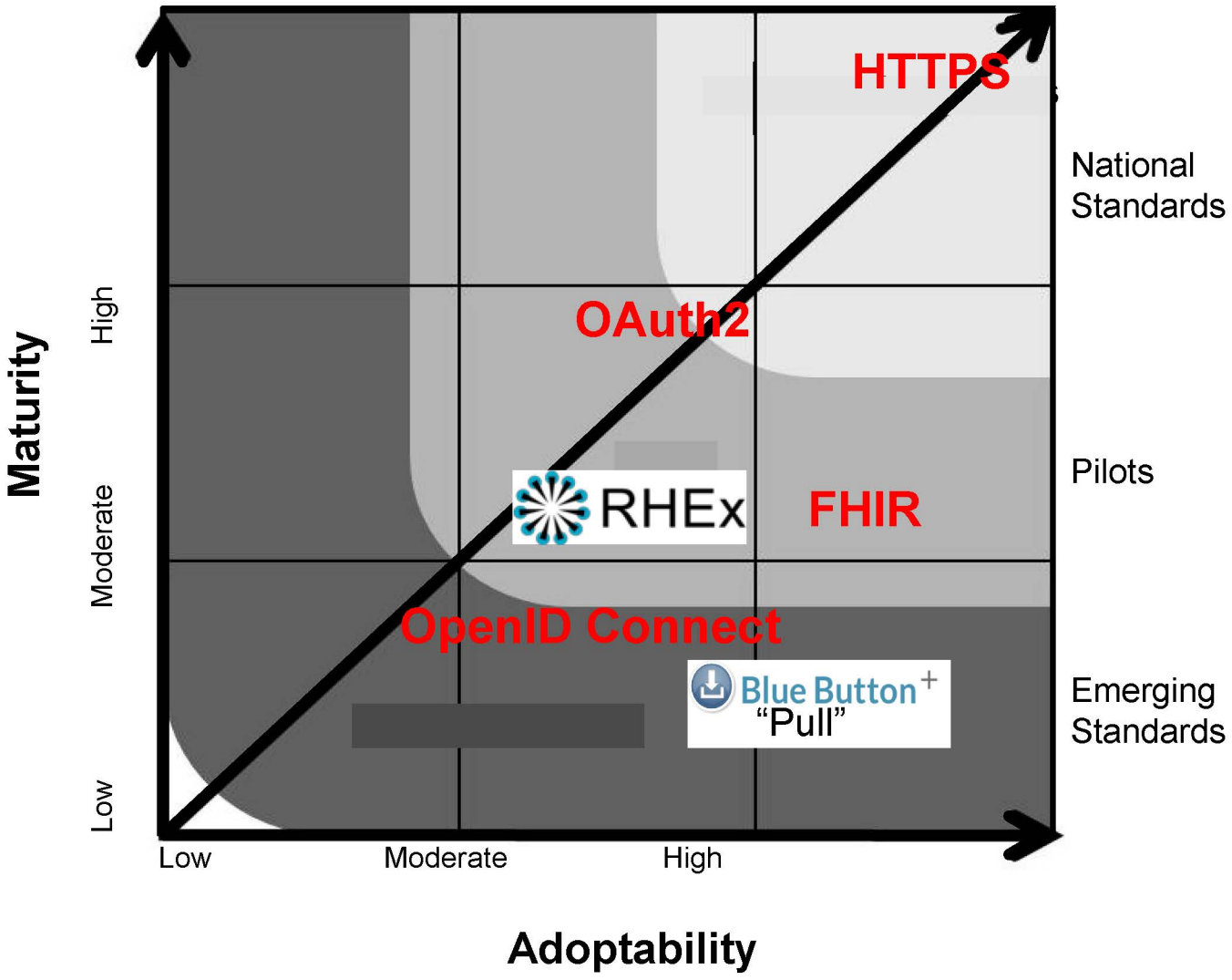
RESTful Health Exchange (RHEx)

- Applies open-source, Web technologies to demonstrate uses of RESTful, secure, standards-based approaches to health information movement
  - Responsive to NwHIN Power Team's September 2011 recommendation for a RESTful transport alternative to (SMTP-based) Direct and (SOAP-based) Exchange
- Layered over core Internet standards
  - *HTTPS* for secure transport
  - *OpenID Connect* for authentication
  - *OAuth2* for authorization
  - *hData* for health content
    - Was designed before emergence of FHIR, but could switch to FHIR for resource definitions

RHEx Status

- Completed two pilots
  - TATRC for exchanging data between two people
  - Maine HealthInfoNet for transporting volumes of data to the state repository
- New pilots under way at TATRC
  - Sharing large images between AHLTA and third party provider systems
  - Providing patients access to their medical history in AHLTA using a mobile platform (hReader)
  - Securely migrating health data from AHLTA to VistA
- Maine implementing RHEx statewide to support small, independent providers and FQHCs in underserved areas
- Planned pilot with VHA

Readiness Evaluation



Red Type = building blocks

Overarching Conclusion

Secured RESTful transport (***HTTPS***)
+
OpenID Connect authentication
+
OAuth2 authorization
+
FHIR healthcare content

a safe and appropriate set of standards to use as building blocks for more complicated healthcare applications

Recommendations (1 of 2)

- **Recommend that ONC support and encourage the development and piloting of BB+, FHIR, and RHEx**
- BB+ “Pull” focuses on a specific, identified need to enable a consumer to access their own health information or to authorize a third-party application to do so
  - Emerging standard whose development should be supported and early pilots encouraged
  - Encourage EHR vendor participation
  - No known alternatives that address this need
- FHIR is highly likely to become a key next-generation content standard for healthcare
  - Need for FHIR CCDA (being developed)
  - Appropriate as content standard for both BB+ and RHEx

Recommendations (2 of 2)

- RHEx is a useful demonstration of how HTTPS, OpenID Connect, OAuth2, and FHIR can be used together to support robust, but simple healthcare exchange
  - Commendable response to NwHIN Power Team's recommendation for a RESTful complement to Direct and Exchange
  - Responds to industry need for a simple means of transmitting large healthcare data objects (e.g., images) that cannot be accommodated by Direct
  - Encourage replacement of hData with FHIR
  - Given the flexibility of the RHEx architecture and the optionality available from OAuth2, profiles based the RHEx initiative may be more appropriate candidates as national standards than the full body of work

Next Steps

- Present preliminary results to Privacy and Security Workgroup and Consumer Workgroup
- Consider questions such as:
  - BB+ Pull considers “open registration” (i.e., non-vetted) appropriate only for new and experimental apps, and suggests displaying a warning with these apps. For a higher level of assurance, apps can undergo a “trusted registration.” What level of assurance is reasonable and appropriate for BB+ Pull apps?
  - How might OAuth2 apps be authenticated? Is TLS server authentication sufficient?
  - Any other security concerns around the use of OAuth2 for enabling consumers to “pull” their data from certified EHRs?
  - ... Other questions suggested by HITSC…